

SAFETY4RAILS meeting

9th Meeting of the EU rail and passenger security platform
(RAILSEC)

10:00–13:00 16/02/2021

Fraunhofer Institute for High-Speed Dynamics | Ernst-Mach-Institut (Fraunhofer EMI)
Stephen Crabbe

<https://safety4rails.eu/>

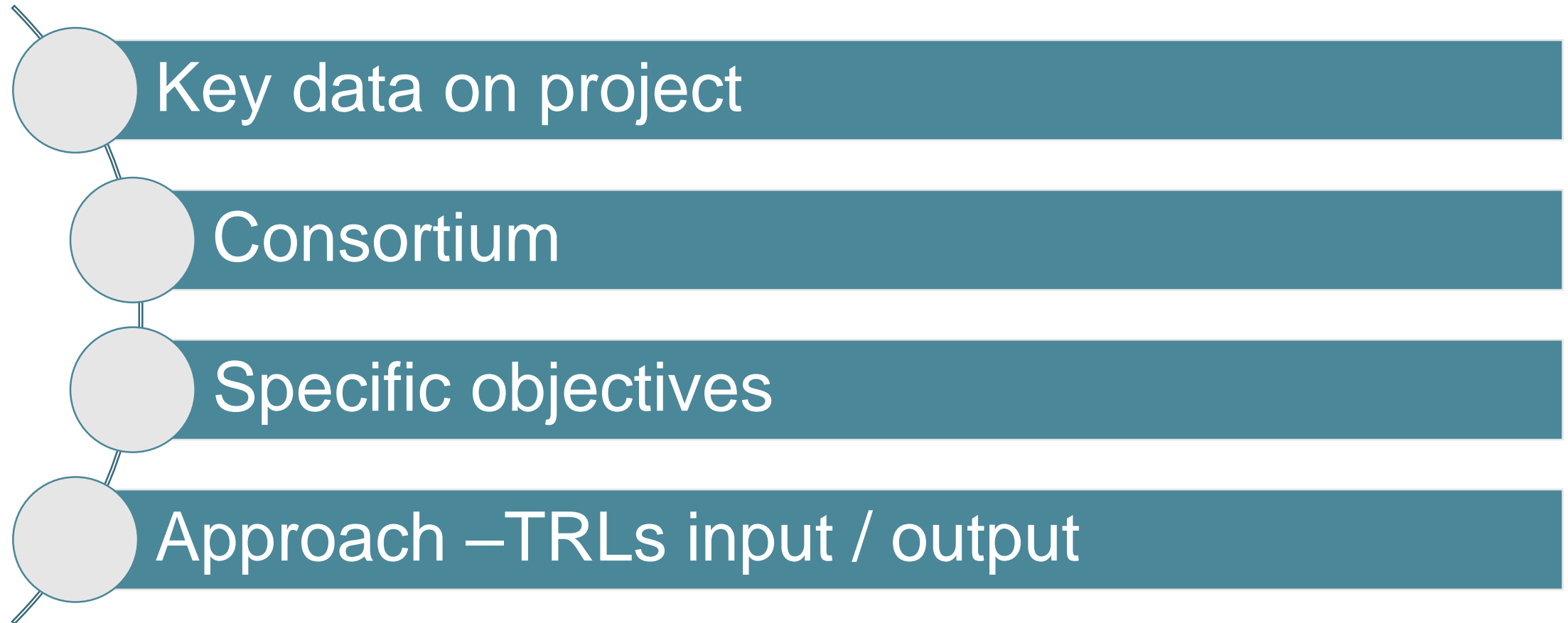
SAFETY4RAILS

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A vertical list of four items, each preceded by a grey circle and connected to the next by a thin line. The items are: Key data on project, Consortium, Specific objectives, and Approach –TRLs input / output.

- Key data on project
- Consortium
- Specific objectives
- Approach –TRLs input / output

Key data on project

Project title: Data-based analysis for SAFETY and security protection FOR detection, prevention, mitigation and response in trans-modal metro and RAILway networkS

Focus: *Increase resilience against combined cyber-physical threats including natural hazards to railway infrastructure*

Our resilience target: “Preserving critical functionality, ensuring graceful degradation and enabling fast recovery of complex systems with the help of engineered generic capabilities as well as customized technological solutions when the systems witness problems, unexpected disruptions or unexampled events” (Thoma et al. [Resilience Engineering as Part of Security Research: Definitions, Concepts and Science Approaches](#) (2016) p.14)



CALL:

H2020-SU-INFRA01-2019 - Prevention, Detection, Response and Mitigation of Combined Physical and Cyber Threats to Critical Infrastructure in Europe

[Innovation project](#)



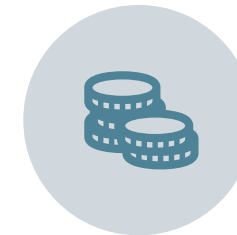
STARTING DATE:

1st October 2020



DURATION:

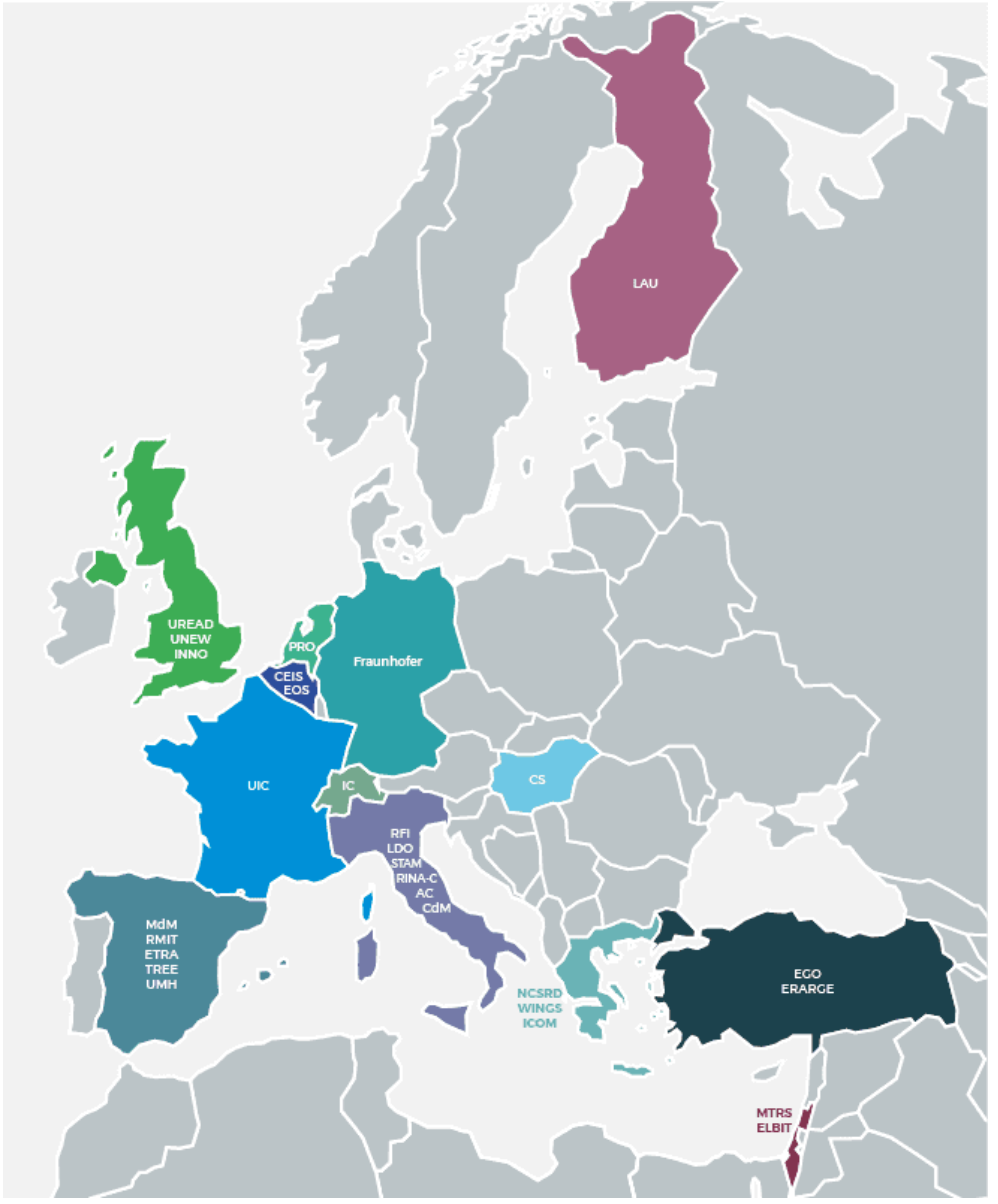
2 years



RESOURCES:

29 beneficiaries (*31 soon*)
 86 person years ~ 1031,5 person months
 EC/REA advice
 4 Expert Boards

