Key Enabling Technologies - Challenges and opportunities

- **KET: technologies, which alone or in combination with other technologies, have the potential to significantly enhance or deliver new capabilities.**

- Similar terms: critical technologies, emerging and disruptive technologies, strategic key technologies

- Several **criteria** are used to define, select and prioritize KETs, for instance:

  - Potentially large societal and economic impact / crucial to solve societal challenges
  - Broad field of application in innovations and sectors
  - Enable innovations on mid-long term
  - Important for (national) security
  - Contribute to economic capacity
  - Enable national/European technological leadership
  - Strengthen international knowledge position

- EC has identified **10 critical technology areas for economic security**: (1) Advanced connectivity, navigation, and digital technologies, (2) Advanced sensing technologies, (3) Space and propulsion technologies, (4) Energy technologies, (5) Robotics and autonomous systems, (6) Advanced materials, manufacturing, and recycling technologies, (7) Quantum technologies, (8) Biotechnologies, (9) Cybersecurity technologies, (10) Artificial intelligence.

- Strategic Technologies for Europe Platform (**STEP**): mobilise investments in the fields of digital and deep tech, cleantech and biotech, with the overall aim of strengthening the EU's sovereignty and long-term competitiveness in critical technologies.

TNO innovation for life

Key Enabling Technologies - Challenges and opportunities

- **Objectives** of this panel:

  1) To get a better understanding of KETs relevant for civil security and where to focus on?

  2) How to boost the development of these KETs and enhance our European security capabilities

  3) Learn from and be inspired by the panellists

- **Panel members**:

  - Mohammad Iranmanesh (Constellr)

  - Olivier Balet (CS Group)

  - Eleftherios Ouzounoglou (Institute of Communication and Computer Systems of the National Technical University of Athens)

  - Daniel Camara (Center for Artificial Intelligence, French Gendarmerie)

  - Marcel van Berlo (TNO) – moderator

RTO perspective: TNO, EARTO

EARTO Working Group
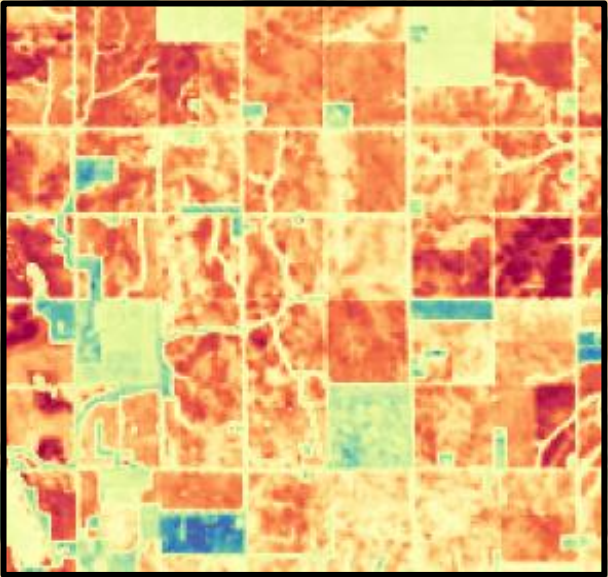Security & Defence Research

- **TNO** is a large RTO based in the Netherlands

- Various units: **Defence, Safety & Security**, Energy & Materials Transition, ICT Strategy & Policy, High Tech Industry, Healthy Living & Work

- We advise our national government regarding **strategic technology development** with impact. E.g. Ministry of Economics on the National Technology Strategy.

- Defining, selecting and prioritizing specific KETs for TNO's research (**Capability Driven Approach**).

- Also KEMs – **Key Enabling Methodologies**: KEMs represent innovative methods and ways of working that are instrumental in identifying KETs and pushing them to higher TRLs ('how' versus 'what'). E.g. horizon scanning, technology assessments, foresight studies.

