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HIGHSPEED

Morocco 2023

HIGH-SPEED RAIL : THE RIGHT SPEED FOR OUR PLANET

Under the High Patronage of his Majesty King Mohammed VI

Session 3.5 Room Karam3

Operational performance / Security and Cybersecurity



Moderator : Ms. Marie-Hélène Bonneau
Head of Security Division, UIC, France

Session 3.5 Operational performance /Security and Cybersecurity Speaker Lists;

1



Mr. Charaf
ZEMRANI

Morocco

2



Mr. AZZEDDINE
CHRAIBI

Morocco

3



Mr. Eddy
Thésée

France

4



Mr. HASSANI
FADOUA

Morocco

5



Mr. Marie-Hélène
Bonneau

France



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11TH WORLD CONGRESS OF HIGH-SPEED RAIL

Marrakesh, 7-10 MARCH 2023

HIGH-SPEED RAIL Morocco: A safety success story

Sharaf , ZEMRANI

Head of General Security Policy Department , ONCF, MOROCCO

Session5-3.5 Operational performance / Security & Cybersecurity





PURPOSE OF THIS PRESENTATION

Share of experience concerning the management of the HIGH-SPEED RAIL Morocco project on the “Safety” plan :

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- ❖ Brief description of the HIGH-SPEED RAIL Morocco– Project organization
- ❖ Application of the Common Safety Method (CSM) relating to the evaluation and assessment of risks
- ❖ Chronology of development and evaluation of project safety cases
- ❖ Process for drafting operating regulations
- ❖ Feedback after 4 years of operation
- ❖ Conclusion



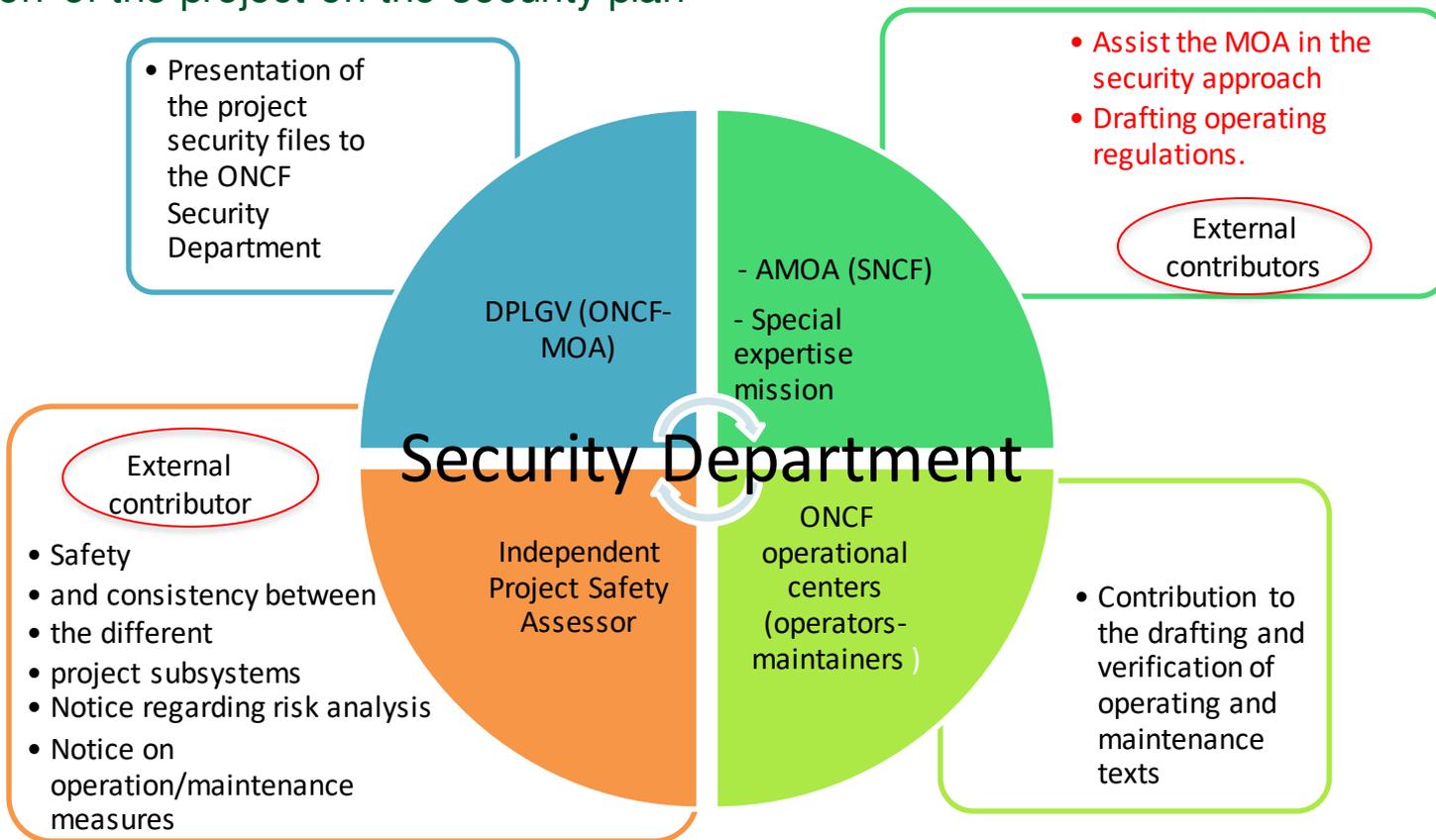
Brief description of the TANGIER – KENITRA HSR 185km _



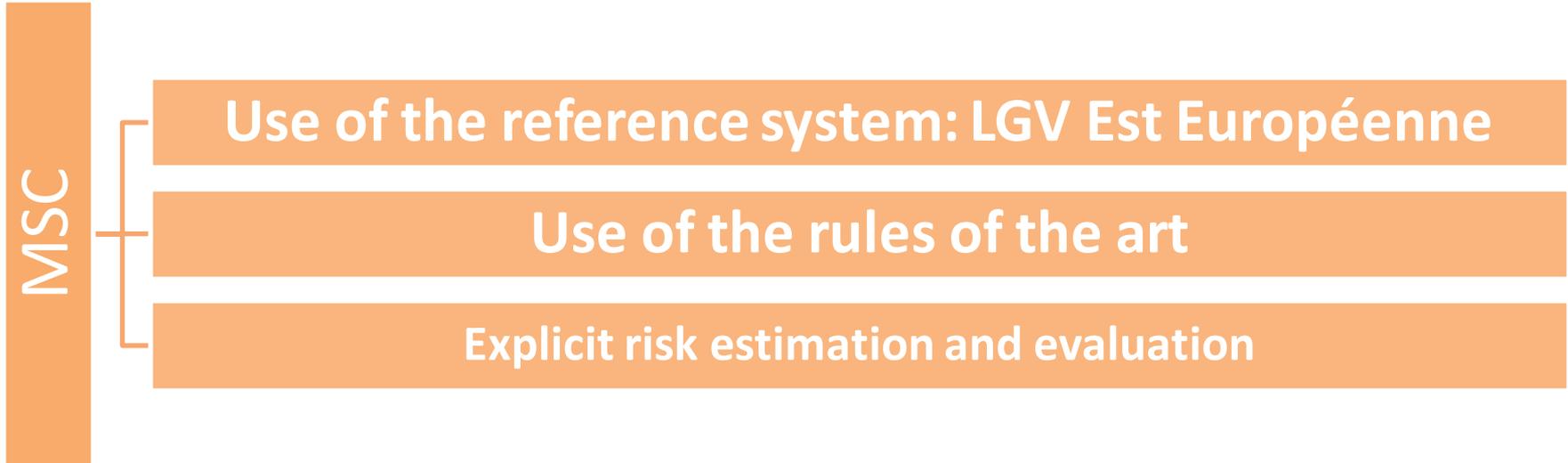
- ❖ specialized in passenger traffic only,
- ❖ designed for a maximum speed of **350 km/h**, operated at **320 km/h**,
- ❖ equipped with two unmarked lanes , *
- ❖ electrified at 2 x 25 kV - 50 Hz,
- ❖ equipped with the ERTMS 2, DVL, DCV and DSI system;
- ❖ equipped with 6 PCV including 1 PCVE .



