AVERT / The Autonomous Vehicle Emergency Recovery Tool (AVERT) provides a capability rapidly to deploy, extract and remove both blocking and suspect vehicles from vulnerable positions and confined spaces.

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Information

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Project objectives

Terrorism can lead to horrific loss of life, extensive disruption to city transport and damage to commercial real estate. Vehicles provide an ideal delivery mechanism because they can be meticulously prepared well in advance of deployment and then brought in to the Area of Operations. Furthermore, a real and present danger comes from the threat of Chemical, Radiological, Biological and Nuclear (CRBN) contamination.

Current methods of bomb disruption and neutralisation are hindered in the event that the device is shielded, blocked or for whatever reason cannot be accessed for examination.

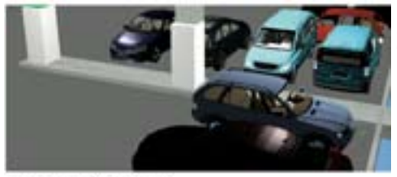
The Autonomous Vehicle Emergency Recovery Tool (AVERT) shall provide a unique capability to Police and Armed Services to rapidly deploy, extract and remove blocking vehicles from vulnerable positions such as enclosed infrastructure spaces, tunnels, low bridges as well as under-building and underground car parks. This will then allow access for Explosive Ordnance Disposal (EOD) operation.

Description of the work

The project covers the development and demonstration of a proof of concept for an Autonomous Vehicle Emergency Recovery Tool (AVERT). This is designed to assist EOD teams by locking onto the vehicle(s) which is (are) obstructing the deployment of EOD systems and rapidly and safely removing it (them) from the path to allow speedier access than can currently be achieved.

The AVERT project concept is to automate the placing of lifting bogies, capable of omnidirectional movement, under the road wheels of identified vehicles and to synchronise their lifting and path as a group in order to remove the vehicle without disturbance. Vehicles can be removed from confined spaces (e.g. where the height level is constrained) with delicate handling, swiftly and in any direction to a safer disposal point to reduce or eliminate collateral damage to infrastructure and personnel.

The operational framework is targeted at a system which is deployed alongside current EOD robots and equipment. This system comprises a number of independent lifting bogies, one for each wheel of the blocking vehicle to be moved. The bogies are deployed from a carrier platform (Deployment Unit) and each locks onto a road wheel on the designated vehicle. Once in position, the swarm of bogies acts in synchronisation to raise the road wheels and move the vehicle along a safe path, allowing the existing EOD robot access for neutralising operations.



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view/plan

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deploy

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extract

The concept also includes a Command Console which is detached from the Deployment Unit and held at the command post. This console will be designed to provide the commander with command and executive control of the operation by designating the desired access path and confirming the sequence of vehicles to be moved to achieve it.

AVERT will be commanded remotely and will operate autonomously under its own power and sensor awareness, as a critical tool alongside existing technologies, thereby enhancing bomb disposal response speed and safety.

Expected results

Demonstration of:

- capability to safely extract and remove blocking vehicles in a timely manner;
- delivery of access paths which cannot be provided by EOD robots;
- delivery of a faster and safer removal capability than that which is currently achievable manually;
- provision of effective command and control of the autonomous co-operative elements within a representative EOD operating framework.

PARTNERS

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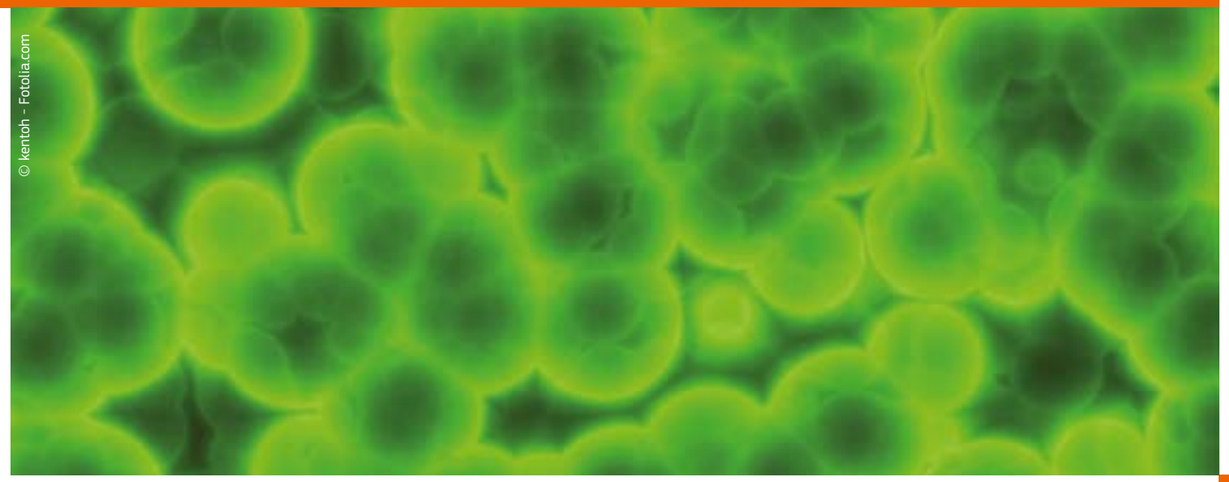
BIO-PROTECT / Ionisation-based detector of airborne bio-agents, viruses and toxins for fast-alert and identification



Information

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242306
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€3,125,577
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36 months

Coordinator

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Project objectives

The malevolent use of Anthrax spores on civilians in 2001 has shown the necessity to protect citizens from criminal use of biological agents. The success of such attack depends on sufficient concentration of pathogens in a defined area.

Detecting pathogenous bacteria, spores and viruses must be accomplished by triggering short-term alarm and identification of the type of threat.

Since most of the bio sensors available today are laboratory bound or require special equipment which needs training as well as experience, new systems are needed.

The concept of BIO-PROTECT is the development of a fast-alert, easy-to-use device for detection and identification of airborne bacteria, spores, viruses and toxins. It is based on bioaerosol detection by fluorescence, scattering and background aerosol measurement followed by ionisation of air flow and analysis of the spectrum of relative speed of passage, enabling identification of biological agents.

Description of the work

The work in BIO-PROTECT will be structured in several technical Work Packages, addressing the following activities:

» Development of a bio-agent detection system based on a miniaturised GC-IMS (Gas Chromatograph - Ion Mobility Spectrometry) instrument able to identify and separate extremely small amounts of a wide range of organic molecules resulting from heat-decomposed organic matter;

» Integration of a particle size analyser which constantly monitors the ambient air, thus triggering a measurement if a sudden change in particle size and/or density occurs;

» Improvement and integration of a continuously operating bioaerosol detector measuring fluorescence, scattering and background aerosol properties to detect presence of potentially harmful biological agents in ambient air and to trigger further identification;

» Research and development of a combined pre-concentration and pyrolysis unit for use with a GC-IMS, that can separate all types of bio-agents from aerosols. The target is to detect bio-agent concentrations likely to infect or intoxicate;

» Development of pattern analysis software for the interpretation of the acquired spectra, thereby identifying bio-agents and distinguishing them from background bacteria.

Expected results

The development of the proposed device will provide security personnel with a viable tool to take fast, effective countermeasures against biological threats. This will drastically reduce the potential impact of terrorist aggressions or accidental release of bio-agents from laboratories, as well as detect spreading of pathogenic microorganisms in the food producing industry or in hospitals.

This breakthrough would lead to technological advantage and favour leadership of European industry in this field.

PARTNERS	COUNTRY
LGI Consulting	France
AVSISTA	Lithuania
C-Tech Innovation Ltd	United Kingdom
Environics Oy	Finland
Commissariat à l'énergie atomique et aux énergies alternatives (CEA)	France
Institut für Umwelt Technologien GmbH	Germany
Robert-Koch Institut	Germany
University of Aalborg	Denmark
Environics-IUT GmbH (ENIT)	Germany

BONAS / BOmb factory detection by Networks of Advanced Sensors


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Information

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261685
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42 months

Coordinator

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Project objectives

The BONAS project presents the following objectives:

» To design, develop and test a novel wireless sensor network for increasing citizen protection and homeland security against threats posed by IED devices. The sensor network will focus on the detection of traces of precursors used in IED production (particulates, gases, waterborne) in the vicinity of a "bomb factory". This will contribute to the determination of the "factory's location", allowing an early threat thwart.

» To perform a feasibility study that will assess the usefulness and potential advantages that the BONAS concept will bring about in the future. A cost analysis will be performed in order to foresee the financial effort associated with the field deployment of such a sensor network, its operation and maintenance.

» To demonstrate the BONAS concept in a close to real-life scenario, implementing all developed network sensors with the aim of evaluating their performance and larger scale deployment potentials.

» To investigate and prepare the potential future deployment of key sensors aboard a flying platform with a view towards increasing the BONAS network detection capabilities.

Description of the work

The aim of BONAS is to design, develop and test a novel wireless sensor network for increasing citizen protection and homeland security against terrorist attacks, in particular against the threat posed by IED devices. The sensor network will focus on the detection of traces of precursors used in IED production (particulates, gases and/or waterborne) present in the environment surrounding the vicinity of a "bomb factory". The different sensors are specifically designed to be deployed in sensitive locations and easily camouflaged. This network will help pinpoint the "factory's location", allowing an early threat thwart. A feasibility study will assess the usefulness and potential advantages that the BONAS concept will bring about in the future and the costs of mass production of sensor networks integrating COTS components.

BONAS intends also to investigate and prepare the potential future deployment of key sensors aboard a flying platform with a view towards increasing the BONAS network detection capabilities. The wireless sensor network will feature a variety of sensing devices (in-situ and remote), that will jointly provide broad chemical spread and low false alarm rates through an expert system management of the data collected. In particular, BONAS will develop a Lidar/Dial system; QEPAS sensor; SERS sensor; QCM sensor; and electrochemical sensor.

BONAS includes a multidisciplinary team of leading European research groups together with industrial organizations and end-users with previous experience and activity in the field of specific local and remote sensor development and with experience on security projects. The consortium represents the complete supply chain of the proposed product, which sets good perspectives for exploitation and commercialization of the generated innovations. The consortium will be supported by an already established Advisory Board formed by experts from the various police corps.

Expected results

The BONAS project envisages an innovative, large-scale sensor network in the future, able to detect IED preparation with a minimum rate of false alarms and relying on three different layers. The target substances will comprise explosive and precursor substances contained in IEDs. The concept is based on a series of increasingly specific tests taking place in increasingly smaller areas starting with general tests and then reducing the search area. Each one of the referred layers will correspond to a different phase of threat detection and to different levels of the wireless sensor network.

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PARTNERS

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SERSTECH AB (SAB)	Sweden
TEKEVER - TECNOLOGIAS DE INFORMACAO, S.A. (TEK)	Portugal
LASER DIAGNOSTIC INSTRUMENTS AS (LDI)	Estonia
CSEM CENTRE SUISSE D'ELECTRONIQUE ET DE MICROTECHNIQUE SA - RECHERCHE ET DEVELOPPEMENT (CSEM)	Switzerland
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UNIVERSITE CLAUDE BERNARD LYON 1 (UCBL)	France
OFFICE NATIONAL D'ETUDES ET DE RECHERCHES AEROSPATIALES (ONE)	France
UNIVERSITE DE LAUSANNE (UNIL)	Switzerland
NATIONAL BUREAU OF INVESTIGATION (NBI)	Finland
KING'S COLLEGE LONDON (KCL)	United Kingdom
COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES (CEA)	France
QUEEN'S UNIVERSITY BELFAST (QUB)	United Kingdom

CAPER / Collaborative information, Acquisition, Processing, Exploitation and Reporting for the prevention of organised crime

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Information

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261712
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€7,143,920.80
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01/07/2011
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36 months

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Project objectives

The goal of the CAPER project is to create a common platform for the prevention of organised crime through sharing, exploitation and analysis of information sources. CAPER will support collaborative multilingual analysis of audiovisual content (video, audio, speech and images) and biometrics information, supported by Visual Analytics and Data Mining technologies. The integration of database technologies, application workflow and semantic modelling of processes, and legal and privacy limitations, will permit participating Law Enforcement Authorities (LEA) to share information and investigative and experiential knowledge. The CAPER platform will be built in close collaboration with the LEA users in order to fulfil their current and forthcoming needs. The project is clearly focused on the fusion and real validation of the existing state of the art, coupled with innovative new technologies, to solve current bottlenecks faced by LEAs.

Description of the work

The CAPER platform will consist of six core elements:
Open and Closed Data Sources: Multi-format, multimedia and multimodal information from open sources, TV and Radio capture, and information in closed legacy systems are the data sources to be mined and evaluated by CAPER.

Data Acquisition: Depending on the information source type, different acquisition patterns will be applied to ensure acquired information has a suitable format for analysis.

Information Analysis: Each analysis module is geared towards a specific content type, i.e. text, image, video, audio and speech or biometric data.

Information and Reference Repositories: Both source data when required, and the information mined by the information analysis modules, will be stored in these repositories, separated by content type.

Interoperability and Management Application: This is the end users' workbench. Built on a web based collaborative platform, it will allow the Law Enforcement Officers to create and configure their monitoring requests and analysis petitions.

Visual Analytics (VA) and Data Mining (DM): Grouped under the management application, the VA and DM elements are key components of the CAPER platform, since they will provide the intelligence necessary to support the outputs of the system.

Expected results

CAPER will support multilingual content analysis from its inception. Its focus will be on the acquisition of information from the Internet, Mass Media and existing LEA information systems. CAPER will include workflow and management applications to allow inter agency and transnational collaboration. The CAPER acquisition and analysis modules will be autonomous and deployable as a geographically distributed system. This provides both technical and operational benefits. CAPER will also comply with present European instruments for Freedom, Security and Justice by addressing the priorities 7 and 8 of The Hague programme.

