Artificial Intelligence Threat Reporting & Incidence report system

Nelson Escravana

IRIS - Sistema de Relatórios de Ameaças e Resposta a Incidentes de Inteligência Artificial

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Rede Nacional CSIRTS .PT

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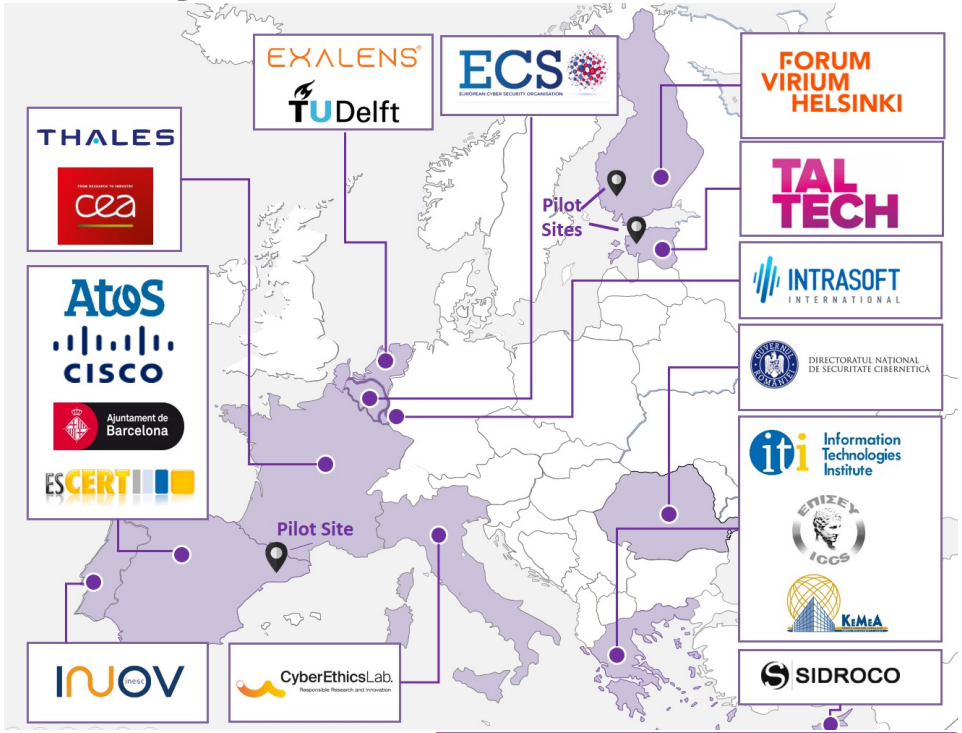
Project at a Glance



Consortium

6 Public organizations
3 SMEs
4 Large ICT industries
6 Research institutions & Universities

Call Identifier: 2020-SU-DS-2020

Topic: SU-DS02-2020 Intelligent security and privacy management

EC Funding: 4 918 790.00

Duration: 36 months (Sept 2021-Aug 2024)

Consortium: 19 partners

Coordinator: INOV - Instituto de Engenharia de Sistemas e Computadores, Inovacão, (INOV), Portugal

Learn More: www. iris-h2020.eu

Join us: @iris-h2020

IRIS H2020 Project

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IRIS Motivation

As existing and emerging **smart cities** continue to **expand their IoT and AI-enabled platforms**, **novel and complex dimensions to the threat intelligence landscape are introduced**. These, are linked with identifying, responding and sharing data related to attack vectors, based on emerging IoT and AI technologies, whose architecture and behaviour are **not currently well understood** by security practitioners, such as CERTs and CSIRTs.

This lack of experience as well as of **tools, for detecting and reporting IoT & AI attack vectors** is further aggravated by potentially greater safety risks caused by such attacks.

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IRIS Vision

The **H2020 IRIS project** aims to deliver a framework that will support European CERT and CSIRT networks **detecting, sharing, responding and recovering from cybersecurity threats and vulnerabilities of IoT and AI-driven ICT systems,** in order to **minimize the impact of cybersecurity and privacy risks.**

The IRIS platform will be made available, **free of charge**, to the European national CERT and CSIRTs, by the end of the project.

