



# ***PESI (cross ETP initiative on Industrial Safety and Security towards Resilient Organizations, Infrastructures and Communities)***

*(Integrated Risk Management & Governance for Critical Infrastructures)*



## **AEI – GT-Security 4.0 RETOS Colaboración**

**(Madrid, 23-Sept-2019)**

**Javier LARRAÑETA**  
**PESI Secretario General**  
**ETPIS Executive Board**



# Index

- **ETPIS PESI: European & Spanish Technology Platforms (2002/2005) on integral Industrial Safety**
  - Integral Vision, Governance and Risk Mgt. for the Resilience (Industry, Networks & Infrastructures): OSH, Safety, Environmental Safety, Crisis Mgt., Security (CIP) /Cybersec., Risk Mgt., GRC
  - Safe & Secure Cities (under CIP: protection of Industrial & Transport Critical Infrastructures)
- **Industrial Security in PESI (ETPIS SafeFuture for H2030)**
  - Safe-Infrastructures and Resilience
  - CIP Directive & Ley PIC
- **Security, Resilience and Critical Infrastructures Protection (Secure Communitities)**
  - Technological priorities in Industry, Networks and relevant Infrastructures
  - **Propuesta a RETOS Colaboración-2019: Modelo de Gobernanza y Seguridad Integral en Infraestructuras Industriales (críticas o no)**



# ETPIS & PESI: Technology Platforms on (integral) Industrial Safety & Security

## ETPIS- PESI 2020 Vision

« **Innovation and technology development (R&D+i) based on a global and integrating vision on Industrial Safety and Risk management»  
(Safety + Security)**



**Four (4) deployment areas:**

- **Safety (processes, instalations)**
- **Occupational Safety & Health**
- **Environmental Safety (SHE) (+climate change influence on infrastructures)**
- **Corporate Security and Resilience**  
based on the CIP European Directive  
(plants, transport infrastructures & utility networks)

## 1.- Industry (Corps & SME, Associations)

- △ Enterprises and Industrial Corporations (many sectors)
- △ Technology-based SME, Engineering & Consultancy firms)
- △ Associations (Manufacturing, Energy, Security, PPE, Fire, etc)

## 2.- Government: Ministeries & Regional Bodies

- △ Ministry of Science, Innovation & Universities: AEI, CDTI
- △ Ministry of Industry: Industrial Safety, Connected Industry 4.0
- △ Min. Economy: Digital Development (INCIBE Cybersecurity)
- △ Ministry of Employment (OSH): INSST
- △ Ministry of Public Infrastructures (Transport Inf, Haz.Goods...)
- △ Ministry of Ecological Transition: Environment
- △ Ministry of Interior (DG PCyE, CNPIC, DG-Traffic)
- △ Public Bodies in Autonomous Regional Governments

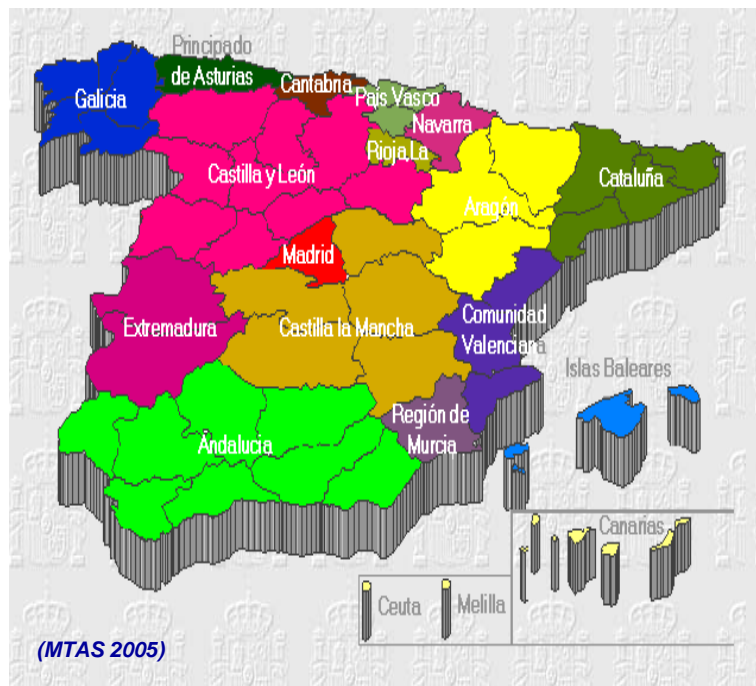
## 3.- Academia and Research Institutions & Labs