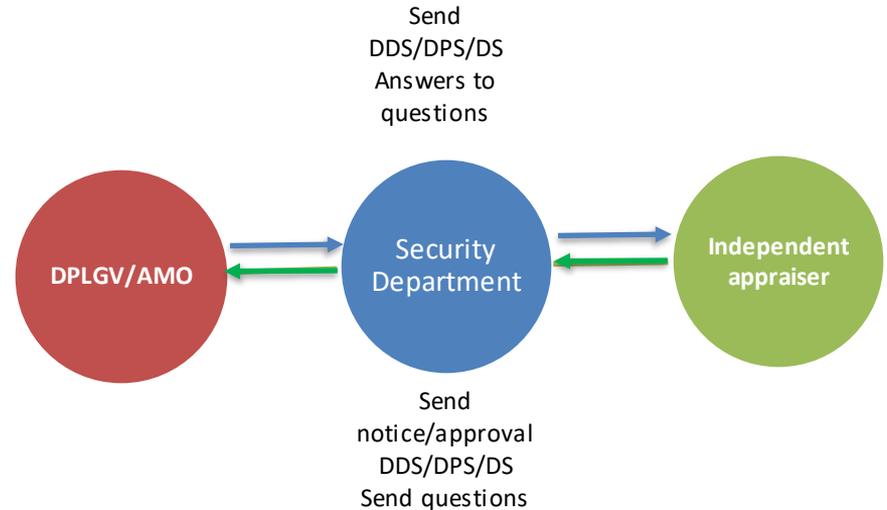
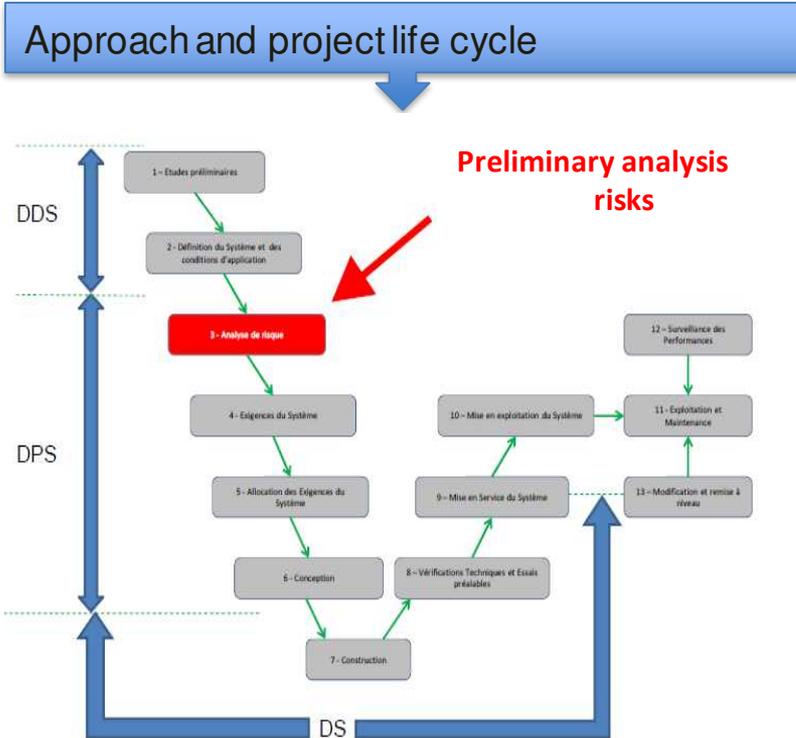
Organization of the project on the security plan



Application of the Common Security Method (CSM) relating to the evaluation and assessment of risks



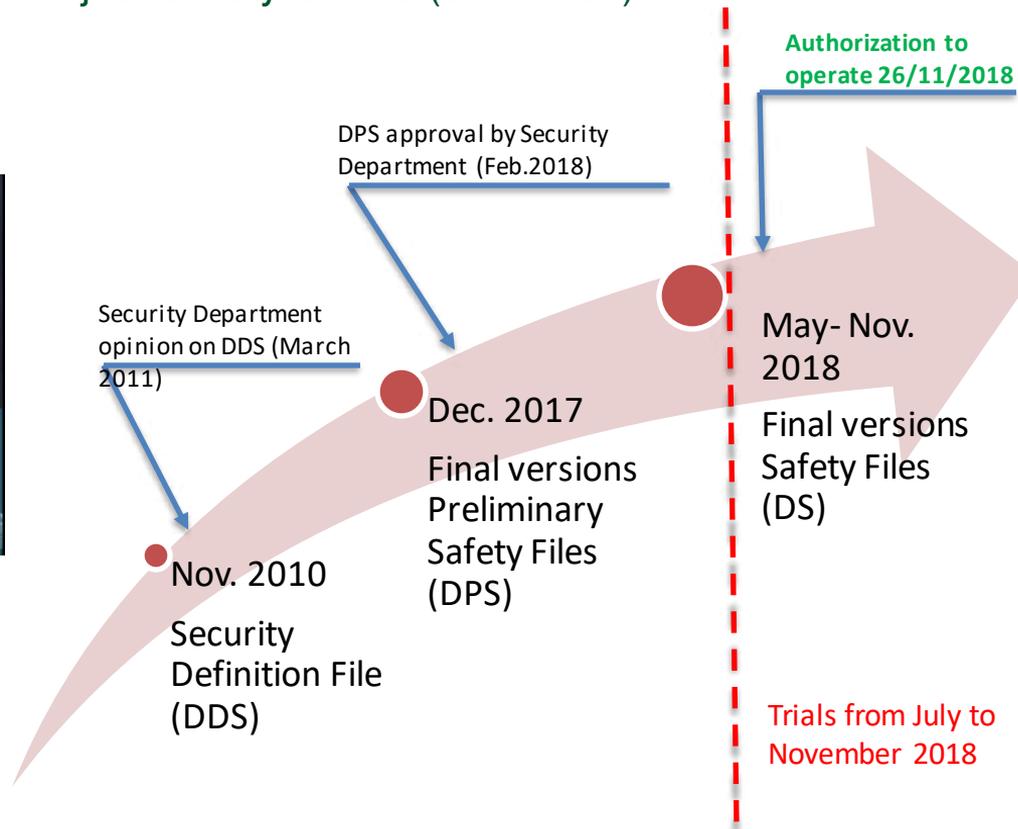
Chronology of development and evaluation of project safety cases



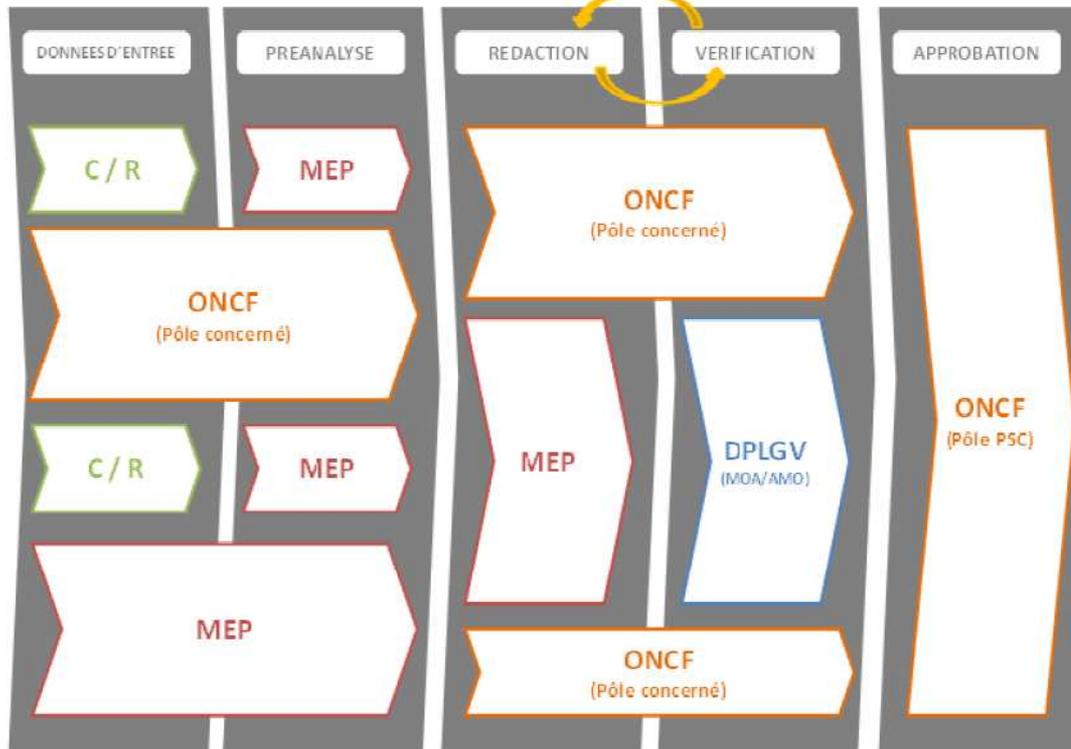
Subsystems: Civil Engineering, Railway Equipment, Rolling Stock (LGV and LC components), Operation/Integration



