FORMAL METHODS AND CSIRT FOR THE RAILWAY SECTOR

Results

Project Information

4SECURAIL
Grant agreement ID: 881775

Funded under
H2020-EU.3.4.
H2020-EU.3.4.8.2.

Closed project

Start date
1 December 2019
End date
30 November 2021

Overall budget
€ 549 875

EU contribution
€ 549 875

Coordinated by
ARDANUY INGENIERIA SA
Spain

Deliverables

Documents, reports (9)

Final Dissemination Report
Report summarising the targets achieved through dissemination and communication activities during the course of the project

CSIRT model dedicated to railway, final release
Co-designed and detailed CSIRT for Railway model, with annexed Requirements and Good Practice Guide validated by reference group (Railway IT and CISOs).

Dissemination plan
The plan will define the project dissemination and communication strategies.

**Case study requirements and specification**
Identification of railway signalling system used in the project as a case study on which to apply the formal demonstrator prototype.

**CSIRT model dedicated to railway, 1st release**
Co-designed and detailed CSIRT for Railway model, with annexed Requirements and Good Practice Guide ready for testing and validation with wider security stakeholder group.

**Specification of cost/benefit analysis and learning curves, 1st release**
The learning curve and the preliminary results of Cost/Benefits analysis.

**Specification of cost/benefit analysis and learning curves, final release**
Final outcome of the CostBenefits analysis

**Specification of formal development demostrator**
This task is divided into two activities: a) Specification of a formal development demonstrator prototype. The specification of the formal development demonstrator will be based on the use case developed in Shift2Rail-(X2RAIL-2): 5.4.1 Development of Systems with standardized interfaces and it will consist in the identification of the overall process to be followed for the formal analysis and establishing the criteria for suitability of supporting tools. In particular, the definition of the architecture of the formal development demonstrator will include the choice of appropriate formal methods and tools to be integrated taking into account the results produced by current projects in SHIFT2RAIL: ASTRail, X2RAIL-2. Moreover, in this activity we will identify the tools for the description in standard interfaces (e.g. SysML) of the railway subsystem. (D2.1). b) Formal development demonstrator prototype. A detailed description of the process and framework constituting the demonstrator prototype will be released in (D2.2i, first draft). This description will show, in particular, how all the identified components will be integrated and used. This first release of the prototype will be validated on a selected portion of the railway signalling subsystem defined in T2.2. The detailed description of the process and the framework constituting the demonstrator prototype will be finalised in (D2.2f, final release), taking into account the results of the experimentation of the prototype done in Task 2.3. CNR will lead the task providing the specification and the formal development of the demonstrator prototype. ARD will contribute in the activity, ensuring the link with ASTRail. SIRTI will ensure the necessary link with the outcome of X2RAIL-2 and will lead the collaboration with the complementary project X2RAIL-3 through at least one collaboration meeting.

**Exploitation plan**
The Exploitation Plan will be designed in order to multiply the impact of 4SECURail results and prepare the transition towards industrial and commercial uptake in order to fully achieve the expected impact. The Exploitation Plan will describe the activities to be undertaken how and by whom in order to ensure the exploitation beyond the project itself.

Other (1)

Set-up public website
This is for the set up, and going live, of a public website for the project. This will be continuously updated with news and results throughout the life of the project.

Demonstrators, pilots, prototypes (3)

CSIRT collaborative environment prototype
A final collaborative environment prototype, supported by its specification linked to user requirements (D3.1), and supported by annexed review of available platforms, along with reported testing results.

Formal development demonstrator prototype, final release
Application of the formal development demonstrator to the selected case study.

Formal development demonstrator prototype 1st release
Detailed description of how all the identified demonstrator components will be integrated and used on a selected portion of the case study.

Publications

Book chapters (1)

Designing a Demonstrator of Formal Methods for Railways Infrastructure Managers
Author(s): Davide Basile, Maurice H. ter Beek, Alessandro Fantechi, Alessio Ferrari, Stefania Gnesi, Laura Masullo, Franco Mazzanti, Andrea Piattino, Daniele Trentini
Published in: Leveraging Applications of Formal Methods, Verification and Validation: Applications - 9th International Symposium on Leveraging Applications of Formal Methods, ISoLA 2020, Rhodes, Greece, October 20–30,
Datasets

Datasets via OpenAIRE (4)

Complementary material of the WorkStream 1 of project 4SECURail
**Author(s):** Mazzanti, Franco; Basile, Davide; Dimitri Belli
**Published in:** Zenodo

Complementary material of the WorkStream 1 of project 4SECURail
**Author(s):** Mazzanti, Franco; Basile, Davide; Dimitri Belli
**Published in:** Zenodo

Formal Methods in Railways: a Systematic Mapping Study - List of Primary Studies and Data Extraction
**Author(s):** Alessio Ferrari; Maurice H. ter Beek
**Published in:** Zenodo

**Author(s):** Franco Mazzanti; Alessio Ferrari; Davide Basile; Maurice ter Beek
**Published in:** Zenodo

Software

Software via OpenAIRE (6)

Formal models of the SAI /CSL systems of the 4SECURail case study
**Author(s):** Mazzanti Franco; Belli Dimitri
**DOI:** oai:zenodo.org:5831093; 10.5281/zenodo.5831093
**Publisher:** Zenodo

The UMC2LNT and UMC2PROB model transformation tools