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IRIS Methodology

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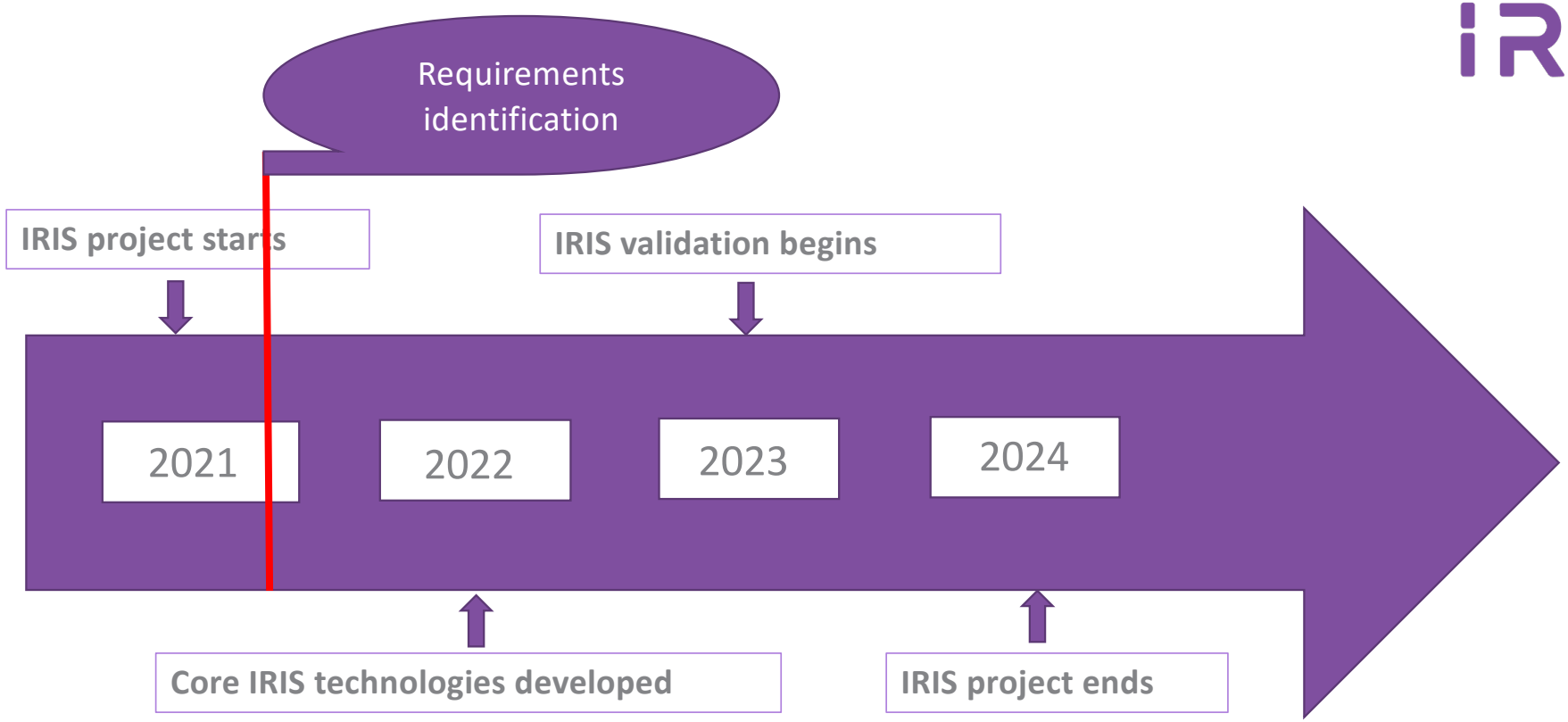
IRIS Time Plan



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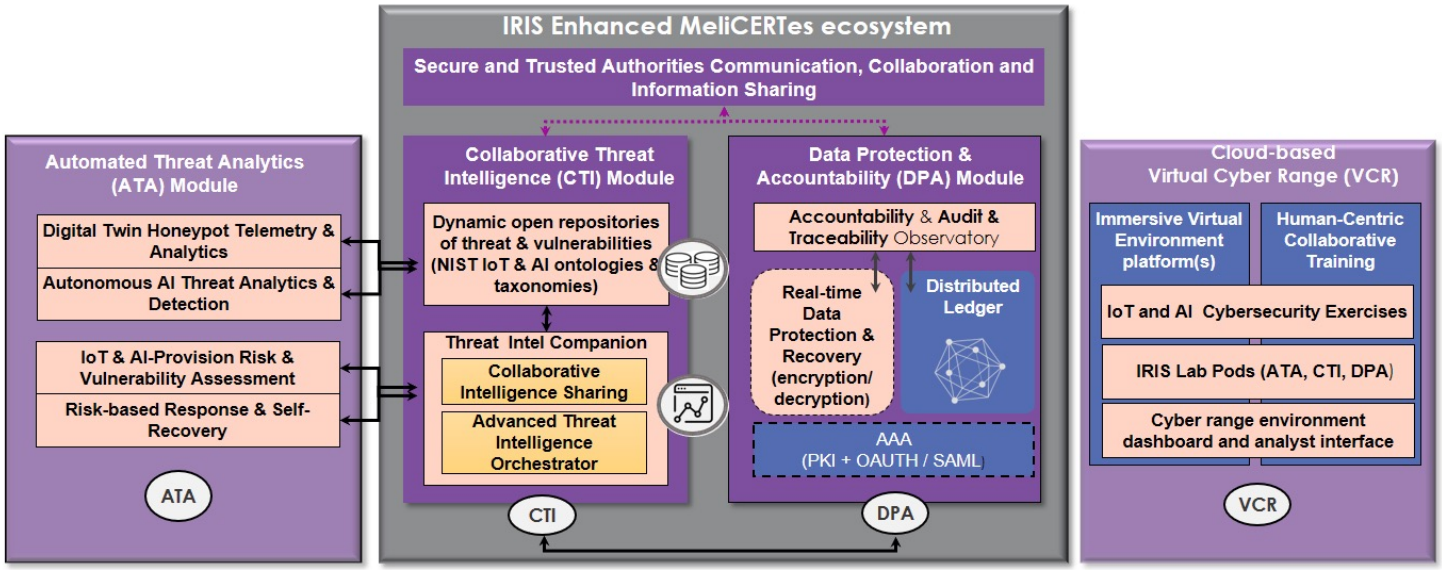
IRIS Architecture



- **Collaborative Threat Intelligence (CTI)** that introduces Analytics Orchestration for supervising coordination between incident response and recovery;
- an **Open Threat Intelligence** interface for disseminating taxonomies of IoT and AI threats;
- an intuitive **Threat Intelligence Companion** that serves as a key human-in-the-loop interface for collaborative incident response and threat intelligence sharing between CERTs/CSIRTs at both the municipal and national level.

