



Deep Learning Powered Holographic Microscopy for Biothreat Detection on Field

Project

Type of action: RIA

Topic: the Secure societies Work Programme - Protecting freedom and security of Europe and its citizens,

Start Date: 01 May, 2021

End date: 30 April 2024

Partners

IDEAS Science Ltd. (Hungary) - coordinator

DataSenseLabs Ltd. (Hungary)

Zug Medical Systems SAS (France)

POLITECNICO DI MILANO (Italy)

UNIwersytet Łódzki (Poland)

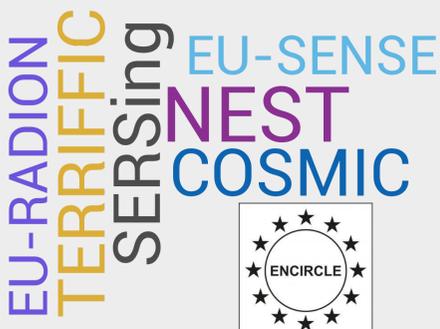
SIoux TECHNOLOGIES BV (Netherlands)

KOMENDA STOLECZNA POLICJI (Poland)

D.M.I (France)

INSTITUT PASTEUR (France)

Cluster B projects



Concept and approach

Combining methods of artificial intelligence (AI) and machine learning (ML), the HoloZcan project will develop novel holographic microscopy and imaging technology for screening potential biological threats and unknown, potentially dangerous substances. The project responds to actual needs of European practitioners and technological gaps identified and indicated in the ENCIRCLE Catalogue of Technologies, and to fill the security gap of public space protection.

Objectives

1. Increase societal resilience against CBRN incidents by bringing a new autonomous detection device.
2. Indicating and demonstrating the HoloZcan technique versatility for a wide range of applications.
3. To respond to the actual needs of European practitioners and technological gaps identified by the ENCIRCLE project.
4. Strengthening the knowledge base in the field of third-generation optical-based bio-detection systems.



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The main beneficiaries of the HoloZcan tools are security actors such as police, relief workers, disaster managers, crisis managers, stakeholders responsible for public safety, critical infrastructure, and service providers.

"biothreat, digital holographic microscopy, AI, pathogens, bacteria, CBRN, bio-aerosol sensing, sampling protocol, optical biodetection"

Holographic microscopy

Digital Holographic Microscopy (DHM) with supplementary optical modalities for triggering on airborne biological hazard events.

DHM technology combines the broad sensitivity of particle counters with the capabilities of a microscope, so that suspicious micro- and nano-objects can be analysed accurately. The microscopic architecture design also allows air samplers and filters to be integrated into the control pipeline. The system is supported by artificial intelligence analysis, calibration and validation techniques for the separation of biological and physical nanoparticles, as well as automatic classification of bio-aerosols visible in images into pre-trained classes.

The strengths of the system include speed, reusability, field use.



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Cordis: <https://cordis.europa.eu/project/id/101021723>