- △ Research Institutes, Labs, Technology Centres
- △ R&D Units at Universities

## 4.- Other relevant institutions

- △ Asociación Española de Normalización (AENOR)
- △ Insurance, Prevention & Medical services: accidents at work, professional diseases

## PESI partners



**80 Founding Members**  
(PESI: non-profit Association)

**Around 850 active Organizations**  
**+2500 technicians members**

## H2020: Industrial Leadership (NMBP) and Societal Challenges (Secure Societies)

### Adaptation of PESI Focused Groups to HORIZON-2020 (since 2013)

- **Industrial Safety** (Smart Working Environments, Structural Safety & ageing infrastr. –industrial plants, transport infrastructures & utility networks-, RAMS, PLM, BIM...)
- **Human & Organizational Factors** (safety culture, Road safety at work,...)
- **Corporate Security** (CIP, resilience, business continuity and industrial cybersec.)
- **Inter-Platforms Groups: Nanosafety, Digitalization, CoRobots, RPAS/Drones**
- **IPG on Smart & Resilient City** (Safety/Security/Cyber, Crisis Mgt., Disasters & Climate Change, Mobility, Circular Economy...)

HORIZON-2020	INDUSTRIAL LEADERSHIP						SOCIETAL CHALLENGES					
ETPIS (PESI): New Focussed Groups	ITC	NANO	BIO	MAT	PROD	SPACE	HEALTH	FOOD	ENERGY	TRANSP	CLIMATE	SEC-SOC
SafeFuture		X			X			X	X	X	X	X
ERANET (SAFERA)					X							
Safe-Production (&Safety Products)		X			X				X			X
Safe-Energy								X	X			X
Safe-Infrastructures					X			X	X	X		X
Safety Transport (haz. goods)									X			X
Security: convergence with Safety (& CIP - Infrastructures Protection-)												X
- Emergencies	X				X	X				X	X	X
- Cibersecurity	X							X	X			X
Nanosafety & Nano-toxicology (Joint ETP Group)		X	X	X	X		X	X				X
Environmental Safety		X	X	X	X	X		X	X	X	X	X
Miscellaneous												
- Ageing at Work (Healthy & Active Ageing)	X				X		X					
- Road Safety (at work)										X		X
- Prevention Culture & Training					X							X



# PESI (ETPIS): FGs for H2020 since 2018 (XII Aniversario)

- **SAFETY**

- **INDUSTRIAL SAFETY** (Smart working environments & Factory 4.0): PPEs, Safety products & systems, Sensing-Monitoring, NDT, RAMS & Assets Management including ageing)
- Structural Safety (Safe-Infrastructures, in coord. with Construction & Transport ETPs)
- **Emergencies Management** (jointly with FG-Security; natural disasters & climate change)
- **Civil use of RPAS-drones on Safety-Maintenance & Security** (joint with FG-Sec)

- **SECURITY** (inc. Industrial Cybersecurity)

- **Governance, Resilience & CIP: Safety-Security Integration (ETPIS)**
- Technologies for Security; People & Assets Protection
- Industrial CIBERSECURITY

- **HUMAN & ORGANIZATIONAL issues**

- **Safety Culture, Health & wellbeing** (Ageing/generational issue, Drugs at work...)
- **Road Safety at Work**
- **Human factor in Security & CIP** (Insider threats)

- **Inter-Platforms Groups:**

- **GICI: Smart, Secure & Resilient Cities**
- **SAFE MOBILITY** (new from 2019): Paradigm, Tech. for Safe Mobility, ITS, Secure Transport, Hazardous goods transportation

# PESI 2030 vision on the Smart & Resilient City

Concept of Secure Society could be very broad from different perspectives (*safety, security, cybersecurity*) or focus (resilience, protection, emergencies, reliability, industrial, road safety, Health, wellbeing...). ETPIS and PESI have face future challenges for the Smart and Secure Safety & Communities through four **main pillar**:

1. A **Governance model for integral risk management and resilience** of the essential services (CI Operators) for citizens,
2. **Reliability** of Utility networks and urban infrastructures and installations,
3. **Security and protection of citizens, Infrastructures and heritage of the City**
4. And the **cyber-security of control systems in the City** (utilities networks, urban systems and infrastructures related to essential services).