PARTNERS	COUNTRY
S21Sec Information Security Labs S.L. (S21sec)	Spain
Asociación Centro de Tecnologías de Interacción Visual y Comunicaciones Vicomtech (VICOM)	Spain
Fraunhofer – Gesellschaft zur Foerderung der Angewandt (Fraunhofer-IGD)	Germany
Synthema (Synthema)	Italy
VOICEINTERACTION – Tecnologias de Processamento de Fala, S.A. (VI)	Portugal
ALTIC	France
Technion – Israel Institute of Technology (Technion)	Israel
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Consiglio Nazionale Delle Ricerche - Institute for Informatics and Telematica (IIT)	Italy
Universitat Autonoma de Barcelona (UAB)	Spain
Studio Professionale Associato a Baker & McKenzie (BAK)	Italy
Ministero dell'Interno - Servizio Polizia Postale e delle Comunicazioni (Postal and Communications Police Service) (PCPS)	Italy
Serviciul de Informații Externe (External Intelligence Service) (SIE)	Romania
Polìcia Judiciària (Judicial Police) (PJ)	Portugal
Guardia Civil (Civil Guard) (GC)	Spain

CBRNEMAP / Road-mapping Study of CBRNE Demonstrator

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RESEARCH **COMPLETED**

Phase two of the CBRNE Demonstrator project will illustrate the usefulness of the system-of-systems approach to counter CBRNE terrorism. This will best be validated in a set of realistic scenarios where vital parameters such as successful denial of access, delay of effect, shortened time for evacuation, shortened response time, more effective health care and other considerations can be observed and quantified.

Information

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242338
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Project objectives

CBRNEmap was a "phase I" Security Research project to define a strategic roadmap that will lead to a subsequent phase II, large-scale CBRNE (chemical, biological, radiological, nuclear, explosive) Demonstrator project. Its goal was to bring together end-users, industry and other stakeholders with Europe's scientific and technical communities to address the cross-cutting activity of such a large-scale effort and to identify potential scenarios and technical solutions.

Its key objective was to evaluate the multi-dimensional challenges of countering CBRNE-based threats. Temporal events (before, during and after) were contrasted against societal targets (mass transport, public spaces, etc.) and societal sectors directly involved in such events (law enforcement, health first-responders, etc.).

These generic needs were matched by technological solutions that will be integrated at a system-of-systems level, leading to the CBRNE Demonstrator.

Results

The project narrowed down CBRNE counter-terrorism to three dimensions: the need to protect society's vital functions, the ability to respond to CBRNE events and the need for resilience to enable society to rebuild capabilities. The generic needs of each dimension were matched with advanced technological solutions and integrated at the system-of-systems level for demonstration during phase II.

CBRNEmap's research identified a number of gaps in CBRNE counter-terrorism and solutions to fill them. Among others, it recommends that:

- more research effort be devoted to the design of buildings and, in particular, to the design of floor plan layouts, escape routes and surface-covering materials;
- recent advances in the material sciences such as nano-technologies argue for the development of new filters and protective equipment;
- the protection of buildings from attack require new modelling techniques to predict the spread of CBRN gas or aerosol agents;
- nano-technologies and new materials be studied for their potential decontamination applications;
- more EU research focus on the use of symbology or simplified language – including animation or other communications channels – to increase the rate, precision and absorption of public messaging about major CBRNE incidents.

PARTNERS	COUNTRY
European CBRNE center at Umeå University	Sweden
Police National CBRN Centre	United Kingdom
National Institute for NBC Protection	Czech Republic
Robert Koch Institute	Germany
DGA Maîtrise NRBC	France
Lindholmen Science Park	Sweden
French High Committee for Civilian Defence	France
Compagnie Industrielle des Lasers	France
European Aeronautic and Space Company	Germany
Totalförsvarets Forskningsinstitut (FOI)	Sweden
Foundation for Strategic Research	France
Istituto Affari Internazionali	Italy
Selex Galileo	Italy
Catholic University of Louvain	Belgium

COCAE / Cooperation across Europe for Cd(Zn)Te based security

RESEARCH **COMPLETED**

Information

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218000
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End Date
31/03/2012

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Project objectives

Fixed and portable detectors are usually used to detect, locate and identify radioactive and nuclear material at the checkpoints such as those at road and rail boarder crossings, airports or seaports. After a first alarm signal, a secondary inspection must be performed. Handheld detectors are then used to distinguish the innocent and false alarm from the real alarms. Hundreds of innocent alarms may take place per day at the boarder control from the portal detectors.

» To make spectroscopic measurements with efficiency equivalent to that of NaI detectors and energy resolution close to that of HPGe devices but without using cryogenic systems.

» To find the direction and the distance of the radioactive source.

» To localize the source into a cargo

» To work at a wide range of absorbed dose rates by adjusting the effective volume of the detector.

The above capabilities will improve the quality of the data gathered by the customs officers during the routine inspections at the boarders and will assist the first responders in case of a radiological or nuclear emergency to estimate the exact situation.

Technology challenges

» The growth of high purity, detector grade Cd(Zn)Te crystals. Their performance will be optimized by material purification, selection of right dopants and post-growth processing to obtain high resistivity, high transport properties and homogeneous distribution of these material properties in the grown crystals. The growth of crystals with a diameter up to 75 mm will be performed.

» The fabrication of pixel detectors having structure of p-n and Schottky diodes. This will permit the application of bias voltage high enough to collect all the induced charge by both electrons and holes.

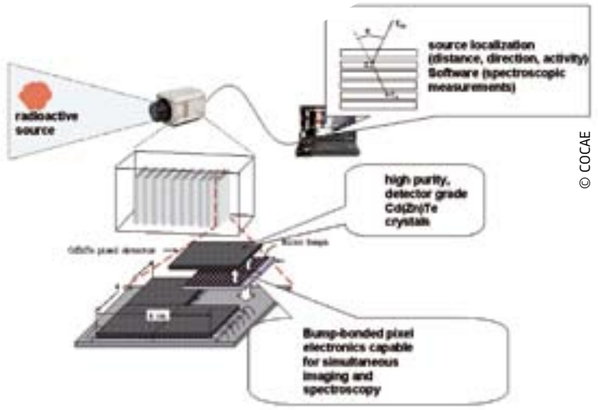
» The design of pixel electronics capable for simultaneous imaging and spectroscopy. The electronics will be bump bonded to the pixel detectors. This is essential for the localization and the identification of the radioactive source.

» The construction of a portable instrument having a stack of detecting elements.

This will allow to exploit the Compton Effect for the localization of the radioactive source and also to have variable detection efficiency.

Results

The results of the project are available on the CORDIS website http://cordis.europa.eu/fp7/security.



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PARTNERS	COUNTRY
Technological Educational Institute of Halkida (TEI)	Greece
Greek Atomic Energy Commission	Greece
Institute of Nuclear Physics, National Center for Scientific Research Demokritos	Greece
Oy Ajat Ltd	Finland
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Universidad Autonoma de Madrid, Departemento de Fisica de Materiales	Spain
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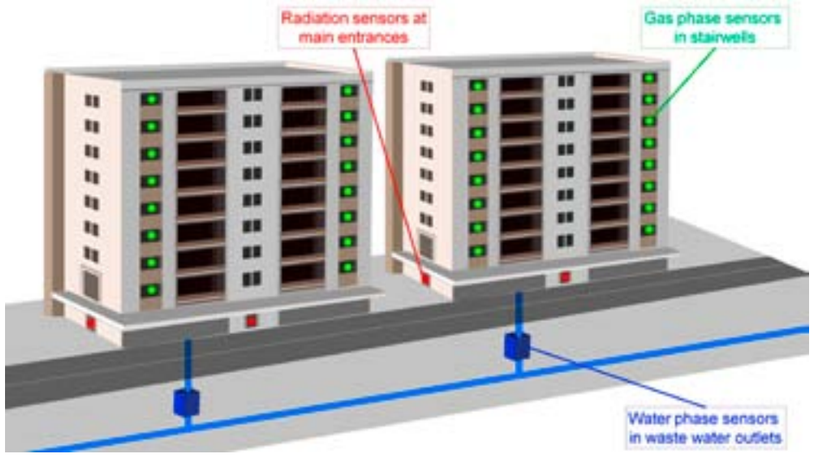
V.E. Lashkaryov Institute of Semiconductor Physics, National Academy of Sciences of Ukraine	Ukraine
Chernivtsi Yuri Fedkovych National University	Ukraine

COMMONSENSE / Development of a Common Sensor Platform for the Detection of IED "Bomb Factories"



Information

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01/01/2011
Duration
36 months

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Project objectives

The detection of chemical explosives is crucial for homeland security, environmental cleaning, and humanitarian efforts. Chemical explosives encompass a variety of compounds, with different vapour pressures, solubilities and chemical reactivities, making broad-class detection a serious challenge. While many sensing methods currently exist, none is ideal. Principal deficiencies include lack of portability, a susceptibility to false positive results due to environmental contaminants or false negative results to interfering compounds. The need exists for a single distributed network, with a common interface and communications protocol, to manage and communicate with a variety of different sensor technologies, and use the combined sensor data to produce clear results with low false positive/negative readings. The objective of the CommonSense project is to create and demonstrate such a single distributed network, with common interface and communications protocols, to manage and communicate with a variety of different sensor technologies, and to use the combined sensor data to produce clear results with low false positive/negative readings.

Description of the work

The work plan for the CommonSense project is divided into five complementary technical work packages:

Design and Specification
At the start of the project, the partners will specify target IED analytes, detection limits and test conditions relevant to end users. Specification of the common testing and benchmarking procedures, operating protocols, network architectures and communications protocols will also be carried out.

Materials Development and Characterisation
A variety of novel molecular, polymeric and nanostructured sensor materials will be developed and characterised with respect to their optoelectrical and photophysical properties, especially their response to sub-ppb (gas phase) and sub-ppm (liquid) levels of explosive compounds.

Sensor Development
Development of the sensor modules will be carried out at separate partner sites for initial testing and characterisation. A variety of different electrical, opto-electrical and opto-electrochemical devices for gas- and water-phase detection of IED analytes will be developed. A series of radiation detection modules will also be developed.

Software Development and Networking
Development of the common network platform for control and communication of the sensor modules. Driver software for control and read-out from different sensor types will be done at partner sites prior to integration with the network and the chemometric "learning" algorithms.

Integration, Testing and Industrial Validation
Integration of the sensor modules and quantitative testing and validation of the performance of the sensor modules. The final testing and assessment will be carried out in a "real-world" environment.

These are supported by two non-technical work packages focusing on dissemination & exploitation of project results and project management.

Expected results

The expected results from the project are:

» Development of modules for gas-phase detection of explosives with ppb sensitivity;

» Development of modules for water-phase detection of explosives with sub-ppm sensitivity;

» Development of a small form factor low-power gamma radiation sensor with <10% energy resolution and an energy range of 60keV to 2MeV;

» Development of an intelligent learning network, using chemometric algorithms to teach itself to detect explosives and ignore interferents.

PARTNERS	COUNTRY
University College Cork, National University of Ireland (UCC)	Ireland
Israel Institute Of Technology (Technion)	Israel
The University Of Manchester (UNIMAN)	United Kingdom
Alphasense Limited (ALPHA)	United Kingdom
Bundesanstalt Fuer Materialforschung und Pruefung (BAM)	Germany
SensL Technologies Limited (SENSL)	Ireland
Thales Communications S.A. (TCF)	France
Police Service of Northern Ireland (PSNI)	United Kingdom

CONPHIRMER / Counterfeit Pharmaceuticals Interception using Radiofrequency Methods in Realtime

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Information

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261670
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€2,634,489
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Coordinator

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Project objectives

The members of the CONPHIRMER consortium have come together to create a portable and easy-to-use sensor for telling genuine medicines from fakes, which customs officers and other agents of law enforcement can use without having to remove the medicines from their packaging. With this device agencies charged with tackling the growing menace of the trafficking in counterfeit medicines will be able to screen packaged pharmaceuticals at EU borders and airports quickly and accurately, using a non-invasive and non-destructive technology that uses only harmless radio waves.

Description of the work

The consortium will be utilizing a form of radio frequency spectroscopy known as Quadrupole Resonance (QR). This technology has been developed and deployed for the detection of concealed explosives and landmines and is considered human safe.

QR is a radiofrequency (RF) spectroscopic technique that can detect signals through multiple layers of cardboard, glass, plastic and/or wood. QR can analyse any compound containing a quadrupolar nucleus, which accounts for over 50% of elements in the periodic table, and, in particular, it is ideally suited for the analysis of compounds containing nitrogen, chlorine or bromine, sodium and potassium, which includes over 80% of all drugs.

The consortium will develop a portable QR-based medicines authentication device tailored to the needs of customs officers operating at EU borders in parallel with identifying the QR characteristics of medicines that afford the best discrimination between real and fake medicines. QR "fingerprints" based on these key characteristics will be put together to form a database that will be of use not only on the CONPHIRMER device, but in all analytical applications of QR for medicines authentication.

Expected results

A robust, economical, user-friendly and portable prototype system for the non-invasive, non-destructive and highly-specific testing of packaged pharmaceutical products will be produced. The system will quickly give an operator an answer to whether or not a medicine under transport matches that listed on the manifest.

Quadrupole fingerprints of active pharmaceutical ingredients (APIs) and pill formulations will be generated and built up into a database pre-loaded onto the device.

PARTNERS	COUNTRY
King's College London (KCL)	United Kingdom
French-German Research Institute of Saint-Louis (ISL)	France/Germany
University of Ljubljana (IMFM)	Slovenia
Jožef Stefan International Postgraduate School (IPS)	Slovenia
University of Lund (ULund)	Sweden
Rapiscan Systems Ltd (RSL)	United Kingdom
Polish Customs Service (PCS)	Poland
Stelar SRL (STELAR)	Italy
London South Bank University (LSBU)	United Kingdom
Bagtronics Ltd. (BAG)	United Kingdom

CUSTOM / Drugs and precursor sensing by complementing low cost multiple techniques

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Information

Grant Agreement N°
242387
Total Cost
€5,295,523
EU Contribution
€3,486,406
Starting Date
01/06/2010
Duration
36 months

Coordinator

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Project objectives

The project aims to develop a chemical sensor able to perform chemical identifications in contexts such as customs offices, where inspection of trucks, cars, containers, as well as people and baggage is required, in order to trace the distribution of illegal narcotics and synthetic substances such as pseudoephedrine and ephedrine.

