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**TERRIFFIC – Tools for early and Effective Reconnaissance in cbRne Incidents providing First responders Faster Information and enabling better management of the Control zone**

*The threat posed by so-called dirty bombs on society is increasing. A dirty bomb or radiological dispersal device (RDD) is a speculative radiological weapon that combines radioactive material with conventional explosives. There are two primary reasons for this - firstly because we have seen in recent years that most attacks are unsophisticated attacks on soft-targets (Europol, 2016) and secondly because ISIS and other terror groups have a strong interest in acquiring and using Chemical, Biological, Radiological, or Nuclear (CBRN) materials (Bureau of Counterterrorism. United States Department of State, 2016).*

The TERRIFFIC project brings together 10 European organisations, which will work together to deliver an important step change in the effectiveness of first responders during the first hours of a Radiological, Nuclear, explosive (RNe) incident. This will lead to reduced response times, less health and safety risks for the response teams, and less human intervention in the operation due to a higher number of automated processes and extended mobile detection capabilities.

TERRIFFIC is a new research and innovation project, funded under the European Commission's Horizon 2020 programme, which will enrich the European response to RNe events by a set of modular technology components in a comprehensive system. These components include new detectors, algorithms, drones, robots, dispersion models, information management software and decision support systems. Although the primary focus of the project is on the response to an explosion containing radioactive or nuclear elements, the project will also provide detailed information on the applicability of some developments within a chemical and biological (C/B) context.

Dedicated Key Performance Indicators will measure the progress towards targeted performance goals, such as significant acceleration of the time to start terrain interventions, as a result of more accurate and near-to-real-time estimation of the control and exclusion zones. Advanced mixed reality technology will be leveraged to provide first responders with ad-hoc available and continuously updated information during operations.

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TERRIFFIC is SME-led and practitioner-driven. Leading edge technologies will be provided by the R&D partners, whereas key innovative components will be developed by SMEs already involved in military or first responder markets taking on the commercialisation of the TERRIFFIC System and its components. Central to the project's future success is the fact that practitioners will be heavily involved throughout the development process, components' assessment and technology trialling. Their operational expertise will be essential to ensuring that all development is focussed on the right areas of development.

The project will also leverage results from previous successful FP7 projects, closely cooperating with ENCIRCLE on the CBRN cluster and market aspects, and with eNOTICE on training and technology testing and assessment. Special attention will be given to standardisation to optimise the integration with future and already applied solutions.

The impacts that dirty bombs have both on individuals and our wider society should not be underestimated. The 10 partners in TERRIFFIC will be working hard over the next three years together with CBRNe experts and practitioners to develop tools and solutions to help them manage such a situation whenever it occurs.

\*\* Ends 497 words \*\*

#### **CONTACT INFORMATION**

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## **BACKGROUND**

### **TERRIFFIC Partner Role / main contributions**

**ARKTIS Radiation Detectors** is the project coordinator and the technology partner providing low cost, modular silicon photomultiplier based gamma and neutron detectors. ARKTIS' roles include the integration of detection technologies into systems along with developing an interface that will allow data to/from ARKTIS' mobile radiation detection system MODES to be transmitted using CBRNe communications standards. This enables the MODES van to perform as a tactical information system or a sub-component of a centralised command and control centre.

The contribution of **NEXTER Robotics** (subsidiary of NEXTER Group) focuses on unmanned ground vehicles (UGV). NEXTER will adapt the UGVs so that they can operate the selected RN detectors (especially Gamma-Camera and Gamma-Detector). Detectors can also be mounted on a manipulator arm to increase their efficiency. NEXTER will provide autonomous exploration capability and autonomous search of contaminated threats inside global areas pre-defined by supervision software (and outputs from PLUME).

**AERACCESS** will provide drones for the mobile detectors component of the project. AERACCESS will focus on a customised interface with the newly designed payloads and the connection to the TERRIFFIC system, enabling precise and real-time information for the first responders' team.

**Bruhn NewTech** is a company specialising in products for CBRNe management with over 25 years' experience of delivering this capability to the military for all NATO and Partnership for Peace (PfP) countries. Bruhn NewTech will provide CBRNe products and product enhancements to the project.

Project Management Partner **ARTTIC** is a management services company, specialising in international R&D collaboration, with 30 years of expertise in European research programmes. ARTTIC will support the project management, communication, dissemination and exploitation activities of TERRIFFIC.

**International Security and Emergency Management Institute (ISEMI)** will provide expertise in practitioners' needs assessment, testing and evaluation (including the preparation of methods) as training (preparation, development or design of training materials as well as actually conducting the training itself).

**TL & Associates** will bring the knowledge of its RNe experts to specify and consolidate the technical specifications. It will also assess the developments work by developing the necessary evaluation and training tools using virtual reality technologies. TL & Associates will contribute to the dissemination activities, linking with its network of end users and publishing and presenting the evaluation results to the RNe community.

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**Luxembourg Institute of Science & Technology (LIST)** will contribute to the Mixed Reality Software Development, Requirements Capture and User Evaluation and Testing. LIST will also develop and test the mixed reality platforms developed during the project.

**The French Alternative Energies and Atomic Energy Commission (CEA)** is a worldwide reference research institute with expertise in the development and industrialisation of systems, dedicated to the monitoring of the RN threat. Within the project, CEA will develop an Ultra Compact Gamma camera for radioactive source localisation and a beta contamination measurement system able to work in a high gamma background.

**École Centrale de Lyon (ECL)** is expert in numerical atmospheric dispersion: plume modelling, inverse dispersion modelling, detectors network optimisation. This expertise is based on the background of the academic research laboratory LMFA in the fields of environmental fluid mechanics and numerical simulation. ECL will develop the algorithms and software used to predict from measurements the location of the source and then the location of the pollutant's plume and the 3D characterisation of the contaminated area.