Timeline for Developing and Evaluating Project Safety Cases (continued)



Process for drafting operating regulations



27 regulatory texts drawn up (excluding local texts)

Process for drafting operating regulations (continued)

Main topics treaties , specific to the operation of the HIGH-SPEED RAIL Morocco

- ❖ Operation of the ETCS N1/ERTMS N2 system
- ❖ Operation in mode degraded (disorder extended ERTMS N2)
- ❖ DCV /DVL/DSI operation – vehicle fall detectors / wind detectors laterals and detectors seismic
- ❖ Daily check of the HIGH-SPEED RAIL
- ❖ Handling of incidents on LGV (rescue / transshipments / Intrusions / straying of livestock , etc.)
- ❖ Protection of works lanes and overhead lines



Feedback after 4 years of operation

Main points to remember :

- ❖ Traffic up to 28 high- speed trains per day in Simple Units or multiple
- ❖ None incident recorded
- ❖ None disturbance major due to a disturbance of facilities
Where equipment
- ❖ Implementation of some _ text adaptations _ operation /
maintenance from the return of experience



To remember

The success of the HIGH-SPEED RAIL Morocco in terms of safety is the result of :

- ❖ a good organization and the total commitment of the teams involved in the project ;
- ❖ Contribution _ to the moments people _ _ skilled in problem solving _ encountered .





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11TH WORLD CONGRESS OF HIGH-SPEED RAIL

Marrakesh, 7-10 MARCH 2023

**SECURITY OF THE MOROCCAN HIGH-SPEED RAIL :
CONTEXT AND SYSTEM**

Azzeddine CHRAIBI

Director of Security, National Railways Office, Morocco

Session5-3.5 Operational performance / Security & Cybersecurity



SUMMARY



1. GLOBAL CONTEXT

2. HSR SECURITY SYSTEM

**3. EVOLUTION OF THE SYSTEM:
Setting up a Security Management System (SMSu)**

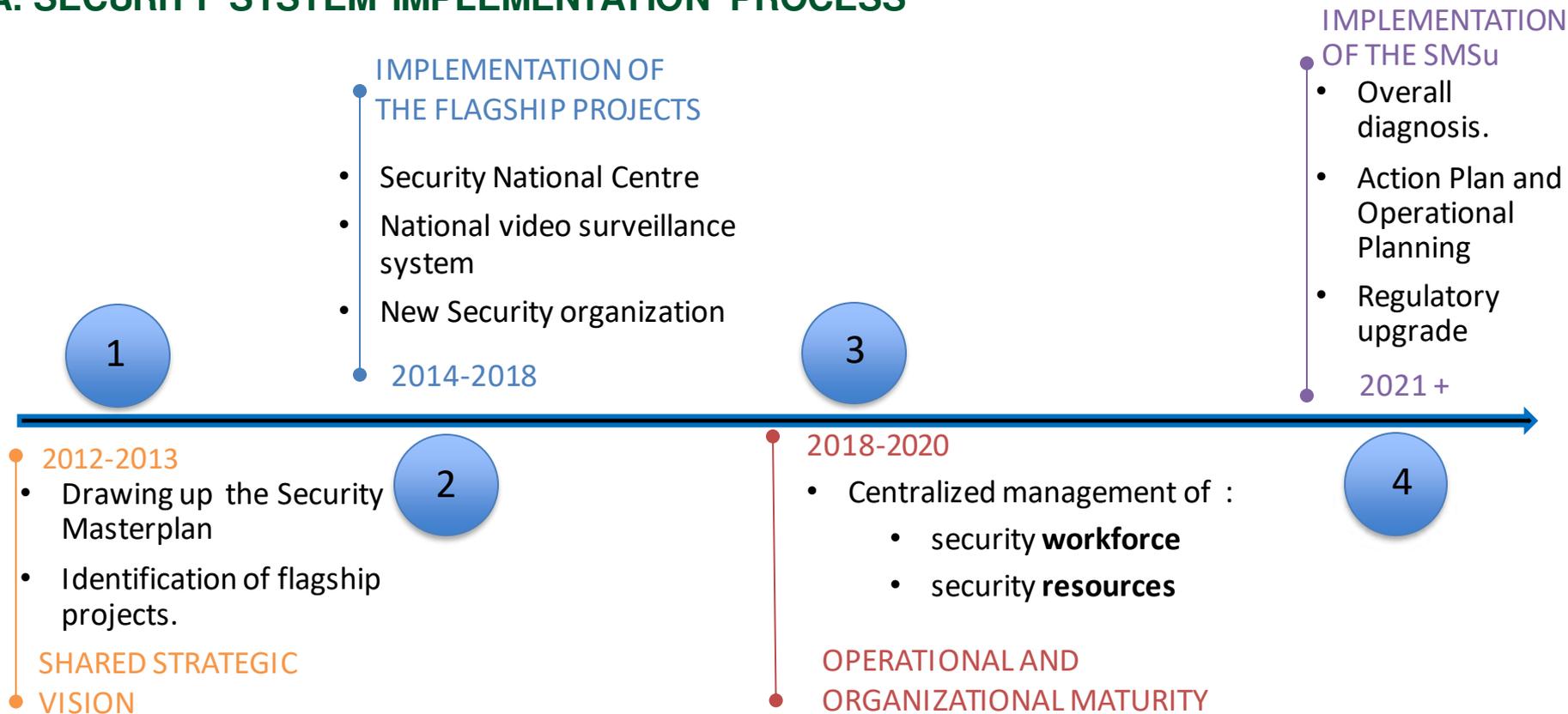
SUMMARY



1. GLOBAL CONTEXT

- A. Security system implementation process
- B. Global Security System
- C. Central and regional organization
- D. National Security Center

A. SECURITY SYSTEM IMPLEMENTATION PROCESS





B. GLOBAL SECURITY SYSTEM



NATIONAL TELESURVEILLANCE SYSTEM

- 1819 cameras.
- Video recording system 7J/7, 24h/24.
- Records period : 30 days.
- Covering all stations and buildings.
- Covering HSL Tangier-Casa Voyageurs .



RAILWAY POLICE

- 184 railway police officers
- 40 Security supervisors



SECURITY OFFICERS (private companies)

- 1376 officers and patrollers

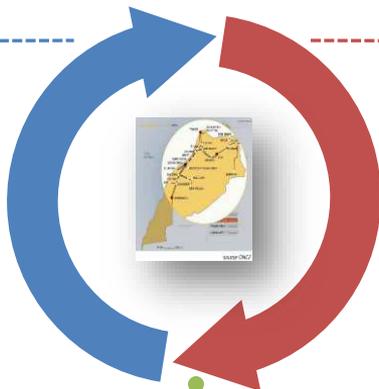


C. CENTRAL AND REGIONAL ORGANIZATION

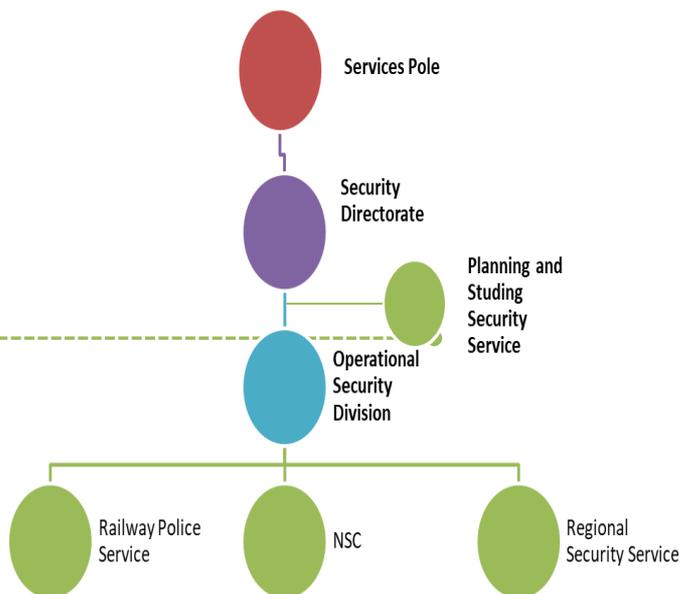
CENTRAL ORGANIZATION

SECURITY DIRECTORATE MISSIONS

- Provide General Surveillance and security of the ONCF network.
- Lead the implementation of the security policy
- Ensure the analysis and feedback of malicious data.
- Setting up an economic model



ORGANIZATIONAL CHART



REGIONAL ORGANIZATION



- **10 SECURITY SITE MANAGER** **08 RAILWAY POLICE RESIDENCES**



D. NATIONAL SECURITY CENTER

CREATION : 2018

- Flagship project resulting from the Security Master Plan.