The detection approach should use established techniques so that it can provide unambiguous responses.

The project will focus on employing multiple techniques, integrating them in a complex system in a complimentary approach, in order to identify an optimum trade-off between opposite requirements: compactness, simplicity, low cost vs. sensitivity, low false alarm rate, selectivity.

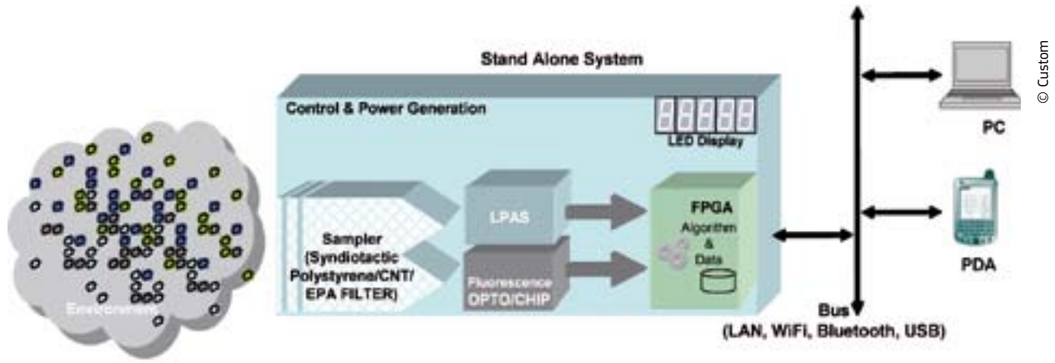
Description of the work

A drug precursor sensor demonstrator, implementing two main techniques will be developed:

» a low cost, high data throughput sensing technique, based on UV-Vis-NIR fluorescence which incorporates an array of different properly engineered chemical proteins able to bind the target analytes as happens in an 'immuno-type' reaction; and

» a highly sensitive and selective, compact and low weight, spectroscopic sensing technique in Mid-IR optical range, based on Laser Photo-Acoustic Spectroscopy (LPAS).

Parallel efforts will be spent on: identifying proper sampling techniques for both vapour and powder phase compounds; collecting or, where not existing, building up a database of characteristic spectra for both measurement techniques.



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Expected results

The sensor will be able to detect Drug Precursors such as ephedrine, P2P, BMK, Acetic anhydride and Phenylacetic acid and others compound with a screening time of 10 seconds.

PARTNERS	COUNTRY
SELEX Sistemi Integrati S.p.A.	Italy
GASERA	Finland
University of TURKU	Finland
INAS-Tecnalia	Spain
Alcatel-Thales III-V Lab	France
CNR IBP	Italy
ENEA	Italy
INSTM	Italy
Aalto University Foundation	Finland
Direction Nationale du Renseignement et des Enquêtes Douanières	France

DIRAC / Rapid screening and identification of illegal drugs by IR absorption spectroscopy and gas chromatography

Information

Grant Agreement N°
242309
Total Cost
€4,256,753.33
EU Contribution
€2,987,717
Starting Date
01/06/2010
Duration
42 months

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Project objectives

The goal of this project is to develop an advanced sensor system that combines miniaturized Gas Chromatography (GC) as its key chemical separation tool, and Hollow-Fiber-based Infra Red Absorption Spectroscopy (HF-IRAS) as its key analytical tool to recognize and detect illicit drugs and precursors. Currently, GC-IRAS (through FTIR implementation) is, together with GC-Mass Spectrometry, the most powerful technique for the identification and quantification of amphetamines. However, so far it has been implemented only as bench-top instrumentation for forensic applications and bulk analysis. In DIRAC, the use of micromachined GC columns, solid state lasers, and hollow fibre IR, will allow for developing a sensor that features hand-portability and prompt response –for field operation– and is able to perform both bulk and trace analysis. The DIRAC sensor will further feature a) an advanced sampling device, that separates the analyte from larger amounts of materials by electrostatic charging; and b), an advanced micro-machined pre-concentrator that treats sequentially both volatile ATS substances and non volatile ammonium salts.

Description of the work

The project has a duration of 42 months, and is divided into three phases as follows:

» Phase 1 (6 months), where requirements are reviewed;

» Phase 2 (24 months), where the sensor is developed together with its sensing modules, techniques and procedures;

» Phase 3 (12 months), where the sensor is tested, optimized and validated.

The main Work Package (WP) active in phase 1 is **WP1**, where a review is made of the target chemicals (amphetamines, precursors, and street compounds) and of the operational requirements for the sensor.

WPs active in phase 2 are:

» **WP2,** where the sensing prototype is developed, with its strategies, procedures, and process controls;

» **WP3,** that develops the sampling module, with its methods and procedures;

» **WP4,** that develops the pre-concentration module, with its methods and procedures;

» **WP5,** that develops the HF-IRAS module, with its methods and procedures;

» **WP6,** that develops the GC separation and detection module, with its methods and procedures;

» **WP7,** that develops the Expert System as a pattern recognition and learning machine.

The main WP active in phase 3 is **WP8**, where the sensor is tested and validated in the lab and through a small-scale field-campaign, and performance is assessed quantitatively, that is in terms of False Positive and False Negative Probabilities.

The Work-Plan further includes a **WP0** (Management) and a **WP9** (dissemination and exploitation of results), both active throughout the project.

Expected results

The main output of the project will be the initial prototype of a sensor able to provide real support to customs officers in their daily fight against the trafficking and distribution of illicit drugs. The prototype is therefore expected to show:

» Reliability (ability to reject interferents);

» Hand portability;

» Fast response (few minutes);

» Good sensitivity (tens of nano-grams or better);

» Broad chemical spread (sensitivity towards different drugs and precursors);

» Identification capacity, (ability to distinguish one target compound from another at least on a family base).

PARTNERS	COUNTRY
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Selex Sistemi integrati SpA (SSI)	Italy
ELSAG DATAMAT S.p.A.	Italy
Universite de Lausanne	Switzerland
Universitatea Dunarea de Jos Din Galati	Romania
Institut National de Criminalistiek en Criminologie	Belgium
National Bureau of Investigation	Finland
Consorzio Interuniversitario Nazionale per la Scienza e la Tecnologia dei Materiali	Italy

EMPHASIS / Explosive Material Hidden Agile Search and Intelligence System

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Information

Grant Agreement N°
261381
Total Cost
4,593,273
EU Contribution
3,406,051
Starting Date
01/10/2011
Duration
36 months

Coordinator

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Project objectives

The goal of the EMPHASIS project is to test a system concept for the surveillance tool of tomorrow for detection and localisation of ongoing illicit production of explosives and improvised explosive devices (IEDs) in urban areas.

The EMPHASIS system is composed of different sensors in a network. Area detectors for the monitoring of explosives or precursors to explosives in the vapour phase will be used. Multiple static sensors, positioned in the sewer, for the monitoring of the sewage for indicative traces will also be used. The total gathered data will be fused and evaluated in a command centre.

If a threat substance is detected in elevated amounts, information about the type, location, time and amount will be registered and sent to a command centre where further evaluation and appropriate actions are undertaken. The intention is first to cover a large area that will be reduced step by step to smaller areas. The search strategy in the smaller area is to increase the number of sensors used in order to localise the bomb factory. The exact pinpointing of the bomb factory will be performed using stand-off detectors in mobile equipped units.

Description of the work

EMPHASIS is a novel way to perform surveillance of a very large area with respect to detecting explosives and precursors to explosives and IEDs.

A key aspect of the EMPHASIS concept is that it will allow efficient intelligence-led assessment of an area of a city in order to establish where, and more crucially when illicit bomb-making activity is occurring. A successful system based on EMPHASIS would lead to a very significant reduction in surveillance man-power of suspect areas. Critically, when a narrow area or house has been identified as being under suspicion, the system will provide invaluable assistance in the timing of police intervention increasing the chance of successful convictions as a consequence.

The area monitoring sensors will be able to cover distances of hundreds of meters thereby facilitating very large area coverage.

Moreover, the stand-off sensors used will have the capacity to detect explosives that have been transferred to surfaces by the touch from people who have handled the explosives. In addition, the combination with electrochemical sensors capable of tracing the explosives present in the sewage will make an extensive system.

A feasibility and cost effectiveness study will be performed in order to ensure a commercially realistic system.

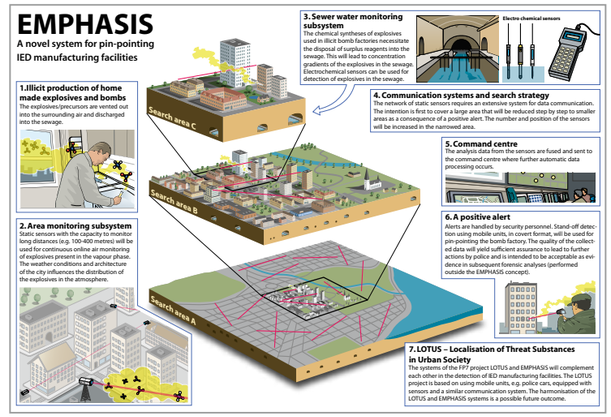
One of the advantages of the EMPHASIS system is the fact that many of the developments achieved in another FP 7 project, LOTUS, can be benefited from. Data and developments can be implemented as much as possible e.g. exploitation of knowledge obtained concerning the central command, threat substance list, dispersion and modelling of threat substances in the air and the already set-up home explosive laboratory.

In EMPHASIS, the focus for the detection will be on three types of cases: i) Detection of explosives/precursors in vapour phase at low concentrations; ii) Detection of explosives/precursors at low concentrations in sewage; and iii) Detection of particles (low concentrations) e.g. door-handles or other covered surfaces.

The fusion of sensor data will lead to potential alerts.

Expected results

On 7 July 2005, three bombs exploded within a very short timeframe on three of the London Underground trains. A fourth bomb exploded somewhat later on a double-decker bus. The bombs were of the home-made explosive types and were packed into rucksacks. The discovery of these types of suicide bomb attacks is very difficult and relies on intelligence and qualified police work. If discovered at a late stage of the criminal activity it is very hard to neutralise the object without consequences for third persons.However, for a system such as EMPHASIS the objective is to discover the illicit activities at a very early stage thus making the neutralisation both easier and with minimum consequence for third persons. This will be one of the strengths of EMPHASIS.



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PARTNERS

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COUNTRY

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United Kingdom
France
France
Poland

FORLAB / FORensic LABoratory for in-situ evidence analysis in a post blast scenario

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Information

Grant Agreement N°
285052
Total Cost
€ 4,473,920
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€ 3,087,446
Starting Date
01/03/2012
Duration
36 months

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Project objectives

The FORLAB project relates to the problem of evidence collection in the post-blast scene after an IED attack. FORLAB will provide the End Users, the scientific police, with a new tool that will improve their efficiency in the investigation of the crime scene by:

» Providing fast analytical technologies to improve the evidence collection in order to reduce the number of samples to be collected and sent to the reference laboratory for detailed analysis;

» Providing a real time 3D recreation of the scene for identification of areas of the scene of higher interest and helping in the re-creation of the scene for later investigations;

» Establishing bidirectional feedback between the Command and Control Centre (where all the information about the investigation is available) and the field technicians. This will make the investigation more efficient.

FORLAB will be compatible with the in-use forensic procedures and will preserve the chain of custody.

Description of the work

The project activities of FORLAB have been broken down into 11 work packages and distributed in 36 months.

FORLAB will develop a new concept for the investigation of the post-blast scene of an IED based attack, complementing the existing forensic procedures in use by security forces in Europe.

The research in FORLAB is focused on four main areas:

» Quick elaboration of a 3D model of the scene;

» Development of technologies for in-situ searching and screening of evidence;

» Accurate positioning of the evidence and dedicated communication network;

» Information management tools for real time exploitation of the results of the investigation.

The works are structured in four stages:

The first stage will be dedicated to the System Definition with a strong involvement of End Users of the consortium. The procedures already in use by Security Forces around Europe will be reviewed and the concept of the FORLAB will be defined.

The second stage will be the development of the technologies needed based on the operational requirements of the End Users.

» LIF, LIBS, Raman and NLJD will be developed to improve the capability for searching and screening samples;

» A communication and positioning system will be developed to meet the requirements of the investigators;

» A system for real time re-creation of the post-blast scene will be developed;

» Information management tools will be developed to support operations in the Command and Control Centre where all the information on the scene will be available, in real time.

The third phase will be the integration of a subsystem in a two-step approach: Field testing of the individual technologies will be performed to obtain feedback on the achieved performance.

Finally the complete system will be validated in post-blast scenarios to verify the achieved performance. The scenarios will be carefully selected with strong involvement of End Users of the project.

Partial results of the project will be disseminated at public and restricted levels. Workshops with the stakeholders will be organized.

Expected results

» Improve the efficiency of the procedures used by European Security Forces for the investigation of a post-blast scene;

» Reduce the number of samples collected for further processing in the reference laboratory;

» Improve the capability to re-create the scene during the investigation in the field and for further investigations after clean-up operations;

» Present to the technician in the Command and Control Centre the real time, updated information about the investigation so that he can guide the investigators in the field of the search.