# SafeFuture

## ***Safety as a trade-mark of the technology "made in EU"***

### ***Safe innovation for sustainable future***

*Way to achieving (by 2020) a new safety paradigm for European industry. Safety as a key factor for successful business and an inherent element of business performance. Industrial safety performance progressively and measurably improved in terms of reduction of reportable accidents at work, occupational diseases, environmental incidents and accident-related production losses. "Incident elimination" and "learning from failures" cultures embedded in design, maintenance, operation at all levels in enterprises. Structured self-regulated safety programs in all major industry sectors in all European countries. Measurable performance targets for accident elimination and accident free mind set workplaces as the norm in Europe.*

#### **Safe Infrastructures:**

- Safe Life extension of process plants, power plants, transport & utility infrastructure networks, ...
- Intensification of NatCat (NaTech)
- Design and monitoring for long term operation
- **Reliability & Resilience**



#### **Safe Energy:**

- New safety challenges in renewable energies (wind, H2, solar, bio-fuels, fuel cells, photovoltaic,...)
- Safe energy production and storage
- Smart grids

#### **Safe Products/Production :**

- Green jobs
- Value chain and interdependencies
- Nanosafety
- PPEs & Smart Working Environments

**Resilience:  
Protection and  
Cyber-security**

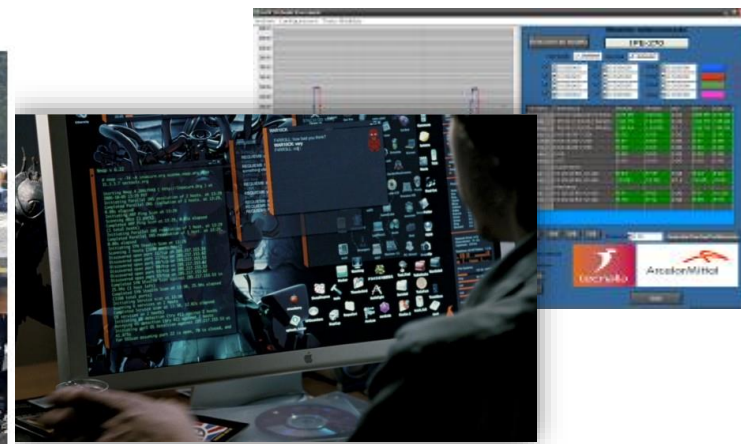
#### **Example: Multi-Risk / Risk-Risk tradeoffs – safety for sustainable integration, interaction and risk governance:**

- "Agreed Approach to Risk-Risk Tradeoff management" (the Multi-Risk initiative); difficulties in putting together different risk mitigation policies and ensuring their compatibility

# Safe-Infrastructures: vision

- SafeFuture / Safe-Infrastructures vision:  
**Safety-Reliability-Resilience**

- Research towards new concepts and systems, with Safety & Reliability as essential elements in Industrial plants and Utilities networks
- Industrial infrastructures: similar technology & organizational challenges related to ageing >>> common research objectives for safety & reliability
- **Industrial Control Systems: also ageing , IT/OT evolution + cyber-security threats !!**

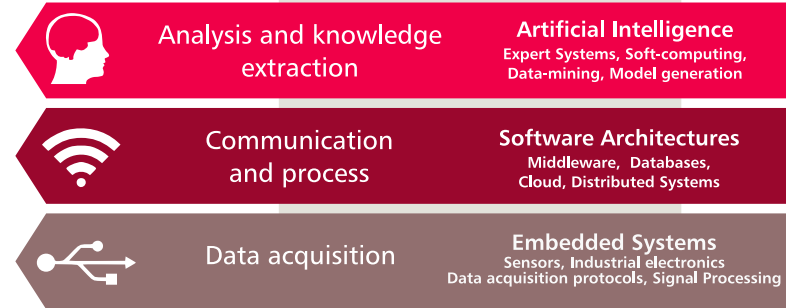




# Safety-Security (operation & maintenance)

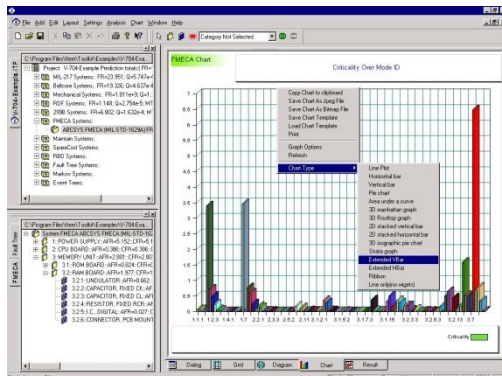
- **RAMS** (Reliability, Availability, Maintenance & Safety + Security) as the reference model
  - **Analysis, Evaluation and Risk Mgt.** (for the whole life-cycle)
  - Predictive Models for maintenance (based on situation: diagnosis, prognosis)
  - Learning from behaviour (artificial intelligence). **Digital Tweens.**
  - Monitoring & Production integ Systems (PLM, Life-Cycle and **Ageing** Management)
  - **ICS Cybersecurity**
  - **INFORMATION SYSTEMS evolution: IoT, Big-Data, Cloud comp., Cyber-physical Syst. !!**

