

# SAFETY4RAILS

## SCOPE

Railways and Metros are safe, efficient, reliable and environmentally friendly mass carriers, and they are becoming even more important means of transportation given the need to address climate change.

However, being critical infrastructures turns metro, railway and other related intermodal transport operators into attractive targets for cyber and/or physical attacks.

The SAFETY4RAILS project will deliver methods and systems to increase the safety, security and recovery of track-based inter-city railway and intra-city metro transportation.

It addresses both cyber-only attacks (such as impacts from WannaCry infections), physical-only attacks (such as the Madrid commuter train bombing in 2004) and combined cyber-physical attacks, which are important emerging scenarios given increasing IoT infrastructure integration.

When an incident occurs during heavy usage, metro and railway operators have to consider many aspects to ensure passenger safety and security.

SAFETY4RAILS will improve the handling of such events through a holistic approach.

## GOAL

To increase resilience against combined cyber-physical threats including natural hazards to railway infrastructure.



Data-based analysis for **SAFETY** and security protection, **FOR** detection, prevention, mitigation and response in trans-modal metro and **RAIL**way networks



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 883532.

**Topic H2020 SU-INFRA01:** Prevention, detection, response and mitigation of combined physical and cyber threats to critical infrastructure in Europe.

**Grant Agreement No:** 883532

**Total Budget:** 9.5 Million €

**Duration:** from 01/10/2020 to 30/09/2022

# DESCRIPTION OF THE WORK

## MAIN STEPS OF THE PROJECT

The project starts with the analysis of end users' requirements. The requirements will serve as input into the adaptation and further development of at least 18 different existing tool prototypes and their implementation within the overall SAFETY4RAILS Information System platform (S4RIS) prototype.

Following a resilience cycle approach, S4RIS will focus on risk assessment, risk reduction, threat prevention, threat detection, stakeholder response to incidents and system recovery; the platform will then be tested and evaluated by the end-users within 2 series of simulation exercises based on different use-cases. This will ensure the applicability of S4RIS in an operational environment.

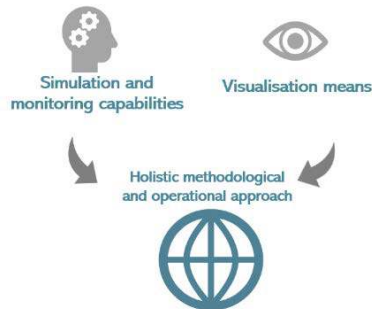
## TIMELINE

M2	Kick-off Meeting
M1-M8	Definition of requirements and specifications
M3	1 <sup>st</sup> End-users requirements workshop
M6	2 <sup>nd</sup> End-users requirements workshop
M3-M18	Development and integration of the tools
M12-M22	Simulation exercises and evaluation in operational environments
M24	Final conference

# EXPECTED RESULTS AND ADDED VALUE

## AN INNOVATIVE SOLUTION: SAFETY4RAILS INFORMATION SYSTEM (S4RIS)

S4RIS will combine **simulation and monitoring capabilities as well as data visualisation** to support prevention, detection, incident response, mitigation and recovery in case of cyber-physical threats based on a **holistic methodological and operational approach**, enabling collaboration between cyber-physical security technologies and actors.



## S4RIS WILL SUPPORT MANAGERS OF RAILWAYS, METROS, AND OTHER CRITICAL INFRASTRUCTURES

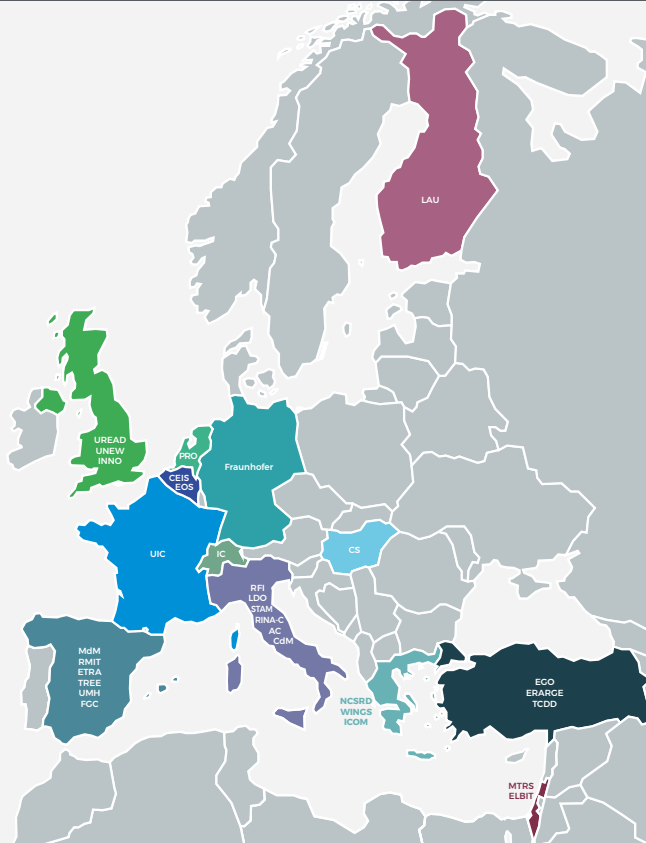
- By identifying critical components in railway systems regarding combined cyber-physical hazards, which are addressed separately;
- By developing strategies and provide decision making support to overcome weaknesses;
- By decreasing possible impact caused by failures in critical components based on past experiences to foresee possible future threats.

