



Università di Roma Tor Vergata

INTERNATIONAL CBRNe MASTER COURSES

Chemical, Biological, Radiological, Nuclear and explosive

Department of Industrial Engineering and School of Medicine and Surgery

Preliminary Program

2nd International CBRNe Workshop "IW CBRNe 2015"

***"CBRNe: new technologies, new strategies,
new approaches to reduce the risk"***

The workshop addresses current CBRNe risk scenarios, focusing on:

- *How the European countries are facing DAESH threats during the economic crisis;*
- *The use of chemical agents to offend and threaten;*
- *New civil and military tools to face CBRNe risk;*
- *The influence of the global political situation on the evolution of non-conventional events;*
- *Medicine and Biology to support a prompt CBRNe response;*
- *Research, didactic and training: the real solutions to reduce risks*

University of Rome Tor Vergata

Villa Mondragone

Via Frascati 51 (Monteporzio Catone, Rome)

For registration please contact:

info@mastercbrn.it

www.mastercbrn.com

20 November 2015

Preliminary Program

08.30 - 08.50	Registration
08.50 - 09.00	Welcome greetings from Rector of University of Rome Tor Vergata Prof. Giuseppe Novelli – <i>University of Rome Tor Vergata, Italy</i>
09.00 - 09.30	Presentation of CBRNe courses results <i>Directive Board of CBRNe Master Course</i>
09.30 - 10.00	Contribution of Authorities Hon. Mario Giro , <i>Under-Secretary Minister for Foreign Affairs, will introduce the Welcome session</i>
10.00 - 10.20	The role of OSCE (O1) Dr. Mathew Geertsen – <i>OSCE, Austria</i>
10.20 - 10.50	Coffee Break & Industrial exhibition
10.50 - 11.10	The correlations between Migrations and Epidemiology (O2) Prof. Leonardo Palombi – <i>University of Rome Tor Vergata, Italy</i>
11.10 - 11.30	Ebolavirus in West Africa (O3) Dr. Cornelius Bartels – <i>ECDC, Sweden</i>
11.30 - 11.50	Enhance Functionality in Chemical Biological Environments (O4) Dr. Giovanni Longo – <i>W.L. Gore & Associates, Inc., Europe</i>
11.50 - 12.10	Teach them how to fish (O5) Dr. Michael Thornton – <i>JRC-ISPRA, Italy</i>
12.10 - 12.30	New challenges of Nuclear plan decommissioning (O6) Dr. Giovanni Calabresi – <i>SOGIN, Italy</i>
12.30 - 14.00	Lunch & Poster Session & Industrial Exhibition
14.00 - 14.20	CBRNe Islamic State - Hoax or reality? (O7) Dr. Ioannis Galatas – <i>Greek Army, Greece</i>
14.20 - 14.40	Proposal of an innovative International Training Curriculum for Advisors in Emergencies and CBRNe Events (O8) Maj. Andrea Gloria – <i>NATO School, Germany</i>

14.40 - 15.00	Selex ES CBRNe experience: the European project EDEN (O9) Dr. Eng. Massimo Piva – <i>SELEX Land & Battlefield LoB, Italy</i>
15.00 - 15.20	Use of Toxic Industrial Chemicals as Chemical Weapons - a Threat? Case Study and investigative challenges – Syria (O10) Dr. Boban Cekovic – <i>HZS, The Netherlands</i>
15.20 - 15.40	OSINT to fight Terrorism (O11) Dott. Federico Sesler – <i>CISINT, Italian Centre for Strategy and Intelligence, Italy</i>
15.40 - 16.00	CBRN Defence within the Framework Nations Concept (O12) Lt. Col. Bernd Allert – <i>German Army, Germany</i>
16.00 - 16.30	Press conference on the CBRNe book series <i>Book series authors</i> – <i>ARACNE, Italy</i>
16.30-16.50	Final Greetings Scientific Committee of CBRNe Master Courses
16.50	Attendance Certification Assignment

Chairman: Dr. Dieter Rothbacher, HZS, The Netherlands

Responsible for the International Training activities at the International CBRNe Master Courses

Industrial Exhibition

WL GORE - Italy



Creative Technologies
Worldwide

**CRISTANINI CBRN
DECONTAMINATION SYSTEMS**

Cristanini

Principium



DPD Service



Preliminary Abstract

Poster Session

	First Author	Affiliation	Topic - Title
P1	Antonelli Luca	Department of Industrial Engineering, University of Rome Tor Vergata	Image computing techniques to extrapolate data for dust tracking in case of fan experimental accident simulation in a nuclear fusion plant
P2	Aspetti Pio Ciro - Carcano Riccardo	BMD Italy	Progettazione e prototipazione di dispositivo elettronico, avente un sistema radio per la "remotizzazione" dei dati e che gestisce sensori di diversa natura quali: Pressione respiratore -posizione-temperatura-radiologico
P3	Baldassi Federico	Italian Army	Testing the accuracy ratio of the Spatio-Temporal Epidemiological Modeler (STEM) through Ebola Hemorrhagic Fever outbreaks
P4	Brancaleoni Rachele / Soave Paolo Maurizio	Università Cattolica del Sacro Cuore - Rome/ CBNRe Master Courses	CRN effects on human beings: developing a tool for first responders
P5	Britti Serena	Italian Army	Bioterrorism or natural outbreak? Validation of a discriminative method applied to a real event
P6	Capobianco Luigi / Corrao Salvatore	Ministry of Home Affairs, National Fire and Rescue Service	The Italian CBRN DET ITA 1 Module: an application of a "best practice"
P7	Carestia Mariachiara	Department of Industrial Engineering, University of Rome Tor Vergata	Fluorescence measurements for the identification of Biological Agents
P8	Carestia Mariachiara	Department of Industrial Engineering, University of Rome Tor Vergata	Using free license codes to simulate the diffusion of contaminants in case of radiological release
P9	Carminati Gaetano	NBC school - Rieti	The Italian Joint CBRN School
P10	Cenciarelli Orlando	Department of Industrial Engineering, University of Rome Tor Vergata	A Novel Approach to set up a Quasi Real-Time Biological Agents Detection System
P11	Ciani Andrea	Italian Police Department	CBRNe First Responder. The Application in Prevention Activities: the OSCE example. An Opportunity of Personal and Professional Growth.