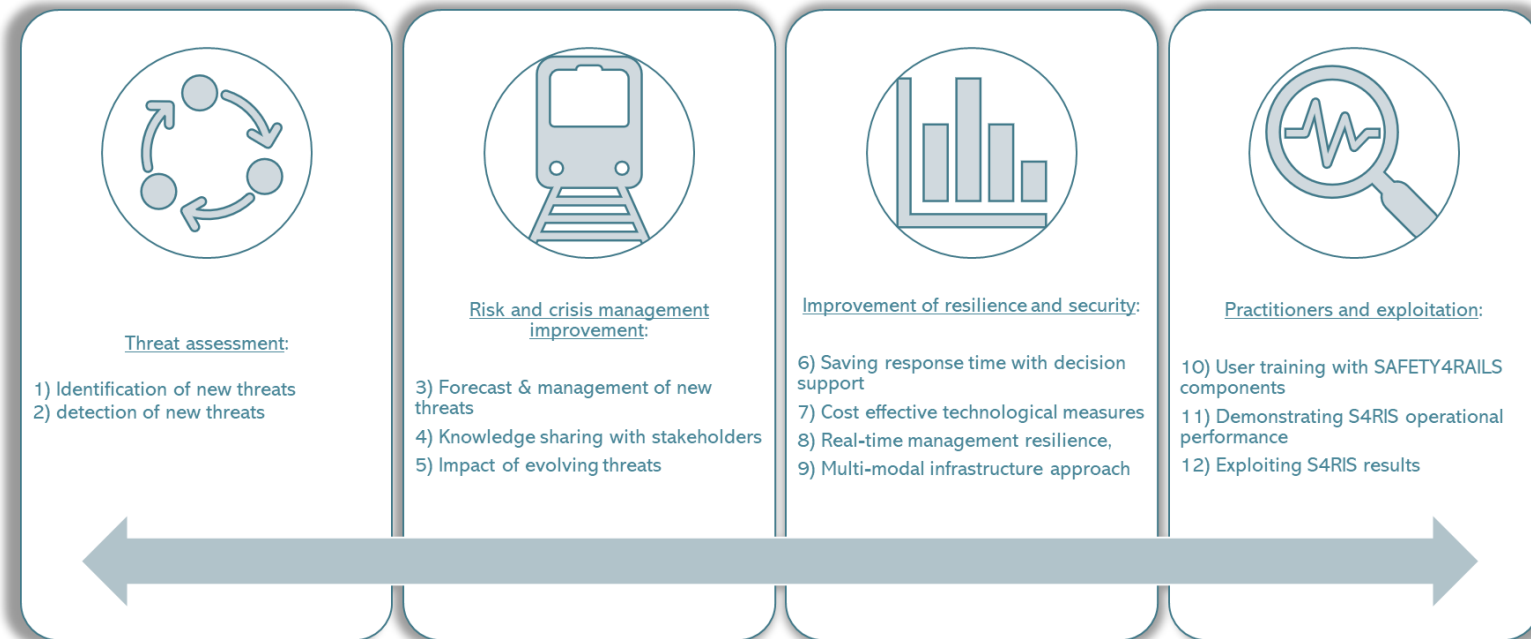
Consortium



Specific objectives



Capabilities to support the characteristics of resilient systems



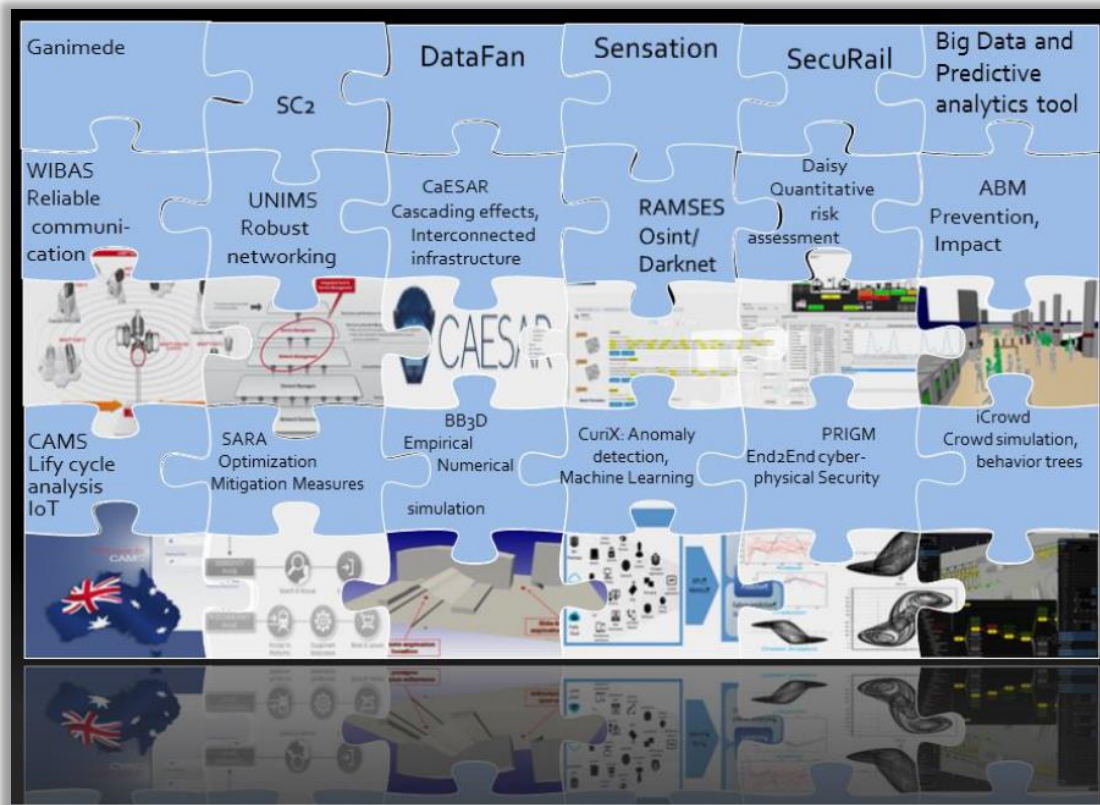
* SAFETY4RAILS, Grant Agreement, Annex1 Description of Action, Part B, p.15.