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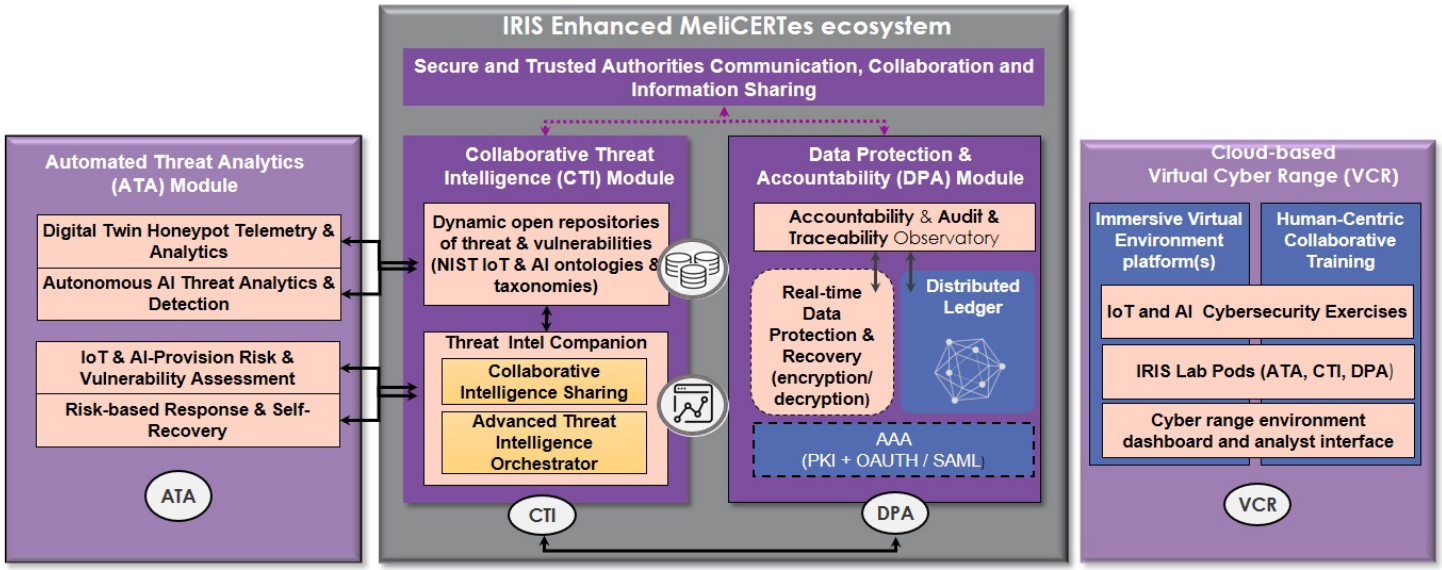
IRIS Architecture



- **Automated Threat Analytics (ATA)** that extends existing intrusion detection tools with a novel threat detection engine for identifying specific IoT and AI attack vectors and includes digital twin honeypots for collecting attack telemetry against end-user systems reliant on these technologies.
- **Virtual Cyber Range (VCR)** for collaborative CERT/CSIRT training exercises based on real-world environment platforms, providing representative adversarial IoT & AI threat intelligence scenarios and hands-on training.

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MeliCERTes

- MeliCERTes CSP I tender project:
  - ✓ Tender coordinated by Capgemini and other sub-contractors, including INTRASOFT
  - ✓ Enabling trusted online communication, collaboration and information sharing among CERTs and CSIRTs
  - ✓ https://github.com/melicertes/csp → Open source
  - ✓ MeliCERTes facilitated building of a network for establishing confidence and trust among national CSIRTs and for promoting swift and effective operational cooperation.
  - ✓ CSIRTs participate in MeliCERTes within verified Trust Circles for sharing and collaborating on computer security incidents.
  - ✓ MeliCERTes CSP is an open source modular platform, adopted by ENISA, offering a complete security incident management solution.