# CONSORTIUM

The SAFETY4RAILS Consortium is led by Fraunhofer EMI and composed of 31 partners from 13 different countries (Germany, France, Spain, Turkey, Italy, Belgium, Switzerland, United Kingdom, Greece, Finland, Hungary, Israel and the Netherlands).

They represent railway operators, railway infrastructure managers, research centres, academia and industry suppliers and bring a range of complementary skills required for this multidisciplinary project.

- 1 GERMANY**  
Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V. (Fraunhofer), Coordinator, represented by Institute for High-Speed Dynamics, Ernst-Mach-Institut (Fraunhofer EMI)
- 2 FRANCE**  
Union Internationale des Chemins de fer (UIC - the worldwide railway organisation)
- 3 SPAIN**  
Metro de Madrid (MdM)  
Royal Melbourne Institute of Technology (RMIT)  
ETRA Investigación y Desarrollo (ETRA)  
Tree Technology (TREE)  
Universidad Miguel Hernandez de Elche (UMH)  
Ferrocarrils de la Generalitat de Catalunya (FCC)
- 4 TURKEY**  
Ankara Elektrik, Havagazi ve Otobusisletme Muessesesi (EGO)  
Ergunler Insaat Petrol Urunleri Otomotiv Tekstil Madencilik su Urunler Sanayi ve Ticaret (ERARCE)  
TAŞIMACILIK A.Ş GENEL MÜDÜRLÜCÜ (TCDD)
- 5 ITALY**  
Rete Ferroviaria Italiana (RFI)  
Leonardo (LDO)  
Stam srl (STAM)  
Rina Consulting spa (RINA-C)  
Alpha-Cyber srl (AC)  
Comune Di Milano (CdM)
- 6 BELGIUM**  
Compagnie Européenne d'Intelligence Stratégique (CEIS)  
European Organisation for Security (EOS)
- 7 SWITZERLAND**  
IC Information Company (IC)
- 8 GREECE**  
National Center for Scientific Research "Demokritos" (NCSRDI)  
Wings ICT Solutions Information & Communication Technologies (WINGS)  
Intracom SA Telecom Solutions (ICOM)
- 9 UNITED KINGDOM**  
The University of Reading (UREAD)  
University of Newcastle Upon Tyne (UNEW)  
Innova Integra Limited (INNO)
- 10 FINLAND**  
Laurea-Ammattikorkeakoulu oy (LAU)
- 11 HUNGARY**  
Cyber Services Zártkörűen Működő Részvénytársaság (CS)
- 12 ISRAEL**  
M T B S 3 Solutions and Services (MTRS)  
Elbit Systems C4 and Cyber (ELBIT)
- 13 NETHERLANDS**  
Prorail BV (PRO)



# ADVISORY BOARD

The consortium is reinforced through an Advisory Board which ensures that the SAFETY4RAILS outcomes meet the needs of railway and metro operators.

About 20 advisors from a range of sectors: rail, metro, public transport, cyber, transport ministries, and security, covering 10 countries: Belgium, France, Bulgaria, Poland, Spain, Sweden, Germany, Netherlands, Switzerland and Turkey.

The Advisory Board is being extended throughout the life of the project through a permanent recruitment process of new members.

## SAFETY4RAILS has already gone social!

Make sure to follow us:



### Coordinator:

Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V., represented by its Institute for High-Speed Dynamics, Ernst-Mach-Institut (Fraunhofer EMI)

### End User Coordinator:

International Union of Railways (UIC)

### Technical coordinator:

IC Information company



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