P12	Ciparisse Jean-Francois	Department of Industrial Engineering, University of Rome Tor Vergata	3D Numerical simulation to validate the first experimental measurements during a LOVA reproduction inside the new facility STARDUST-UPGRADE
P13	Cipollone Domenico	Italian Army	Psicologycal health after CBRNe event
P14	Cirigliano Angela - Rinaldi Teresa	University of Rome La Sapienza - Italian Army	Biological dual-use research
P15	Corrao Salvatore / Priori Fabrizio	Ministry of Home Affairs, National Fire and Rescue Service	The International Response System in case of CBRN emergencies: EU and NATO between deployable capacities and new developments
P16	D'Amico Fabrizio / Ventura Piergiorgio	Italian Army	To be defined
P17	D'Auria Maria Concetta	CBNRe Master Courses	LiDAR technology
P18	De Angelis Paolo / Gallo Romeo	Vatican Fire Fighters	Free licence code sto determine radionuclide contamination: 2 case studies
P19	Di Giacinto Marta	CBNRe Master Courses	Food Safety and Biological Risk: Potential Use of Food for Dissemination or Biological Threat
P20	Di Giovanni Daniele	Department of Industrial Engineering, University of Rome Tor Vergata	Gap Tool for Evaluation (GATE) of CBRNe Drills, Table Top Exercices and Full Scale Exercices
P21	Di Persio Luca	Italian Police Department	To be defined
P22	ENEA (Padoani)	ENEA	To be defined
P23	Farrace M. Giuseppina - Galeotti Francesca	Italian Department of Civil Protection	Environmental effects after flooding in Italy: analysis and proposal of action.
P24	Gabbarini Valentina	CBNRe Master Courses	Viral bioterrorism: learning the lesson of Ebola virus in West Africa 2013-2015
P25	Gabriele Jessica	CBNRe Master Courses	Use of Non-Pathogenig Biological agents as Biological Weapons simulants for the development of a stand-off detection system
P26	Gallo Romeo	Ministry of Home Affairs, National Fire and Rescue Service	Radioactivity - A Manual for First Responders
P27	Gaudio Pasquale	Department of Industrial Engineering, University of Rome Tor Vergata	The World of Research Working on CBRNe Problems: Laser Remote Sensing Systems for CWA, TICs and TIMs Detection and Identification

P28	Gelfusa Michela	Department of Industrial Engineering, University of Rome Tor Vergata	Modelling of the signal electronics of JET interferometer-polarimeter
P29	Geri Francesco - Sassu Beppe - Follari Massimo Giuseppe	Italian Department of Civil Protection	EU Host Nation Support Guidelines in case of CBRN Emergency
P30	Gruppo Marinelli Marco	Department of Industrial Engineering, University of Rome Tor Vergata	Synthetic single crystal diamond diodes for radiotherapy application
P31	Gruppo Marinelli Marco	Department of Industrial Engineering, University of Rome Tor Vergata	Dosimetric characterization of a synthetic single crystal diamond detector in narrow clinical radiation therapy photon beams
P32	Latini Gianna	AeroSekur	To be defined
P33	Lembo Raffaele - Secchi Alberto	Italian Navy	Study of a DSS for the management of CBRNe events in civil and defence scenarios
P34	Lisanti Maddalena / Martino Pietro	Ministry of Home Affairs, National Fire and Rescue Service	To be defined
P35	Provincial committee Frosinone	Italian Red Cross	Strategic objectives for the Italian Red Cross till 2020
P36			
P37			
P38			
P39	Ludovici Gian Marco	CBNRe Master Courses	Hospital infection control incurred by <i>Acinetobacter baumannii</i>
P40	Lungaroni Michele	Associazione EUROFUSION-ENEA, Department of Industrial Engineering, University of Rome	Symbolic regression with robust metrics to investigate scaling laws in Tokamaks
P41	Malizia Andrea	Department of Industrial Engineering, University of Rome Tor Vergata	To be defined
P42	Minghetti Salvatore	Ministry of Home Affairs, National Fire and Rescue Service	Campionamento ed Analisi - Laboratori CBRN del nucleo dei Vigili del Fuoco di Venezia
P43	Murari Andrea	-	To be defined
P44	Pacciani Eleonora	CBNRe Master Courses	Design of a scenario simulator for interactive training of medical response to major emergencies

P45	Paoletti Roberto	Ministry of Home Affairs, National Fire and Rescue Service	External emergency plan: Exercise with fire of dangerous substances
P46	Pazienza Michele	Italian Army	Application of Real-Time PCR to Identify Residual Bio-Decontamination of Confined Environments after Hydrogen Peroxide Vapor Treatment: Preliminary Results
P47	Peluso Emmanuele	Department of Industrial Engineering, University of Rome Tor Vergata	Application of the Symbolic Regression technique via Genetic Programming to derive Empirical Models.
P48	Pietropaoli Stefano	University of Rome 3	An analysis of Ebola Virus Disease 2013-2014 Outbreak in West Africa
P49	Poggi Luigi Antonio	Department of Industrial Engineering, University of Rome Tor Vergata	Experimental campaign to test the capability of STARDUST-Upgrade diagnostics to investigate LOVA and LOCA conditions
P50	Presciutti Federica	Istituto Nazionale di Geofisica e Vulcanologia (INGV)	Laboratory HPGe detector start up for gamma-ray spectrometry measurements applied to environmental studies.
P51	Riccio Roberto	Italian Police Department	To be defined
P52	Rossetti Pietro	Italian Red Cross	NATO Comprehensive approach in biological defence: preparedness and prevention to a potential bioterrorist Ebola Viral Disease (EVD) attack
P53	Russo Colomba	Department of Industrial Engineering, University of Rome Tor Vergata	The Importance of a High Level Academic Approach to the CBRNe Problem to improve the Capabilities of Prevention, Management and Evaluation of Consequences
P54	Sassolini Alessandro	ARPA Lazio	SX34 and the decontamination effects on chemical warfare agents (CWA)
P55	Tamburrini Annalaura	CBNRe Master Courses	Techniques for the detection of Biological Agents
P56	Tedesco Luca	Italian Navy	Islamic State and CBRNe, the new threat
P57	Vittorio Badalone	Military Italian Red Cross	To be defined
P58	Volpetti Vito	Thales Italy	CBRNe Threat Detection and Monitoring System Advanced prototype
P59	Wengler Patrick	1er Brigadier Hazardous Material Technician Police Grand-Ducale Aéroportuaire Luxembourg	Police Grand-Ducale Aéroportuaire Luxembourg Service de Garde, Dep. CBRN
P60	Zahiddullah Zahid	CBNRe Master Courses	Printed and disposable biosensor based on cholinesterase inhibition for nerve agent detection

In progress



Abstract

P1

Image computing techniques to extrapolate data for dust tracking in case of an experimental accident simulation in a nuclear fusion plant

In this paper, a preliminary shadowgraph-based analysis of dust particles re-suspension due to loss of vacuum accident (LOVA) in ITER-like nuclear fusion reactors has been presented. Dust particles are produced through different mechanism in nuclear fusions devices, one of the main issues is that dust particles are capable of being re-suspended in case of events such as LOVA. Shadowgraph is based on an expanded collimated beam of light emitted by a laser or a lamp that emits light transversely compared to the flow field direction. In the STARDUST facility the dust moves in the flow and it causes variations of refractive index that can be detected by using a CCD camera. The STARDUST fast camera setup allows to detect and track dust particles moving in the vessel and then to obtain information about the velocity field of dust mobilized. In particular, the acquired images are processed such that per each frame the moving dust particles are detected by applying a background subtraction technique based on the Mixture of Gaussian algorithm. The obtained foreground masks are eventually filtered with morphological operations. Finally, a multi-object tracking algorithm is used to track the detected particles along the experiment. For each particle a Kalman filter- based tracker is applied; the particles dynamic is described by taking into account position, velocity and acceleration as state variable. The results demonstrate that it is possible to obtain dust particles velocity field during LOVA by automatically processing the data obtained with the shadowgraph approach.