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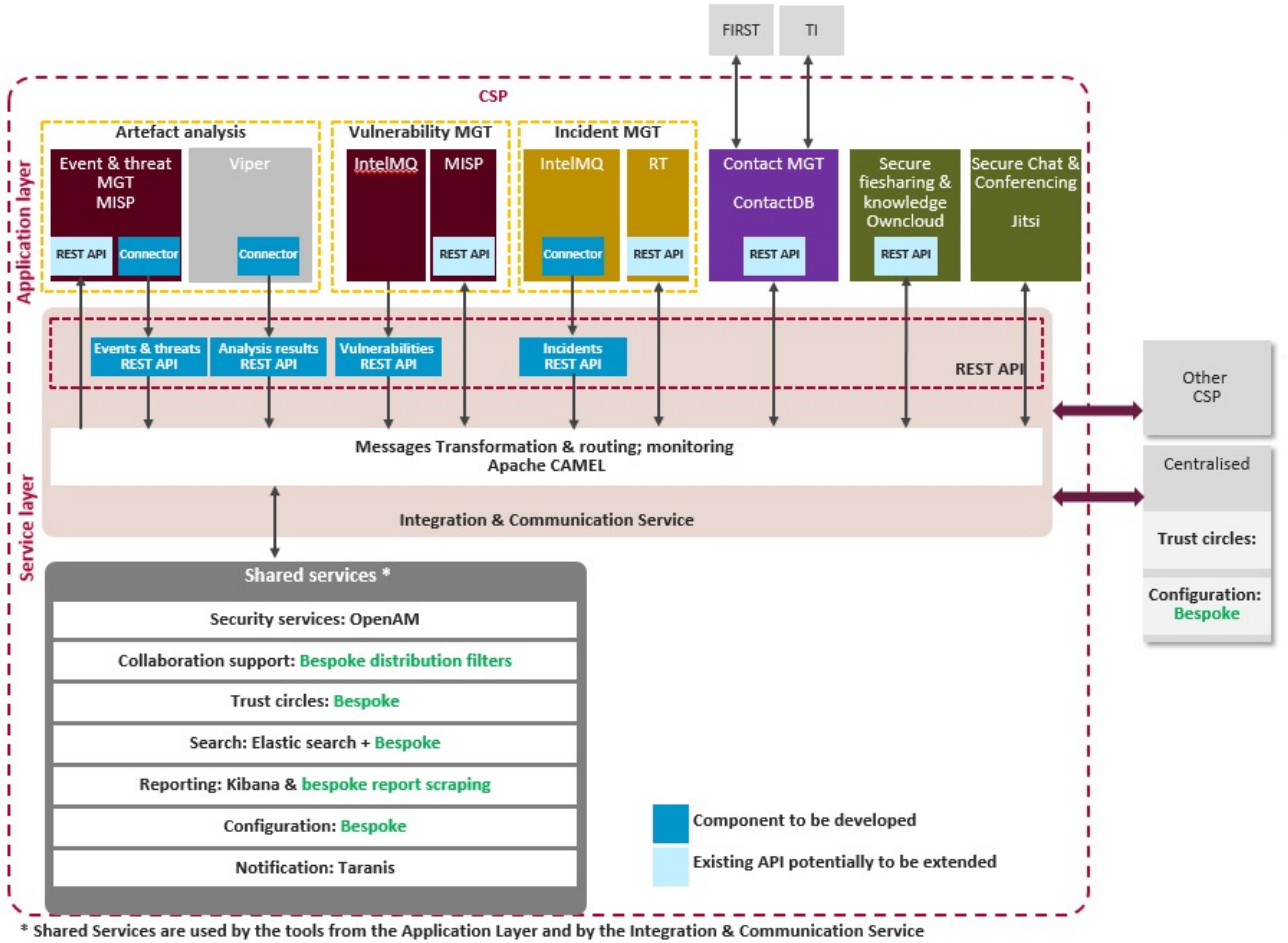
MeliCERTes



* Shared Services are used by the tools from the Application Layer and by the Integration & Communication Service

MeliCERTes CSP I is **a modular platform** that offers a **security incident management solution** but also **allows CSIRTs to share information and collaborate with each other within verified Trust Circles**.

Includes open-source projects:

- **IntelMQ** harvests and manages security vulnerability events from multiple sources.
- **MISP** organises harvested information as events, main module for vulnerability management and information exchange among CSIRTs.
- **Viper** receives events from MISP for critical malware analysis. Analysis results updated back into MISP.
- **OwnCloud** used to securely exchange module files within Trust Circles.
- **Jitsi** is for establishing real-time communications channels for quick response and collaboration.