PARTNERS	COUNTRY
INDRA SISTEMAS S.A. (INDRA)	Spain
AGENZIA NAZIONALE PER LE NUOVE ECNOLOGIE, L'ENERGIA E LO SVILUPPO ECONOMICO SOSTENIBILE (ENEA)	Italy
ASTRIUM S.A.S. (ASTRIUM)	France
PANEPISTIMIO THESSALIAS (UNIVERSITY OF THESSALY) (UTH)	Greece
SPACE APPLICATIONS SERVICES NV (SAS)	Belgium
ASTRI POLSKA SPOLKA Z OGRANICZONA ODPOWIEDZIALNOSCIA (APL)	Poland
NATIONAL BUREAU OF INVESTIGATION (NBI)	Finland
MINISTERIO DELLA DIFESA (RACIS)	Italy
PRZEMYSLOWY INSTYTUT AUTOMATYKI I POMIAROW (PIAP)	Poland
SOCIETE NUCLETUDES SA (NUCLETUDES)	France
MINISTERIO DEL INTERIOR (CNP)	Spain
MINISTERE DE L'INTERIEUR (LCPP)	France

HEMOLIA / Hybrid Enhanced Money Laundering Intelligence, Investigation, Incrimination and Alerts

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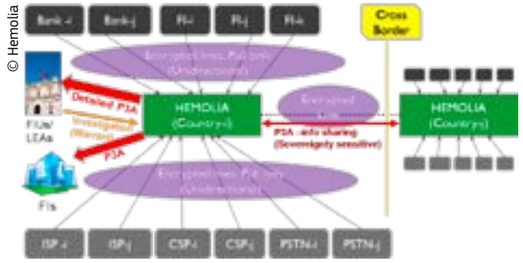

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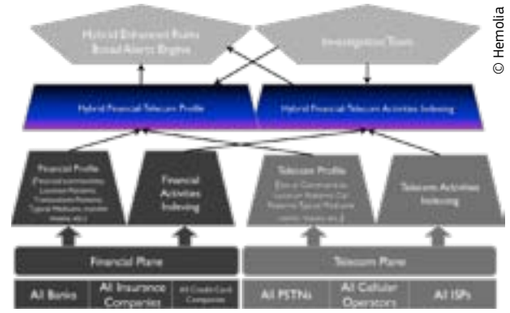

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Information

Grant Agreement N°
261710
Total Cost
€4,361,954
EU Contribution
€2,979,390
Starting Date
01/05/2011
Duration
36 months

Coordinator

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Project objectives

HEMOLIA contributes to disrupting, deterring and dismantling criminal financing networks in the fight against terrorist activities by providing a full picture of money laundering networks. It contributes to reveal money laundering criminals and their connections to terrorism and organized crime due to the novel use of telecom information and due to the use, exchange and processing of relevant data according to the Anti Money Laundering legal framework. The enhanced approach of HEMOLIA significantly improves the detection of money laundering by encouraging the sharing of information with better use of the existing legal framework, and by ensuring the transparency and harmonization of the procedures between the Law Enforcement Agencies. The use of financial and telecom data together raise the level of Money Laundering detection. The information sharing is improved by HEMOLIA both at the national and at the international level.

Description of the work

HEMOLIA is a new generation Anti-Money Laundering (AML), intelligent, multi-agent alert and investigation system which in addition to traditional financial data makes extensive use of modern society's huge telecom data source, thereby opening up a new dimension of capabilities to all Money Laundering fighters (FIUs, LEAs) and Financial Institutes (Banks, Insurance Companies, etc.). Adding the Telecom Plane to the existing Financial Plane may improve and dramatically change AML doctrines, since another dimension is added to the analysis and investigation processes.

HEMOLIA, taking into account existing legal frameworks, will hybridize and correlate the Financial and Telecom Planes in order to create richer and more accurate alerts, intelligence and investigation tools, as well as information sharing, both nationally and internationally. A major part of HEMOLIA will be the legal research and provision of legal guidelines to all ML fighters. To respect privacy rights HEMOLIA will bring a new model of Push Privacy Preserving Alerts where all FIUs and FIs are pushed with alerts that mark a transaction or customer with a money laundering / fraud risk level or risk probability, yet without disclosing any private data. This model may have outstanding impact on AML because it means that FIs will be alerted based on data of all other FIs and based on Telecom service providers at the national and international level, opening up a new era of Money Laundering and financial crime reporting by FIs to FIUs.

Expected results

HEMOLIA's technological impact is twofold. On the one hand HEMOLIA generates an intelligent Anti Money Laundering Alerts system based on financial data providing the basis of future AML systems. On the other hand, the hybridization between financial and telecommunication data analysis is a breakthrough approach to Money Laundering prevention and contributes to the technological challenges involved in obtaining and analyzing such data.

PARTNERS	COUNTRY
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APLICACIONES EN INFORMATICA AVANZADA SA	Spain
CAPGEMINI NEDERLAND BV	The Netherlands
ZWIAZEK BANKOW POLSKICH IZBA GOSPODARCZA	Poland
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VERENIGING VOOR CHRISTELIJK HOGER ONDERWIJS WETENSCHAPPELIJK ONDERZOEK EN PATIENTENZORG	The Netherlands
SWITCHLEGAL ADVOCATEN	The Netherlands
TELEKOMUNIKACJA POLSKA S.A.	Poland
Industrial Research Institute for Automation and Measurements PIAP	Poland
Ernst & Young	Israel

HYPERION / Hyperspectral Imaging IED and Explosives Reconnaissance System

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Information

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284585
Total Cost
€4,829,409
EU Contribution
€3,458,969
Starting Date
01/07/2012
Duration
36 months

Coordinator

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Project objectives

The objective of HYPERION project is to develop and test a system concept for the on-site forensic analysis of an explosion. The forensic tools and procedures used will mostly be at safe stand-off detection distances. This will also include tools which can help with the identification of unexploded IEDs. The on-site data provided by the HYPERION system will be the type and amount of explosive used in the attack, the point of origin of the detonation and an assessment of the type of IED. The crime scene will be mapped using 3D-registration and in the map the positions that have been analysed in detail will be marked. The forensic tools and data will be of a quality that can be used as evidence in a court of law. The quality assured data will be electronically documented on-site and sent to the police in a timely manner at the crime scene.

After the crime scene area has been secured, the laboratory forensic sampling and analysis can be started. In HYPERION, new and validated sampling protocols will be developed.

The data from the Hyperion System will supplement the work of the bomb disposal specialist in establishing a safe crime scene.

Description of the work

A rapid response from the forensic investigation to the police is an absolute necessity in order to increase the chance of finding the perpetrators of the attack or for the possibility for the police to be proactive in the case of a series attack such as the London Underground (2005) or Madrid train bombings (2004). For the police, the first 24 hours is of major importance for a successful outcome of the crime investigation. This means that the forensic investigation and analysis of the post-blast scene of the attack has to be carried out quickly. In addition, it is of importance that the analysis data of the crime scene is of a high quality so it can be used as evidence in a trial.

Some of the information the police authorities need to know for facilitating the investigation is the type and amount of explosive that has been used in the attack. The type of explosive will reveal what kind of threat the authorities are facing and will give a hint about where the explosives could have been obtained. Explosives that are of the home-made type require the utilization of a "bomb factory", for the production. This would allow the police the opportunity to use intelligence for the localization of the bomb factory that may finally lead them in the direction of the perpetrators of the attack.

The point of origin for the detonation is needed primarily for assessing the charge size of the bomb and type of IED. It is important for the crime investigation to assess if the IED is of e.g. VBIED (Vehicle Borne IED), PBIED (Person Borne IED) or LBIED (Left Behind IED) types.

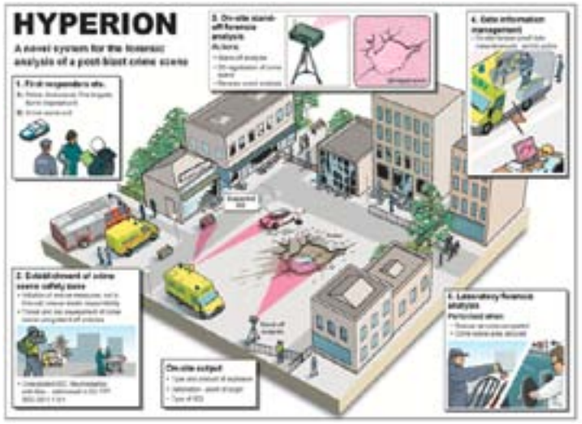
The crime scene area also needs to be well documented using ordinary high-resolution 2D photographs but most important using a 3D registration. In this 3D registration the hot-spots that have been analysed using the forensic stand-off detection tools as well as the areas that have been sampled for the laboratory forensic analysis can be marked. The 3D registration contributes to the calculation of the charge size and point of origin for detonation and facilitates the investigation and evidence presentation in the trial. The 3D crime scene registration can also be used to register the typical damage patterns in the direct vicinity of the crime scene, e.g. damage on the buildings.

On-site electronic documentation of forensic data will be performed in order to preserve the chain of custody.

Expected results

A successful system based on HYPERION would lead to a very significant reduction in the time delay of delivered forensic evidence requested by the police.

The fast crime scene investigation that HYPERION will provide can help in rapidly finding terrorists, thus being pro-active in preventing future attacks.



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PARTNERS

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VIGO (VIGO)
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Portendo AB (Portendo)
Tecnalia (TECNALIA)
The Swedish National Laboratory of Forensic Science (SKL)

COUNTRY

Sweden
Germany
The Netherlands
Turkey
Italy
France
Germany
Poland
Turkey
Sweden
Spain
Sweden

INDECT / Intelligent information system supporting observation, searching and detection for security of citizens in urban environment

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Information

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218086
Total Cost
€14,984,466
EU Contribution
€10,906,984
Starting Date
01/01/2009
Duration
60 months

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Project objectives

The **main objectives** of the INDECT Project are:

- to develop an intelligent information system for automatic detection of threats and recognition of criminal behaviour or violence;
- to develop new methods and techniques providing tools to support activities of police officers, including tools for threat detection on the Internet; this includes the development of a new type of search engine combining direct search of images and video based on watermarked contents and storage of metadata in the form of digital watermarks;
- to develop techniques for data and privacy protection in storage and transmission of data based on quantum cryptography and new methods of digital watermarking.

Description of the work

The INDECT Project aims to develop tools for enhancing the security of citizens and protecting the confidentiality of recorded and stored information as well as the privacy of involved persons. INDECT targets threat detection in both real environments (intelligent cameras) and virtual environments (computer networks, especially Internet).

The INDECT methodology addresses, firstly, the detection of specific crimes (such as Internet child pornography, trafficking of human organs, spread of botnets, viruses, malware as well as terrorism, and organised crime), then the detection of the source of the identified crimes (for example, specific criminals responsible for the crimes). It is always a human being (police, security services, etc.) who ultimately decides whether an intervention should take place once a source has been identified.

It should be underlined that the INDECT project is a research project, allowing involved European scientists to develop new, advanced and innovative algorithms and methods aimed at combating terrorism and other criminal activities, such as human trafficking and organised crime, which are affecting citizens' safety.

The INDECT Project ensures strict fulfilment of the EU ethical regulations on privacy, data protection, prevention of dual use, etc. In accordance with these regulations, a great deal of attention is paid to ethical issues, and among others, the INDECT Project will never involve processing of any personal data without the prior written consent of individuals.

Expected results

The **main expected results** of the INDECT project are:

- trial of intelligent analysis of audio-visual data for threat detection in urban environments;
- performing computer-aided detection of threats and targeted crimes in public Internet resources;
- construction of search engines for content related to child pornography and human organ trafficking;
- implementation of a distributed computer system that is capable of effective intelligent processing;
- creation of tools and technology for privacy and data protection using quantum cryptography and digital watermarking.

PARTNERS	COUNTRY
AGH University of Science and Technology (AGH)	Poland
APERTUS Távoktatás-fejlesztési Módszertani Központ Tanácsadó és Szolgáltató Közhasznú Társaság (APERTUS)	Hungary
Gdansk University of Technology (GUT)	Poland
InnoTec DATA G.m.b.H. & Co. KG (INNOTEC)	Germany
Grenoble INP (INP)	France
General Headquarters of Police (GHP)	Poland
INDESOL (INDESOL)	Spain
PSI Transcom GmbH (PSI)	Germany
Police Service of Northern Ireland (PSNI)	United Kingdom
Poznan University of Technology (PUT)	Poland
Universidad Carlos III de Madrid (UC3M)	Spain
Technical University of Sofia (TU-SOFIA)	Bulgaria
University of Wuppertal (BUW)	Germany
University of York (UoY)	United Kingdom
Technical University of Ostrava (VSB)	Czech Republic
Technical University of Kosice (TUKE)	Slovakia
X-Art Pro Division G.m.b.H. (X-ART)	Austria
Fachhochschule Technikum Wien (FHTW)	Austria

LINKSCH / Grasping the Links in the Chain: Understanding the Unintended Consequences of International Counter-Narcotics Measures for the EU


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Information

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285073
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36 months

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Project objectives

» design a model of current market dynamics along key illicit commodity chains that currently affect the EU;

» arrive at a typology of unintended consequences generated by current policy as it interfaces at numerous points along these two chains, taking into account both national and international efforts at control and prohibition;

» investigate via empirical investigation (fieldwork) the actual scale and nature of the most harmful of these unintended consequences, with a view to generating policy recommendations for improving them;

» and disseminate the results of this research to a wide variety of key audiences in fora that will also accommodate comparative data from studies of related areas (the cocaine trade for example).

Description of the work

This project aims to develop a model of unintended consequences utilizing the conceptual prisms of global commodity chain theory and hybrid political regimes, and treating the current prohibition regime as a hybrid political system running from closed to open access orders. This process will incorporate both a survey and summary of current state of the art thinking on unintended consequences of the contemporary prohibition regime, and a series of clearly targeted research questions which will then be pursued in active fieldwork across Morocco, Turkey, Russia, Afghanistan and Kazakhstan. Audiences to be engaged with during this process include NGOs, international agencies, government bodies and local communities. The work is novel in the manner that it seeks both to compare the soft and the hard end of the illicit drug spectrum and to look at policy activities beyond the immediately obvious ones of prohibition and harm reduction.

Expected results

The overarching aim of the project is, through examining the interface of current policy stances with current reality, to then develop and disseminate an empirically-based set of policy recommendations for engaging in a more integrated manner with downstream partners in the current drug control regime, with a view to improving unintended consequences. It is anticipated that dissemination itself will occur at a series of workshops, an international conference in Brussels, and in a series of research publications.