P2

SAFETY BOX: Design and prototyping of electronic device, that have a radio system for data "Remoting" and integrating sensors of different nature such as: -Position- Temperature- respirator pressure- radiological.

The Poster will describe the design and the features of a device, that will support First-responder or emergency operators that will be working in areas of risk, called SAFETY BOX. Scenarios can be various. It can be a CBRNe incident or a fire/environmental disaster. The device is a sensor platform that transmit data to a remote central unit. It is modular and easy to program. There is an unique operator identification via RF antenna. The versatile platform allows implementation of Wireless Sensor Network, from Smart environmental detection to Smart evacuation solutions. The system will be designed so as to be small in size and easy to use. Depending on the demands of the end user can be "tailed " in different ways. The device will be able to handle various sensors such as: Pressure air, temperature and radiological, operator location, physiological parameters, thermal flash and movement sensor.

The main advantages are: 1. Versatility, it can be used in many emergency scenarios. 2. Small size / Ergonomics, it is very robust (military application) 3. Ultra-low power consumption, the components used are optimized to reduce the power consumption and there are special algorithms that optimize the consumptions. 4. Automatic operation via pressure sensor, the device is thought to allow the operator to use both hands. 5. State of the art communication systems. The protocols used are very robust, adaptable, scaling, energy saving, reliable, and safe. ATEX complied. The system can be used in a very harsh environment. The system is provider of a GUI (Graphic User Interface). The software is interactive, easy understood and very friendly for the operator.

Abstract

P3

Testing the accuracy ratio of the Spatio-Temporal Epidemiological Modeler (STEM) through Ebola Hemorrhagic Fever (EHF) outbreaks

Mathematical modeling is an important tool for understanding the dynamics of the spread of infectious diseases, which could be the result of a natural outbreak or of the intentional release of pathogenic biological agents (BAs). Decision makers and policymakers responsible for strategies to contain disease, prevent epidemics and fight possible bioterrorism attacks, need accurate computational tools, based on mathematical modeling, for preventing or even managing these complex situations. In this work, the authors tested the validity, and demonstrate the reliability, of an open-source software, the Spatio-Temporal Epidemiological Modeler (STEM), designed to help scientists and public health officials to evaluate and create models of emerging infectious diseases, analyzing three real cases of Ebola Hemorrhagic Fever (EHF) outbreaks. The authors will discuss the cases analyzed through the simulations results obtained with STEM in order to demonstrate the capability of this software to be a proper suite in case of biological emergencies helping the decision makers to plan the interventions. In particular, the authors' approach consisted in the initial assessment of the validity of the software through a benchmark between simulations and epidemiological data from the past Uganda EHF outbreak (2000, Ebola-Sudan SEBOV strain). After that, the authors applied the epidemiological data from another well known EHF outbreak occurred in Zaire in 1995 (Ebola-Zaire ZEBOV strain), and they further evaluated the software as tool to simulate the development and evolution of two real EHF outbreak due to ZEBOV strain, Gabon (2001) and the recent Guinea (2014).

P4

CRN effects on human beings: developing a tool for first responders

The rescuers deployed in the red zone during a CRN event are non-medical personnel. First responders have several problems in the recognition of the toxidromes, triaging casualties, understanding English language. The background led the authors to do a research among the first responders to understand which are their needs. Rescuers from various groups such as firefighters, soldiers, international security agencies, emergency health workers, and countries were interviewed during EDEN project demos. We created a website, with an adjustable view for smartphone and tablet. Its database came from a multiple sources and the informations are validated by a toxicologist. This website hazmat-eden.eu was thought as a flexible, simple and light tool useful for everyone who is involved in CRN event. The tool was presented during an EDEN demo and it has been successful. Many partners still contact us to improve this website. In our opinion this tool can be a rapid and reliable way to have information during a CRN event. Now we are still improving the tool, in cooperation with EDEN partners and national rescuers, hopefully it will remain an open repository to address any necessity of first responders.

Abstract

P5

Bioterrorism or natural outbreak? Validation of a discriminative method applied to a real event

International terrorism at this time, represents a world-wide impact issue. Particular importance in the CBRN terroristic scenario must be given to the biological one, which takes place using biological weapons: i.e. one or more biological warfare agents plus a spreading mean. Moreover, natural outbreaks of re-emergent viral and bacterial strains increased in the last few years, raising suspects on possible terroristic deliberate spreading. The ability of discriminating between natural outbreaks and terroristic deliberate spreading is definitely necessary in order to prepare proper countermeasures according to the different kinds of events. The task of this work is to validate an investigative approach through its application to an epidemical event which really occurred working backwards through some indicators. As case study we chose the *Escherichia coli* outbreak occurred in Germany in 2011 because of a series of particular aspects which may suggest a terroristic nature: i.e. rapid outbreak, rare serotype, antibiotic multiresistance.

Our results excluded the terroristic spread but highlighted all the ambiguous aspects which suggested anthropic suspect, defined as doubt the origin of this epidemic. The crucial innovation of this method is to provide clear indication in order to analyze a suspect epidemic. The use of this method in large scale could unify the procedures used to identify bioterroristic attack worldwide, with consequent simplification in communications and quickness in emergency response

P6

The Italian CBRN DET ITA 1 Module: an application of a “best practice”

Each Member State recently has identified, within their civil protection services, intervention teams, now known as "modules", that may be available at very short notice and be sent and coordinated by the European Civil Protection Mechanism under the Commission, to places affected by an emergency. A module is "a combination of human and material resources suitable for the contrast of a determined and precise scenario" In the Decision 2010/481/EU it is described the characteristics and requirements of the modules such as tasks, skills, components, and deployment time, and level of autonomy and interoperability. The civil protection modules are defined on a voluntary basis through the use of national resources from one or more Member States, and must be able to operate autonomously for a determined period of time, which varies depending on the type of intervention or the type the interested module, thus providing the rapid response capability in the occurring emergency. The activation system triggers always from a request for assistance from the stricken country in accordance with the principle of subsidiarity. Any Member State having registered modules into the Mechanism must inform and update the Commission on the resources available in an ongoing emergency. The CBRN DET ITA 1 Module presents capabilities and detection equipment tested, at a first stage in 2011, during the “OPCW Assistex 3” (Tunisia) exercise and later, with some adjustments, during two CBRN international exercise. The module is able to perform additional tasks like dangerous liquid transfer from damaged vessels to safe and emergency vessels and chemical and radiological remote monitoring and identification.