Decision and action

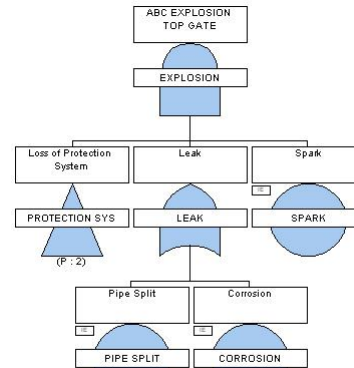


Industrial Systems

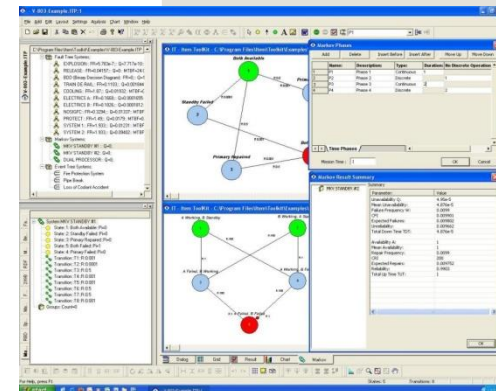
Factories  
 Renewable Energy  
 Transport  
 ...



FMECA (Failure Mode, Effects and Criticality Analysis)

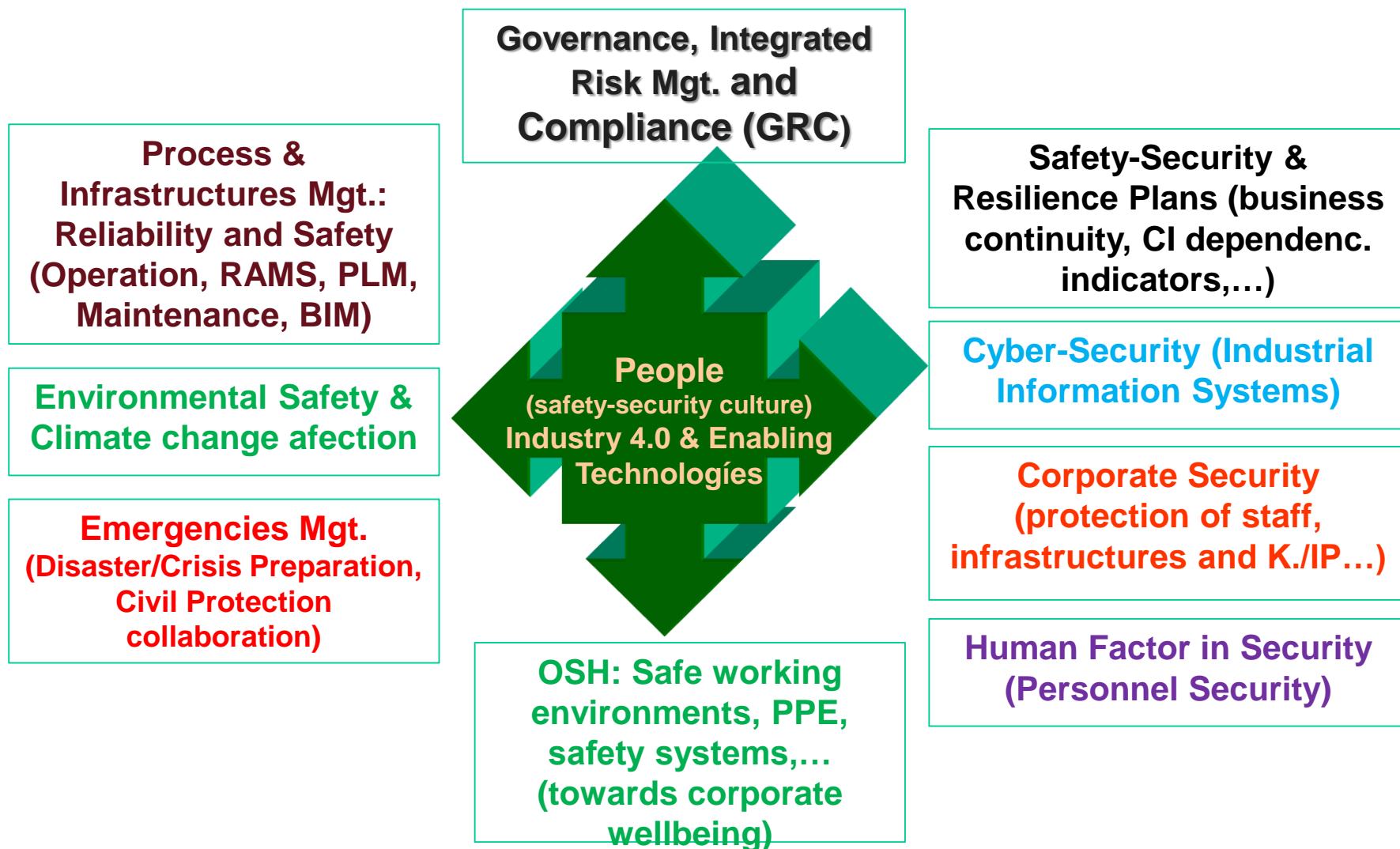


FTA (Fault Tree Analysis) and ETA (Event Tree Analysis)