PARTNERS	COUNTRY
University of Glasgow (UGLA)	United Kingdom
Virtual Hand Research (VHR)	The Netherlands
CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE (CNRS)	France
Coventry University (CBS)	United Kingdom
SCHOOL OF ORIENTAL AND AFRICAN STUDIES, UNIVERSITY OF LONDON (SOAS)	United Kingdom
THORNLEY MANSFIELD LTD (MANSF)	United Kingdom
UNIVERSITAET POTSDAM (POTSDAM)	Germany

LOTUS / Localization of threat substances in urban societies

RESEARCH **COMPLETED**

Information

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217925
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Project objectives

LOTUS set out to develop the software, hardware and concepts of operation needed to deploy an array of mobile and fixed position detection devices to locate explosive precursor chemicals and drugs in urban environments.

The LOTUS team aimed to develop a technical tool for intelligence gathering. This would enable the information obtained to be combined and confirmed with data from other sources (eg. law enforcement investigation) to accurately track and neutralize potential terrorist or organized criminal threats.

Results

A range of sensor mounts was developed and tested by LOTUS for this project. The primary detection method used was air sampling by using sensor units mounted on cars or other mobile platforms that traversed urban spaces.

Ion mobility spectrometers (IMS), differential mobility analysis and IR (infrared) absorption spectroscopy technologies were combined to detect trace elements of explosives or drugs found in the air near bomb-making factories and drug manufacturing laboratories.

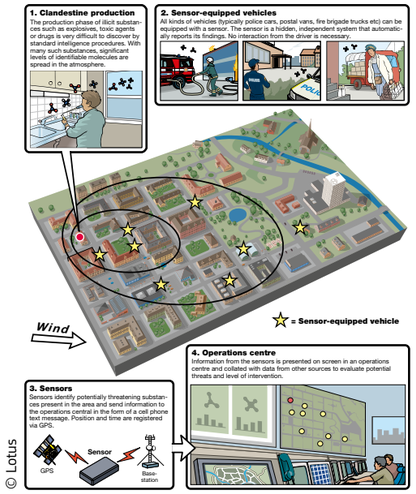
Field experiments conducted in Stockholm, Helsinki and Madrid found that trace elements could be positively identified up to 45 metres away, depending on wind, temperature and humidity conditions.

In order to process and report the findings of these sensors, GSM-capable transmitters were built into each unit. These sent data reports, including potential threat detection alerts and GPS coordinates, to a central data fusion hub. Advanced analytical tools were developed to allow the hub to process and categorize readings.

If a potential operational intervention was deemed necessary (i.e. a law enforcement raid), analysis could be carried out with a range of tools to further ascertain the exact location of the threat. To avoid signal interception or pattern detection by potential adversaries, reports from each sensor were heavily encrypted and randomly transmitted.

The LOTUS early warning system

Prevention and detection of threat substances is a major challenge for intelligence and police authorities. A system of mobile sensors that report significant levels of compounds in a specific or random area will give such authorities new complementary information that will significantly increase their ability to intervene at an early stage.



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Another element of the LOTUS system was that no interaction between the vehicle driver and the sensor was required. Indeed, the project proposes that sensors could be mounted on civilian vehicles whose users have no knowledge or need to know about what each sensor is doing.

The result would be a network of sensors randomly surveying urban areas, producing GPS pinpointed reports on potential explosive or drug manufacture locations for central assessment.

PARTNERS	COUNTRY
Totalförsvarets Forskningsinstitut (FOI)	Sweden
Portendo AB	Sweden
Saab AB	Sweden
Bruker Daltonik GMBH	Germany
Ramem S.A.	Spain
Bruhn NewTech A/S	Denmark
Research and Education Laboratory in Information Technologies	Greece
Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek (TNO)	The Netherlands
Universidad de Barcelona	Spain
Secrab Security Research	Sweden

MIDAS / The development and validation of a rapid millifluidic DNA analysis system for forensic casework samples

Information

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36 months

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Project objectives

The objective of the project is to specify and develop a working instrument for the rapid analysis of DNA from samples recovered from a scene of crime. The system will be simple to use and require a single input from the user. The system will be "closed" and will operate on a fully automated basis such that a sample is simply introduced into the instrument and no further sample manipulation is required from the individual. The development of a closed system for the DNA as described above brings a number of advantages to the field of forensic science.

The core scientific and technical objectives of MiDAS are therefore to:

- Develop an agreed technical specification for the instrument and consumables;
- Deliver a prototype integrated instrument for validation;
- Evaluate the instrument in accordance with the validation plan and user requirement;
- Evaluate the instrument and cartridge designs to ensure they are fit for manufacture;
- Evaluate the legal requirements for sample handling and data transfer and protection;
- Determine system validation strategies for each of the participant member states.

Description of the work

Work Package 1 – Technical Specification
Define and agree the specification for a cartridge-based fully integrated millifluidic device for forensic DNA analysis. Calling on all project participants to draw on their own fields of expertise, WP1 will ensure the system is defined so as to fulfil internationally agreed guidelines for the analysis of DNA in a forensic context.

Work Package 2 – Prototype development
Develop and evaluate the prototype DNA analysis device. The instrument will be developed to meet the technical specifications as defined by the Technical Specification Board (TSB) in WP1 and tested against the agreed acceptance criteria. Any optimisation of the final system will take place here and implemented changes will be re-evaluated.

Work Package 3 – Instrument and software validation
Validate the prototype instrument delivered from WP2 in accordance with the validation plan delivered in WP1.

Work Package 4 – Process Integration
Define the process whereby the instrument is integrated into the forensic organisation and how it will integrate with current processes. An understanding of the technological, organisational and human implications of implementation will allow an assessment of the impact to be made.

Work Package 5 – System Validation & Implementation
Define, agree and deliver the system validation. This process is likely to be different in different jurisdictions. It is essential therefore to incorporate knowledge from all the end user partners in the consortium and to identify those parties interested in early implementation of the instrument to their own process.

Work Package 6 – Data Protection
Define, agree and deliver the Data Protection required by the project to industry standards and EU guidelines.

Work Package 7 – Device and System Scalability
Produce a number of strategic plans to allow the device to be developed allowing it to be commercially viable and to consider manufacturability.

Work Packages 8 and 9 – Dissemination and Exploitation; Project Management
Work Package 8 (Dissemination & Exploitation) together with Work Package 9 (Project Management and Reporting to the EC) will ensure effective project management and communication with the EC.

Work in WP8 will also evaluate the impact the successful implementation of a rapid DNA analysis system might have on society as a whole.

Expected results

MiDAS will deliver simple to operate automated DNA analysis technology and will validate this technology and associated processes required for its implementation, enabling forensic DNA analysis to be carried out at the crime scene. With fast results authorities will have the opportunity to rapidly compare the scene samples against DNA profiles from known criminals or results from other crime scenes held in national DNA databases. The project will have dramatic implications for both criminal justice and international security, with the ability to deliver vital intelligence results much more quickly both in a national sense and across the EU.

PARTNERS

Forensic Science Service Ltd (FSS)
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Medizinische Universitaet Innsbruck (IMU)
Bundeskriminalamt (BKA)
Netherlands Forensic Institute (NFI)
Arizona Board of Regents (University of Arizona- UoA)

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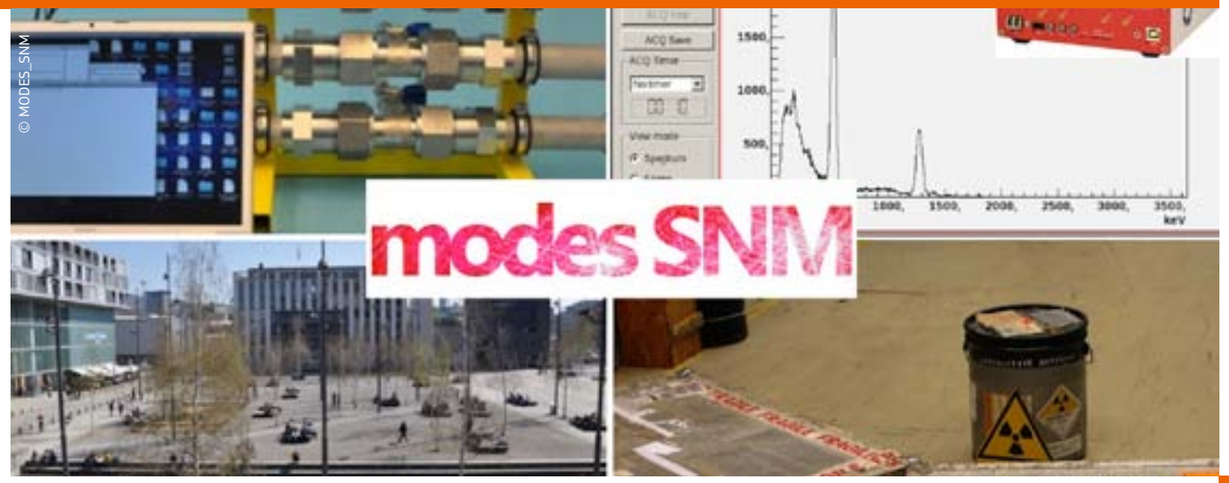
Netherlands
United States

MODES_SNM / Modular detection system for special nuclear material



Information

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284842
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EU Contribution
€ 2,411,633.00
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01/01/2012
Duration
30 months

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Project objectives

Special Nuclear Materials (Highly Enriched Uranium and Plutonium) are difficult to detect, especially when masked or shielded: gamma rays and neutrons emitted by SNM have to be detected in order to increase the sensitivity against natural backgrounds. These objectives will be pursued by optimizing a novel technology recently developed allowing the detection of all relevant radiation types and the engineering of a prototype of a modular, compact, mobile detection system that will be qualified under laboratory conditions. Moreover, it will be commissioned in an on-field campaign driven by the end-user group established in the project. The campaign will focus on both performance and usability aspects including the verification of the man-machine interface. The MODES_SNM system shall satisfy two major requirements:

» improving the state-of-the-art in detection of radioactive and Special Nuclear Material in terms of sensitivity for shielded SNM;

» being usable by emergency responders in the field filling the gap between Radiation Portal Monitors and hand-held devices.

Description of the work

Starting from the pre-existing know-how of ARKTIS in the field of high pressure noble gas scintillation detectors, the MODES_SNM project aims first at a general optimization of the detector with the goal of designing and realizing the modular mobile system described below. The relevant tasks are:

» Optimization of the mechanical design of the high-pressure gas cells to minimize weight;

» Studies and development geared towards the replacement of the photomultipliers in the current system with solid state devices to reduce the size and increase robustness;

» Design of compact front-end electronics based on CAEN know-how on Digital Pulse Processing.

In parallel with the optimization task, two other tasks will be performed:

» Using ARKTIS technology, new types of detectors will be developed using noble gas cells: a gamma ray sensor and a thermal neutron sensor. The ambitious goal of this task is to develop a suite of detectors capable of gamma, fast and thermal neutron detection, and spectroscopy, all based on the same technology and using the same electronics front-end and DAQ;

» A suitable INFORMATION SYSTEM (IS) will be prepared. The IS will manage and control the detectors, including start-up operations and calibrations. It will manage and analyze the data flow from the detectors to achieve on line: 1) the irate of all radiation species compared with the background level; 2) the application of energy windowing on the fast-neutron and gamma-ray spectra to validate the alarms for weak sources; 3) the analysis of gamma ray spectra for isotope identification; 4) data fusion of all detectors and presentation of the data to the operator through a simple man-machine interface.

This MODES_SNM prototype will represent the final deliverable of the project. It will be modular and scalable, divided into so-called system blocks easily mounted and removed into/onto vehicles:

» *Block A* consists of all system electronics including power supply and battery, signal processing electronics and computing;

» *Blocks B* consists of arrays of four detectors per block, selected from the suite of gamma, fast and thermal neutron. The prototype will consist of one *Block A* and several *Block Bs*, depending on the specific deployment.

Expected results

Improved SNM detection performance to detect weak or well-shielded SNM or SNM at larger stand-off. The proposed technology incorporates thermal and fast neutron detectors along with gamma ray detectors. These measurements are complementary: their combined power is expected to improve the system performances.

Improved usability: the MODES_SNM system will offer single stage screening (rapid primary screening and threat identification), being relocatable, enhancing the portability, and allowing adaptability to varying threat situations.

PARTNERS	COUNTRY
UNIVERSITA DEGLI STUDI DI PADOVA (UNIPD)	Italy
ARKTIS RADIATION DETECTORS LTD (ARKTIS)	Switzerland
Narodowe Centrum Badań Jądrowych - National Centre for Nuclear Research (NCBJ)	Poland
Eidgenössische Technische Hochschule Zürich (ETH)	Switzerland
COSTRUZIONI APPARECCHIATURE ELETTRONICHE NUCLEARI C.A.E.N. SPA (CAEN)	Italy
UNIVERSITA DEGLI STUDI DELL'INSUBRIA (UINS)	Italy
THE REVENUE COMMISSIONERS (RC)	Ireland
THE UNIVERSITY OF LIVERPOOL (UNILIV)	United Kingdom

ODYSSEY / Strategic pan-European ballistics intelligence platform for combating organised crime and terrorism

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RESEARCH **COMPLETED**

Information

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218237
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01/11/2008
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Project objectives

The ODYSSEY project undertook to research and develop a secure platform for the sharing of information about gun-crime throughout the EU.

The main project objectives were:

» creation of European standards for ballistics data collection, storage and sharing;

» demonstration of a secure, interoperable platform for the management of crime information and the sharing of ballistic intelligence;

» development of techniques for the mining of data and extraction of knowledge about gun crime across the EU;

» exploitation of automated and semi-automated processing and analysis of crime data to generate 'red flags' and analysis of complex data with multiple reference models;

» improved mutual co-operation, security and sustainability across the EU.

Results

The ODYSSEY project established that sharing data about gun crime between authorities and jurisdictions is technically feasible, and would bring operational benefits. These benefits would arise from the creation of trans-national data sets that could be manipulated using advanced data mining techniques to reveal hitherto hidden information.

The bedrock of these findings was the creation of a potential set of new EU standards for gun crime data defined by their own data structures, taxonomies and ontologies. These can now be taken onward to CEN, one of the EU's technical standards organisations, or ISO for evaluation and use.