Abstract

P7

Free License codes to simulate the diffusion of contaminants in case of radiological release

The radiological risk is inherent to a wide range of activities, beginning with the medical and military ones and including those connected to the industry and research such as nuclear fusion. A valid tool to predict the consequences of accidents and reduce their risk consists in computing systems that allow modeling the evolution of a possible release of radioactive materials. In addition to proprietary codes there are free license codes, such as Hot-Spot, which allow providing a set of tools to simulate diffusion in case of accidents involving radioactive materials and to analyze the safety and security of the facilities in which the radioactive material is manipulated, used or stored. In this paper, the authors simulate an accident of a plant for reprocessing radioactive fuel and compare the numerical data with experimental ones measured in-situ and published by the IAEA in the report "The radiological accident in the reprocessing plant at Tomsk". The code, validated with data measured in situ, has been used to simulate a diffusion of radiological contaminants in a nuclear fusion experiment and the results are presented. The aim of this work is to demonstrate the capability of free license codes to model the radiological diffusion in case of accidents in order to guarantee the safety of people and operators and the security of the plants. Both are critical issues for the development of nuclear fusion plants like ITER.

P8

Fluorescence measurements for the identification of biological agents (Features for the construction of a spectra database)

the use of biological weapons represents a great concern both from a military and civilian point of view. The early detection of biological warfare agents (BWAs) in atmosphere is a huge challenge that could be addressed through UV-LIF (Ultra Violet Laser Induced Fluorescence) techniques. Fluorescence measurements of aerosol particles can provide gross discrimination between bio-agents and atmospheric background particles, In this work we intend to investigate the capability of discriminating among different biological warfare agents (BWA) through the analysis of the optical emission spectra. To accomplish this task, a deep knowledge of fluorescence features with different boundary conditions is required, in order to create a database of comparable spectral fingerprints. Preliminary results, obtained through a laboratory setup with a standard UV lamp source, showed that significant differences can be appreciated among BWAs simulants' spectra. This represents a first step towards the implementation of a spectral database and a laser-based biological stand-off identification technique.

Abstract

P10

A novel approach to set up a quasi real-time biological agents detection system

Bio-security and biosafety are two key concepts in the CBRNe scenarios. Reduce the risks related to the use of biological agents in civil or military or terroristic actions is a must for the expert. The detection and identification of biological agents is a discipline studied trough the years but the challenge today is develop a quasi-real time stand-off detection system able to detect a potential bio contamination at short-middle range. One of the most promising approach to achieve this goal is the use optical apparatus. Biological samples can be analyzed by means of several optical techniques, covering a broad region of the electromagnetic spectrum. Strong evidence proved that the informative content of fluorescence spectra could provide good preliminary discrimination among those agents and it can also be obtained through stand-off measurements. Such a system necessitates a database and a mathematical method for the discrimination of the spectral signatures.

P11

CBRNe First Responder. The Application in Prevention Activities: The OSCE example. An Opportunity of Personal and Professional Growth

The thesis, which comes at the end of the course, is intended to highlight the possibility that international organizations and other institutions could offer in view of its activities, emphasizing above all that turns around the concept of prevention. In cooperation with the OSCE, partner of the master, I shall produce a link between the rules and bodies dedicated of the organization and the techniques acquired during the master modules and encoded by NATO. The relevance of international character will guide and support the internal context; for the Italian police forces the concept of prevention is already as important in planning as to achieve the goals. The right emphasis on the practical experience conducted by the attending will be told because passage of the training and special characteristic of the master. In conclusion, this paper aims to be a guide to some of the lessons learned and what was experienced under CBRN, in terms of opportunities for personal, cultural and professional growth.

Abstract

P12

3D numerical simulations to validate the first experimental measurements during a LOVA reproduction inside the new facility STARDUST-UPGRADE

The aim of this work is to simulate a Loss of Vacuum Accident (LOVA) in the STARDUST (Small Tank for Aerosol Removal and DUST)-UPGRADE facility. These events are one of the major safety concerns in Tokamaks, since they can cause the mobilization and the dispersion of radioactive dust contained in a fusion reactor. The first step in the study of a LOVA event is the estimation, by means of numerical simulations, of the pressurization transient in the vacuum chamber. The STARDUST-UPGRADE facility, which has a cylindrical shape, is considered as a case study. An air inlet is located in a radial position with respect to the facility, so the numerical domain is symmetric and, therefore, only a half of it has been considered in the simulation. A time-dependent mass flow rate is imposed at the inlet, in a range consistent with experimental estimates. The simulation takes 20 seconds and the attention is focused on the mean pressure value over time and on the Mach number distribution. The results are presented and discussed in the perspective of simulating LOVAs in ITER (International Thermonuclear Experimental Reactor).

P14

Biological dual-use research

In recent years, the publication of the studies on transmissibility in mammals of H5N1 influenza virus and synthetic genomes, has triggered heated and concerned debate on biological *dual-use* research within the scientific community; these papers have raised the awareness that in some cases fundamental research could be diverted to harmful experiments with bioterrorism purposes. We presented an overview of the *dual-use* concept and related international agreements, underlining the work of the *Export Control Regimes* on preventing proliferation of chemical, biological, radiological, nuclear (CBRN) weapons of mass destruction and destabilizing accumulations of conventional arms. In particular, it is hoped that the principles and activities of the *Australia Group* (AG), which focuses on chemical and biological *dual-use* materials export control, reach and become well known to the academic researchers from different countries, since they exchange biological materials (i.e. plasmids, strains, antibodies, nucleic acids) and scientific papers. To this extent and with the aim to draw the attention of the yeast scientific community on the so called *Dual-Use Research of Concern* (DURC), this work reports also the case studies on biological *dual-use* research on the first eukaryotic yeast synthetic chromosome and use of yeast cells as a factory to produce opiates from the common and harmless yeast *Saccharomyces cerevisiae*.

Abstract

P15

The International Response System in case of CBRN emergencies: EU and NATO between deployable capacities and new developments

This paper, starting introducing the features of the European Civil Protection Mechanism through the ERCC and the NATO response system to natural and technological disasters through the EADRCC, aims to analyse the current state of the Italian protection and defence system and highlight what opportunities are needed to process a coordinated and comprehensive planning of a "Smart Response". Unavoidable premises confirm that, nowadays, the evolution of international relations between States and supranational organizations fully involves also the field of management of major disasters also in case of CBRN events. Moreover, a joint and coordinated action both in Italy and abroad must be considered representing a necessary method to operate in a global context. In fact, from one side new "modus operandi" where concepts like "capacities cooperation" and "remote support" (Reach Back, Advisory Group, etc...), typically in use in NATO and from the other, the "modules" approach of the Mechanism and the RRC - Rapid Response Capability, may, however, be a valuable resource in situations of austerity that currently involves some NATO and EU countries. All these resources, in conclusion, are processed and facilitated in close contact with the Office for the Coordination of Humanitarian Affairs (UN OCHA), establishing an OSOCC, this representing an useful operational and coordination tool for both these systems.

P17

LiDAR technology

One of the most challenging issue during a CBRNe event is the detection of the agent involved in the incident, independently if the dispersion is caused by the human hand or is the tragic consequence of a natural disaster. Being able to detect an agent in the atmosphere mean a quicker response to the crisis and allow the operator on the field to be better prepared to face the menace and to evacuate the area where the contamination happened.

Especially in case of a terroristic attack or warfare use, CBRNe agents are more commonly delivered in the air, using systems that have four major components: payload (the chemical agent, often with a solvent or carrier chemical depending on the agent), ammunition (container that keeps payload intact during delivery), delivery system (missile, artillery shell, aircraft, UAV, etc.), dispersal mechanism (an explosive force or spray generator to dispense the agent into the air, where it can reach the target population).