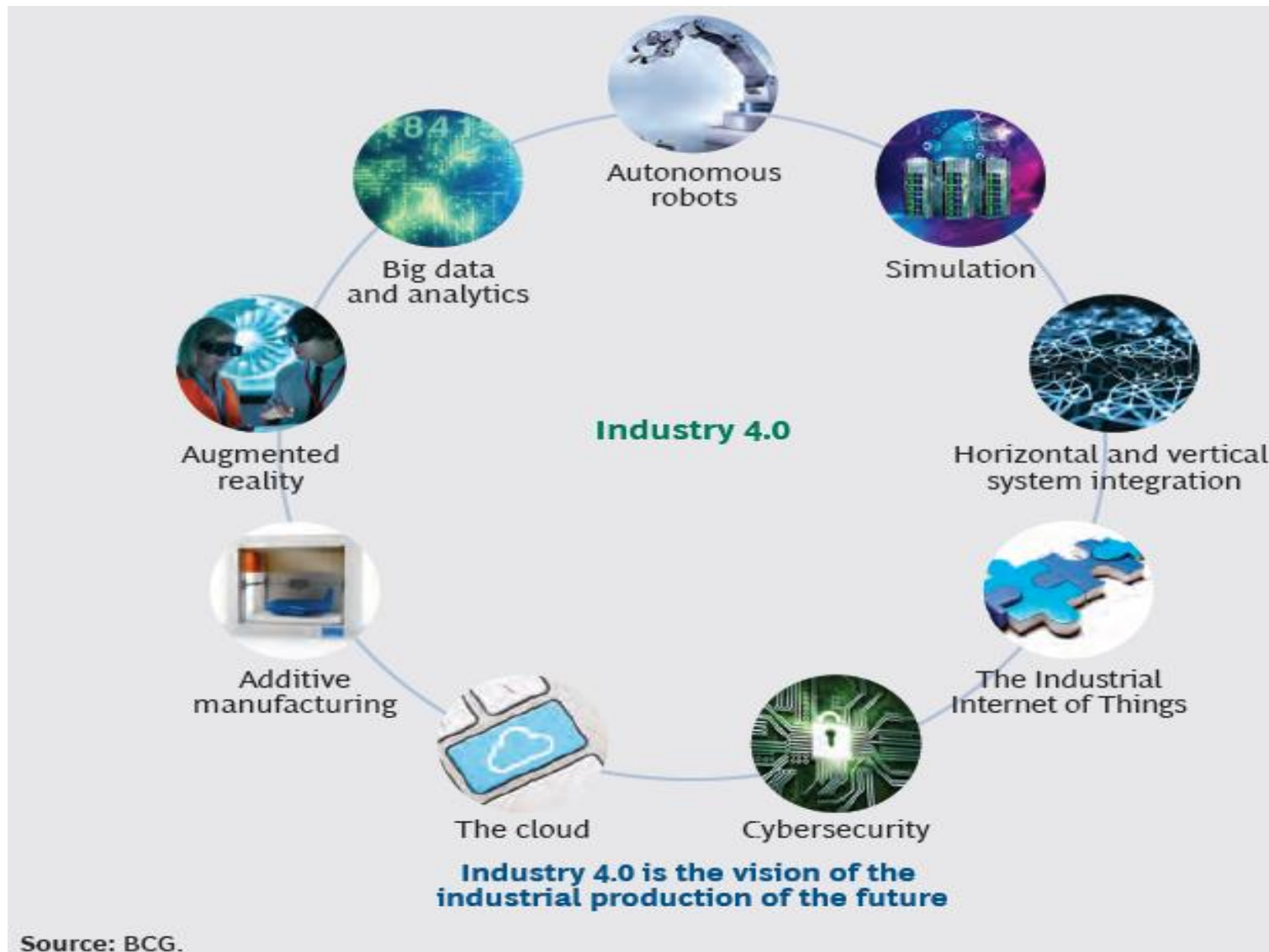


Behaviour modelisation (Markov nets, Altarica, etc...)

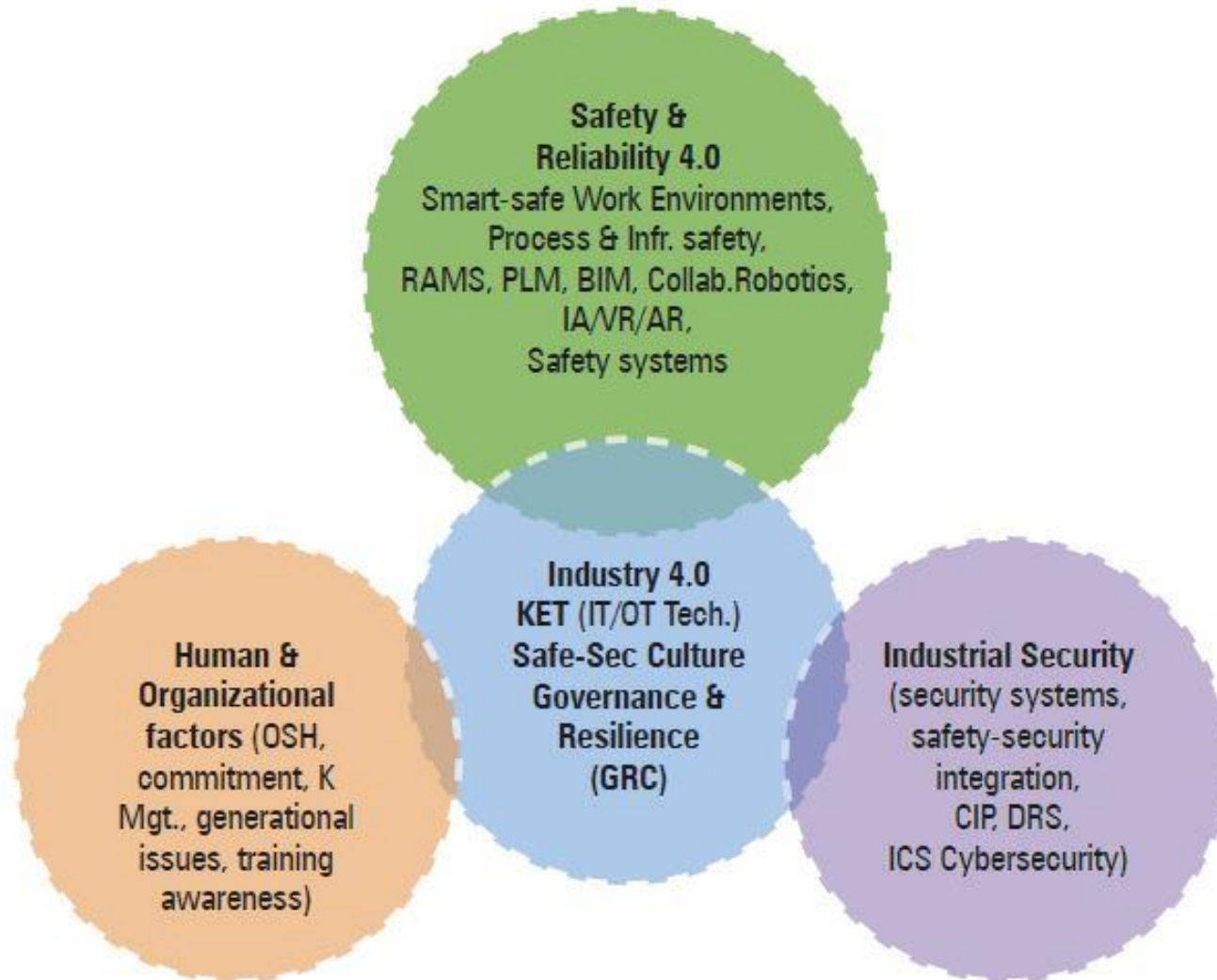
# New Governance and integrated Risk Management model (reliability, safety, security and resilience under Industry 4.0 paradigm)