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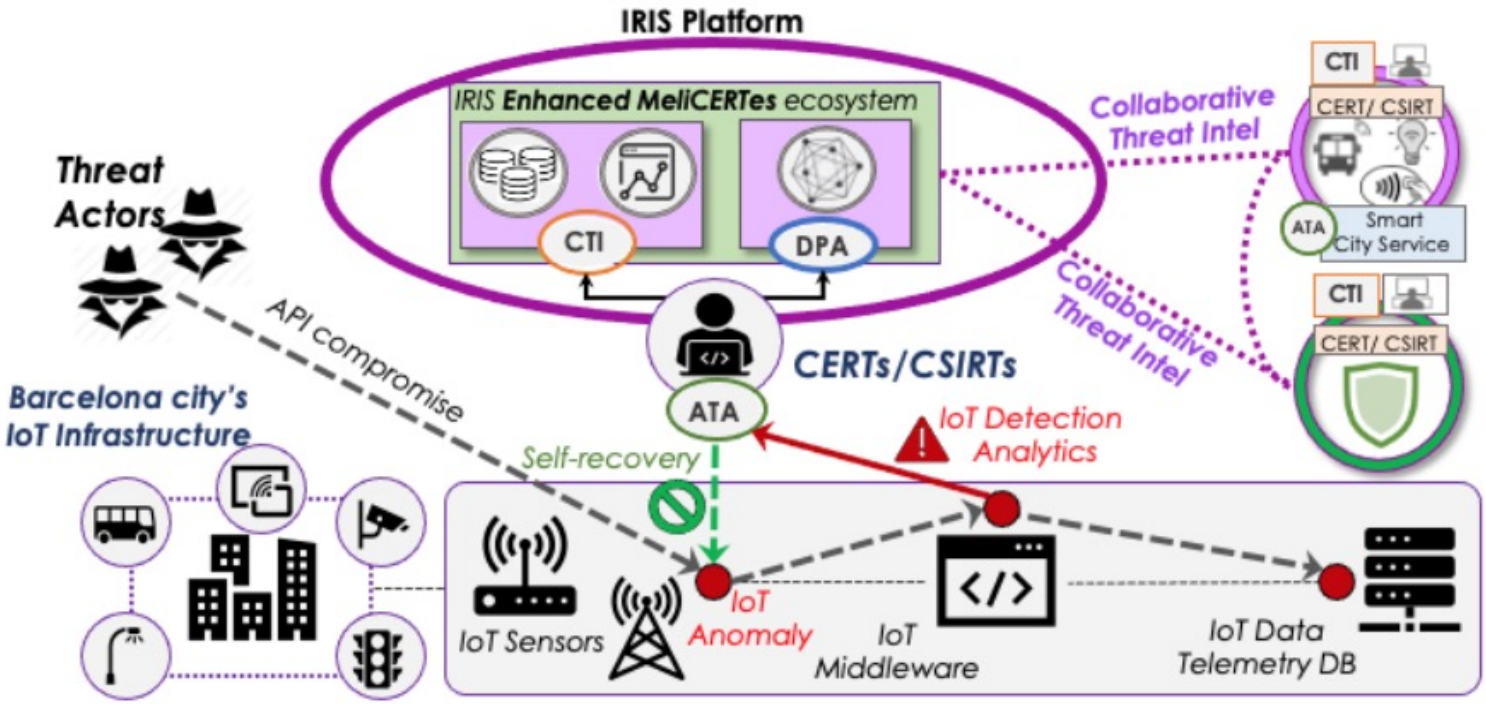
IRIS Pilots: **Pilot Use Case 1**

Securing the smart city's IoT and control systems against confidentiality and integrity breaches (Barcelona, Spain)



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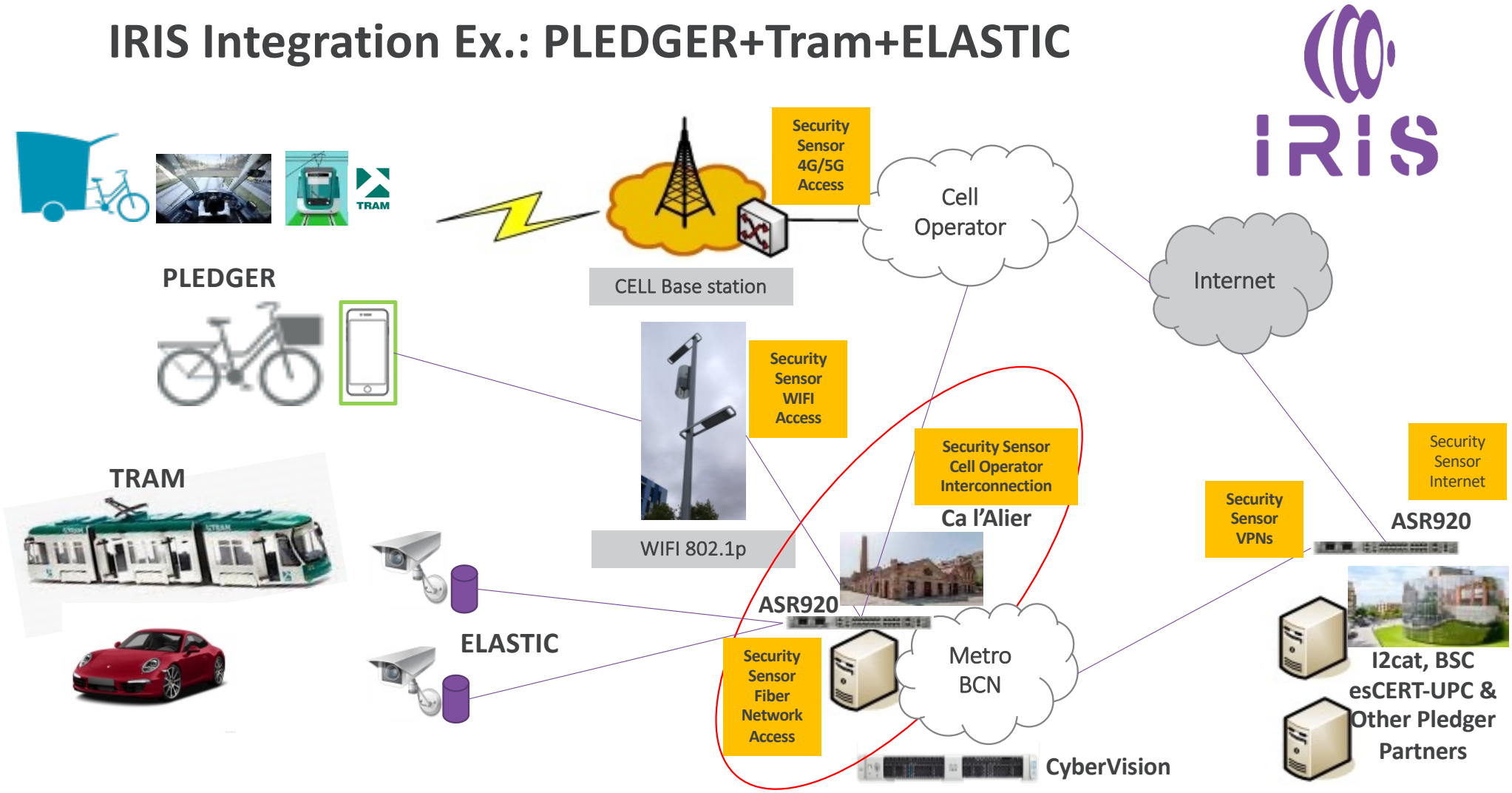
IRIS Integration Ex.: PLEDGER+Tram+ELASTIC



