



PROTECTRAIL Report Summary

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Periodic Report Summary - PROTECTRAIL (The railway-industry partnership for integrated security of rail transport)

Project context and objectives:

The PROTECTRAIL project will tackle the railway security problem from a layered system integration perspective. The basic concept of the project is to address this goal by dividing the global mission into a limited number of smaller ones (or submissions) that respond to the well identified needs of railway protection, within a framework of general coherence and integration of technical and organisation solutions.

Approaching the problem by selecting main security missions responding to specific requirements, it is ensured that appropriate solutions and innovations are favoured over isolated questions and solutions, as well as comprehensive and scalable answers to well defined security missions are represented.

The integration process is therefore based on the following activities:

- the design of an overall system architecture that will assure interfacing and a proper interoperability between security submissions;
- the design and demonstration of a specific sub-system architectures to tackle the most pressing security submissions (part of them already identified in the work programme and enlarged in PROTECTRAIL on the basis of rail operators' needs) by integrating the most suited and mature technologies available both on the market and in research laboratories.

The project will also provide approaches and tools to assess the security potential of a given security submission composed with a given set of sensing and actuating technologies in terms of performance, reliability, speed and costs.

Security submissions are a set of realistic issues of protection needs and requirement in rail transportation systems. The selection of security submission is based on a 'holistic method', both on risk evaluation and selected identified priorities by end-users and rail operators, and will take account of cost-benefit analyses, as well as the attitudes and behaviour of both individuals and groups and their dynamic.

The solution research will guarantee that all technology required to develop viable security solutions, involves science, humanities and social science disciplines and are addressed towards common and realistic goals.

Security submissions will therefore embrace many parts and components of the railway system (physical, operational and transported assets) and incorporate various threats scenarios and conditions.

In this way, the proposed mission-oriented security research will not only satisfy the current security requirements but is also geared to a rapid and scalable implementation of the results, and will become 'common bricks' of multi-faceted system architecture.

Security submissions will:

- evolve as a complex protection 'capability' missions, specifically oriented to rail context protection goal;
- be developed in a common vision;
- adopt the same 'security design' criteria and consider the mutual dependency of function performed, using, the same or fully compatible 'backbone' technologies;
- ensure control of physical and functional interfaces with other security submissions and railway systems organisation and structure;
- aim to performances, readiness, applicability, affordability, reliability, resilience.

The global level of integration will also allow a more efficient capability to threat intelligence and detection and assure a coherent and homogeneous approach to actions to be managed to face the risk or crisis situation.

The main scientific and technological objectives of the project are to:

- develop an exhaustive common vision of actual and future risks regarding many different assets and regarding and assessing disparity aspects;
- implement asset oriented integrated solutions (submission level) based on mature technologies;
- integrate the asset oriented solutions and demonstrate a global architecture, including modularity and interoperability;
- derive a future design for homogenous security.

Due to the broad participation of many end-users it will be guaranteed that all results are closely related to stakeholders needs all over Europe.

Project results:

The work performed in the period can be summarised in the following points:

- organisation and set-up of the dissemination mechanisms (SP1) of the project (website, workshops);
- completion of the first round of user requirements elicitation, specification and prioritisation (SP2) as well as the set-up a Stakeholder advisory and validation group;
- start of the work on modelling the future design for security (SP6);
- organisation of the work on the single missions demonstrations for both physical and operational assets (SP3) and transported assets (SP4); start of the definition of the global Service-oriented architecture (SOA) based Information and communication technologies (ICT) architecture for the project (SP5).

The project has reached the following main results:

- definition of the user requirements and its prioritisation;
- analysis and assessment of regional disparities;
- definition of the main scenarios; definition of the functional specifications;
- definition of the technical specifications;
- definition of the SOA basis;
- completion of milestone MS1 delivery of security functional specifications;
- completion of milestone MS2 delivery of security technical specifications.

Potential impact:

The expected final results of PROTECTRAIL are the development of an integrated system to improve the security of rail transportation through better protection of railways and trains (e.g. including immunity of signal and power distribution systems against electromagnetic terrorism acts, detection of abnormal objects on or under ballast, clearance of trains before daily use, and new methods/tools to isolate and secure luggage), as well as the decrease of disparity in security between European railway systems.

By tackling the railway security problem, from a layered system integration perspective, thus dividing the global mission into a limited number of smaller ones (or submissions) that respond to well identified needs of railway protection, the solution research is expected to guarantee that all technology that is required to develop viable security are addressed towards common and realistic goals. In this way, the proposed mission-oriented security research is expected not only to satisfy the current security requirements but also to be geared to a rapid and scalable implementation of the results.

Through the exploitation of such layered approach, the main expected scientific and technological results of PROTECTRAIL are to:

- develop an exhaustive common vision of actual and future risks regarding many different assets and regarding and assessing disparity aspects;
- implement asset oriented integrated solutions (submission level) based on mature technologies;
- integrate the asset oriented solutions and demonstrate a global architecture, including modularity and interoperability;
- derive from these results a future design for homogenous security.

The security solutions under development inside the project may constitute the reference solution for security in a wide market and a basis for a real standardisation of technologies and procedures.

Approaching the problem by selecting main security missions ensures that appropriate system solutions and innovations are favoured over isolated questions and solution. The basic assumption made is that each railway operator in Europe, at the end of the project, should be able to compose its preferred integration of existing technological tools by using the same architecture according to its own needs, requirements and budget and subsequently assess the security potential of the solution.

Security submission solution developed inside the project could be used and ported with limited effort to other mass transportation systems like e.g. metros even if they are not part of the scope of this project. In addition, strong link with on-going and previous Research and development (R&D) project will ensure a better understanding of the solutions that would better fit the market needs.

Interesting potential market figures are emerging in the recent years, from federal government funding in the United States (US), as well transit authority action in security of transportation and specifically of rail and rail transit. The importance of rail network and passenger transport in the European Union (EU) is quite higher than in the US. In a

project frame where EU railway industries and operators are willing to play together an important and synergic role, the results of the project could really reinforce their potential leadership and create important market opportunities for the European industry.

More concretely, PROTECTRAIL is expected to deliver essential contributions to:

- achieve a substantial improvement with respect to performance, reliability, speed and cost;
- identify standardisation requirements;
- provide information concerning further research needs with a view to future security work programmes;
- allow product and service developers to verify and optimise their technologies at all development stages;
- create important market opportunities for European industry and establish leadership;
- demonstrate the technology based potential for enhancing the effectiveness of European authorities in implementing their security policies and the capabilities of security forces;
- provide guidance for their implementation, including privacy relevant aspects;
- impact the European Rail Research Advisory Council (ERRAC) Strategic Rail Research Agenda (SRRRA).

List of websites:

<http://www.protectrail.eu>

Related information

Documents and

Publications

[Periodic Report - PROTECTRAIL \(The railway-industry partnership for integrated security of rail transport\)](#)

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Subjects

[Security](#)

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Collaboration sought: N/A

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