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SUSTAINABLE DEVELOPMENT, GLOBAL CHANGE & ECOSYSTEMS

SUB-PRIORITY 1.6.2: SUSTAINABLE SURFACE TRANSPORT

INTEGRATED PROJECT – CONTRACT N. TREN-06-FP6TR-S07.70077-S07.69821

Retrack

REorganization of Transport networks by advanced RAil freight Concepts

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Summary

The underlying report describes the training methodology and its backgrounds for the training as it is intended to be given by Work Package 5. It concerns the training of operations staff in cross border services both for the RETRACK pilot and for the RETRACK pilot under future conditions. The methodology is developed starting from Retrack goals as described in the Technical Annex, and the Retrack Deliverable 1.4 describing market requirements.

Summarized from the Technical Annex the goals are:

- to demonstrate, using market-growth knowledge, how business expansion of new rail entrepreneurs can be supported through field-validation of new service concepts.
- to devise strategies for better exploitation of opportunities through removal of existing barriers.

The knowledge used is the result of interviews with possible customers, and research from the European project Re-orient and concerns the following top level Key Performance Indicators (KPI's) :

- reliability of transit time
- reliability of the right goods at the right place
- price
- service quality
- security

These top level KPI's are broken down in measurable KPI's, which are used for the WP5 training. The KPI's that are needed for Training have been incorporated in the formalisation of KPI's in WP9 (Oslo, January 2009). The effects of the training will be expressed using these KPI's.

The training contains two independent blocks, Present and Future:

Present situation:

Training by train run simulation serves to improve the present situation by training the operations staff. The objectives for the present situation are:

- to prepare the personnel for the actual RETRACK pilot.
- to identify the risks before the actual RETRACK pilot or by improving the performance using actual pilot train data.
- Quality check of the RETRACK pilot,
- Reduction of costs by risk management and by optimised processes
- Reduction of time and thus improvement of efficiency

Future situation:

To study the impact of the introduction of ERTMS and the EU Train Driver License an ERTMS Level 2 driver training will be developed in conjunction with the development of an

set of codes for language with respect to the first two requirements of the language and communication level as set forth in DIRECTIVE 2007/59/EC on the certification of train drivers operating locomotives and trains on the railway system in the Community. The codes are meant to overcome a major part of the language barriers in terms of safe train operations under stable and safety critical conditions. The codes will be based on the application of ERTMS Level 2.

The simulations will run following the RETRACK Operations Plan of the RETRACK pilot train developed under WP8.

The RETRACK training will take place in dedicated “off site” training sessions.

A training manager will be assigned to control and manage the simulation and to manage the objectives.

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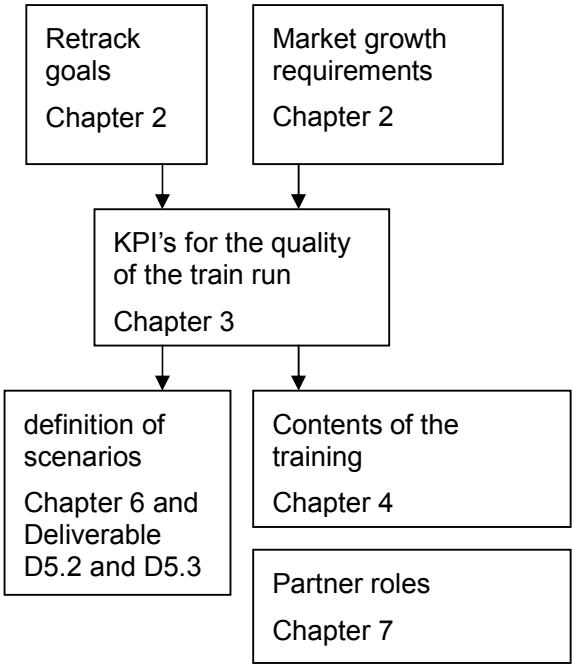
1 Introduction and scope

The RETRACK project focuses on the future starting today. The shift from traditional rail freight to flexible and complex rail transportation will require a radical move in methods, design and skills. Europe must be ready for this shift by providing new training opportunities, for both business professionals as well as government structures.

EU policy is geared to improve interoperability of the European railway network and operations. In a technical way by the implementation of ERTMS and in a regulatory way by the development of a European Train Driver License[1].