LiDAR can be use with proficiency for the detection of accidental o intentional release of chemical (C) and biologic (B) agents dispersed in the atmosphere.

Focus of this work will be about the LiDAR technology explanation and how it is used to scan the atmosphere.

LiDAR technology is based on the transmission of laser pulses and on the analysis of the return signal.

The light emitted by the laser interacts with the particles present on various layers of the atmosphere, or can be absorbed or scattered according to the variation of Physical Characteristics of particles, which can be molecules or aerosols.

Abstract

P18

Free license codes to determine radiological contamination: 2 CASE STUDIES

This work has been developed to determine proper analytical support instruments in order to improve emergency operation systems in case of radiological contamination. The case studies analyzed are in reference to: An experimental nuclear fission power plant in Italy (the information about the name and location of this plant has been omitted for safety reasons); A generic deposit of radiological materials.

The accidental event's consequences has been simulated using a free licensed software, HotSpot and a software for the radiological diffusion developed by the authors in collaboration with Italian Fire Brigades. The simulation results (for areas classified with respect to limits on effective dose) has been used as input in the development, through the use of the GeoMedia GIS software, of a vulnerability model that takes into account the spatial distribution of the population in the area affected by the event. In the context of emergency management, such instruments should be integrated with the systems of command & control centres for crisis management and the emergency operation centre (EOC), and made available to the entire chain of emergency management, including the field teams with handheld terminals. The authors will present the software developed, all the results obtained and the possible applications.

P19

Food safety and biological risk: potential use of food for dissemination or biological threat

Can be correlated CBRNe events and food? In particular the study addresses issues related to biological risk as a hazard to food and then for the people who every day have the opportunity to find increasingly international dishes and products. Traditions but with raw materials more and more exposed to the risk because they are more subject to processing, a raw material that even though traditional, is produced and imported, or exported to other countries with more requests. We tried to understand if food production increasingly important, in terms of quantity, quality and thus may face if it can create danger and how; if today is possible compare and control the current productions. Population in the world is increasing, but there are people belonging to underdeveloped states and people belonging to industrialized countries; in both cases these are exposed to the same biohazard from food, but the problems to solve are different and obviously much more serious in countries where there are serious deficiencies in the hygiene and public health, and we can't longer think a state that is not our should not be in the public interest. Doing a review of food-borne diseases through the United States, comparing the incidence of the late 90's with the years 2011 and coming years in our Europe, 2010-2013, we will also analyze specific case studies to understand how, through monitoring systems, preventive measures, approved bodies and good organization, be able at least to limit the cases: Hepatitis A with berries, Salmonella contaminating eggs and meat, BSE and meat, Sprouts and STEC. The work focuses on the controls performed on the Italian territory throughout the food chain. We discuss the legislative references and the related European and essential European System of Allert, RASFF, authorities and offices involved in the controls and their management.

Abstract

P20

Gap Tool for Evaluation (G.A.T.E) of CBRNe Drills, Table Top Exercises and Full Scale Exercises

A tool for gap analysis (“GATE”, Gap Analysis for TTX Evaluation) was developed to provide a complete, systematic and objective evaluation of several types of exercises organized in CBRNe fields but applicable to different scientific, economic, legal, medical, industrial, political and social activities. In this work the authors will present the application of GATE to a Table Top Exercise (TTX). TTX consist in discussion-based emergency management exercises, organized in a simulated emergency scenario, involving groups of players who are subjected to a set of solicitations (‘injects’), in order to evaluate their emergency response abilities. This kind of exercise aim is at identifying strengths and shortfalls and to identify and propose potential and promising changes in the approach to a particular situation. This tool, “GATE”, support the management and the analysis of TTX’s outputs, and it allows to identify the 'gap' in term o preparedness and specific areas and actions to improve. The results coming from “GATE” will be discussed and analyzed by the authors.

P23

Environmental effects after flooding in Italy: analysis and proposal of action

Chemical, biological, radiological and nuclear defense is a protective measure taken in situations in which any of these four hazards are present.

It can be an hazard also a natural disaster, as a flooding, that causes widespread destruction, lots of collateral damages or loss of life, brought about by forces other than the acts of human beings. The main objective of this research was to gain an overview of the environmental consequences that a flood might bring to society and nature, looking at analysis, gaps and proposal to solve flooding. The study was deepened studying literature references and bibliography as well as looking at real emergency experiences occurred in some Italian regions. Starting from true events, flood event in Piemonte, Liguria, Emilia, Toscana in November 2014, will be made an environmental action strategy for assessment and characterization method for flood waste. It has been reported guideline given by the National Research Council - Institute for Water Research Institute (IRSA) for the emergency management of waste water plans, with a case study on waste water plants of Cesena. Finally, it was mentioned on the management of human remains in emergency for which are under study and drafting guidelines and ad hoc legislation.

Abstract

P24

Viral bioterrorism: Learning the lesson of Ebola virus in West Africa 2013-2015

Among the potential biological agents suitable as a weapon, Ebola virus represents a major concern. Classified as Biological Level 4 (BSL4) agent by Health and Safety Executive (HSE) and as Category A biological warfare agent by the Centers for Disease Control and Prevention (CDC), Ebola virus causes severe hemorrhagic fever, characterized by high case-fatality rate: to date, no vaccine or approved therapy is available. The EVD epidemic, which broke out in West Africa since the late 2013, has got the issue of the possible use of Ebola virus as BWA to come to the fore once again. The involvement of urban areas has made the risk of uncontrolled spread a real trouble. Its use as biological agent by terrorist groups with offensive purpose could have serious repercussions from a psychosocial point of view as well as on closely sanitary level, with a destructive impact that goes beyond health issues, affecting the stability of one or more nations. The real threat of a large-scale bioterrorist attack makes the defense against bioweapons a priority in terms of security. The study of EVD outbreak in West Africa 2013-2015 can provide essential information to design security protocols and possible infection scenarios in order to react properly to a possible intentional release of weaponized virus form in non-endemic areas during a bioterrorist attack.

P25

Use of Non-Pathogenic Biological agents as Biological Weapons simulants for the development of a stand-off detection system

Development of new technologies for Biological Warfare Agents (BWA) stand-off detection implies several safeties, logistic and economic drawbacks that involve production of different highly virulent bacteria and viruses, their isolation and characterization under adequate bio-containment and sample preparation for each agent to evaluate the testing method. In order to overcome these difficulties most of the research activities and tests reported so far, are performed using simulants: Biological Agents (BA) which are phylogenetically or structurally related to BWA. Stand-off detection and warning of BWA release represent the main goal to be achieved in order to reduce the biological threat and the risk for population. These detection systems allows to analyze samples remotely, thus making possible an early identification of the contamination source. Preliminary studies carried out using UV-LIF technique show promising results for the detection and discrimination of biological particles, thanks to the presence of endogenous fluorophores, which are able to emit fluorescence when excited at specific wavelengths in the UV range. The use of the simulants (BWA-S) show, however, some limitations: they can share some of the properties of the biological warfare agents but have different antigens, proteome and genome. In this work, different BWA-S was evaluated for the application in the development and training of stand-off detection systems. This study is the basis for the use of simulants in the development of an Ultraviolet Laser Induced Fluorescence (UV-LIF) based detection systems.

