NEST

An interoperable multidomain CBRN system

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NEST EU project overview

Secure Societies – Protecting freedom and security of Europe and its citizens

Topic: SU-DRS04-2019-2020 – Chemical, Biological, Radiological & Nuclear (CBRN) cluster

Type of action: RIA

Dates: May 2021 to April 2024 (36 months)

Budget: 3,473,703 €

Coordinator: Sensing & Control Systems S.L (Barcelona)

Technical Coordinator: CSIC – Microelectronics Institute IMB-CNM (Bellaterra)

Total score: 13 (Threshold: 10)

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NEST partners

Research & commercial

10 partner organisations:

Industrial and SME partners:

- **Amper S&C IOT SL (ES) – Coordinator**
- **Woepal GmbH (DE)**
- **Thales Portugal, S.A. (PT)**
- **Dynamic Safety Corporation Sp zo.o. (PL)**

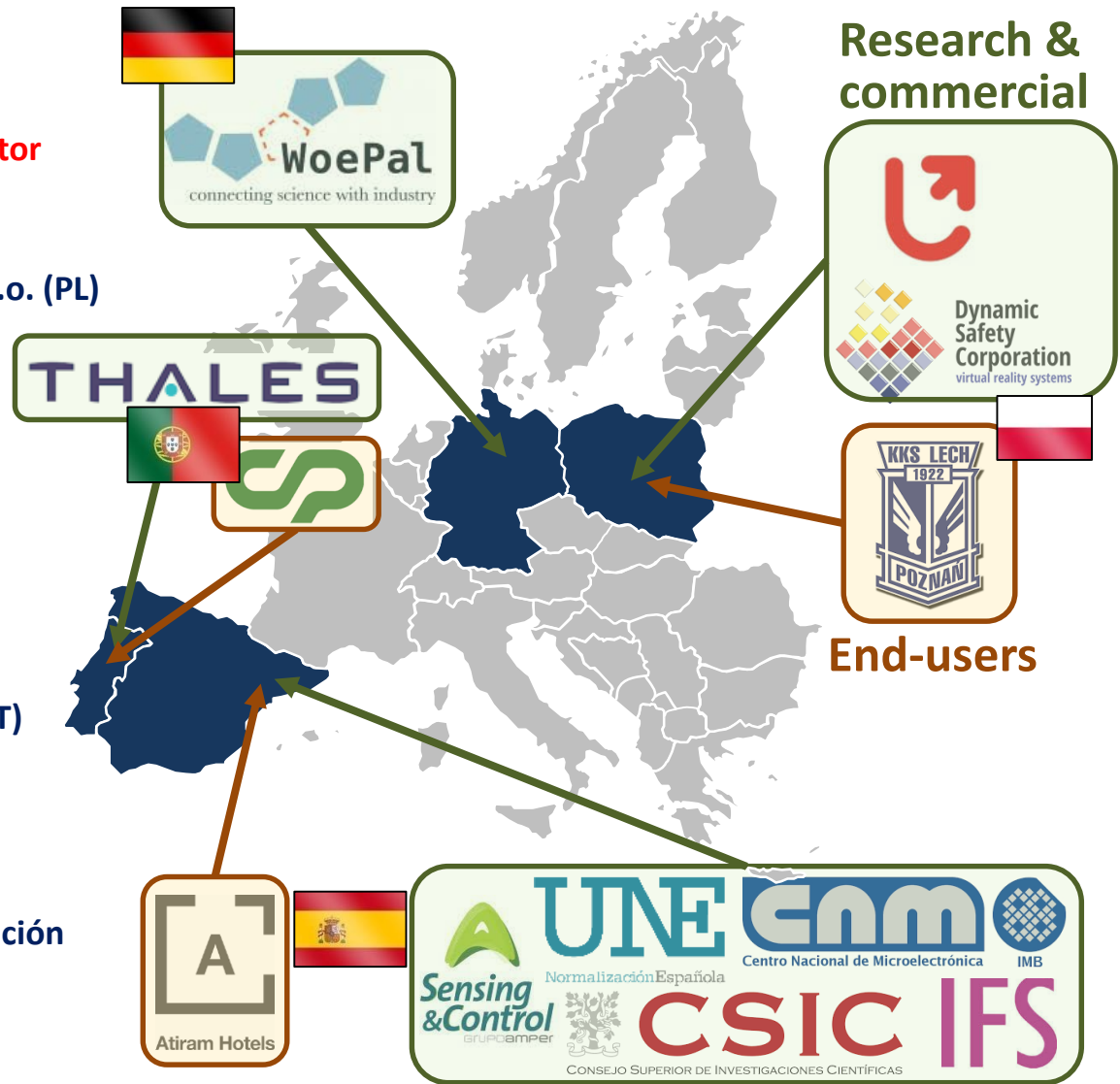**Academic and Resarch Institutions:**

- **CSIC (ES) – Technical Coordinator**
  - ➢ **IMB-CNM (Barcelona Microelectronics Institute)**
  - ➢ **IFS (Philosophy Institute)**
- **Uniwersytet Łódzki (PL)**

End-users partners:

- **CP – Comboios de Portugal EPE (PT)**
- **KKS Lech Poznań (PL)**
- **LIHSA Hotels S.A. (ES)**

Standardisation Body:

- **Asociacion Española de Normalización UNE (ES)**

End-users

Project Concept and approach

NEST will design and implement a unique novel standoff system with the capability to **detect multiple CBRN threats**

NEST will **support** owners, operators, and security staff by providing

(i) threat indications and warnings, and

(ii) guidance for facility security, information-sharing and analysis.