The underlying report describes the training methodology and its backgrounds for the training as it is intended to be given by Work Package 5. It concerns the training of operations staff in cross border services both for the RETRACK pilot (present situation) and for the RETRACK pilot under future conditions. The methodology is developed starting from Retrack goals as described in the Technical Annex, and the Retrack Deliverable 1.4 describing market requirements. The methodology framework is shown in the following figure.



Training by train run simulation serves to improve the present situation by training the operations staff. By simulating the introduction of ERTMS and the EU Train Driver License, the impact of these conditions on the future RETRACK operation can be measured. With regards to the European Train Driver License specifically the qualifications for language and communication will be dealt with.

[1] DIRECTIVE 2007/59/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 October 2007 on the certification of train drivers operating locomotives and trains on the railway system in the Community

To study the impact of the introduction of ERTMS and the EU Train Driver License an ERTMS Level 2 driver training will be developed in conjunction with the development of an set of codes for language with respect to the first two requirements of the language and communication level as set forth in DIRECTIVE 2007/59/EC on the certification of train drivers operating locomotives and trains on the railway system in the Community. The codes are meant to overcome a major part of the language barriers in terms of safe train operations under stable and safety critical conditions. The codes will be based on the application of ERTMS Level 2.

1.1 Relevant target groups

The training and simulations will be relevant for the following target groups:

- Train Operating Companies involved in cross border services
- R&D and academic representatives presenting the detailed technologies and innovations
- decision makers and politicians especially for the policy dimension of introducing advanced systems, decision processes and strategy development
- transport planners, to exploit the results of the project through guidelines for developing scenarios/action plans around RETRACK technologies.

1.2 Pilot

The simulations will run following the RETRACK Operations Plan of the RETRACK pilot train developed under WP8.

1.3 Operations Staff Training

For the present situation the training simulates the real operational situation as much as possible. The processes for solving the encountered problems is played in real time, and with retrievable content of communications carried out by the operations staff (text messaging). The objectives for the present situation are:

- to prepare the personnel for the actual RETRACK pilot. Staff will be allowed to experience the logistics chain, to understand the business process and to use the IT platform developed under WP4 (SOPTIM software)
- to identify the risks before the actual RETRACK pilot or by improving the performance using actual pilot train data. Risks can be defined before the pilot starts, so the processes can be altered or improved correspondingly. In this way the RETRACK pilot will be given a start with less operational risks.
- Quality check of the RETRACK pilot, in order to fasten the process of continuous optimisation of the processes during the project
- Reduction of costs by risk management and by optimised processes
- Reduction of time and thus improvement of efficiency

1.4 Future situation

For the Future situation the simulation will focus the application of ERTMS on the RETRACK corridor to overcome technical and procedural barriers, and the possibility for cross border train operation by a single train driver using a coded language for communication to help overcome the language barriers. In this way the long term goals of EC policy with regards to cross border freight train operations in Europe can be pre tested and pre validated.

By using these two components the advantages and disadvantages of both the technical systems for interoperability and the removal of procedural barriers will be shown to give maximum improvement for the development of the European cross border rail freight traffic operations.

The effect of ERTMS on the interoperability will be studied by comparing the RETRACK pilot under current signalling systems and under ERTMS Level 2.

1.4.1 Code of language

The EU train driver licence is the leading topic in the 3rd Railway Package and is seen as a major barrier for interoperability of the railway system and hence also a major barrier for seamless service. Under the coming EU Train Driver License train drivers must be able to use the messages and communication method specified in the 'Operations' TSI. Drivers must be able to communicate according to level 3 of the table on page L 315/77 of the Directive2007/59/EC. To facilitate these requirements a solution for this barrier of language will be studied by testing the applicability a code of language aimed to provide for the first two requirements in the table:

- can cope with practical situations involving an unforeseen element
- can describe

The third requirement ("can keep a simple conversation going") will not be addressed directly but can be influenced positively by the use of codes by limiting the required ("simple") proficiency.