Abstract

P26

Radioattività: Un manuale per i First Responder

A nessun livello si può pensare di poter affrontare il rischio “CBRN” senza avere una adeguata conoscenza della materia. Pensato per i “first responder” il volume, facente parte della collana “CBRNe Book Series” della Aracne Editrice, affronta in particolare il pericolo radiologico. Si tratta di un rischio che può manifestarsi tanto nell’ambito della difesa civile, in caso di attentato terroristico, che in quello più tipicamente di protezione civile, nel caso di incidente coinvolgente sorgenti radioattive.

Se in quest’ultimo caso è plausibile che chi interviene abbia notizia in anticipo della presenza di tale sostanze, lo stesso non è possibile nel caso di utilizzo in un attacco terroristico. Questo, data la “invisibilità” ai sensi umani delle radiazioni, potrebbe portare ad una non corretta valutazione dell’evento, con conseguente assunzione di dosi da parte dei soccorritori e della popolazione. Solo un’accurata analisi dell’evento terroristico e il corretto uso di idonea strumentazione può permettere di escludere o confermare la presenza di sorgenti radioattive. La conoscenza delle misure di radioprotezione potrà poi garantire la sicurezza tanto dei soccorritori che della popolazione.

Con l’obiettivo di essere un utile strumento per la preparazione dei “first responder”, il testo affronta tanto aspetti più teorici, quali la definizione delle principali grandezze radiologiche (di sorgente, di campo, di dose) e l’interazione delle radiazioni con la materia, che altri più pratici quali la radioprotezione, la dosimetria, i rilevatori attivi e passivi, la contaminazione ed il trasporto delle materie radioattive.

Il percorso di apprendimento è sostenuto dalla presenza di oltre 60 esercizi svolti e di oltre 120 immagini.

P27

The world of research working on CBRNe problems: laser remote sensing systems for CWA, TICs and TIMs detection and identification

The long-term experience of Quantum Electronics and Plasma Physics Research group in laser techniques like LIDAR (Light Detection and Ranging) and DIAL (Differential Absorption of Light) is evident by improve of four experimental demonstrator (TAEMS, SAI, COLA and TELEMACO) developed by the group itself. SAI and COLA are two mobile LIDAR systems for detection of pollutants in atmosphere (with detection we mean the capability to see a suspicious presence of a substances in atmosphere without information about the composition of the substances). TAEMS is a mobile DIAL systems able to measure some minor constituents in atmosphere and TELEMACO is a laboratory demonstrator that is improving for identification of chemical agents. The ability to rapidly detect, identify and monitor chemical warfare agents (CWAs) is imperative for the efficient use of both military and civilian defense resources. This knowledge allows the severity and extent of a hazard to be assessed so that areas that are clean or contaminated can be identified (Sferopoulos R., 2009).

In this work the authors will presents the systems and the main results obtained during the several experimental campaigns.

Abstract

P35 - P36 - P37 - P38

Strategic objectives for the Italian Red Cross till 2020

Poster n.1) The "Strategy 2020" is our target about the actions of the International Federation of Red Cross and Red Crescent Societies throughout this decade. It defines strategic aims to inspire, encourage, facilitate and promote all forms of humanitarian activities to preventing and alleviating human suffering.

Poster n. 2) Tuteliamo la salute e la vita con attività e progetti di assistenza sanitaria non dimenticando la prevenzione incoraggiando l'adozione di misure sociali. Favoriamo il supporto e l'inclusione sociale per ridurre le vulnerabilità individuali ed ambientali.

Poster n. 3) Preparariamo una risposta attiva alle emergenze e ai disastri. Diffondiamo il DIU (Diritto Internazionale Umanitario).

Poster n 4) Promuoviamo lo sviluppo dei giovani per favorirne l'empowerment. Pianifichiamo e promuoviamo la comunicazione interna e verso il pubblico, per rafforzare la cultura del servizio di volontariato, per ottenere una struttura capillare, efficace e trasparente.

P39

Hospital infection control incurred by *Acinetobacter baumannii*

This paper reflects the activity of surveillance and control of hospital infections incurred by *Acinetobacter baumannii* contracted into the Intensive Care Unit (ICU) of the Hospital "Umberto I" of Frosinone, where the reporting work of the ICU and the diagnostic of the Pathology Laboratory are coordinated by the department of Infectious Diseases. In particular, this study is designed to evaluate the presence of *A. baumannii* in the ICU, in samples from hospitalized patients and in environmental samples, especially after remediation activities carried out following an increase in the number of isolations of *A. baumannii*. The samples from hospitalized patients, since the main infections are represented by pneumonia and septicemia, mainly concerns samples from the respiratory tract and the bloodstream. As for environmental surveillance, given the importance of the potential role of environmental reservoirs in the transmission of MDR germs, were performed crops from swabs taken on inanimate surfaces, frequently touched by the hands of health care workers in hospital rooms and service spaces. Finally, we show the strategies used in the department for preventing and limiting the transmission of *A. baumannii* in the environment and among patients.

Abstract

P40

Symbolic regression with robust metrics to investigate scaling laws in Tokamaks

In the last years, symbolic regression has been successfully deployed in various fields to overcome the limitations of log regression for the study of scaling laws. The main comparative advantages of this new methodology are: a) that it is not limited to power laws but can determine the most appropriate mathematical form of the scaling laws to model the available databases b) that it presents much less stringent requirements in terms of statistics of the errors in the measurements. In this paper, the technique is tested with various robust statistical indicators, to assess the resilience of the approach to both noise and outliers, in the perspective of its deployment in studying scaling laws in Tokamaks. The present investigation allows determining the relative advantages of various robust statistical indicators in the usual Euclidean space.

P44

Design of a scenario simulator for interactive training of medical response to major emergencies

The need of simulator for interactive training of the response to major emergencies has been increasingly recognized during recent years. One of the possible advantages with such simulators is that all components of the chain of response can be trained simultaneously. This includes the important communication/coordination between different units, which has been reported as the most common cause of failure. Very few of the presently available simulators have been suitable for the simultaneous training of decision-making on all levels of the response. The aim of the present study was to describe the possibility to train interactively the emergency response performed by medical staff about optimal utilization and relocation of available resources and/or rapid mobilization of additional assets.

P45

Comparison of chemical risk management approaches

This paper describes the exercise that took place in the Province of Ascoli Piceno which has seen the commitment of the Fire Department, the Prefecture, the 118, Asur, the police headquarters, the Province, the City of Offida, Civil Protection and of ARPAM. The exercise was organized by the Prefecture to test the External Emergency Plan PEE of a company to Major Accident Risk according to the Seveso III. Inside one of the storage company has simulated a fire of 1,500 liters of Fastac 50, a highly toxic and flammable substance. The event required the support of special teams of the Fire Department for CBRN operations and for the installation of decontamination station and primary zoning of the area. The staff of 118 rescued two injuries in the red zone, ARPAM carried out sampling air and water while the police have closed the access roads. The relief activities were coordinated by the Fire Department, and all activities of the Civil Protection and support to the population have been coordinated by the Prefecture that activated the CCS. The work highlights the perfect management of the exercise, but also how this can be different from the actual management of an emergency, in particular with regard to the zoning of the area and the evacuation of people.