CONSISTENCY

- Integrated platform of security systems : videosurveillance, intrusion detection, access control.
- 6 ONCF permanent operators
- 2 Police and Royal Gendarme permanent operators

MISSIONS

- Management of security incidents .
- Elaboration of security statistics and KPI.





SUMMARY



2. HSR SECURITY SYSTEM

2. HSR SECURITY SYSTEM

SECURITY OF THE HSR STATIONS



- 311 cameras
- 60 security officers



- 01 video control room/ station.
- 01 Police office / station.
- 01 security Site Manager office /station.

TANGIER STATION



KENITRA STATION



RABAT AGDAL STATION



CASA.VOYAGEURS STATION



2. HSR SECURITY SYSTEM

TRACK SIDE TANGIER-CASA VOYAGEURS

VIDEO SURVEILLANCE

- 251 cameras (track side).
- 141 Cameras for Technical premises

TELESECURITY

- 75 technical premises equipped with intrusion detection and access control systems

ROYAL GENDARMERIE

- 17 Fixed positions
- Regular guard walk

RAILWAY POLICE

- 01 Safety Site Manager
- 02 Railway Police teams control rounds
- 02 Railway Police officers / train.



AWARENESS CAMPAIGN

- areness raising program for local residents about dangerous behaviors

SECURITY OFFICERS
182 agents.



SUMMARY

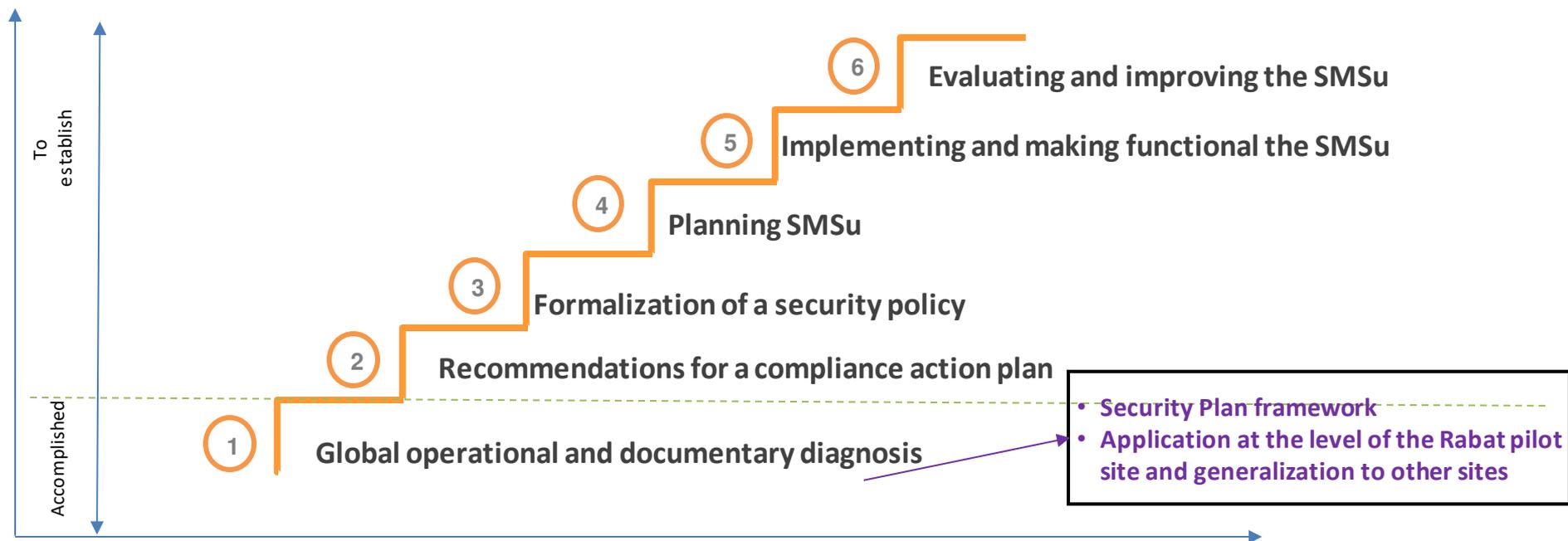


3. EVOLUTION OF THE SYSTEM : Setting up a Security Management System (SMSu)



3 . EVOLUTION OF THE SYSTEM

SMSu implementation process





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Collaboration in railway cybersecurity for standardisation and supply chain management

Eddy Thésée

Vice President, Group Products & Solutions Cybersecurity Alstom

Session3- 3.5 Operational performance/ security & Cybersecurity



WHAT IS AT STAKE ?

- An industry made of integration
- Railway is made of complex system with safety regulation and homologation
- Operation is always executed in “mixed” environment
- No one can succeed alone !
- We are in fast changing context requiring frequent (re)alignment



Design & Build

Practices, objectives, referential and roadmap must be shared

Operation&maintenance

Security “incident/event” sharing across the industry is a must (ISAC, exchange groups, conferences, ...)



WHAT IS AT STAKE ? : EXAMPLES



Connected product on the railway network

- Network; Mobile Storage Media (e.g. USB)
- Wireless connection (Wifi, GSMR, 3G)
- Connected permanently or temporarily

Examples

- DMI, Brake, HVAC, CCTV, workstation, Power supply controller, On board vital computer; data recoding ...
- Balise, Maintenance tools

More and more components are connected increasing the attack surface.

WHAT DO WE NEED FOR COLLABORATION ?

- A **common language**
- **Clear** (shared) **targets** to manage expectations
- Development of **common product roadmaps**
- **Information Sharing** and Analysis Center (ISAC)
A hub for information sharing (at different levels)
Specific to Railway (in coordination with other sectors)
Involving : regulators, operators/asset owners, and OEM
- The collaboration is supported by the development of
Vulnerability management (policy, standards, methods to be instantiated)
Incident response plans (synchronization of all stakeholders [cf log4j])
Crisis management : rehearsal and preparation

International
standards and
regulations

What
Interoperability
on Cybersecurity
?

Global and local
structure with
exchange
mechanisms

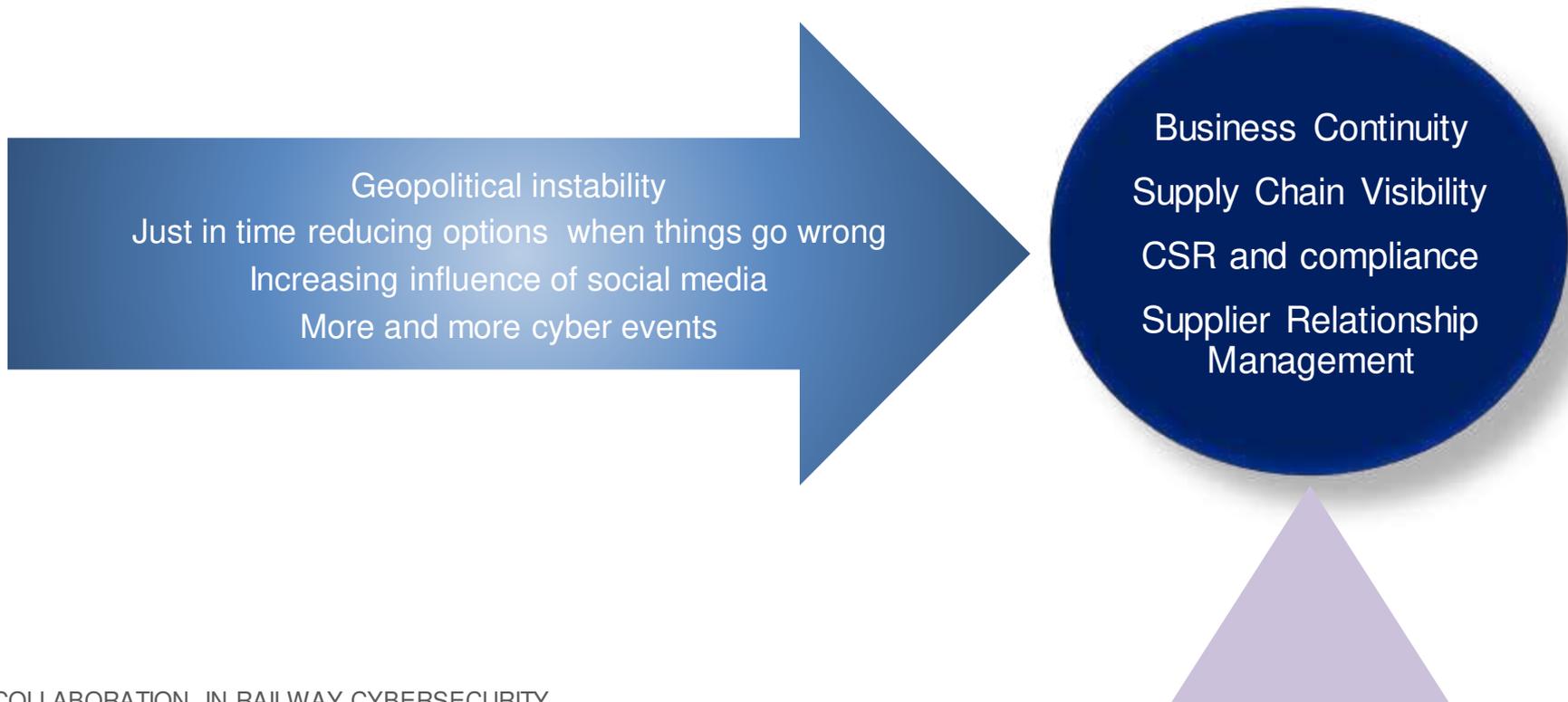
The structure of
ISAC must be
“animated”