# Tecnologías facilitadoras (Industria 4.0)



# ETPIS: Innovation circles for H2020 (PESI Secretariat, 2019)



# ETPIS: Innovation circles for H2020 (PESI Secretariat, 2019)





# Security issues and CIP

## Security & Resilience related to “Industrial” Critical Infrastructures





# Integral Security and Resilience: the new paradigm

- World context: Security and Defence
  - New threats with new means (intelligence, cyber-arms)
- National Strategies (USA, EU) on Security and Critical Infrastructures Protection (CIP) Directives:
  - **Convergence from a National Security (& Defence) vision :**
    - Risk Analysis, physical and logical security plans
    - Military technologies (dual use) for Corporate Security
  - **CIP of “private-operated” critical or relevant Infrastructures (industrial plants / energy / oil & gas/ water/ transport inf.&networks/ telecomms...)**
    - complex industrial installations & infrastructures (more than HQ buildings and IS)
    - Cybersecurity (IS but mainly SCADA)
    - Business Continuity and Resilience
- New driver: Disaster Resilience (climate change increasing nat.disasters)
- **Smart & Secure Cities:** our Citizens and infrastructures are the new target (NY, Madrid, London, Paris, Brussels)



## H-2020 – Secure Societies, next call: R&D topics

**SU-INFRA-01:** Prevention, detection, response and mitigation of combined physical and cyber threats to critical infrastructures in Europe

- **Critical Infrastructures (for the Smart City):** Water Systems, Energy Infrastructure (power plants and distribution), Transport Infrastructure and means, Communication Infrastructure, Health Services, Financial Services

**SU-INFRA-02:** Security for smart and safe cities, including for public spaces

**DISASTER RESILIENCE :** safeguarding and securing society, including adapting to climate change (Response, Awareness/Civil protection, Communication Systems, Bio threats, CBRN cluster)

### **DIGITAL SECURITY:**

- Cyber Security for SMEs and Individuals, Security Economics, EU and International Coordination in Cybersecurity Research and Innovation, Cyber Security Threats and Threat Actor, Privacy and Data Protection

# Framework for corporate security in Spain: National Security Strategy & CIP Law

## Deployment of the National CIP Law (CNPIC):

- **Sectors & Critical Infrastructures :**
    - Private Operators
    - Public Administrations
  - Sectoral White-Books (13: 8 industry-related)
  - PSO Operator Security Plan
  - PPE Specific Protection Plans (individual CIs)
  - **Entreprise Security Organization and Plans**
    - New integrated Strategy & Risk management (adaptation of Saf-Sec systems & plans)
    - Certification of Sec plans/systems (CNPIC)
- + New Law for Security Private Services (security subcontractors in Operators)





# Systems and Technology towards Resilience

- Organization and new responsibilities in Safety & Security
  - **Integrated Risk Analysis** & Business Intelligence (TS/CI, new risks: conflicts and radicalization)
    - Operational Reliability and Safety (engineering / process): industrial and environmental Safety and OSH
    - Security of industrial installations, infrastructures and networks
    - Information Security (IT-OT: Cybersecurity)
  - **GRC Strategy** & organization based on a real **SECURITY-SAFETY integration**
- New Framework (CIP Directive & National Laws: **Ley PIC**, H-2020/Secure Societies):
  - **Convergence** safety- security (from different visions: industrial safety, cybersecurity and corporate security): integrated **Risk Mgt. and Dependencies**
  - **DRS (Natural Disasters Resilience, including climate change)** and Tech. Accidents (Civil Protection and emergencies plans): **Crisis Mgt.**
  - Critical Infrastructures **Protection** (industry / utilities/ transport /...) towards Business Continuity
  - **Cybersecurity** (IS security, automation& control systems/SCADA)
  - **Business (essential services) Continuity and Resilience**