Abstract

P46

Application of Real-Time PCR to Identify Residual Bio-Decontamination of Confined Environments after Hydrogen Peroxide Vapor Treatment: Preliminary Results

This study was conducted to assess the effectiveness of Hydrogen Peroxide Vapor (HPV) to remove biological contamination in a confined environment and to evaluate real-time PCR assay as a technique for the evaluation of the decontamination efficiency. Decontamination after the dispersion of biological aerosol is a main issue from a civilian, public health and military perspective. Despite the effectiveness of aggressive substances, eco-friendly but still efficient methods for decontamination are a relevant demand and Hydrogen Peroxide Vapor (HPV) is among the most recent and promising technologies in this field. Another related issue is: when an environment can be considered fully decontaminated? The answer clearly depends on the objectives of the decontamination and this will affect the choice of the methodology. Furthermore, classical microbiological and molecular biology techniques are commonly used to identify biological contamination and residual contamination, but many of them are time consuming and require advanced training for the operators who perform the analysis. This may represent a bottleneck, especially when a quick response to an emergency is needed (i.e. during an unconventional event like CBRNe ones). In this work, a combination of commercially available equipment for detection, identification and decontamination, was evaluated in partnership between the Italian Army, the Department of Industrial Engineering and the School of Medicine and Surgery of the University of Rome "Tor Vergata". The purpose of this work was to find a setup for equipment and methodologies for detection, identification and decontamination, to implement in case of biological events. Preliminary results show that, despite the death of the microorganisms, nucleic acids are not completely degraded by HPV treatment and, as a consequence, that real-time PCR may be the adequate, quick and easy method to verify the efficiency of bio decontamination when nucleic acid degradation represent the final objective.

P47

Application of the Symbolic Regression technique via Genetic Programming to derive Empirical Models

Many processes in plasma physics are inherently complex and highly nonlinear. Typically their behaviour is difficult to interpret with theoretical models based on first principles. To perform high-quality inference, these processes have to be modeled starting directly from the experimental data.

Symbolic Regression (SR) via Genetic Programming (GP) searches for the Best Unconstrained Empirical Model Structure (BUEMS). This implies deriving the significant variables, the functional form of the model and its parameters directly from the data. SR via GP takes inspiration from the biological criteria of "natural selection" and "evolution", since the aim of an algorithm implemented is to provide the best "individual" among many for a specific problem.

Abstract

P48

An analysis of Ebola Virus Disease 2013-2014 Outbreak in West Africa

The unprecedented diffusion of Ebola virus epidemic in West Africa during the 2013-2014 has been an exceptional occasion to study infectivity, lethality and progression of Ebola virus disease (EVD). Poor data were recorded before 2013 during Ebola virus species outbreaks because of the high case fatality rate and spread limited in rural regions only. The recent dramatic outbreak of EVD, which involved several countries including Guinea, Liberia, Sierra Leone, Senegal and Mali, provided important data to better understand the virus "behaviour", improve procedures to contain and cure patients, develop new drugs and vaccines for a virus that not only had no prophylactic therapy but also no approved proper treatment. The new route in the geographical spread of the virus involved large urban areas at an early stage of the epidemic with consequent increase in its diffusion featuring the largest outbreak of EVD of all time, with more than 20 thousands of confirmed cases, becoming a public health emergency of international concern.

Thanks to the data provided by various national and international organizations involved in the response to this outbreak, including WHO, CDC and MSF, we were able to analyse the numerical and geographical spread of the disease following the sequential appearance of new cases and their location and evaluating the measures implemented by each government and international organizations to contain the epidemic. The global concern about virus spread due to the potential reaching of far countries through air transport took to the development of unprecedented procedures to assure the containment of the disease in the affected regions.

The importance to define standard procedures to treat patients and to contain the disease are critical to prevent an even larger future outbreak, and to set efficacious protocols in case of its possible use in a bioterrorist attack.

P49

Experimental campaign to test the capability of STARDUST-Upgrade diagnostics to investigate LOVA and LOCA conditions

Given the urgent need to converge on precise guidelines for accident management in nuclear fusion plants, an experimental campaign has been carried out on the "STARDUST-Upgrade" facility for dust mobilization phenomena investigation at the University of Rome "Tor Vergata", in the framework of the activities of the Quantum Electronics and Plasma Physics and Materials (QEPM) Research Group. The main purpose of this preliminary work is to test the "STARDUST-Upgrade" capability to investigate not only Loss of Vacuum Accident (LOVA) but also Loss of Coolant Accident (LOCA) accidents and their consequences. In fact, an upper port of "STARDUST-Upgrade" is used as an inlet port, reproducing coolant loss consequences from the upper ports of the vacuum vessel in ITER. The diagnostics required for these experimental studies and the results of this first experimental campaign are presented.

Abstract

P50

Laboratory HPGe detector start up for gamma-ray spectrometry measurements applied to environmental studies.

The gamma (γ) spectrometry is a method of analysis to qualitatively and quantitatively identify the radionuclides present in a sample of interest, through the analysis of the energy spectrum of emitted gamma photons. There are two types of spectrometers for the detection of gamma rays: the high purity Germanium (HPGe) and the sodium iodide (NaI). The former have an energy peak resolution of few keV, are based on semiconductors and must be cryogenically cooled; the latter have a much lower energy resolution, are based on scintillators and work at room temperature. In the Environmental Monitoring laboratory at INGV (section Roma2) a p-type HPGe detector is installed, with a relative efficiency of 150% and configured in Ultra-Low Background mode. To be able to measure nuclides activities from samples, it is important to perform both energy and efficiency calibration on the instrument. Energy calibration is needed to have the correct association between incident photon energy and MCA (multi-channel analyzer) channel, this is crucial to correctly identify the radionuclides that may be present in the samples. Efficiency calibration is essential for quantitative analysis, and is strongly dependent on the geometry of the entire experimental setup (detector / sample sizes and materials). Efficiency curves for few chosen geometries were calculated using samples of different reference material with certified known activity, procured from IAEA. The final target is to apply gamma spectrometry to the study of radioactivity in environmental samples from the sites of interest.