- **Characteristics of RTOs:** nodal position in the RD&I ecosystem, impartial, medium- to long-term technological perspective, strengthening competitiveness (e.g. via transfer of technologies, supporting SMEs and start-ups), analysis capacity, enablers / orchestrators of cooperation, creating synergies

- **EARTO**: association with 350 RTOs from more than 30 countries

- **Working Group Security & Defence research**: 36 RTOs, 19 countries, 80 experts

- Closely connected to **CERIS**

See vegetative stress before damage has occured

HEALTHY STRESSED DAMAGED

Measuring temperature from space to support food security on Earth

constellr

From ideation to adoption, a pathway paved with KETs

CRIMSON
Smart security and operation management
http://www.crimson.eu

3D simulation & visualisation

eXtended Reality

2007 CRIMSON FP7 project

2010 INDIGO FP7 Project

Digital Twin based hypervision and C2

2014 VASCO FP7 Project

2017 Adopted by first SDIS

2019 First deployment abroad (Tunisia)

2020 10+ critical infrastructures

2021 25 SDIS

2022 EU Domino FSX exercise

2023 40 SDIS 7 COZ & COGIC Rugby World cup

2024 Adopted by 50+SDIS & Critical infrastructures of French MoD — Paris 2024 Olympic Games

2017 STEPWISE ISF Project

Smart autonomous UxVs Environment sensing

2020 S4ALLCITIES H2020 Project

2021 INTREPID & APPRAISE H2020 projects

Intelligence Amplification

Augmented First Responder

eS
a Sopra Steria company
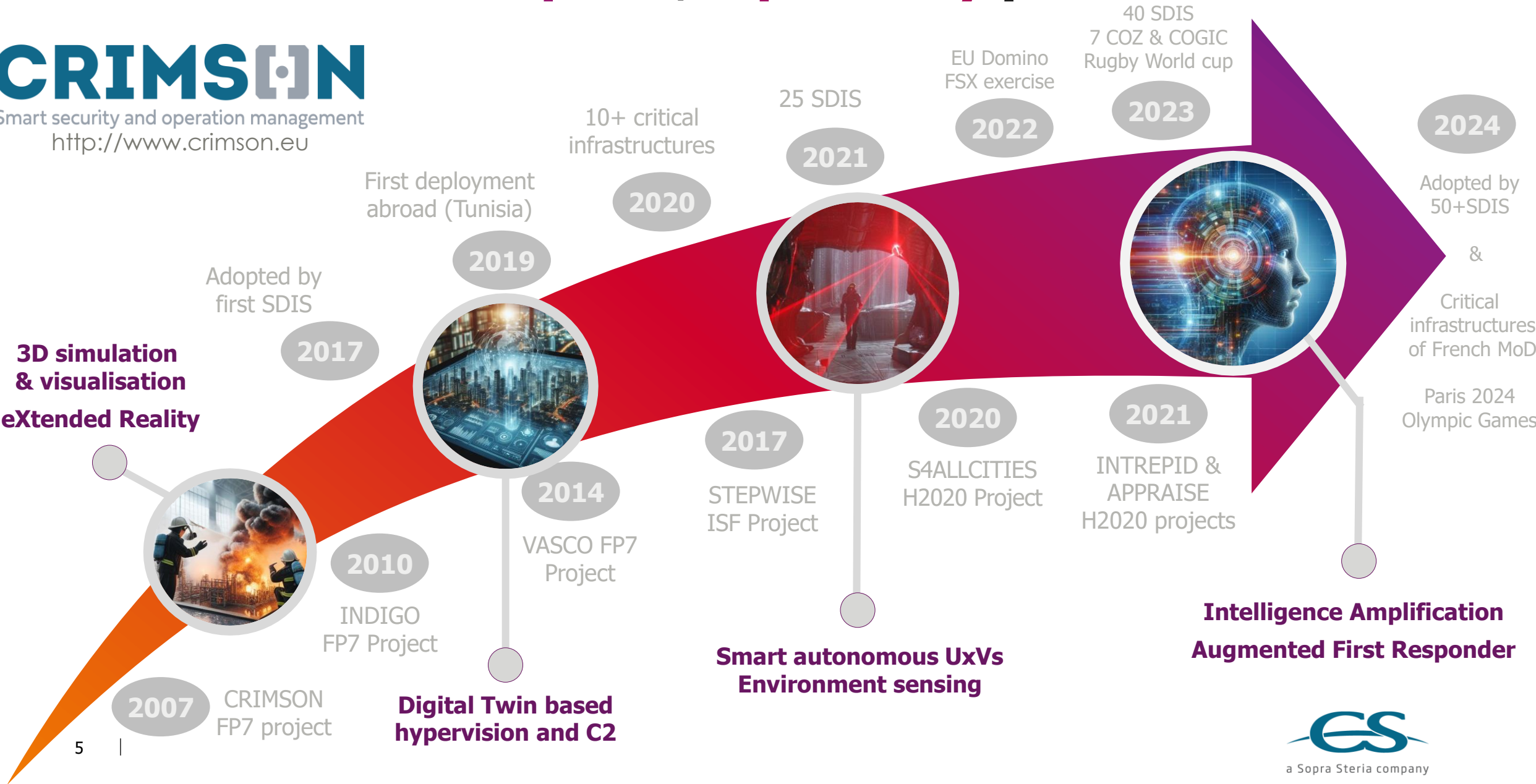
I-SENSE/ICCS and Key Enabling Technologies