2 Focus of the training

2.1 RETRACK goals

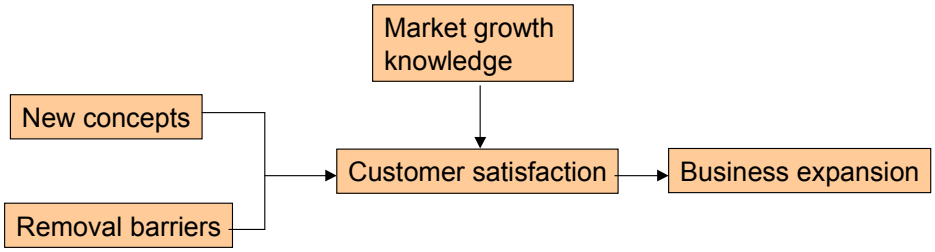
The main RETRACK goal is to improve the competitiveness of rail freight transport in the European freight market. The assumption is that customer satisfaction leads to more frequent choice for rail transport and thus to business expansion.

Summarized from the Technical Annex the goals are:

- to demonstrate, using market-growth knowledge, how business expansion of new rail entrepreneurs can be supported through field-validation of new service concepts.
- to devise strategies for better exploitation of opportunities through removal of existing barriers.

The concepts and barriers apply to improvements in infrastructure, capacity, legislation, etc. but also communication, training of personnel and software systems.

Figure 1: objectives of WP5



2.2 Pillars for market growth

RETRACK deliverable 1.4 'logistic market requirements for new rail freight services' gives an overview of requirements by shippers to chose for rail freight transport. The knowledge is the result of interviews with possible customers, and research from the European project Re-orient and concerns the following top level goals:

- reliability of transit time
- reliability of the right goods at the right place
- price
- service quality
- security

2.3 New concepts

It was decided on the WP5 meeting of 5 August 2008 that the following new concepts are included in the training:

- the use of supporting logistic software by the train control centres
- ERTMS replacing existing signalling systems
- Coded language for the drivers

2.4 Operational barriers to be removed

A “Top 10” list of actual operational barriers will be applied to simulate situations in the training in order to estimate their effect on the process. Examples of subjects are:

- changed timetables or handling slots at borders or sidings
- delays due to traffic, shunting or loading/unloading
- unforeseen infrastructure problems like the signalling system, bottlenecks caused by temporary single track routes or problems with points
- unforeseen rolling stock problems like engine failure, brake system failure or problems with cargo
- the (un)availability of wagons, locos or staff
- errors in communication or lack of communication between national traffic control centres, the goods control centre, train drivers and operations staff
- human errors like signals passed at danger (“SPAD”) and accidents

3 Use of Key Performance Indicators (KPI's)

Key Performance Indicators have been developed in order to demonstrate the effect of the training. As the training plays in a simulated reality (simulation of the train run) the KPI's are similar to KPI's used for the optimisation of a real train run. The KPI's are used to:

- demonstrate the differences in performance between situation with and without IT support system
- demonstrate the performance under different solutions for degraded situations
- demonstrate the impact of ERTMS Level 2
- demonstrate the impact of coded language

The KPI's have been chosen starting from the market growth pillars described in chapter 2.2. The next step was to find KPI's on a functional level. Finally the relationships between all KPI's was defined.

The KPI's that are needed for Training have been incorporated in the formalisation of KPI's in WP9 (Oslo, January 2009). The effects of the training will be expressed using these KPI's.

3.1 First step: definition of top level KPI's

The first step in the definition of the KPI's was to translate the market growth pillars of chapter 2.2 into a KPI tree. See figure 2. Business expansion, which is the main RETRACK goal, is taken as top level KPI. This KPI can be measured by input from the market growth knowledge: reliability, price, security and service quality. This following list can be extend. Possibly frequency of service will be considered in the analysis after the training.

Reliable transport is for many shippers more important then the transit time itself. Punctuality can not only be measured by "delivered as planned" but also by timely response and communication.