P53

The importance of a high level academic approach to the CBRNe problem to improve the capabilities of prevention, management and evaluation of consequences

Nowadays when we talk about security it is essential talk about the CBRNe events because the global crisis related to the reduction of energy fossil resources, the reduction of potable water resources and the war for the control of energy sources are part of the causes which can lead to an intentional CBRNe event. These kinds of events could also be the consequence of an unintentional release of substances (i.e., an accident of a truck containing a Toxic Industrial Chemical), or of natural events like a tsunami or an earthquake. Thus the high percentage of risk connected to their occurrence is clear. The evolution and proliferation of safety and security issues in the National and International framework made it necessary to respond in a competent and professional way to any crisis scenarios resulting from non-conventional events (i.e., CBRNe events). In all industrialized countries there are Institutions and Facilities with highly specialized groups facing up to emergencies (first responders), but only a few persons are sufficiently trained to manage these incidents. The complexity of these events requires experts and DUAL USE innovative technologies. (Malizia et al, 2014). The authors will show how a University like Rome Tor Vergata, working in CBRNe, starting from academic courses is able to create a network able to cooperate in research, industrial developments, didactic and training in an innovative way in order to improve the capabilities of prevention, management and evaluation of consequences.

Abstract

P52

NATO Comprehensive approach in biological defence: preparedness and prevention to a potential bioterrorist Ebola Viral Disease (EVD) attack

Today, a whole range of complex challenges and threats to Alliance security, much different from hostile actions that faced by NATO when the Alliance was formed, requires to be prepared to protect and defend against both State and non-State actor threats. The development of an integrated approach to respond to acts of bioterrorism, could be seen as an extension of NATO long-standing defence concept, involving not only military but also, political and civilians instruments. Terrorists may use biological agents because they have extremely difficult of timely detection, diagnosis, first response, high perception in media, politics and society, and specially, the high potential to achieve a cross-border dimension in the complexity of intersectoral comprehensive scenario. Ebola Virus Disease(EVD) 2013-2015 epidemic in West Africa as an emerging infectious disease of high consequence(IDHC), poses the greatest biological threat to Allies security in today context: Ebola virus is classified as a biological agent with the maximum level of risk according to the: Centers for Disease Control and Prevention(CDC) Critical Biological classification, Biological Risk Groups classification (EU-Directive 2000/54/EC), World Health Organization(WHO) list. Due to potential characteristic of the Ebola virus to cause infectious diseases and the severity of morbidity and mortality rates, it has been classified as a highly potential agent of bioterrorism (Japanese cult Aum Shinrikyo attempt to weaponize Ebola virus). According to the mission statement, NATO will work actively in a strategic comprehensive approach against Bioterrorism. The role of the NATO Partnership Action Plan against Terrorism (PAP-T) is crucial in prevention and preparedness through political consultation and practical measures. Other NATO entities, such as NATO Civil emergency improving cooperation in the counter terrorism fight, training and developing a multi-agency CBRN exercises, while the Centre of Excellence for Military Medicine is tasked in preparedness with facilitating interoperability between the military medical services in NATO.

P55

Techniques for the detection of biological agents

Biohazards represent an important issue in the field of security, both for the destructive potential and the psychological, economic and social impact that the use of biological agents for biowarfare could have on populations. Early identification of an intentional biological event is essential to ensure correct management and response to the emergency. Much effort for the development of innovative equipment that permit prompt and remote detection of biological warfare agents are needed to achieve this goal. In this work, the different detection systems suitable in the CBRN context for biological agents will be analyzed, focusing on non-specific and specific point-detection systems, and stand-off detection systems, evaluating the pros and cons of each technology.

Abstract

P54

SX34 and the decontamination effects on chemical warfare agents (CWA)

The decontamination of sensible surfaces contaminated by chemical agents is a key issue for the safety of population and security of structures. SX34 is an innovative decontamination product developed for sensible surfaces decontamination from biological and chemical agents. In this work the authors present the effects of SX34 on contaminated surfaces and its effectiveness compared to classic decontaminants. The electrical insulation on sensitive equipments is analyzed as innovative possible application of this product about virus spread due to the potential reaching of far countries through air transport. The development of unprecedented procedures to assure the containment of the disease in the affected regions.

The importance to define standard procedures to treat patients and to contain the disease are critical to prevent an even larger future outbreak, and to set efficacious protocols in case of its possible use in a bioterrorist attack.

P56

Islamic State and CBRNe, the new threat

We are about to enter 2016 and one of the most dangerous terrorist organization ever seems to be more brutal and strong than the past. The Islamic State now controls big bunches of Iraqi and Syrian territory, hundreds of millions of dollars, and thousands of armed troops. Moreover it is now clear that its ambitions are global and its statement, declaring itself the caliphate promised by Allah, is an explicit invitation to violent Islamic extremists from all over the world to join them.

Latest attacks depict a terrorist organization seeking any possible mean useful to conquer the world, even Weapons of Mass Destruction. The issue hereby discussed is to assess the NCT coming up from IS through an analysis which consider not only if those materials have been really acquired, but if terrorists have the intention, financial capability, skill, knowhow, equipment and specialized personnel who could transform a simple dangerous material in a Weapon of Mass Destruction.

Abstract

P58

CBRNe Threat Detection and Monitoring System Advanced prototype

Thales Italia has developed an advanced prototype of a CBRNe (Chemical, Biological, Radiological, Nuclear and explosives) Threat Detection & Monitoring System that features beacons embedding innovative smart sensors, integrating CMOS chip microsensors and exploiting Wideband Electrical Impedance Spectroscopy technology. Each beacon is in the form of lab-on-a-chip already inclusive of electronic acquisition and pre-processing of the signal coming from the sensors with high sensitivity and selectivity, high miniaturization and low unit costs. Through a Wireless Sensor Network (WSN) of beacons there will be significant reduction of false alarms while using the sensors on-the-field, with synchronous detection of CBRNe threats and with minimal training requirements. Automatic data transfer to a Command Centre equipped with ESTHER software will eventually lead to data fusion and real-time visualization of geo-referenced alarms for interactive decision.

P59

Police Grand-Ducale Aéroportuaire Luxembourg Service de Garde, Dep. CBRN

The Luxemburg Airport Police deals with normal day to day police operations at the International Airport of Luxemburg. The police is responsible for the supervision of the security personal, who screens the passengers. At the same time the Police responds to any kind of incidents occurring in the Cargo Fret Center (Cargolux). We have to deal on a regular basis with work accidents involving chemicals. At the Luxemburg Cargo Center we have all chemical categories stocked from cat. 01-09 (explosive-, corrosive-, toxic-, dangerous when wet-, materials and radioactive isotopes etc..). We have also stocked, around 62 biological infectious agents, due to the Mark Planck Institute in Germany and a Pharmaceutical department. The Luxemburg Police has basically no operational or investigative possibilities during a HAZMAT / CBRN Incident and needs to wait out, until the problem is solved by the local Fire Department or the Specialized Civil Protection Unit. We are responsible for putting in place the safety barrier, and communicate the information we have to, to the responsible fire department.

P61

International First Responder University Course

The scenario rescue is evolving every day, with both the evolution and the industrial Toxic Industrial Materials, both the globalization of infectious diseases favored by the current need for people to travel to other states, and the import of foreign products. The need for training for rescue operations increases exponentially in response to natural events that interact with human activities, and especially in response to man-made events, including terrorist attack that come every day more in the field of CBRNe events. Currently in Italy the rescue system is fragmented into various territorial entities, and there is no coordination capillary unified and standardized nationwide. Every European country has a different system response. An international course may be the answer to unify the rescue in Europe.

INTERNATIONAL CBRNe MASTER COURSES

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