1. Modular sensing units: will integrate the different selected sensors into a unique base unit that will be located into the buildings and infrastructures creating a wireless wide-area monitoring network.

2. NEST Platform: Detector Platform and Tools for Security Staff. Represents the core of the solution by collecting, fusing, processing and displaying the data produced by the sensor network.

3. Training kit and **standardisation**.

NEST Top Objectives

UNIQUE NOVEL STANDOFF SYSTEM

DAY-TO-DAY PROTECTION OF DIFFERENT FACILITIES

MULTIPLE THREATS DETECTION

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GUIDANCE FOR FACILITY SECURITY

THREAT INDICATIONS AND WARNINGS

Objectives

1. **<u>Assist</u>** critical infrastructures' owners and operators with situational awareness and threat risk assessment at **<u>initial</u>** phases.

2. **<u>Improve</u>** CBRN detection capabilities.

3. **<u>Reduce</u>** time to market.
   - Training materials and demo kits; and reduced variant of the final NEST solution.

4. **<u>Validation</u>** of integrated system by security managers of critical infrastructures and transport systems in real life operational environments (TRL6).

5. **<u>Best practices</u>** in security and privacy.
   - Openness & interoperability, scalability, end-to-end security and conformance with regulatory and legal regulations and recommendations.

6. **<u>Standardisation</u>** to facilitate implementation @ EU level.
   - Identification of existing standards & interaction with the standardisation committees.

CBRN sensor structure

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Owners/Operators' Critical Infrastructures App

NEST Risk Assessment and Decision Support

Emergency Operator application – recognized situational picture & response management

Decision Support

Situation & Risk Assessment

API

External systems

API

NEST Detector Platform

Data Collection

Data Processing/Fusion

Sensors Management

Sensors Integration

API

Chemical Detection

Biological Detection

Radiological / Nuclear Detection

Sensor Integration

**Modular sensing units
Possibility of 3rd parties**

TCP/IP

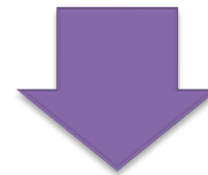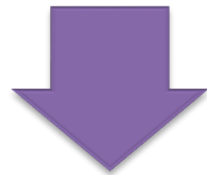Communication Module

LoRaWAN™

Sensor Integration

NEST Ambition

Chemical detection technology	Biological detection technology	Radiologycal and Nuclear technology	Display threat and hazard data
⬇	⬇	⬇	⬇
Combination of two chemical sensing technologies	Low-power bio-sensor devices which will break the limitation barriers for bio-detection systems	Design detectors with tailored sensitivities (mV/mSv) and dynamic ranges to cover a wide range of radiation scenarios	a COP tool designed for the intuitive presentation of information for monitoring purposes

NEST Impact

Actions applicable to CBRN prevention, detection and response	
Goal	**NEST Impact**
Enhance international cooperation	The interoperability, and structured information output of NEST.
Develop improved information tools for CBRN security	A shared responsibility between different stakeholders. The threats detection and response at initial phases falls to the owners and operators. NEST will facilitate the engagement at all levels and promotes information sharing and practical exchanges.
Improve training	NEST will be user-friendly and easy to operate and will provide a training kit for the users.
Strengthen and prioritize research	R&D activities are at the core of the NEST project. NEST will motivate new research lines.
Ensure the criminalization of CBRN terrorism	NEST will provide data that may be used for the investigation and criminalization of acts involving CBRN materials.

Project NEST target groups

List of the target groups:

- Owners, operators and security staff of critical infrastructures
- Civil security forces
- Technology providers
- Defense Agencies
- Law enforcement agencies
- Research and academic institutions
- European Commission
- International bodies
- Investors
- ENCIRLE community
- General public

Established contact with target groups

Medical Emergency
Ministry of Health
Transfer Technologii Sp.z o.o.
VORTEX
Mistral Inc.
UV VISION Inc.
SKYLOCK SYSTEMS
Bounce Imaging
Jevell Innovation
REMIN
Sonovero R&D
Military Institute of Armament Technology
Military Institute of Armored and Automotive Technology
Warsaw University of Technology
The Silesian University of Technology
Military University of Technology
Silsense S.A.
Plasan Sasa Ltd
Oran Company

civil security forces;
Technology providers
Owners, operators and security staff of critical infrastructures
Law enforcement
European Commission (e.g. CBRN-E Advisory Group, DG HOME, DG Health)
International bodies (e.g. EUROPOL, INTERPOL, CEPOL, ATLAS group)
ENCIRLE community
General public - groups interested of CBRN protection
Standardization committees (e.g. ISO/IEC, CEN/CLC)
Investors
Defence Agencies
Research and academic institutions

Questions

What are **the operational scenarios** that the knowledge or technology studied or developed by your project addresses?

The developed scenarios increase the efficiency of LEA (Law Enforcement Agency) services, and at the same time increase the level of security by minimizing the response time to a CBRN incident.

What c**apabilities for those scenarios** is your research and innovation promising to develop?

The VR and AR technology used allows for the creation of a training system that can reflect any existing situation in a real, thus reducing training costs to a minimum.

How those **capabilities will be improved compared to the state of the art**?

Low-power bio-sensor devices which will break the limitation barriers for bio-detection systems

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Thank you

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