Security concerns care for the cargo handled

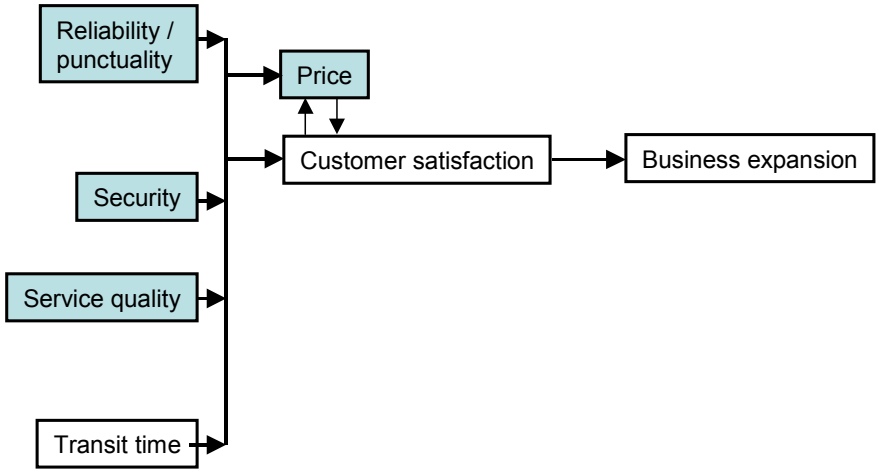
Transit time is an important parameter, depending on the type of undertaking. Certain types of goods can be transported by train if the transit time is reduced and reliable, like transport of perishables or JIT manufacturing components. Reduction of transit time will then lead to business expansion.

Price is a minimum requirement for business expansion. If it is low enough, than reliability and service quality start to gain importance.

Customer satisfaction can be a metric reported by the customer to define non quantifiable or overall satisfaction with the service. As such it is a commercial KPI and as such difficult to simulate. Alternatively it could be defined as the satisfactory completion of tasks according to the other quantitative KPIs.

Service quality is a KPI which cannot be quantified in the simulation. It is influenced by parameters such as frequency of service, invoicing accuracy or energy consumption. Some elements may be possible to simulate, but this KPI is more relevant to the pilot in WP8.

Figure 2: Top level KPI's, Blue boxes: most important requirements by shippers, according to market growth knowledge. Transit time is added as an important parameter.



3.2 Second step: choice of (relevant) functional KPI's

In figure 3 the complete training KPI tree is shown. Only the KPI's which can be simulated are included. 'Service quality' has been changed into 'Service availability ' because in the training only this aspect of Service quality can be treated.

The KPI's are horizontally grouped and split between top level and lower level KPI's. The orange KPI's are the lower level KPI's. The lower level KPI's can be split vertically between long term and short term problems.

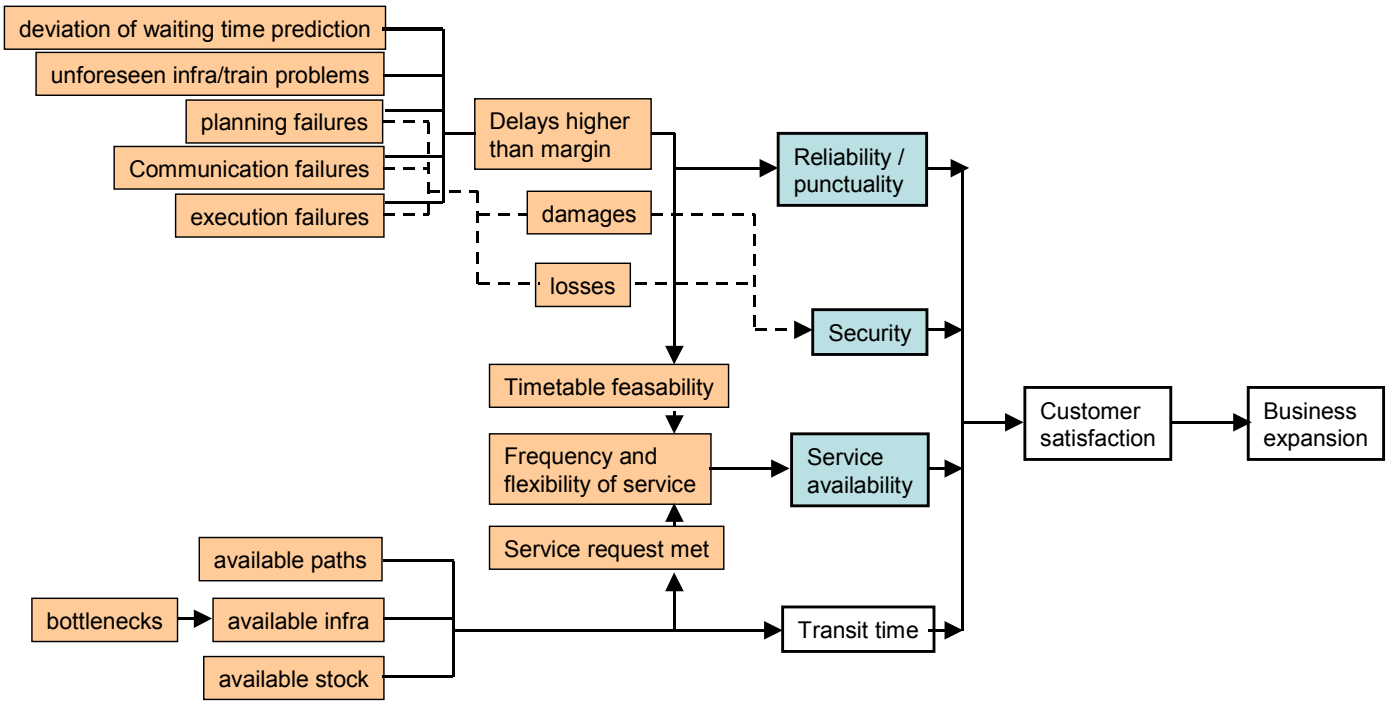
Operations Staff Training (short time problems and failures)