Learning & training
Implemented plans
REX

To be managed
as a priority



GROWING THREATS AND STAKES





THE CHALLENGES OF THE SUPPLY CHAIN

Two key elements to be covered:

- Open source integrated at all level in the development environment and the final product
- Third party companies contributing to the final system

Beyond the « logistic » part of the supply, we must:

- Maintain the trust
- Share information in the whole ecosystem
- Manage incidents & alerts efficiently



INCIDENTS AND ALERTS MANAGEMENT



- Different points of view to be integrated
 - Asset owners
 - Operators
 - Maintainers
 - Product suppliers
- Lesson learnt from the recent global incidents: **escalation processes are missing !**
- On the ground, several areas are sharing common components (and data):
 - Physical security
 - Enterprise / IT security
 - Operational / Product security
- Processes and organization to be tailored and enhanced



→ Going forward communication and collaboration are paramount

OPEN SOURCE



© whitesource software

- Open source is everywhere
- It comes with specific risks
 - Vulnerabilities (outdated, corrupted or defective components)
 - Intellectual property (use of commercial or licensed components)
- It must be addressed at the earliest design stages

- Lesson learnt :
 - Enforce **open-source approval policies** for in-house software
 - **Assess the policies** implemented for subcontracted software
 - Embed the control(s) in the application lifecycle
 - **SBOM management** must be implemented as a best practice

SUPPLIER MANAGEMENT PROGRAM AND INFORMATION SHARING



Supplier management program

To be coordinated at industry level

With a focus on railway specificities (leveraging on existing frameworks and standards)

Sharing some basics across all industry stakeholders

- Develop trusted partnerships while keeping the ecosystem away from unnecessary overload
- Measure supplier capability to protect their own perimeter, information integrity and confidentiality
- Define security controls to be shared across the industry (down to the implementation)



Information sharing

Benefit from ISAC (at all levels) to keep the industry ahead of the threats

Organize the information capture and analysis

Feed the product manufacturers with incidents, trends and tactics seen in the real world

→ Collaboration is a must for a sustainable ecosystem



CONCLUSION

- System are more and more connected, interconnected and exposed
- The geopolitical context is fast changing
- Expectations are growing
 - Rise of the overall maturity in the industry, railways standards and national regulations



- The threat is global and fast changing
- The exposure is worldwide and growing
- The ecosystem is shared



- Communication and collaboration are a must for**
- **Standardization and regulation**
 - **Supplier management**



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ALSTOM
• mobility by nature •



Railway Cybersecurity : Product development context

PEOPLE

Customer training

Internal expertise development



PROCESSES

Standard definition

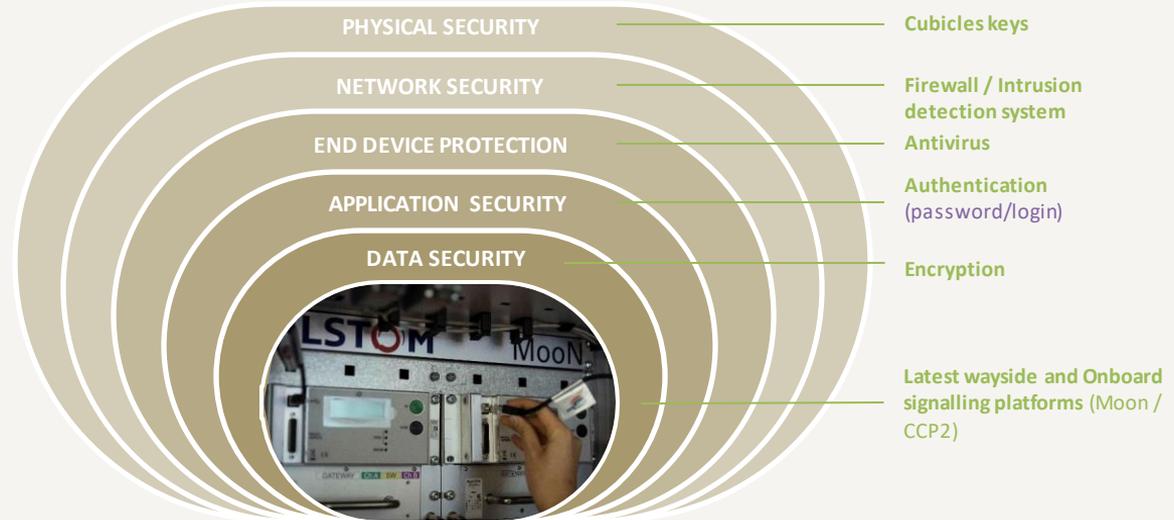
Internal process alignment

New operation processes (security monitoring, crisis management)



TECHNOLOGY & PRODUCTS

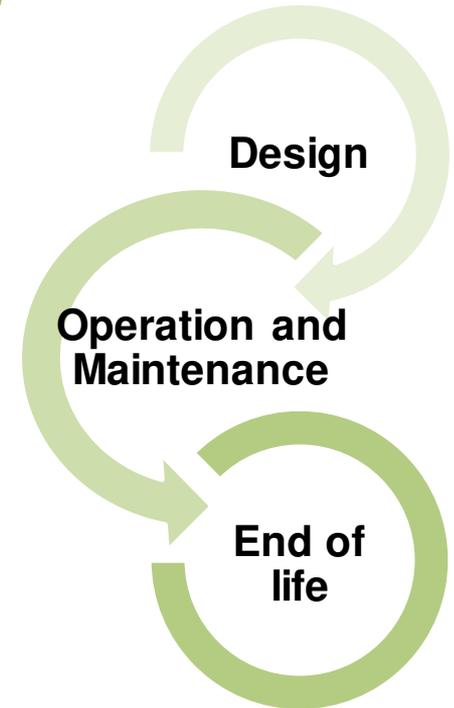
“DEFENCE IN-DEPTH PRINCIPLES”



We need to address all pillars and layers

Cybersecurity by design

- Security is never set once for all !
- Cybersecurity « by design »
 - A specific design lifecycle integrating Cybersecurity **from inception up to retirement**
 - It covers product in **development and** in **operation**
 - What do we do for **the "Installed base"** ?
- All axis must be addressed:
 - **Technology**
 - ❖ Application of Standard & regulations (TS50701, IEC 62443, NIST ...)
 - ❖ Defense in depth
 - ❖ Supplier management
 - **Processes**
 - ❖ Context definition
 - ❖ Risk analysis and definition of security targets
 - ❖ Implementation of security controls
 - ❖ Security management during product life and operations
 - **People**
 - ❖ Training and awareness
 - ❖ Adjust the skills to new needs (for design and operations)





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Marrakech, 7-10 MARCH 2023

Risk Management related to Cybersecurity and Railway Safety

- Fadoua HASSANI
- Head of Governance, Risk and Compliance
- Moroccan Railway Company (ONCF)
- Morocco- Rabat
- Session5-3.5 Operational performance / Security & Cybersecurity