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Key capabilities

VISBILITY

- Asset inventory
- Identify relationships between assets
- Generate inventory reports

Benefits
Store all data collected within the CyberVision center database, export or link to other systems (CMDB).

OPERATIONAL INSIGHTS

- History of events & asset modifications
- Highlight changes to asset configurations
- View key events on the control system
- Generate Controller reports

Benefits
Provide situational awareness and empower OT staff to reduce attack surface.

ANOMALY DETECTION

- Automated baselines for asset behaviors
- User created baselines
- Alerts on deviations

Benefits
Identify malicious behaviors.

VULNERABILITY

- Threat Intelligence database
- Identify asset vulnerabilities
- Generate vulnerability reports

Benefits
Provide situational awareness and empower OT staff to reduce attack surface.

INTRUSION DETECTION

- Snort based Intrusion Detection
- Signatures curated for industrial networks

Benefits
- ❑ Enable and streamline incident response.
- ❑ Accelerate remediation & recovery.

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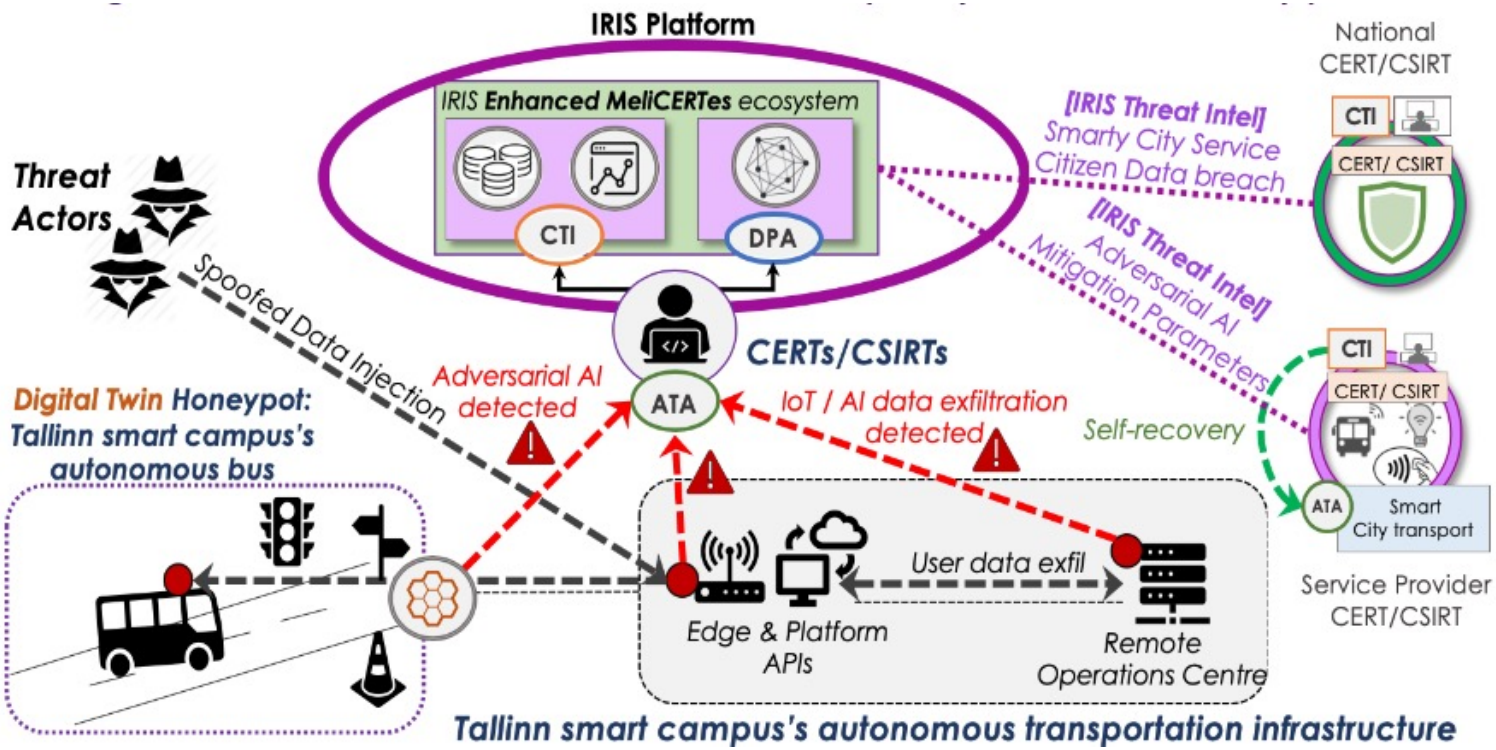
IRIS Pilots: **Pilot Use Case 2**