The KPI's listed on the left upper side of figure 3 (from 'deviation of waiting time prediction' to 'execution failures') are KPI's for short time problems and failures. These KPI's can be influenced by human errors with regards to skills, procedures and communication. It includes the use of the IT platform.

Future conditions (EU goals and policy)

The KPI's listed on the left lower side of figure 3 (from 'available paths' to 'available stock') are longer term characteristics of the process. These KPI's can only be influenced by system change or by a change of long term planning, like the ERTMS signalling system, the development of an EU driver license or building new infrastructure.

Figure 3: lower level KPI's added to the higher level KPI's of figure 2



3.3 Third step: quantification

By using KPI relationships, the effect of the improvements are quantified where possible. Reference situations are used to express the effect of the training. The training will focus on processes which can be quantified, in order to keep the results clear and convincing. But parameters which cannot be quantified may also be included if necessary.

The KPI's serve to demonstrate

- the quality of service
- the need to improve certain aspects of the service or chain of logistics to reach the RETRACK goals.

4 Content and organization of the training

The RETRACK training will take place in dedicated “off site” training sessions.

A training manager will be assigned to control and manage the simulation and to manage the objectives.

The RETRACK training is limited by the operations process following the input of the actual details of the contract with the customer into the production environment and will involve planning, transportation and delivery. The training will not involve invoicing and after sales.

The simulation events, decisions and actions will be registered by logging all train movement data, communication between staff and time.

It will be possible to re-run events to be able to apply lessons learned, to test (changed) procedures or show effects of actions and alternative solutions.

Simulation software will serve as a basis for the sessions, facilitating virtual train runs from origin to destination allowing staff to learn how to perform their roles and tasks.

The duration of the training will depend on:

1. the extend of the network
2. the complexity of the service
3. the number of roles and functions that need to be trained as a whole
4. the need for development or validation of procedures
5. the number of people that need to be trained

4.1 Training blocks

The training contains two independent blocks:

- operations staff training for the present RETRACK service and improvement of performance
- training train drivers for ERTMS Level 2 with the proposed international driver codes.

4.2 Training sessions

The training blocks are split into different modules, which all focus on different training aspects for the staff.

Block 1 – Present situation

1.0 REFERENCE SITUATION

- Train run as planned
- Training focus on use of simulation systems and communication means

1.1 REFERENCE SITUATION + IT support system

- train run as planned with support system
- to demonstrate the differences in performance with the reference situation using KPI’s
- training focus on use of the IT support system

1.2 REFERENCE SITUATION + DEGRADED SITUATIONS

- train run starting as planned with injected problems and failures without support system

- focus on border crossings
- to demonstrate the performance under different solutions for identical degraded situations by using KPI's
- focus of training on communication in difficult situations and on using the systems correctly to find solutions