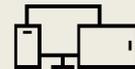
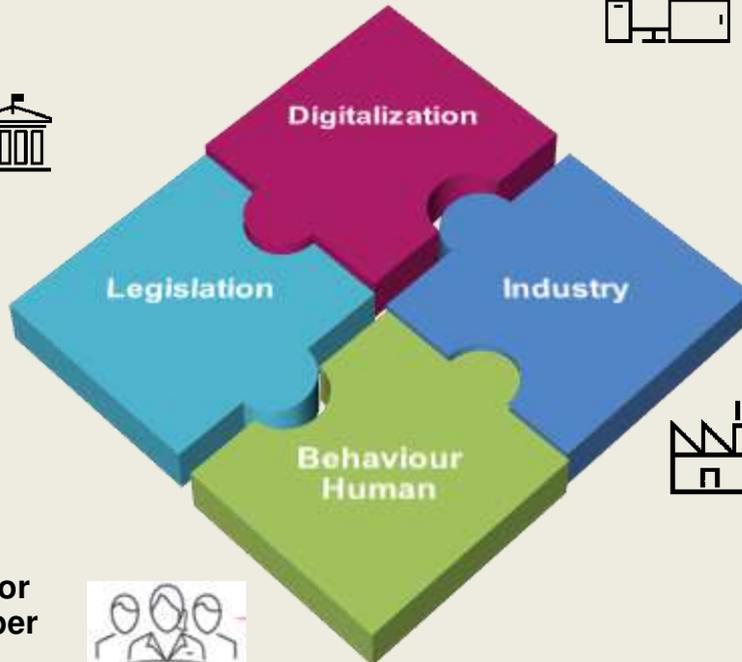
PLAN

- 1** RAILWAYS SECURITY CHALLENGES
- 2** RISK MANAGEMENT APPROACH
- 3** HIGH SPEED SCOPE : Processes, Risks and Impacts
- 4** HIGH SPEED SCOPE : Security and Safety Measures



Railways Security Challenges

The legal requirements of
Cybersecurity



Digitization of processes

Evolution of human behavior
exposing companies to Cyber
threats



Industrial systems are becoming
smarter and more
interconnected



Railways Security Challenges:

! Railway safety

! Information system security

! Cybersecurity of industrial installations

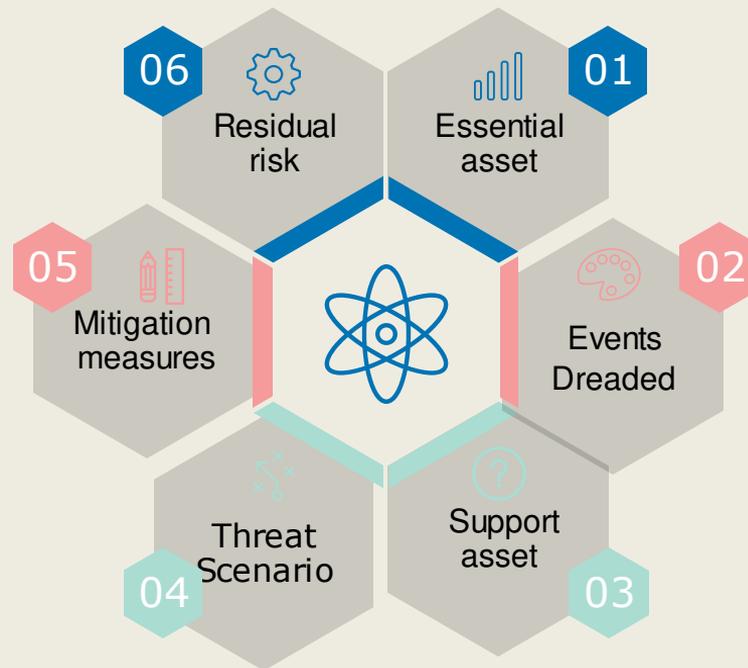




Risk Management Approach



-  Identification of workshops
-  Business objectives
-  Identification of essential functions
-  Security target
-  Tech measures, Security Orga
-  Validation of residual risks



