



*PROTECTRAIL (242270) - The Railway-Industry Partnership  
for Integrated Security of Rail Transport*

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# PROTECTRAIL

Project scope, objectives and  
results

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## ■ Protection of key assets (Physical and Operational)

- stations and buildings
- structures
- tracks
- signalling, command & control, power distribution
- communications and information systems
- rolling stock clearance
- staff clearance.



## ■ Protection for the transported assets

- passenger clearance control
- luggage clearance control
- freight clearance control
- tracking and control of rolling stocks (dangerous goods)





# The PROTECTRAIL Integration Process

- The integration process has been conceived:
  - to design an **overall system architecture** that will assure interfacing and **interoperability** between security sub-missions, integrating the most suited and mature technologies
- Therefore, the global level of integration will :
  - allow a more efficient capability to threat **detection and intelligence**;
  - assure a coherent and homogeneous approach to actions to be managed **to face the risk or crisis situation**
- The project is carried out also by:
  - Strictly monitoring the impact of security measures on **ethical issues and citizens rights**;
  - considering the positive impacts against **other forms of threats** and for mitigation of consequences of natural events.





# The Open Architecture Framework (SOA)

PROTECTRAIL implements a **Service Oriented Architecture (SOA)**

- SOA can provide an open and flexible integration framework based on the following core requirements and capabilities:
  - **Interoperability**
    - Allowing reliable exchange of information between different sub-systems and technologies
  - **Modularity and Scalability**
    - Allowing solutions that can be integrated together through their interfaces, remaining autonomous and replaceable.
  - **Integration**
    - Allowing railways security subsystems to be combined and coordinated in a flexible system (both legacy and emerging technologies) and to be adapted to different railways Organizations



## Choice criteria of the technical solutions

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- Security **cost/benefits** for operators and authorities
- Usability in **real operational conditions** (crowds, all weather, etc.)
- **Lack of negative impact** on operations (false alarms, reduced competitive edge, etc.)
- **Ethical** compliance
- **Potential market** justifying industrialization



# Priority of Threats and Assets to be protected

Priority	Threat
1	Terrorists attacks •Explosive •CBRN •Fire •Hijacking of trains and cars •Sabotage of tracks/equipments •Black mail
2	Thieves attacks •Theft of copper •Theft of equipments •Theft of technology •Theft of passengers' properties
3	Vandals attacks •Graffiti •Equipment damaging •Interiors of train damaging •Stone throwing

Priority	Asset
1	Stations and buildings
2	Tunnels
3	Viaducts and Bridges
4	Rolling Stocks
5	Yards and depots
6	Open air tracks
7	Plants, signalling and ITT systems
8	Power supply systems



# Stakeholders requirements

Priority	Stakeholders requirement
1	To identify people (abnormal behaviour, tracking capability, face identification capability etc...)
2	To identify unattended luggage (detection capability)
3	To detect CBRNe
4	To control accesses (detection of unauthorized people, ID badge for the personnel, etc...)
5	To have human guards and employees with a high security awareness and vigilance
6	To have an integrated security system
7	To check luggage and neutralize dangerous contents
8	To integrate safety and security technologies
9	To protect dangerous goods
10	To protect plants (plants, power and signalling)
11	To have efficient communications channels to passengers/involve passengers in vigilance
12	To protect information systems (cyber-crime)



## The five key issues

1. The **integration among different security subjects** (internal and external to railways) must be strongly pursued as well as between the **Security and the other railways functions** (i.e. traffic control);
2. Due to the railways context, **some security solutions can't be adopted** (i.e. scanners for all passengers in a station) and others are **not yet effective** (i.e. detection of abnormal behaviour or abandoned luggage in crowded areas);
3. Despite any adopted technology the major factor of reassurance for people is ..... a **patrol of sturdy and well viewable policemen**;
4. Threats which have the major economical effects on the rail process are the **illegal actions (metal thefts and graffiti)**. Therefore, **solutions that can cope** with these menaces and terrorism ones are very well accepted;
5. Common **European norms and laws** (ethical), security related, are strongly waited for, both by end users and suppliers.

but

**due to the economical crisis the Security is having strong cuts in funds in many countries.**





# PROTECTRAIL Demonstrators

The **Sub-mission solutions and technical performances** for the different sub-missions will be demonstrated by means of specific **“in – lab” demonstration,**

and

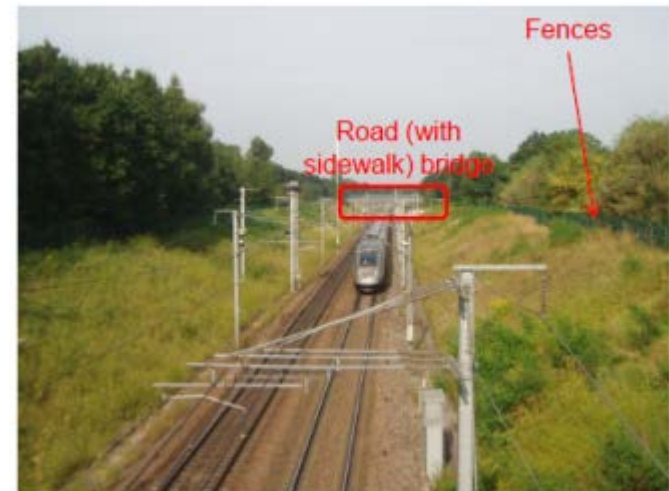
The **Global Integration and interoperability** of solutions and systems will be validated by **integration demos.**

- Main demonstration will take place in **Poland** and will demonstrate how integrated solutions coming from the project could improve security and protection of assets
- Other satellite demo sites are selected (**Paris - RFF/SNCF, Sicily - RFI**)

# Satellite demo sites (France)

## 1) Protection of HS tracks and Tunnel entrance at Villecresnes Tunnel – France South East HS Line

- Experimentation over about **1km of tracks +1 tunnel + emergency exits**
  - **Two bridges**
  - Several months in all weather and in real conditions (wooden area, wild animals, many fast trains)
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- Operational evaluation of different solutions for protection of high speed tracks and tunnel entrance
    - Combination of mature technologies and man in the loop to confirm threat
    - No impact on high traffic line operations
    - Complex environment (vegetation, urban context, railway)
  - Experimentation will assess if trespassing detection is reliable enough and can be confirmed by the operator in charge
  - Idea is to compare different options (internal to PROTECTRAIL and invited) and their ability to survive the environment on the long term (maintenance, etc.)



## Satellite demo sites (Italy)

### 2. Track near Messina (Sicily), between Contesse and Fiumara Gazzi



- Single track, flat semi-urban area
- No viaducts, stations, level crossing, tunnels



# Satellite demo sites (Italy)

## Basic Scenarios

- **Different Intrusion possibilities**
- An **object is thrown inside the area** from either a bridge or along the line
  - It's revealed by the installed cameras and recognised
    - **position**
    - **size**
    - **nature, if possible**

## Considered Technologies

- **Alarmed fences** (against climbing, against cut)
- **Buried fibre optics** (against intrusion)
- **Cameras** (all with video analysis)
  - **Standard CCTVs cameras**
  - **Standard IP cameras**
  - **Infra-Red cameras**
  - **Day/Night laser cameras**



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# Thanks