1.3 REFERENCE SITUATION + DEGRADED SITUATIONS + IT support system

- train run starting as planned with injected problems and failures with support system
- focus on border crossings
- to demonstrate the performance under different solutions for identical degraded situations by using KPI's
- focus of training on communication in difficult situations and on using the systems correctly to find solutions

Block 2 – Future situation

2.0 FUTURE SITUATION: ERTMS Level 2

- train run as planned with support system
- the national signalling systems replaced by ERTMS
- using a revised operations plan based on interoperable cross border operations to demonstrate the differences in performance (focussed on cross border operations) with the reference situation using KPI's.
- focus of training on ERTMS Level 2, and implications for the control centres

2.1 FUTURE SITUATION: ERTMS Level 2 + DEGRADED SITUATIONS

- the national signalling systems replaced by ERTMS
- train run starting as planned with injected problems and failures with support system
- focus on border crossings
- to demonstrate the performance under different solutions for identical degraded situations by using KPI's
- focus of training on communication in difficult situations and on using the systems correctly to find solutions

2.2 FUTURE SITUATION: ERTMS Level 2 + coded language

- train run as planned with support system
- the national signalling systems replaced by ERTMS
- introduction of coded language
- using a revised operations plan based on interoperable cross border legislation and removal of part the language barrier by the use of coded language for the train drivers involved
- training focus on combination of ERTMS and coded language

2.3 FUTURE SITUATION: ERTMS Level 2 + DEGRADED SITUATIONS + coded language

- to test the performance of coded language in normal and degraded situations
- training focus on coded language

- test the effect of coded language on normal and degraded situations

Different scenario's will be chosen at different critical (Key Performance) locations of the route, with different critical positions of trains, and including different critical types of events.

The use of the supporting IT platform will be trained by using it to manage the operation, and by doing so training people to take correct and appropriate actions.

Block 1 – Present situation: IT system and degraded situations

Modules	1.0 REFERENCE SITUATION	1.1 REFERENCE SITUATION + IT support system	1.2 REFERENCE SITUATION + DEGRADED SITUATIONS	1.3 REFERENCE SITUATION + DEGRADED SITUATIONS + IT support system
Goals	Base line measurement	differences in performance with the reference situation (Module 1.0) using KPI's	Differences in performance with the Module 1.0: measure the effect of degraded situations	differences in performance with the reference situation (Module 1.1) using KPI's

Block 2 – Future situation: ERTMS Level 2 and coded language

Modules	2.0 FUTURE SITUATION ERTMS Level 2	2.1 FUTURE SITUATION ERTMS Level 2 + DEGRADED SITUATIONS	2.2 FUTURE SITUATION ERTMS Level 2 + coded messaging for train drivers	2.3 FUTURE SITUATION ERTMS Level 2 + DEGRADED SITUATIONS + coded messaging for train drivers
Goals	measurement on (technical) interoperable cross border operations	Difference in performance with the today train run including injected problems (Modules 2.1 and 1.2).	test the applicability of coded language (EU Train Driver License) in normal future situations	measure the effect of coded language messaging on degraded situations

4.3 Operations staff training

These modules concern the present operation and include the use of the IT platform. By simulating the train movement of the RETRACK service all personnel involved in the logistics chain will be able to test and validate appropriate actions when problems or failures occur.

The personnel will help to find the bottlenecks of the RETRACK service in the simulation environment, to adjust and to test in order to optimise the actual operations of the RETRACK corridor for the next run of the real service.

- The actual operational plan and functional organisation serves as the input for the simulation.
- The scenarios will be determined following the needs for training determined by WP8 (pilot).

4.4 Plan of action

The data used for the training must be identical to the data entered into the IT Platform (WP4 and WP8). This concerns routes (relations), rolling stock, time tables, etc. The technical specification of the simulation aspects such as routes, the traction (locomotives) and the traffic environment (paths and timetables) are based on this information, to be delivered by WP8.

The functional organisation (people), roles (responsibilities) and tasks (activities) are also based on input from WP8. In this step the workstations with their functionalities necessary to perform are determined.

Next the "translation" of the operations plan into scenario's is performed (routes and timetables). The final step concerns the organisation of the training in terms of the training curriculum, preparation of the venue, equipment and program.