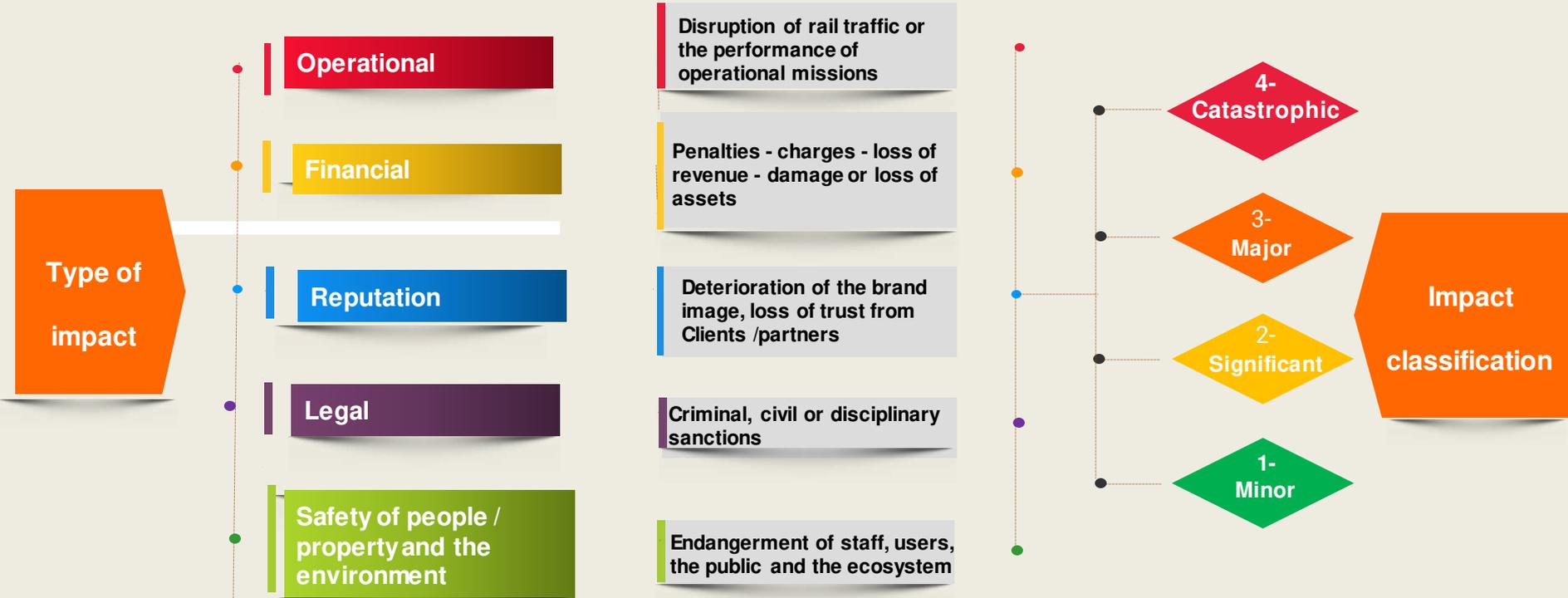


Risk Management Approach



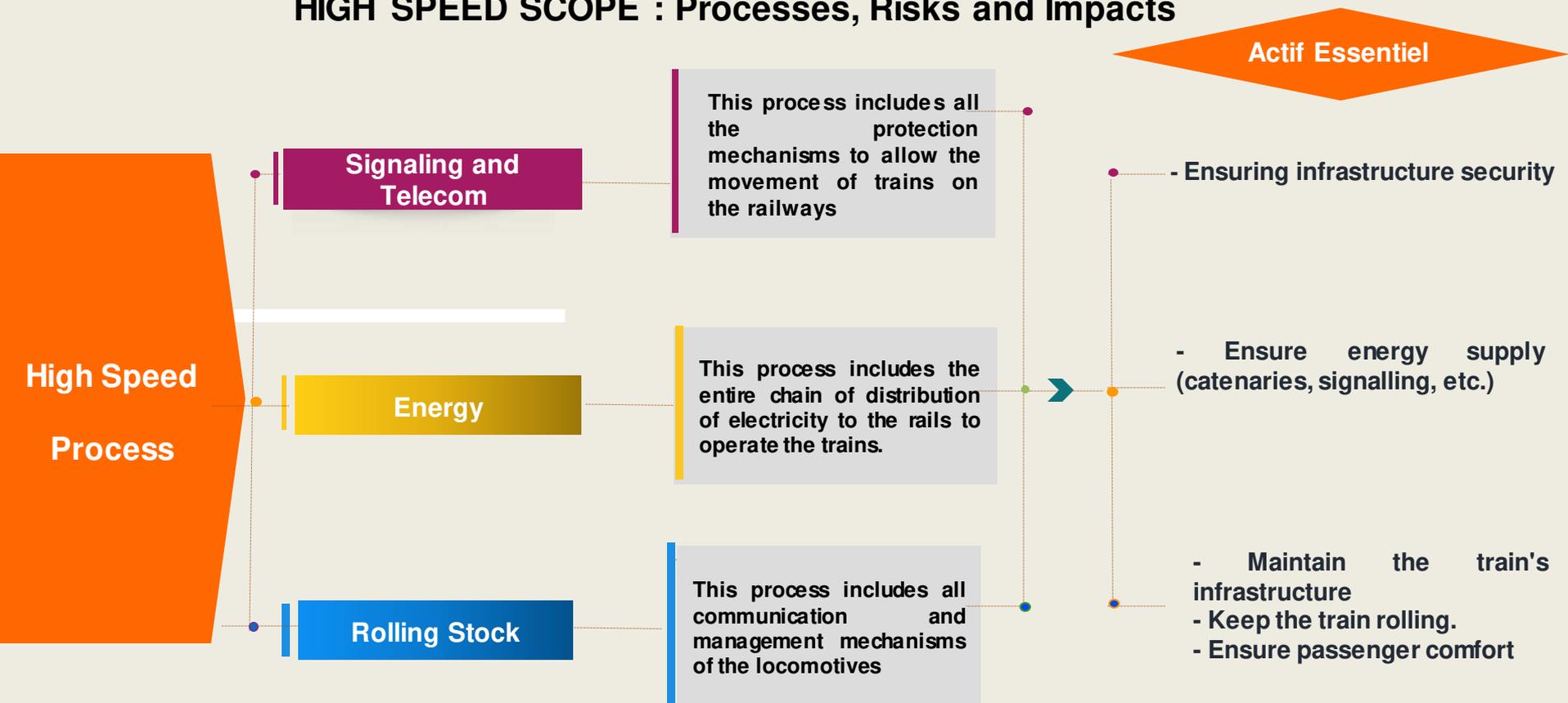
Very high	Tolerance < 2h	A priori certification	Strictly Confidential	Imputable accountability	SIL 4
High	Tolerance < 4h	A posteriori justification	Restricted distribution	Controllable auditability	SIL 3
Moderate	Tolerance < 8h	Reporting and correction	Internal	Simple traceability	SIL 2
Low	Tolerance > 8h	No need	Public	No need	SIL 1

Risk Management Approach





HIGH SPEED SCOPE : Processes, Risks and Impacts





Threat Scenario 1

Unsecured access to the GSM-R Network backbone leading to signaling unavailability

RISK

Partial or total stop of the circulation

IMPACT

- Reputation- Alteration of trust
- Operational (implementation of the degraded process)

CONSEQUENCE

- Dead zone**
- Failure to receive the authority movement
 - Failure of alarms to rise

Threat Scenario 2

Distribution of false information on the remote display screens due to an alteration of the Passenger Information System

RISK

General Panic

IMPACT

- Brand image
- Operational

CONSEQUENCE

Traffic disruption

Threat Scenario 3

Contamination of the recording data storage SAS (train black box)

RISK

Data Alteration

IMPACT

- Operational
- Reputation (difficult investigation in case of incident)
- Legal

CONSEQUENCE

- *Legal sanctions*
- *Loss of passenger confidence due to the incident*



HIGH SPEED SCOPE : Processes, Risks and Impacts



01. Rolling Stock

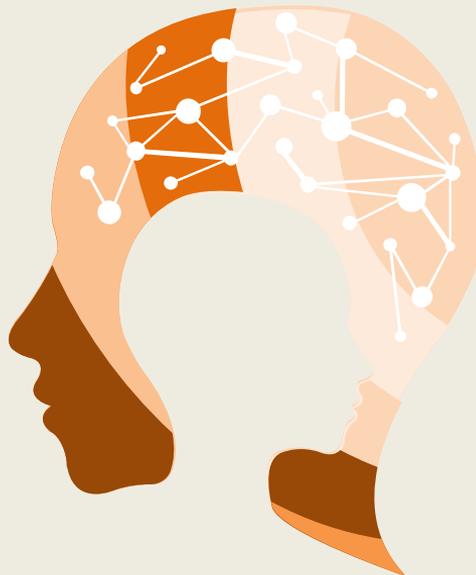
- General panic
- Disruption of railway traffic
- Derailment
- Collision
- Partial or total stoppage of railway operations
- Exfiltration of operational data/alarms



02. Signaling

- Partial or total stoppage of railway operations
- Collision
- Derailment

Cyber Risks



04. Maintenance

- Infrastructure failure
- Exfiltration of business record data
- Alteration and/or unavailability of business record data

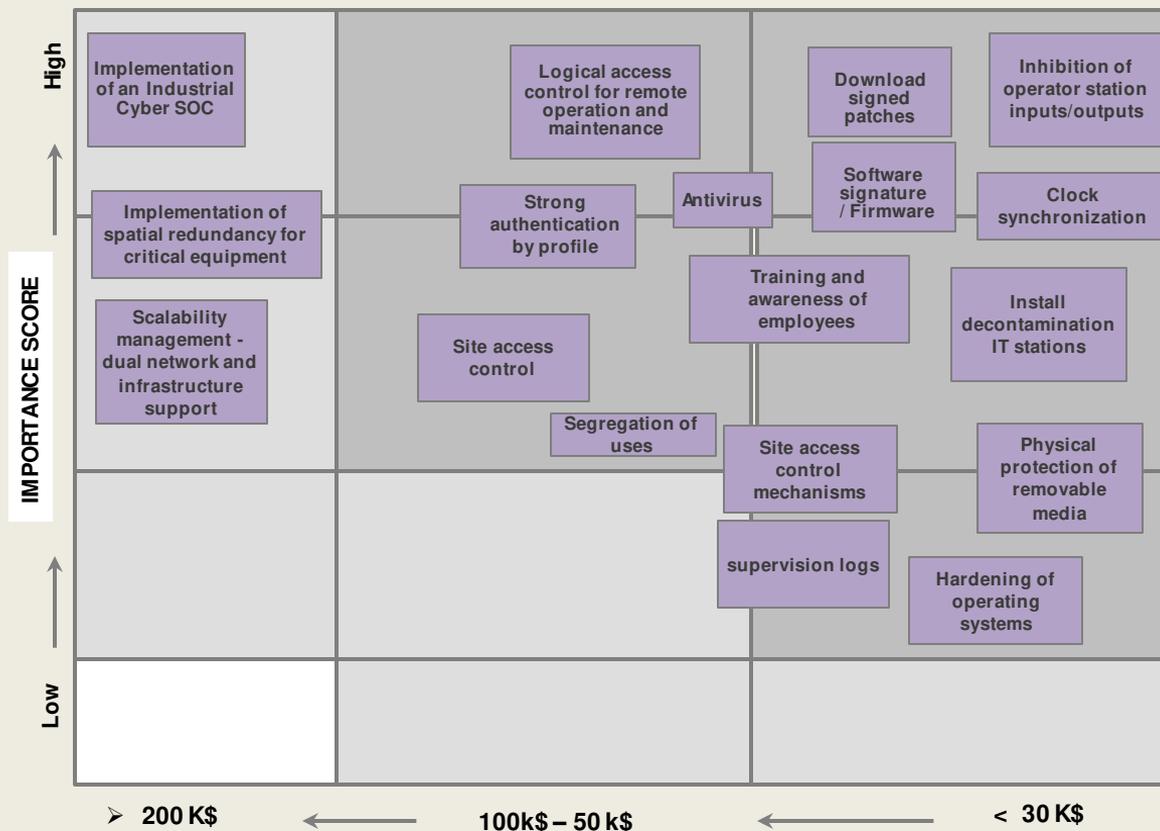


03. Energy

- Partial or total stoppage of railway operations



HIGH SPEED SCOPE : Security measures





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SECURITY AT UIC

Marie-Hélène Bonneau
Head of security division, UIC, Paris
Session 3.5 Operational performance /
Security and Cybersecurity



Agenda

- ❖ Risks and threats for railways
- ❖ Systemic approach to security is needed
- ❖ Main objectives of the UIC Security Platform
- ❖ Organisation of the UIC Security Platform
- ❖ UIC Security Platform : 2 main streams
 - ❖ Tools & products for security managers
 - ❖ EU Research projects



Risks and threats for railways



Pickpocketing
Begging
Property Damage
Power Blackout
Media Reports
Migration
Labor Dispute
Mass Events
Border control

Derailment
Terrorism
Metal Theft
Sabotage
Ticket Fraud

Freight Theft
Cyber Attacks
Graffiti
Trespassing
Accidents
CBRN incidents

Pandemic
Extreme Weather
Harassment
Violence


























































































































































































































































































































































Systemic approach to security is needed

- ❖ **Strategy & Organisation** : cooperation with authorities, legal framework, security strategy of rail companies, security plan, risk assessment
- ❖ **Human** : training and awareness programmes
- ❖ **Physical/Technological means** : centered on fluid transport based on security by design