# **PESI integrated approach**

## **Risk Management, Business Continuity and Resilience (considering Dependencies)**

# **PROPUESTA RETOS COLABORACIÓN**

# Risk Management and Risk concept evolution

## Conventional Risk concept:

- Threat / hazard – Vulnerability – Consequences

## Risk Management (ISO 31000)



## Resilience capability in an advanced Risk concept:

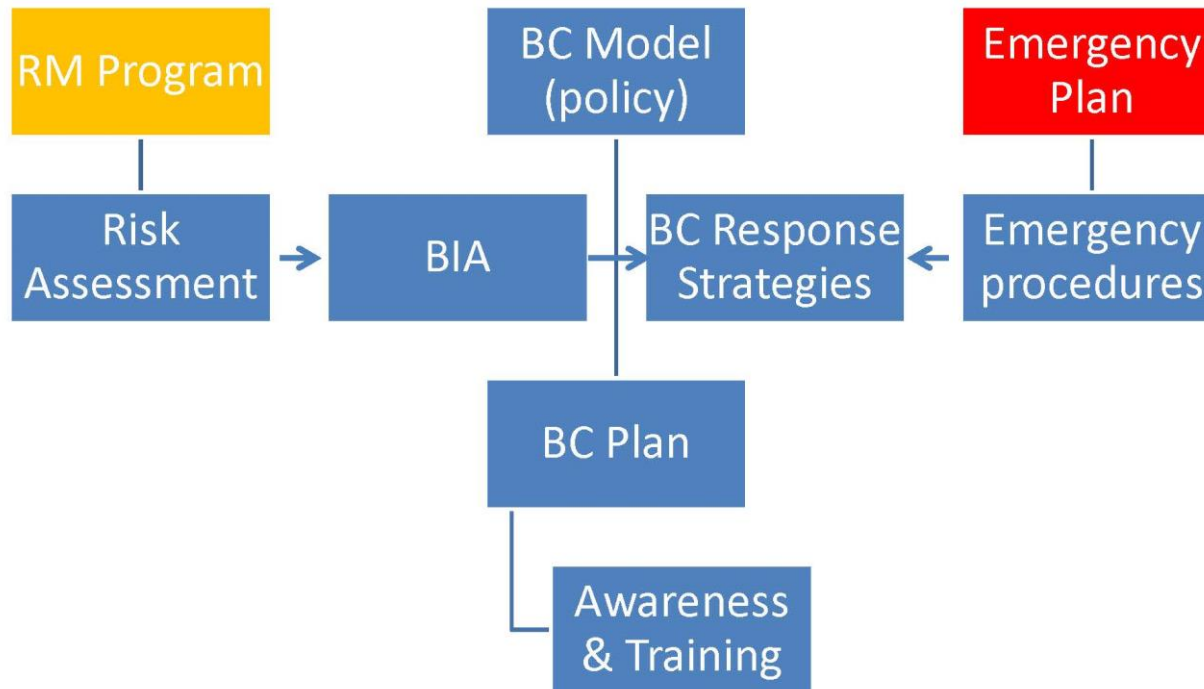
- Threat / hazard – Vulnerability – **Resilience** – Consequences
- Resilience: Processes/Systems/Services

## Resilient People (2 layers: Individual & Teams)

# PESI integrated approach for BC and Resilience in CI

Integrated Risk Management and Emergency Mgt. within an advanced Business Continuity Model

## Bussines Continuity Management in CI





# Propuesta a RETOS: Modelo de Gobernanza

## Fase 1. Diseño de un modelo de Gobernanza de la Seguridad y Resiliencia de una Infraestructura Crítica Industrial

Sobre los nuevos principios de una Seguridad integral para la continuidad del negocio (función industrial) y la mejora de la Resiliencia de una Infraestructura Crítica Industrial, el modelo de Gobernanza y gestión integral se debe desplegar mediante una serie de subsistemas de ayuda a la toma de decisiones, con sus correspondientes herramientas tecnológicas avanzada.

Es por ello que en esta primera fase del proyecto se desarrollan por tanto 4 subsistemas fundamentales:

- a. Sistema integral de Gobernanza y Tableau d'abord
- b. Gestión de la función de Seguridad
- c. Herramientas para la Evaluación y Gestión de Riesgos integral
- d. Gestión de emergencias y crisis
- e. Modelo de indicadores de Resiliencia



# Esquema del Modelo de Gobernanza

## Modelo de Gestión integral de la Seguridad y Resiliencia



*Thank you so much for your attention:*

*Questions or comments ?*

J. Javier Larrañeta

PESI Secretary General

[javier.larraneta@tecnalia.com](mailto:javier.larraneta@tecnalia.com)

[secretario-tecnico@pesi-seguridadindustrial.org](mailto:secretario-tecnico@pesi-seguridadindustrial.org)