For the second block the existing simulation scenario's will be modified by applying ERTMS Level 2 (.3) and the coded language will be developed.

The Action milestones are defined in global lines in the following tables

Action table 1 - plan of action for operations and staff training

Milestone	Input from	preparation	Output
Operational data	WP 8 (Data IT Platform)	Operations plan (identical to data used in the IT platform)	Routes, rolling stock, time tables, etc
Technical specification of infrastructure and rolling stock	WP 8	Track and Train configuration	Simulation track and rolling stock
Functional organisation of the operation	WP 8 (Operations plan)	Roles and tasks	Workstation configuration
Scenario's of present situation	WP 8 (Operations plan)	Scenario's	4 modules

Action table 2 – Plan of action for ERTMS Level 2 & coded messaging

Milestone	Input from	preparation	Output
Future conditions ERTMS L2	WP 5 DeltaRail	ERTMS L2 driver training	Training package
Future conditions Coded language	WP 5	Coded language	Coded language procedure
Future scenario's	WP 5 DeltaRail	Modification scenario's to ERTMS L2	3 modules

Action table 3 - Training organisation

Milestone	Input from	preparation	Output
Training handbook	WP 5 UNEW	Write handbook	Training handbook
Training scenario	WP 5 DeltaRail	Organisation of location, people and means, written down in scenario	Training scenario for organisation
Document	WP 5 DeltaRail	Simulations	Impact ERTMS L2 Applicability coded

			language
Recording of communication	WP 5 DeltaRail	Communication method	Communication tool

Table 2: Action tables for training preparations

4.5 Input Operations from WP 8 (identical to input used in IT Platform)

This data covers for example:

- Relationships (routes)
- Alternative relationships
- Infra structure (catenaries voltage, ATP systems and signaling, axle load limits, length limits, etc.)
- Timetables (weight, length, speed)
- Train speed (timetable)
- Transport logistics and management at sidings, shunting yards and terminals in terms of:
    - timetable / slot allocations
    - train composition (wagon handling)
    - technical preparations
    - document handling (train data and customs)
    - staff allocation at terminals
    - driver allocation for feeding and long haul
    - rolling stock planning allocation

4.6 Input Organisation from WP 8

This data covers for example the number of:

- undertakings participating (i.e. R4C, LTE, CER, Transpetrol,etc)
- roles per undertaking (i.e. planning, quality management, rolling stock management, terminal handling, staff management, etc.)
- workstations per role or function
- operations plan data and technical specifications

4.6.1 Staff Involvement

Involved will be all staff that is involved in the operations process from plan to delivery (to be determined by WP8). For example:

1. transport planner(s)
2. goods control centre worker(s)
3. operations manager(s)
4. train driver(s)
5. *signallers (traffic control)
6. *terminal and shunting staff

* these roles will be enacted but can also be actually involved (to be determined).

4.7 ERTMS Level 2 & coded language

These scenario's concern the future operation where ERTMS Level 2 and the cross border operation for train drivers will be assumed to be fully functional.

4.7.1 ERTMS Level 2

The present day scenario's will be modified by configuring the lines and rolling stock with ERTMS Level 2. Based on the same contracts with the RETRACK customers the operations plan will be adjusted to the use of ERTMS Level 2 in terms of rolling stock planning, travel time and staff planning. The impact of ERTMS Level 2 will be simulated and measured using KPI's.

4.7.2 Coded language

Based on the use of ERTMS Level 2 and by using actual communication during the RETRACK train operations both in normal and degraded situations, the applicability of coded language in terms of safe communication will be tested.

5 Simulation tools

The simulation tools consists of offline and on-line software for the train simulation and communication, and recording and playback tools for the management and control of the training.

The train operation is simulated by simulating the tracks and the track side equipment that are used for each country of the RETRACK service, including the most tracks for alternative routes. The border crossings will be detailed in terms of sidings and change of canopy system voltage.

All Retrack trains will be simulated in terms of length, weight, traction profiles, braking profiles, resistance parameters and actual control functions (brake handle, throttle control, circuit brakers, etc.).

Besides the Retrack trains also other trains (“traffic”) will be simulated to create a traffic situation. These trains will serve a purpose to create delays or to reroute RETRACK trains (capacity allocation).