Main objectives of the Security Platform

- ❖ **Sharing experience among UIC members** : identify best solutions to address security threats and adapt them to each specific situation
- ❖ **Ensuring coherence between different security policies** to help the development of international traffic
- ❖ **Elaborating recommendations** regarding technologies, human factors and organisation;
- ❖ **Addressing new threats and developing innovative solutions** : managing and participating in EU funded projects dealing with rail security





Organisation of the UIC Security Platform – Worldwide activity

- ❖ **Chaired** by RPF (Indian Railways Protection Force)
- ❖ **Co-chaired** by SNCF (French Railways)
- ❖ **Steering committee** : WG Chairs, UIC regions (Colpofer in Europe), UIC activities, partners (CER, RAILPOL, UITP)

Permanent working groups



Strategy & Regulations chaired by **SNCB** (Belgium)



Security Technologies chaired by **SZ** (Czech Republic)



Human Factors chaired by **Via Rail (Canada)**

Thematic, ad hoc working groups



Crisis Management chaired by PKP (Poland) and co-chaired by RPF (India)



SIA - Sabotage, Intrusions, Attacks chaired by **DB AG** (Germany)

UIC Security Platform : 2 main streams

Tools & products for security managers

- ❖ **Network of quick responders** : survey and analysis of emerging security issues among member
- ❖ **Rail Security Hub** : database of security solutions shared between members
- ❖ **Publications and guidance**
- ❖ **Congresses and workshops**
- ❖ **Regional activities**

EU Research projects focussing on improving rail resilience from prevention, detection to response and recovery

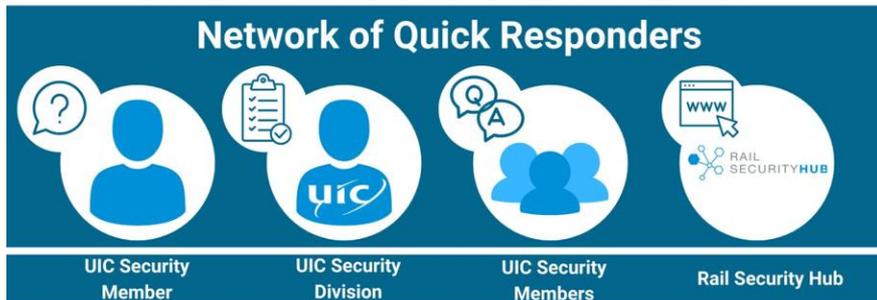
- ❖ **Emerging threats** : Terrorism, CBRNe, cybersecurity, combined cyber and physical attacks
- ❖ **Innovative solutions** : Technical solutions based on AI, innovative training and awareness programmes, ...



Tools & products for security managers

Network of Quick Responders

Exchange fast information about arising security questions



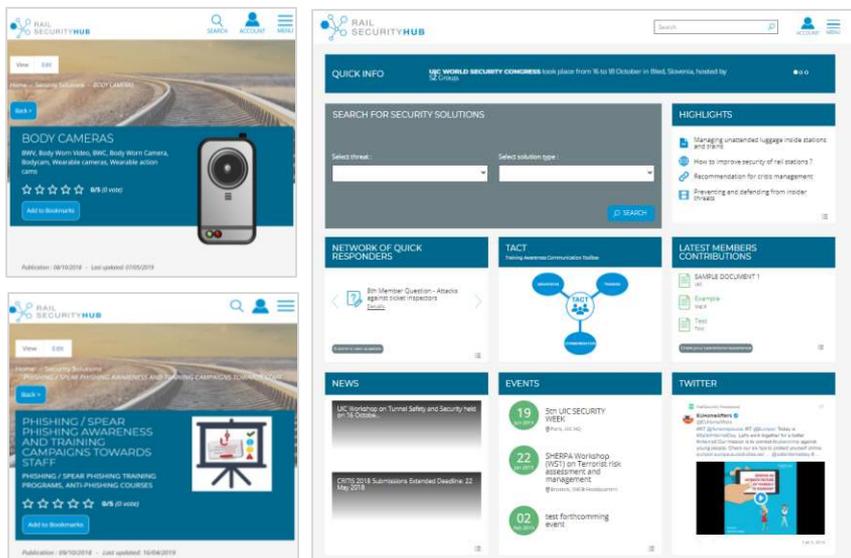
41 surveys since 2017
7 surveys in 2022

- Awareness of radicalized employees
- Use of Air Drones
- Inspire Magazine
- Attacks against maintenance staff
- Anti-smoking policy at railway stations
- Security of women in railway transport
- Use of FFCCTV
- Aggression against ticket inspectors
- Mystery Customer
- Use of AEDs
- Use of body cameras
- Security Organization
- CBRN
- GDPR
- Active shooter/armed aggressor procedure
- Subjective and objective feelings of security
- Obstacles on tracks
- Unauthorized access to train driver cabins
- Unauthorized entry into tracks, on bridges or into tunnel areas”
- Migration – effects on the rail sector
- Unattended items at railway stations and on trains
- Train driving simulation applications
- Impact of the COVID-19 on security issues
- Malfunction at railway signals
- Use of the intelligent video surveillance systems
- Human trafficking
- Crowd management



Tools & products for security managers

Rail Security Hub



Approx. 100 solutions since 2017 includes benefits, recommendations, operational experiences

- ❖ Easily FIND, ACCESS and SHARE SOLUTIONS to railway security issues via our comprehensive catalogue
- ❖ INTERACT with other rail professionals through comments, ratings and information sharing
- ❖ STAY INFORMED with permanent updates by UIC Security Division

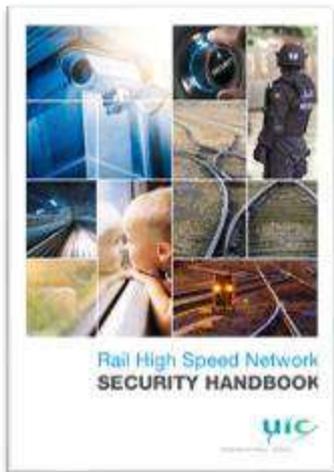


railsecurityhub.org



Tools & products for security managers

Handbooks, guidances, leaflets & recommendations



1. Theoretical and practical aspects of HSR security requirements



2. Proposal of *Railway Security Management System (RSMS)* concept



3. List of security measures and concepts

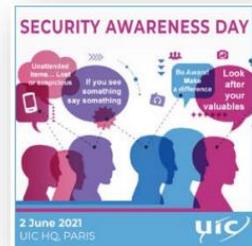


- Technical Measures**
- Access control gates
 - Body cameras
 - CCTV + Video Analytics
 - Drones
 - Passenger and baggage screening
 - Security dog
- Institutional, organizational and procedural measures**
- Alcohol prohibition
 - Interaction with third parties
 - Security Operation Centre
 - Security concept
- Human Factors Measures**
- Help applications
 - Help points at stations
 - Information for passengers about security actions
 - Pre-designed signage for evacuation
 - Railway staff presence
 - Reception desks
 - Social Media analysis
- Design, construction and ambience**
- Calming ambience
 - Car barriers
 - Transparent materials



Tools & products for security managers

Annual congresses and workshops



Tools & products for security managers

Regional activities



African Region

Security trainings

Participants at the WSC 2023 in Jaipur: *Algeria, Ethiopia, Gabon, Mauritania, Senegal*



Middle East Region

Security expert network to be created in 2023

Participants at the WSC 2023 in Jaipur: *Saudi Arabia, Israel*



Asia Region

Open discussions for future networking in Asia



Security Research projects

Past projects

Terrorism targeting the railways



Trespassing and suicides



Graffiti vandalism



Crisis management



Critical infrastructure protection and resilience



Rail cybersecurity



Border security



Common approach in Europe for rail security



On-going projects

- ❖ PROACTIVE : PPreparedness against CBRNE threats
- ❖ IMPRESS : Security trainings and awareness programmes
- ❖ CYRUS : Cybersecurity trainings
- ❖ ODYSSEUS : Accelerating border checks at the borders



Visit our websites

- UIC website (security activity) :
uic.org/security
- Around 1000 documents available on security private workspace :
extranet.uic.org
- Over 100 security solutions available on the Rail Security Hub : **railsecurityhub.org**

Stay in touch with the UIC Security Division



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Morocco 2023

HIGH-SPEED RAIL : THE RIGHT SPEED FOR OUR PLANET

Under the High Patronage of his Majesty King Mohammed VI

THANK YOU