- **Personal Background:** Informatics and Telecoms – Machine Learning – Bioinformatics
- **Group's Activities:** CCAM, INS, Smart Mobility, Logistics, Smart Manufacturing, Circular Economy, Earth Observation, XR, **Crisis Management and Secure Societies**, Health Technologies

| Additive Manufacturing | Microelectronics | IoT | AI | AR | IoT Protocols |

UWB Localization under Debris

NG112 Sensor

Digital Triage Tag and Apps

Smart K9 Vest

Smart Life Vest

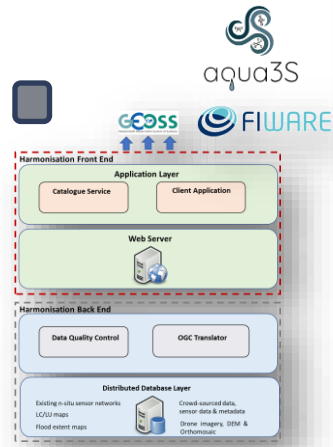**On-board processing multi-sensor UAV for object detection and tracking**

Injured Face Identification

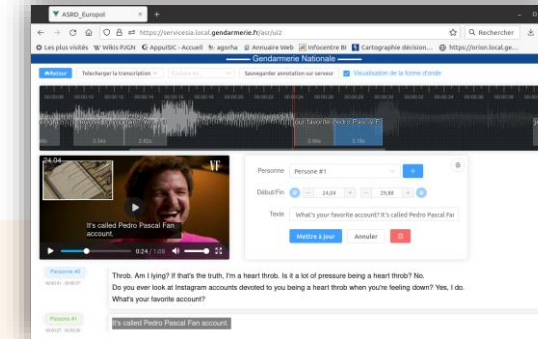**AR campaigns for Risk Perception**

AR Training

Interoperability Gateways

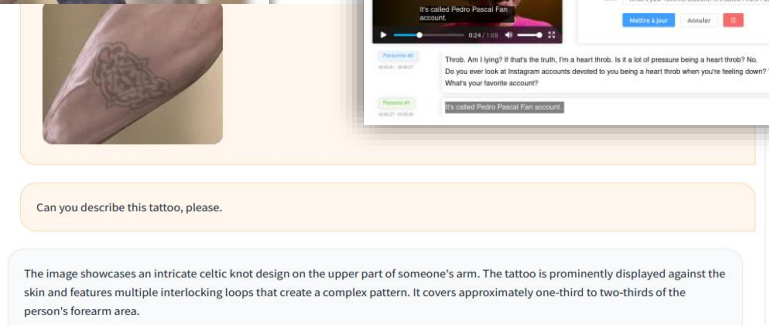# KET at the Center for Forensic Artificial Intelligence

- The usage of AI to develop state-of-the-art solutions for treating criminal data
  - Natural language processing
  - Image analysis
  - Temporal series analysis
  - Weak signal detection
  - Speech to text
  - Generative AI

- Participation in recherche projects

- Coordination of Europol's core group on Speech and Text Analysis of The European Clearing board