The timetable will be built depending on the actual schedules of the RETRACK pilot.

The RETRACK trains can be controlled manually or automatically. Also the route setting can be controlled automatically or manually. This enables the user of the system to run the simulation in full automatic mode or to introduce manual control by signalers and/or train drivers. During the simulation the events can be paused and resumed. Including the possibility to pause and change routes.

All actions that take place during the track and train simulation - both in automatic or in manual mode - are logged. The loggings will be used for analysis or replay.

Communication between the people involved will be recorded with time stamps per message and a logging of the origin (sender) and destination (addressee). Also the communication between the train drivers and the signalers will be carried out in this way.

By combining the loggings of the track, train and communication sequences of events can be analyzed and used for the desired goals.

Because events are controlled by “scenarios”, scenarios can be replayed as often as necessary.

5.1 Offline tools

The scenarios for training are build using off line tools. With the tools the tracks and scenarios are programmed and stored into an MySQL database. This concerns:

- track editor
- scenario editor

5.2 On line tools

The simulation software uses the predefined and stored data from the MySQL database. This concerns:

- GSM-R network simulation
- ERTMS RBC simulation
- ERTMS EVC simulation (6 lap top computer based operational train simulators)
- scenario controller for system running with L0, L1 and L STM under SRS 2.3.0D
- timetable controller
- multi-train simulation controller
- automatic route setting
- interlocking simulation
- data logging and analyzer

5.3 Track simulation

The track simulation software consists of simulated tracks, points and crossings with generic (Red-Yellow-Green) line side signals, and interlocking. The vertical and horizontal alignments of the tracks can be adjusted to simulate curves, inclinations and declinations. Stations, bridges, viaducts and level crossings can be added as markers,

The overhead traction canopy system can be set to different voltages.

A generic Automatic Train Protection system in correspondence with the line side signals, and a fully functional ERTMS Command Control and Signalling system can be applied.

The ERTMS system is fully functional for all levels (0-STM-1-2-3) under the currently available Specific Requirement Specification 2.3.0D.

5.4 Train simulation

The train simulation software consists of simulated trains with a generic on board ATP system and a fully functional ERTMS EVC and DMI.

It will be possible to automate the actions of train drivers (AUTOMATIC TRAIN MODE) such that the entire operation or replays of certain parts of the operation can be simulated with the operations staff only.

6 Scenarios

The effect of new concepts and removal of barriers is demonstrated by playing different scenarios. The basis for the development of the scenarios is the RETRACK corridor with focus on the operational risks. Trains can run cross-border for a maximum of 6 countries

- tracks will be scaled and comprise a total of about 600 km (train speed will be "scaled" as well to maintain the real time aspect)
- there will be alternative routes available for each country
- 6 RETRACK trains can be operated manually or automatically
- Surrounding traffic will consists of a maximum of 16 train paths for each country
- scenario's will run in automatic, manual or mixed (automatic and manual) dispatching mode
- All actions will be monitored and recorded so that:
    - errors can be corrected
    - skills and decision making can be improved
    - procedures can be tested and altered
    - staff will be trained to handle disturbed situations

7 Partner roles

UNEW: WP leader

- Training handbook and curriculum
- KPI input from WP9

(WP4) Soptim: IT platform and software
Training the use of the IT platform software

(WP5) TCI: analysis
analysis of results Qualification, evaluation

(WP8): Operational plan and data

- Input of operations plan
- input of organisational structure
- Input of Key Performance Events that have an effect on the Quality of Service (top 10)
- Supply of staff for training

(WP5) DR: Supplying a simulation of the Retrack pilot operation and future conditions

8 Sources

8.1 Reference List

RETRACK Annex 1 – Description of Work – February 2008

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RETRACK Deliverable 3.1 – Operational and technical barriers along the corridor served, Yu Bai, TOI

RETRACK Deliverable 3.3 - Service, terminal and corridors expansion – Draft 3, Yu Bai, Johanna Ludvigsen, Michael Roggenkamp, Dewan Islam and Arnaud Burgess

RETRACK Deliverable 4.1 - state_of_the_art_requirements_of_users, Dr. Rittscher, Soptim AG

RETRACK Deliverable 4.2 - RETRACK_IT_Prototype Description, Mr. Husagic, Soptim AG