Securing AI-enabled infrastructure of autonomous transport systems in a smart city (Tallinn, Estonia)



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AI Enabled Infrastructure - Transportation

- Autonomous Vehicle Shuttles for Public Transportation
- Vehicle-to-Everything (V2X) Communication
- Teleoperation/Remote Control Operations Center
- Autonomous Vehicle Telemetry and Smart City Data fused into Urban Operating Platform (UoP)

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Tallinn Pilot Cyber Threat Scenarios

1) Availability of telemetric data from the AV to the Urban Operating Platform (UoP)
2) False information being fed to disrupt the ML/AI used for autonomous driving

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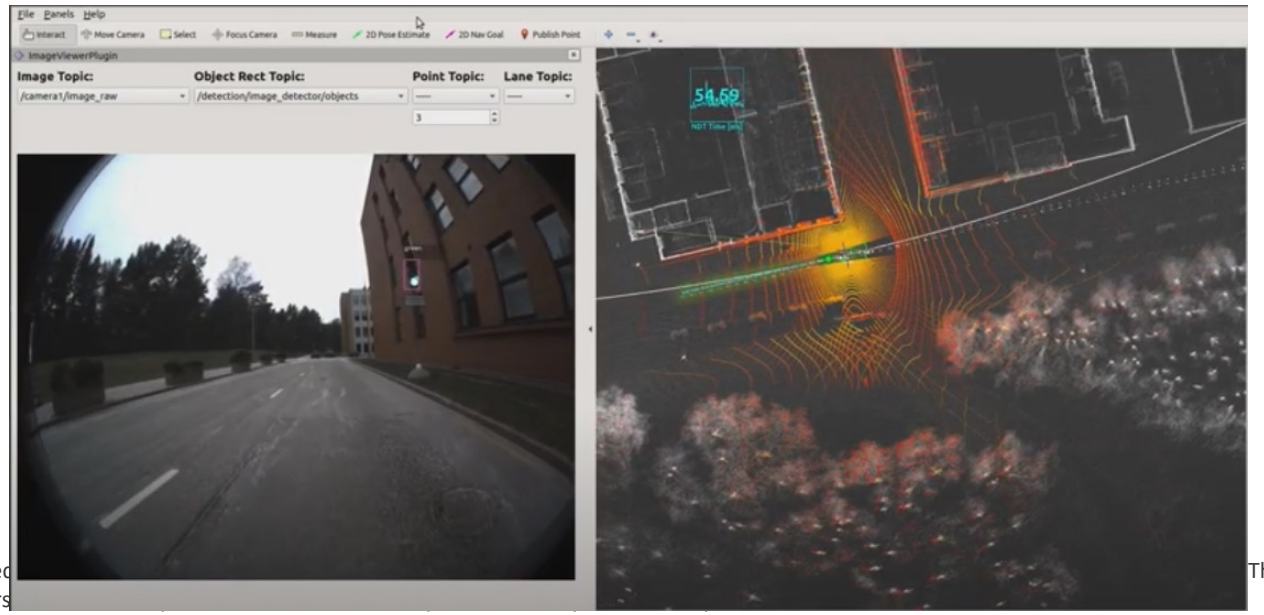
Example

The Autonomous Vehicle (AV) approaches a traffic-light controlled intersection or roadway. The machine vision of the AV focusses on the traffic light and the AV object-detection module detects the traffic light color and makes a driving decision to pass-through or stop.



This project has received
reflects only the authors

Key capabilities

- Threat Identification
- Self-Healing
- Information Sharing
- Enable Cyber Incident Response from CERTS/CSIRTS