* Department of Communications, Climate Action & Environment, NIS Compliance Guidelines for Operators of Essential Service (OES), August 2019, p.8 and p.22.

Approach – input / output - 1

Input (17+ tools)

Increase of TRL



- TRL1 – Basic principles observed
 - TRL2 – Technology concept formulated
 - TRL3 – Experimental proof of concept
 - TRL4 – Technology validated in lab
 - TRL5 – Technology validated in relevant environment (industrially relevant environment in the case of key enabling technologies)
 - TRL6 – Technology demonstrated in relevant environment (industrially relevant environment in the case of key enabling technologies)
 - TRL7 – System prototype demonstration in operational environment
 - TRL8 – System complete and qualified
 - TRL9 – Actual system proven in operational environment (competitive manufacturing in the case of key enabling technologies; or in space)
- Starting point of 3 tools in SAFETY4RAILS project (S4R)
- Starting point of 14 tools in S4R
- End point of 15 tools in S4R AND S4R Information system S4RIS (latest September 2022)

*SAFETY4RAILS, D1.1 Project Management Manual, p.8.

*European Commission, HORIZON 2020 – WORK PROGRAMME 2014-2015 General Annexes, G. Technology readiness levels (TRL).

*SAFETY4RAILS, Grant Agreement, Annex1 Description of Action, Part B, page 22.

* "SAFETY4RAILS puzzle" SAFETY4RAILS, Grant Agreement, Annex1 Description of Action, Part B, p.31.

Approach – input / output - 2

Input - tools' capabilities *(summary)*

- Agent based modelling
- Design optimisation e.g. mitigate blast effects
- Cryptography between any node pairs + secure gateways
- Wireless and wired telecommunication network components
- Quantitative/qualitative risk assessment
- Cost benefit analysis (financial modelling)
- Simulation cyber/physical threats incl. cascading effects
- Agent based simulation
- **Artificial Intelligence (AI) based analytics**
- Block chain based data collection
- Website crawlers
- Command and control platform(s)

Expected main output *(subject to update...)*

- SAFETY4RAILS Information System (S4RIS) platform
 - Communication between “relevant” tools
 - Decision Support Platform
 - Increase overall quality of data and its visualisation
 - Scope: “Smart City” concept
- Increase of Technology Readiness Levels (TRLs) of individual input tools
- 4 pilots for testing and user validation: MdM Madrid, EGO Ankara, RFI Rome, CdM Milan. (S4RIS at TRL7)
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Bibliography

Department of Communications, Climate Action & Environment, NIS Compliance Guidelines for Operators of Essential Service (OES), available at: <https://assets.gov.ie/76729/ea0bcd3b-0161-41d2-8c51-df00e558689c.pdf>, last accessed 10 February 2021.

European Commission, *HORIZON 2020 – WORK PROGRAMME 2014-2015 General Annexes, G. Technology readiness levels (TRL)*, available at: https://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/annexes/h2020-wp1415-annex-g-trl_en.pdf, last accessed 10 February 2021.

European Commission, *SAFETY4RAILS Grant Agreement*, version 1.0, dated 21 April 2020.

European Commission, *What you need to know about HORIZON 2020 calls*, available at: https://ec.europa.eu/research/participants/docs/h2020-funding-guide/grants/applying-for-funding/find-a-call/what-you-need-to-know_en.htm, last accessed 10 February 2021.

Thoma K., Scharte B., Hiller D., Leismann T., *Resilience Engineering as Part of Security Research: Definitions, Concepts and Science Approaches*, *Eur J Secur Res* (2016) 1:3–19, available at: <https://link.springer.com/content/pdf/10.1007/s41125-016-0002-4.pdf>, last accessed 10 February 2021.

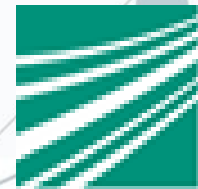
Thank you for your
attention!

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