A working prototype – an automated interoperable platform for data sharing – was also tested. It consisted of a secure platform for the management of crime information and the sharing of ballistics intelligence. It was tested to assess its ability to provide analysis, situation awareness and threat monitoring functionality. This was supported by a distributed technological infrastructure to store metadata in a semantic format for advanced querying and analysis.

As well as demonstrating automated 'red flag' functions, the tests also highlighted the possibility of expanding such a secure platform into other forensic areas such as DNA, fingerprints and physical evidence and other cross border policing domains such as human trafficking.

Odyssey thus demonstrated through its prototype the potential for a federated system to provide cost and time savings, as compared to current cross-EU processes.

PARTNERS	COUNTRY
SHEFFIELD HALLAM UNIVERSITY (SHU)	United Kingdom
AN GARDA SIOCHANA (AGS)	Ireland
ATOS ORIGIN SOCIEDAD ANONIMA ESPANOLA (Atos)	Spain
ECOLE ROYALE MILITAIRE - KONINKLIJKE MILITAIRE SCHOOL (RMA)	Belgium
EUROPEAN POLICE OFFICE (EUR)	The Netherlands
FORENSIC PATHWAYS LIMITED (FPL)	United Kingdom
MINISTERIO DELL'INTERNO (DAC)	Italy
MIP - CONSORZIO PER L'INNOVAZIONE NELLA GESTIONE DELLE IMPRESE E DELLA PUBBLICA AMMINISTRAZIONE (MIP)	Italy
North Yorkshire Police Authority (North Yorkshire Police)	United Kingdom
SAS SOFTWARE LIMITED (SAS)	United Kingdom
SESA - COMMERCE HANDELSGMBH (SESA)	Austria
WEST MIDLANDS POLICE AUTHORITY (WMP)	United Kingdom
XLAB RAZVOJ PROGRAMSKE OPREME IN SVETOVANJE D.O.O. (XLAB)	Slovenia

OPTIX / Optical technologies for identification of explosives

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Information

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218037
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EU Contribution
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01/11/2008
Duration
54 months

Coordinator

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Project objectives

Terrorism, as evidenced by recent tragic events (Madrid 2004, London 2005, New York 2001), is a real and growing threat to Europe and the world. Attacks using Improvised Explosive Devices (IEDs) appear in the news every day. More than 60% of terrorist attacks are carried out by the use of such explosive devices.

Security forces demand new tools to fight against this threat. One of the most demanded capabilities by end users is that of standoff detection and identification of explosives. Today's technologies are not able to provide these capabilities with the required minimum reliability.

The objective of the project is to contribute to increasing the security of European citizens by the development of a transportable system for the standoff detection and identification of explosives in real scenarios at distances of around 20 metres (sensor to target), using alternative or simultaneous analysis by three different complementary optical technologies (LIBS, RAMAN, IR).

Description of the work

The project activities of OPTIX have been broken down into ten work packages and distributed across 42 months.

OPTIX will make important progress beyond the state of the art in three different ways:

- Specific developments regarding the individual core technologies (LIBS, RAMAN and IR) for standoff detection and identification of explosives;
- Specific developments of the enabling technologies being addressed in the project: lasers, spectrometry, optics and data fusion and analysis;
- Integration of all technological developments onto a single system to leverage and enhance the individual capabilities for the standoff detection and identification of explosives.

The first stage will be dedicated to the System Definition. The project consortium will perform focused research on the core optical technologies addressed by the project. Scenarios and system requirements will be defined. This is a key stage for the success and final usefulness of the system from the end user's point of view. Workshops with end users will be organised.

Technology development of LIBS, RAMAN, IR (core technologies) and laser, spectrometry, optics and data fusion (enabling technologies) will follow.

Phase three is System Integration, where a single platform will be developed.

Testing will be carried out in laboratories and also in real environment scenarios, adequately supported by end users. Evaluation of results will follow.

Dissemination and Exploitation will provide information on the project's activities, performance and results both at public and restricted levels, as well as defining and carrying out the initial exploitation of the outcomes and expectations of OPTIX. Workshops with end users and other potential stakeholders will take place.

Expected results

- Improved capabilities of LIBS, RAMAN and IR for the detection of explosives at standoff distances;
- Enhanced spectrometrics for an Integrated OPTIX system;
- Advanced data fusion and chemometrics algorithms;
- A technology demonstrator capable of detecting explosive traces at distances of 20 metres;
- Demonstrated capabilities of the developed system to end users and to additional stakeholders as needed.

PARTNERS	COUNTRY
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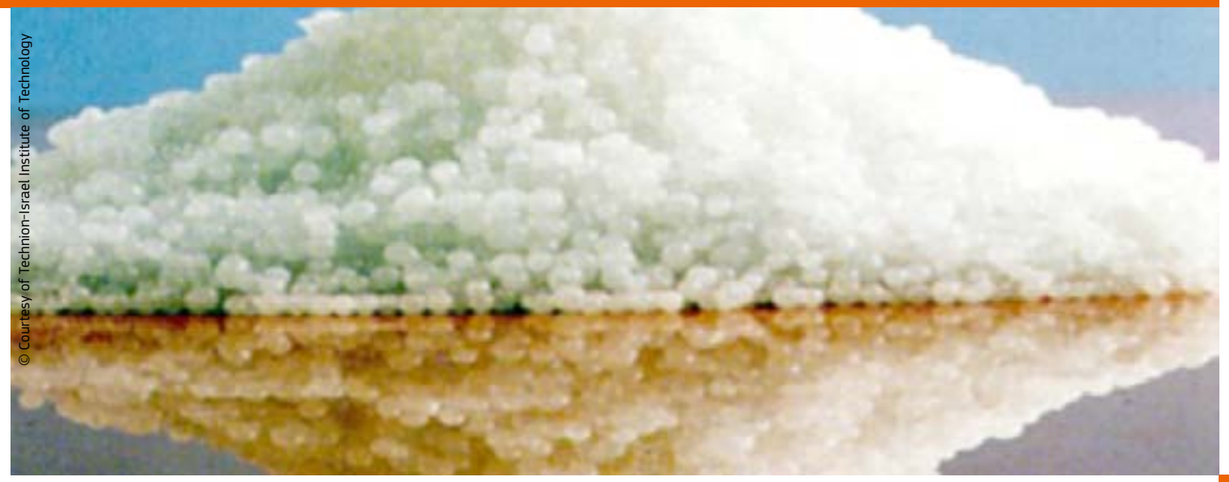
University of Malaga	Spain
Totalförsvarets Forskningsinstitut (FOI)	Sweden
EKSPLA UAB	Lithuania
AVANTES BV.	The Netherlands
Technical University of Clausthal	Germany
Vienna University of Technology	Austria
University of Dortmund	Germany
Guardia Civil	Spain

PREVAIL / Precursors of explosives: Additives to inhibit their use including liquids



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Information

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241858
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€3,343,162
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01/09/2010
Duration
36 months

Coordinator

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Project objectives

The PREVAIL project is an innovative approach to inhibit the use of some common materials for use as precursors to explosives and to allow for easier detection. Home made explosives are easy to make from readily available materials used for legitimate purposes in everyday life. This availability attracts terrorists and criminals to manufacture and use home made explosives since military and commercial explosives are harder to come by. A great security problem for society today is the availability of these chemicals, since they are very easily attainable.

There are basically three different approaches to increase the security related to these materials: 1) limiting their availability, 2) tracking their use, or 3) limiting their usefulness as explosives or explosives precursors.

This third approach is the way forward and the goal for the PREVAIL project.

Description of the work

The PREVAIL project focuses on finding inhibitors to add to some precursors to prevent them from being used to produce home made explosives or to prevent them from being concentrated by boiling water. A second goal in the PREVAIL project is to find markers to add to certain precursors to ensure easier detection. PREVAIL will perform research into a marker/detection system rather than just the markers, in order to ensure detectability of the markers. The markers found must be environmentally friendly, non-toxic and bio-degradable. Honey bees, micro crystals and fluorescence light will be tested as detectors for these added markers, and micro encapsulation will be used for slow and controlled release. For a successful project, the objectives must be met: without causing any adverse effects on the environment or on people's health and without obstructing the legitimate use of these materials. Since this project will strongly influence manufacturers, users, legislators and governmental security agencies, the ties between the project and the stakeholders are strong. The industrial partners will identify if added inhibitors and markers need extra testing for safety. A road map for future Research and Development work and actions (as well as regulatory) will be prepared.

Expected results

A successful project will make it more difficult for terrorist and other mis-users to use some precursors to manufacture improvised explosive devices. Further, a successful project will also ensure easier detection of some precursors that today are "invisible" by adding markers and by developing a detector to that marker. Also, the usefulness of the developed additives for other precursors not included in this project will be assessed in the road map for future work, and the required future research will be indicated.

PARTNERS	COUNTRY
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Technion – Israel Institute of Technology (Technion)	Israel
Arkema France (Arkema)	France
KCEM AB (KCEM)	Sweden
Yara International ASA (Yara)	Norway
Commissariat à l'énergie atomique et aux énergies alternatives (CEA)	France
Wojskowy Instytut Higieny i Epidemiologii (WIHiE)	Poland
SECRAB Security Research (SECRAB)	Sweden
Inscentinel Ltd. (INSC)	United Kingdom

RAPTOR / Rapidly deployable, gas generator assisted. inflatable mobile security kits for ballistic protection of European civilians against crime and terrorist attacks

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Information

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218259
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01/01/2010
Duration
48 months

Coordinator

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Project objectives

The aim of the RAPTOR project is the development of a mobile, rapidly deployable and inflatable structure for ballistic protection. The project consortium is working on specific solutions to support European security forces in the prevention of, or response to, various threat scenarios. Emphasis is placed on the protection of individuals, general security at events and the protection of humanitarian workers, such as Red Cross employees.

© Raptor

Isometric View without covering

Description of the work

» Definition of threat scenarios such as acts of terrorism and organised crime. Based on these scenarios, specifications for the development of the security kit are defined and criteria for the demonstration of their effective performance derived;

» Development of textiles and coatings for ballistic protection with respect to foldability, light weight and environmental influence;

» Development of textiles and coatings for inflatable structures and suitable coverings for transport and storage;

» Development and characterization of a gas generator formulation with high mass specific gas output, low gas temperature and non-toxic gas components;

» Evaluation and testing of combustion chamber designs with respect to small size and light weight;

» Consolidation of the demonstrators will comprise the incorporation of all basic systems, e.g. gas generator, ballistic protection design and the inflatable structure;

» The final tests of the demonstrators will be done according to the defined threat scenarios. The results will be reviewed according to the goals set out at the start of the project;

» Development of a dissemination plan of the results and knowledge obtained in the project;

» Overall Project Management and Co-ordination, Accounting, Quality Assurance & Control.

Expected results

» Compilation of threat scenarios;

» Performance requirements of protection kit;

» Selection of ballistic protection textiles appropriate to security kit requirements;

» Development of textiles and coatings for inflatable structures;

» Ballistic testing to explore the effectiveness of multi-layer set-up;

» Gas generator composition characterised by high gas output and fast burning behaviour;

» Consolidation and final testing of demonstrators;

» Innovation plan, exploitation plan and feasibility study.

PARTNERS

Fraunhofer Gesellschaft zur Förderung der angewandten Forschung e.V. (Fraunhofer-ICT)
Bundeskriminalamt (BKA)
Dr. Lange GmbH & Co KG (LANCO)
Explosia a.s. (EXPLOSIA)
P-D Interglas Ltd. (INTERGLAS)

COUNTRY

Germany
Germany
Germany
Czech Republic
United Kingdom

REWARD / REal-time Wide-Area RaDiation Surveillance System

Information

Grant Agreement N°
284845
Total Cost
€ 4,270,883.00
EU Contribution
€ 3,020,795.00
Starting Date
01/12/2011
Duration
36 months

Coordinator

CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS
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Project objectives

The REWARD project will develop portable, intelligent radiation detectors that can determine the flux and energy of the incoming radiation, as well as their own location. Multiple individual detectors will be integrated in a ubiquitous radiation sensing system in order to continuously monitor an area, generate an alarm if an anomalous situation is encountered and locate and identify the radiation sources. The main features of the REWARD system:

» Real-time system with wide area coverage;

» Novel solid-state detector technologies;

» Gamma and neutron detection;

» Scalable in terms of complexity and costs;

» Portable and adaptable to any type of environment.

New methods and tools will be developed for fusion, real-time and offline data mining of the radiation sensor information to discover patterns and associations of background radiation.

Description of the work

REWARD is a novel mobile system for real-time, wide-area radiation surveillance. It is based on the integration of new miniaturized solid-state radiation sensors: a CdZnTe detector for gamma radiation and a high-efficiency neutron detector based on novel silicon technologies. The sensing unit will include a wireless communication interface to send the data remotely to a monitoring base station as well as a GPS system to calculate the position of the tag.

The system will also incorporate middleware and high-level software to provide web-service interfaces for the exchange of information and an expert system to continuously analyse the information from the radiation sensor and correlate it with historical data in order to generate an alarm when an abnormal situation is detected.

REWARD will be useful for many different scenarios such as nuclear terrorism threats, lost radioactive sources, radioactive contamination or nuclear accidents. It can be deployed in emergency units and in general in any type of mobile or static equipment, but also inside public/private buildings or infrastructures. The sensing units will be highly portable thanks to their low size and low energy consumption. The complete system will be scalable in terms of complexity and cost and will offer very high precision in terms of both the measurement and the location of the radiation.

REWARD's goals will be realized by the collaborative effort of eight highly specialized, though synergistic research organizations, wireless sensor networks providers, software developers and application users.

The modularity and flexibility of the system will allow for a realistic introduction to the market. Authorities may start with a basic, low-cost system and increase the complexity based on their evolving needs and budget constraints.

Expected results

» High-efficiency radiation detectors, both for gamma radiation and for neutrons, using state-of-the-art technologies that offer superior performances, lower volume and lower cost compared to conventional sensors;

» A central monitoring and decision support system with the ability to process the data from the sensing units and to compare them with historical records;

» Small size & weight sensing tags, equipped with a positioning and communications unit, resulting in a radiation monitoring network that is capable of autonomous operation, is flexible and can easily be adapted to the needs and conditions of the specific situation;

» A security framework to ensure protection against unauthorized access to the network and data, ensuring the privacy of the communications and contributing to the overall robustness and reliability of the REWARD system.