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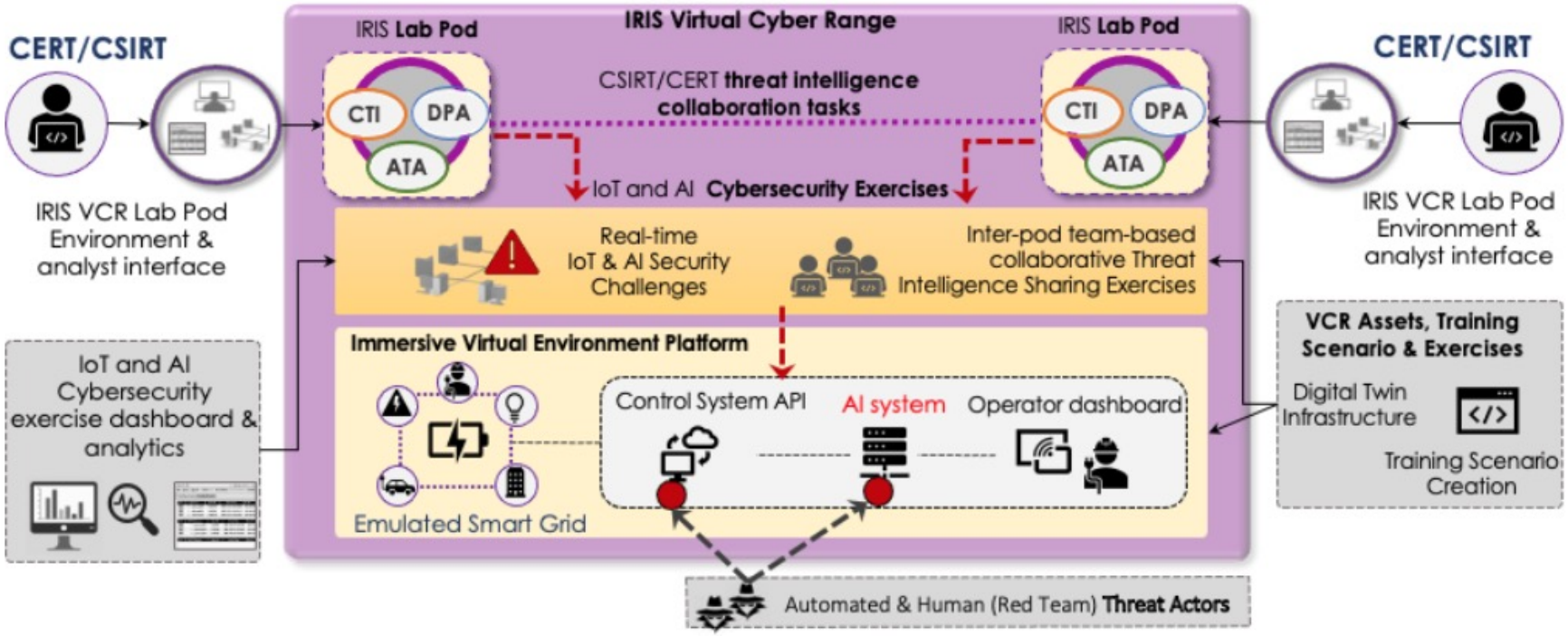
IRIS Pilots: **Pilot Use Case 3**

Effective incident response and threat intelligence collaboration for critical cross-border smart grid threats (Helsinki, Finland and Tallinn, Estonia)



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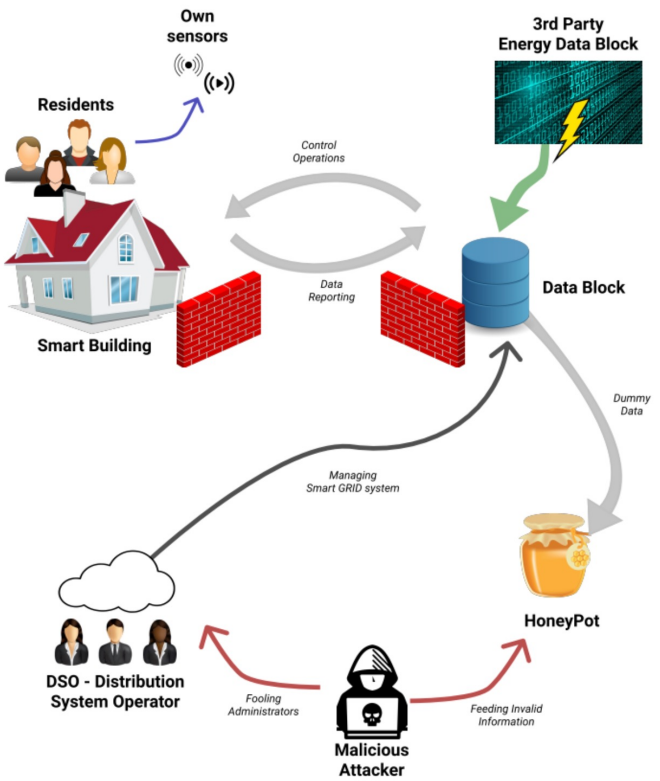

Stakeholders to consider

- **DSO (Distribution system operator)** – Acting as a party who directly reports the energy demand, controlling the building load. E.g., malform the data in the load system, confusing the DSOs and the load control.
- **Building Residents -** Having data wallets of personal data as a React application, allowing users to map own sensors in the system. E.g., security of personal data.
- **CERTs/CSIRTs –** Feedback on handling and forecasting security incidents, complex attacks and propagated vulnerabilities in IoT and AI-driven ICT systems.

Cross-Border Smart Grids – Helsinki - Talin Pilot

- Helsinki city **Smart grid** - enabling real time smart metering, electric vehicles network and new storage solutions for electricity.
- Provision of **load control functions** that the distribution system operator (DSO) can use in situations where the production has reached its peak.
- **Urban Data Platform**, a smart city data platform based on Apache Kafka, Apache Spark, Microsoft Azure-
- **Smart grid APIs** from the city of Tallinn.

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Cybersecurity Challenge

- Effective incident response and threat intelligence collaboration for critical **cross-border** smart grid threats
- Focus on protecting the customer facing components of the smart grid against threats to control functions defined for the demand control.

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