PARTNERS	COUNTRY
Consejo Superior de Investigaciones Científicas (CSIC)	Spain
Sensing & Control Systems S.L. (S&C)	Spain
Vitrociset S.p.A (VCT)	Italy
Universität Freiburg (ALU-FR)	Germany
Instituto Tecnológico e Nuclear (ITN)	Portugal
XIE. X-ray Imaging Europe (XIE)	Germany
EDISOFT (EDI)	Portugal
Civil Protection Unit of Campania (DIP)	Italy

SALIANT / Selective Antibodies Limited Immuno Assay
Novel Technology

Information

Grant Agreement N°
242377
Total Cost
€4,498,088.80
EU Contribution
€3,362,598.60
Starting Date
01/09/2010
Duration
36 months

Coordinator

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Project objectives

SALIANT is focussed on developing a hand-held device for real-time analysis of trace levels of explosives, chemicals and drugs. The key innovation is a positive detection lateral-flow test for small molecules that is highly sensitive and simple to use making it ideally suited to deployment by First Responders at crime scenes and terrorist incidents.

SALIANT offers a system based on a small bindable moiety that is first conjugated close to the binding site of a primary antibody against the analyte such that when analyte binds the antibody, the moiety can still be bound by a labelled secondary antibody. A large reagent-analogue of the analyte is also introduced, binding the analyte-unbound primary antibody, and thereby blocking binding of the secondary antibody to the moiety. Thus the more analyte present, the more binding of secondary antibody occurs and more signal is produced.

Description of the work

Lateral flow immunodiagnostics has long offered the promise of fast, high-quality testing for substances of low molecular weight. There have however been very real challenges to bringing the full power of such technology to bear in this area. What is required is a robust system in which there is no observable signal in the absence of analyte, and even low-level samples give an obvious observable signal over this zero background.

The SALIANT project is divided into several technical work packages which comprise research and development of sampling and detection methods, technology integration and demonstration of practical device application in forensic laboratories and first responder scenarios.

An initial specification process will ensure that target molecules and application scenarios are catered for in the development of sampling technologies. This is followed by development of the SAL Universal detection system and in parallel the development of the Apposition detection system to give complementary dipstick and read-out systems respectively. The device will be further developed and integrated with sampling and detection technologies before practical demonstrations in both laboratory and first responder scenarios.

A work package is also dedicated to the dissemination of results which will not only spread awareness of the knowledge gained between project partners and the wider security industry research and technology community but also promote and develop synergy between the security sector, security industry and academia through common training activities and workshops.

Expected results

» Demonstrate Immunoassay based technology for detection of small molecular weight analytes relevant to the needs of specific end users targeting explosives and chemical toxins;

» Deliver a mobile, hand-held system for non-invasive sampling, detection, read-out, display, storage, retrieval and secure communication of results;

» Equip First Responders and Forensic Scientists at major crime scenes with high performance, simple to use real-time technology that can support risk assessment, evidence collection and information-guided investigation.

PARTNERS	COUNTRY
University of Newcastle upon Tyne (UNEW)	United Kingdom
Selective Antibodies Limited (SAL)	United Kingdom
OY REAGENA Ltd (REAG)	Finland
Indicia Biotechnology (IND)	France
Department of Justice, Equality & Law reform (FSL)	Ireland
Zilinska univerzita v ziline (UNIZA)	Slovakia
Netherlands Forensic Institute (NFI)	Netherlands
Applikon Analyzers (APP)	Netherlands
Stichting Dienst Landbouwkundig Onderzoek (DLO-FBR)	Netherlands
Centre of Excellence for Life Sciences Ltd (CELS)	United Kingdom
Kite Innovation (Europe) Limited (KITE)	United Kingdom

SAVELEC / Safe control of non-cooperative vehicles through electromagnetic means

© SAVELEC

Information

Grant Agreement N°
285202
Total Cost
€ 4,253,993
EU Contribution
€ 3,321,749
Starting Date
01/01/2012
Duration
40 months

Coordinator

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Project objectives

SAVELEC aims to provide a solution for the external and safe control of a non-cooperative vehicle with no consequences for the persons inside the vehicle or other persons and objects nearby. The proposed solution is based on the use of electromagnetic means in order to disrupt the correct functioning of the electronic components inside the vehicle, which will make it slow down and stop. The SAVELEC approach is based on the premise of obtaining an optimized solution in terms of field strength, ensuring the solution complies with EU guidelines regarding human exposure to electromagnetic fields.

The ultimate purpose of the project is to design and build a car-stopper prototype to validate the technology. A real demonstration on cars going along a controlled track will be performed to assess the technology in a realistic scenario.

The involvement of security forces as end-users in the project is a key factor as regards the need to have realistic information about the use-cases, scenarios and operational parameters.

SAVELEC will propose a regulatory framework regarding the use of the technology by EU security bodies in their daily missions.

Description of the work

The work programme will start with an assessment of the use-cases and scenarios that will lead to the definition of a set of operational requirements. These activities will be performed in close cooperation with the end-user panel made up of a group of security bodies from Spain, France, Germany and Greece.

An in-depth technology review of the available state-of-the-art technology that may be considered as a reference to follow for generating the signals needed for the project's activities will be performed afterwards. This will consist of waveform generation and modulation, high-power amplifiers, power sources and ultra directional radiating elements, high bandwidth and the ability to withstand high-power signals. In addition, a series of activities are planned to review the electronic architectures and systems in cars and light commercial vehicles, providing a list of vulnerabilities regarding electromagnetic coupling effects ranked according to their expected effectiveness for the following test bench experiments.

The test bench experiments will consist of defining, designing and building automotive test bench architecture for electrical measurements. Additionally, a specific set-up for generating a wide range of electromagnetic signals will be prepared. These two elements will be used to perform a wide range of EMC experiments on sensors, electronics, wires and communications in order to identify the optimized type of signal that could lead to stopping the car as a consequence of the electromagnetic coupling.

Some additional considerations of more legal and safety aspects will be evaluated in the scope of collateral effects regarding the use of this kind of electromagnetic means: human exposure to electromagnetic fields (user, target and persons in close proximity), explosive atmosphere exposure to electromagnetic fields and an assessment of the drivers' reaction once the car goes into abnormal behaviour mode. In addition to this, specific legal and ethical studies will be carried out regarding the use of this kind of electromagnetic means by security forces. A regulatory framework will be sketched out and proposed.

Taking into consideration all the aforementioned outcomes, a breadboard-level prototype car-stopper device will be designed, manufactured and validated in an operational environment.

Expected results

SAVELEC will make technology available that could be used by law enforcement agencies in their daily missions to stop and control non-cooperative land vehicles at distance, safeguarding all the legal and ethical considerations that may arise from the use of this kind of technology. An extrapolation to the case of maritime missions could follow.

SAVELEC will demonstrate the new technology's added value to law enforcement agencies as regards their daily operations. The project will raise awareness among policy-makers and help develop the proper legal framework.

PARTNERS	COUNTRY
INSTITUTO DE APLICACIONES DE LAS TECNOLOGIAS DE LA INFORMACION Y DE LAS COMUNICACIONES AVANZADAS (ITACA)	Spain
DEUTSCHES ZENTRUM FUER LUFT - UND RAUMFAHRT EV (DLR)	Germany
MBDA FRANCE SAS (MBDA)	France
IMST GMBH (IMST)	Germany
TECHNOLOGICAL EDUCATIONAL INSTITUTE OF PIRAEUS (TEIP)	Greece
BCB INFORMÁTICA Y CONTROL S.L. (BCB)	Spain
STATENS VAG- OCH TRANSPORTFORSKNINGSINSTITUT (VTI)	Sweden
OTTO-VON-GUERICKE-UNIVERSITAET MAGDEBURG (OVGU)	Germany
AKADEMIA OZBROJENYCH SIL GENERALA MILANA RASTISLAVA STEFANIKA (AOS)	Slovakia
HELLENIC AEROSPACE INDUSTRY SA (HAI)	Greece

SAVEMED / Microstructure secured and self-verifying medicines

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Information

Grant Agreement N°
261715
Total Cost
€4,278,114.80
EU Contribution
€3,144,724.50
Starting Date
01/04/2011
Duration
36 months

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Project objectives

Protecting EU citizens from counterfeit pharmaceuticals – SAVEmed offers comprehensive, user friendly and simple to implement solutions.

Counterfeit medicinal products are a threat to the health and safety of patients around the world. They range from drugs with no active ingredients to those with dangerous impurities.

They can be copies of branded drugs, generic drugs or over-the-counter drugs as well as faked implants or diagnostic devices.

In SAVEmed, self-verification security systems highly relevant for a secure track-and-trace system for the whole supply chain of a variety of medical products (e.g. solid dosage forms, pharmaceutical container, medical implants, and sterile pouches) will be developed. The key of the system is that it will work independent of external databases. It will enable the verification of the product's genuineness and its correct supply chain on-site at every step of this chain.

Description of the work

The project aim is to transfer diffractive gratings, random microstructures, micro-barcodes and contrast generating micro-prisms in hard tools. Moreover, algorithm enabling cross checking of the secure microstructures on the product (even through coatings) and on the package will be developed to ensure the highest level of security possible. In SAVEmed, this direct product marking approach will be realised for pharmaceutical tablets, injection moulded pharma caps and laminated sterile pouches.

Nevertheless the approach is applicable to nearly all other types of medical products.

The strategies of criminal organisations will be analysed and the development will be adapted to counteract these strategies. The key advantage of the implementation of secure microstructures directly in or on the medical product itself is that no chemical or biological additives and no costly changes of production lines are needed. Thus no additional approvals from regulatory agencies are required.

Expected results

- Fabrication of novel overt and covered self-verifying security features in medical products;
- Experimental proof of cost-effective manufacturing route of tools equipped with durable micro- and nanostructures;
- Fast measurement devices developed capable of identifying the secure microstructures in a variety of – coated and uncoated – medical products;
- Identification of a technology implementation strategy for different geographic regions which is based on the analysis of weak points in the dissemination of counterfeit pharmaceutical and medical products by organized crime.

PARTNERS	COUNTRY
NANO4U GmbH	Germany
Heliotis AG	Switzerland
Centre Suisse d'Electronique et Microtechnique SA (CSEM)	Switzerland
SteriPack Ltd.	Ireland
Klocke Holding	Germany
Mauer Sp. z o. o,	Poland
United Nations Interregional Crime and Justice Research Institute (UNCRI)	Italy

SCIIMS / Strategic Crime and Immigration Information Management System

Information

Grant Agreement N°
218223
Total Cost
€3,595,562.80
EU Contribution
€2,318,996.45
Starting Date
01/11/2009
Duration
36 months

Coordinator

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Project objectives

» Development and application of Information Management (IM) and Information Exploitation (IX) techniques enabling information to be fused and shared nationally and trans-nationally within a secure information infrastructure in accordance with European crime and immigration agencies' information needs;

» Development and application of tools to assist decision making in order to predict and analyse likely People Trafficking and People Smuggling sources, events and links to organised crime;

» Utilisation and enhancement of existing 'State of the Art' products to develop and incorporate new capabilities, 'Beyond State of the Art' into product baselines in order to speed up the introduction of new innovative techniques, technologies and systems.

Description of the work

People Trafficking and People Smuggling have long been a problem for European Governments, adversely affecting the security of their citizens. In many cases women and children are forced into the sex trade and subjected to labour exploitation. In formulating the SCIIMS project the consortium will focus upon an overarching research question from which the developed capabilities, demonstration and experiments will be focussed:

"In the European Union context how can new capabilities improve the ability to search, mine and fuse information from national, trans-national, private and other sources, to discover trends and patterns for increasing situational awareness and improving decision making, within a secure infrastructure to facilitate the combating of organised crime and in particular people trafficking/ smuggling to enhance the security of citizens?"

The SCIIMS Consortium will utilise 'State of the Art' products which will form the base capability on which to develop new innovative capabilities and technologies. This approach is designed to provide an early exploitation opportunity for the consortium and the user groups involved.

Expected results

Research into Information Management and Information Exploitation techniques to help in combating organised crime. SCIIMS will research and develop 'beyond state of the art' technologies and techniques to search, mine and fuse information from heterogeneous data sets. Visualisation techniques of information for sense-making will be improved in order to conduct analysis, detect trends and improve the understanding and detection of People Trafficking and Smuggling.

SCIIMS will do this through a research capability development and experimentation programme which will investigate both existing technologies and those currently being researched and developed. This will allow European agencies to make more effective decisions and interventions to improve the security of citizens and in particular the fight against organised crime.

PARTNERS	COUNTRY
BAE SYSTEMS INTEGRATED SYSTEM TECHNOLOGIES LTD	United Kingdom
INDRA SISTEMAS S.A. (INDRA)	Spain
COLUMBA GLOBAL SYSTEMS LTD (Columba)	Ireland
ELSAG DATAMAT S.P.A. (ED)	Italy
DENODO TECHNOLOGIES SL (DENODO)	Spain
Magyar Tudomanyos Akademia Szamitastechnikai Es Automatizalasi Kutato Intezet (Sztaki)	Hungary
UNIVERSIDADE DA CORUNA (UDC)	Spain
SELEX SISTEMI INTEGRATI SPA (SSI)	Italy
GREEN FUSION LIMITED (DATA FUSION)	Ireland

SCINTILLA / Development of detection capabilities of difficult to detect radioactive sources and nuclear materials

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Information

Grant Agreement N°
285204
Total Cost
€ 3,867,616.38
EU Contribution
€ 3,023,652.12
Starting Date
01/01/2012
Duration
36 months

Coordinator

COMMISSARIAT À L'ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES
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(public website due month 6)

Project objectives

SCINTILLA aims at building an innovative and comprehensive toolbox of devices and best-of-breed technologies for the enhanced detection and identification of difficult to detect radioactive sources and nuclear material:

» Dealing with the challenge of masked and shielded material;

» Developing effective solutions, which are reliable, portable/mobile and cost effective;

» Finding a reliable replacement for Helium-3, which is the major consumable for today's RPM (Radiation Portal Monitors) devices for neutron detection and has become close to unavailable in the European Union.

Description of the work

SCINTILLA will cover a broad range of different usage cases including automatic screening of moving targets such as people, cars and trucks, the inspection of large containers as well as the detection of radioactive sources in bombs.

The SCINTILLA Test-bed Service and annual Technology Benchmarks will respectively support and select the technologies; they will also be open to third-party developments.

In addition to more technical criteria such as sensitivity, discrimination between neutron and gamma radiation and the minimisation of false alarms, SCINTILLA will assess technologies with respect to practical criteria such as portability, mobility and cost-benefit ratios.

The resulting selection of best-of-breed technologies will then be integrated into full prototype devices, which will be ready for assessment in selected usage cases under (close to) real-life conditions.

To reflect the different TRL of technologies under development the project will proceed in two stages with usage assessments at midterm and project end.

The SCINTILLA Toolbox will be provided with User Guidelines and a Technology Handbook for integrators.

SCINTILLA will also develop and promote communication protocols and standards.

Around the Test-bed and Benchmark services a sustainable SCINTILLA Partnership Network will be built, a worldwide community of technology providers, experts and users, around the topic of detection technologies.

Expected results

SCINTILLA will contribute to minimise the risk of use or dissemination of difficult to detect radioactive sources in the population.

By proposing effective substitutes for Helium-3, SCINTILLA will contribute to the resolution of a strategic threat to Europe: the increasing difficulty to procure Helium-3 for RPMs.

The Test-bed services, Technology Benchmarks and Partnership Network will ensure Europe stays at the front of this area which is critical for the security of Europe and its citizens.

PARTNERS	COUNTRY
COMMISSARIAT A L'ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES (CEA)	France
EUROPEAN COMMISSION - JOINT RESEARCH CENTRE (JRC)	Belgium
ISTITUTO NAZIONALE DI FISICA NUCLEARE (INFN)	Italy
ANSALDO NUCLEARE SPA (ANSALDO)	Italy
CENTRE FOR ENERGY RESEARCH – HUNGARIAN ACADEMY OF SCIENCES (IKI)	Hungary
FRAUNHOFER-GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V (FhG INT)	Germany
ARTTIC (ART)	France
SAPHYMO SAS (SAPHYMO)	France
SYMETRICA SECURITY LTD (SYMETRICA)	United Kingdom

TIRAMISU / Toolbox Implementation for Removal of Anti-Personnel Mines, Submunitions and UXO

Information

Grant Agreement N°
284747
Total Cost
€ 19,798,269.08
EU Contribution
€ 14,934,745.00
Starting Date
01/01/2012
Duration
48 months

Coordinator

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Project objectives

Anti-personnel landmines and unexploded ordnance (UXOs) represent an important obstacle in the transition from crisis to peace for war-affected countries. They threaten post-conflict development and welfare.

The objective of the TIRAMISU project is to provide the Mine Action community with a toolbox to assist in addressing the many issues related to Humanitarian Demining and thus promoting peace, national and regional security, conflict prevention, social and economic rehabilitation and post-conflict reconstruction.

The tools in development are divided in two main categories:

» Demining planning tools, which will help locate the threats and define the contaminated areas;

» Detection and disposal tools, which will physically neutralise mines and UXOs and improve operators' safety. In this context, in-depth training will be provided to the users.

These tools will be tested and validated in mine-affected countries and will also benefit from state-of-the-art technologies (robots, UAV...).

Description of the work

TIRAMISU is divided into 10 modules that will cover all the different aspects of Humanitarian Demining. They are:

» Land Impact Survey: tools enabling the prioritisation of the areas most affected and the efficient use of the other modules in a given situation. These tools will make use of remote sensing and decision support systems;

» Non-Technical Survey & Advanced General Survey: tools to facilitate land release;

» Technical Survey: tools to detect indicators of probable presence of landmines/UXOs;

» Ground-based Close-in Detection: tools, such as advanced metal detectors, Ground Penetrating Radars and novel chemical sensors;

» Stand-off Detection: tools to detect mines, submunitions or explosives at close range with remotely controlled Micro (Unmanned) Aerial Vehicles (MAV/UAV) or flying biosensors (honeybees);

» Disposal of ERW (Explosive Remnants of War): tools to protect deminers or vehicles against explosions;

» Mine Risk Education: tools to assist in Mine Risk Education activities;

» Training: tools aiming at developing capacity building and enabling the user uptake of the tools developed;

» Mine Action mission management: tools to improve planning and execution of Mine Action missions;

» Standards: this module includes the current and in-progress or proposed CEN Workshop Agreements (CWA).

In order to test the tools and to also increase the confidence of the Mine Action community in these tools, test and validation campaigns will be organised in several mine-contaminated countries.

The project is steered by two boards that will be involved in every step of the development of TIRAMISU to ensure that the tools being developed will really be useful to the Mine Action community. The End-User Board will assist in the definition of the needs and the assessment of the usefulness of the tools. The Project Advisory Board will provide an independent view on the tools' design and development and on any ethical issues that could arise in the course of the project.

Expected results

The TIRAMISU Toolbox will offer a comprehensive modular structure covering the different Mine Action processes, from Land Impact Survey to the safe Mine Clearance Actions and disposal. The tools will be designed with the active participation of end-users, and tested and validated in mine-contaminated countries.

It is expected that these tools will benefit Mine Action Centres and national Mine Action authorities, private companies and NGOs working in Mine Action, as well as European and UN agencies.

PARTNERS	COUNTRY
ECOLE ROYALE MILITAIRE - KONINKLIJKE MILITAIRE SCHOOL (RMA)	Belgium
UNIVERSITA DEGLI STUDI DI GENOVA (DIMEC)	Italy
DEUTSCHES ZENTRUM FUER LUFT - UND RAUMFAHRT EV (DLR)	Germany
INSTITUTO DE SISTEMAS E ROBOTICA-ASSOCIACAO (ISR-UC)	Portugal
AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES (CSIC)	Spain
UNIVERSITA DEGLI STUDI DI CATANIA (UNICT)	Italy
INSTYTUT MASZYN MATEMATYCZNYCH (IMM)	Poland
DIALOGIS UG (HAFTUNGSBESCHRANKT) (DIALOGIS)	Germany
SVEUCILISTE U ZAGREBU - GEODETSKI FAKULTET (FGUNIZ)	Croatia
HRVATSKI CENTAR ZA RAZMINIRANJE-CENTAR ZA TESTIRANJE RAZVOJ I OBUKU DOO (CTDT)	Croatia
NOVELTIS SA (NOVELTIS)	France
PARIS-LODRON-UNIVERSITÄT SALZBURG (PLUS)	Austria
WOJSKOWY INSTYTUT TECHNIKI INZYNIERYJNEJ IM PROFESORA JOZEFA KOSACKIEGO (WITI)	Poland
THE UNIVERSITY COURT OF THE UNIVERSITY OF ST ANDREWS (USTAN)	United Kingdom
UNIVERSITE LIBRE DE BRUXELLES (IGEAT)	Belgium
SPINATOR AB (SPINATOR)	Sweden
PROTIME GMBH GESELLSCHAFT FUR INFORMATIONSLOGISTIK (PROTIME)	Germany
SPACETEC PARTNERS SPRL (STP)	Belgium
EUROPEAN UNION SATELLITE CENTRE (EUSC)	Spain
VALLON GMBH (VALLON)	Germany
I.D.S. - INGEGNERIA DEI SISTEMI - S.P.A. (IDS)	Italy
PIERRE TRATTORI DI GIOVANNI BATTISTA POLENTES & C SNC (PIERRE)	Italy
BRIMATECH SERVICES GMBH (BRIMATECH)	Austria
COMITE EUROPEEN DE NORMALISATION (CEN)	Belgium

TWOBIAS / Two stage rapid biological surveillance and alarm system for airborne threats

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Information

Grant Agreement N°
242297
Total Cost
€4,935,083.65
EU Contribution
€3,577,834
Starting Date
01/07/2010
Duration
36 months

Coordinator

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Project objectives

The project aim is to develop a demonstrable, modular and "close-to-market" demonstrator of a stationary, reliable, vehicle-portable, low false alarm rate Two Stage Rapid Biological Surveillance and Alarm System for Airborne Threats (TWOBIAS) for use at indoor or outdoor public sites regarded as targets for bioterrorist attacks.

The objectives are to:

» Establish a command and control software system for TWOBIAS in order to reliably function at a real-life site;

» Test and evaluate biodetectors in large-scale chamber tests, and analyse background interference detection signals under real-life conditions;

» Enhance the performance of TWOBIAS using advanced data classification methods;

» Provide a functional combined two stage alarm biological detection and identification system.

Description of the work

TWOBIAS includes both detection (BDU – biological detection unit) and identification (BIU – biological identification unit) schemes:

» *StageONE:* First alarm based on best-in-use optimized optical BDU (detect-to-warn);

» *StageTWO:* Second alarm based on highly automated microfluidic-based platform with a molecular BIU (detect-to-treat).

The project, containing six workpackages, will enhance the progress of the state-of-art technology by developing a reliable biological surveillance system TWOBIAS in order to reduce the total time response for first responders by focusing on:

» assessing the requirements from users;

» reducing false alarm rates by improving current BDUs using complementary orthogonal detector techniques obtaining classification of biological threat agents during detection;

» developing improved alarm algorithms for existing mature and almost mature BDUs;

» combining the improved BDU with a semi-automatic, microfluidic, on-site, molecular identification unit (BIU) for multiplex identification of biological threat agents in the air;

» integrating the optimized BDU and BIU to obtain a demonstrator of TWOBIAS; and

» using real-life conditions for characterising, improving BDU and performing testing and evaluation of TWOBIAS together with users.

Expected results

» An integrated BDU and BIU system with a two-stage alarm functionality - TWOBIAS;

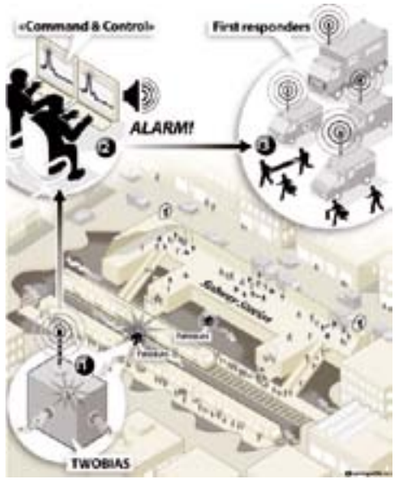
» The best-in-use BDU components with accompanying alarm algorithms (StageONE alarm);

» A reliable BIU component – automatic - microfluidic - molecular (after StageONE alarm);

» No (extremely low) false alarm rates;

» A simulation/model of the real-life test site and BDU/ TWOBIAS;

» A demonstration of TWOBIAS at a real-life test.



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Thales SA (TRT)
Thales Security Solutions and Services S.A.S (TSS)
Uppsala universitet (UoU)

COUNTRY

Norway
France
Cyprus
The Netherlands
Sweden
Czech Republic
Sweden
France
France
Sweden

UNCOSS / Underwater coastal sea surveyor

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Information

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Project objectives

The waterways are becoming more and more crucial for coastal economy and paradoxically, such areas remain very vulnerable to terrorism attacks especially against underwater IED threats. Coastal regions such as in southern Europe and south-east Asia are contaminated by different ammunition left on the sea bottom after war activities from World War I, II and more recent conflicts. This represents a constant threat to the sea traffic, fishermen, tourists and local populations. The objects on the sea bottom are of different natures and include torpedoes, airplane bombs, anti-ship mines, grenades, gun fuses, ammunition and projectiles of different calibers. For example, it is estimated that there are at least 130 000 tons of explosive devices in the eastern coastal waters of the Adriatic Sea. This dramatic pollution weakens the economic development capacity of such regions.

A major challenge is to provide new tools for keeping naval infrastructure safe: harbours, ships, coastal areas, ferry terminals, oil and gas terminals, power/nuclear plants, etc. The main objective of the UNCOSS project is to provide tools for the non-destructive inspection of underwater objects mainly based on neutron sensors. The technology used has already been experimented with for Land Protection (especially in the frame of the FP6/Euritrack project). The application of this technology for underwater protection will be a major achievement.

The classic approach to underwater IED detection is mainly based on sonar detection (derived from military development for mine clearance) which can not guarantee if unattended objects contain explosive. The identification/classification of underwater objects using classical sensors such as sonar and video cameras, becomes more and more difficult when facing asymmetrical attacks. The UNCOSS project is a cost-effective response to new terrorism threats and provides a fundamental technology for the global issue of maritime surveillance and port/naval infrastructure protection.

There is no specific device capable of identifying explosive contents of submerged UneXplode Ordnance (UXO) therefore Explosive Ordnance Disposal (EOD) teams at present have to remove the objects without knowledge of the explosive charge presence.

fig.1

fig.2

fig.2

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Figure 1: Torpedo from World War II
Figure 2: Antiship mines

Expected results

The end product of this project will be a prototype of a complete coastal survey system that will make use of a specifically designed underwater neutron sensor capable of confirming the presence of explosives on the bottom of the sea, either visible or partially covered by sediments. Such a device will allow a safer and more efficient removal of explosive devices from the sea bottom of ports and elsewhere.

The final demonstration campaign shall be carried out in Croatia under the supervision of the IRB which shall be responsible for the management of all licensing and authorization issues.

fig.3

fig.4

fig.5

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Figure 3: ECA's innovative mine killer with tiltable head
Figure 4: ECA OLISTER MIDS Identification and destruction of mines
Figure 5: H1000, 1000m rated, remotely controlled subsea inspection vehicle (ROV)

PARTNERS	COUNTRY
Commissariat à l'énergie atomique et aux énergies alternatives (CEA)	France
ECA S.A.	France
Ruder Boskovic Institute (RBI)	Croatia
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