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**The Proceedings of The Abstracts**



**Editors: Snježana Knezić, Andre Samberg, Meen Bahadur Poudyal Chhetri**

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**Editors:**

***Professor Snježana Knezić***

*University of Split, Faculty of Civil Engineering and Architecture, Split, Croatia*

***Professor of Practice Andre Samberg***

*TIEMS Ukraine Chapter President, Kyiv, Ukraine*

***Professor Meen Bahadur Poudyal Chhetri***

*President of Nepal Center for Disaster Management, Lalitpur, Nepal*

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## Preface

Dear colleague,

We would like to thank you very much for reading the proceedings volume of the “TIEMS International Annual Conference”, which took place in Kyiv, during December 4-7, 2017.

The conference was organized by the TIEMS Ukraine Chapter.

The general theme of the conference was “*How Emergency Management Can Improve the Resilience of Society*” and its main objective was to bring together leading researchers, practitioners and industries from all areas of emergency management to take advantage of the presented methodologies and practical applications. More than 100 participants and 61 presentations we outnumbered our own expectations for this event.

Keynote speakers were:

- Ms. Oleksanda CHURKINA, Deputy Minister of Ministry of Social Affairs of Ukraine
- Mr. Oleksandr SUKHODOLIA, Head of Department of Energy Security and Technogenic Safety, National Institute for Strategic Studies of Ukraine under the President of Ukraine
- Mr. Vitaly PETRUK, Head of The State Agency of Ukraine on Exclusion Zone Management, Ministry of Ecology and Natural Resources (Ukraine)
- Mr. Artur AYVAZOV, UNICEF's Director for Social Policy in Ukraine
- Mr. Mark BATTLE, Head of UN Water and Sanitation Cluster (presentation “Water Risk Assessment in Donbass”)
- Mr. Rustam Pulatov, Component Leader of Community Security and Social Cohesion of UNDP Recovery and Peacebuilding in Ukraine (“Community Security in Pro-longed”)
- Mr. Dmytro AVERIN, Project manager, The Organization for Security and Co-operation in Europe OSCE (presentation “Assessment of Environmental Damage in Eastern Ukraine by means of Donbass Environment Information System DEIS”)

The conference covered all aspects related to Emergency Management, Cyber Risk Analysis, Virtual Training Means for First Responders and Resilience.

We had six workshops:

- Leveraging TIEMS Disaster Management Expertise to Strengthen Local Community Resilience through Global DRR Platform, Web-based Technologies for Disaster Risk Reduction
- Assessments of Vulnerabilities of Cyber in Power Grids and Critical Infrastructure: Case Ukraine 2015 – 2017
- EU-funded Horizon 2020 project “TARGET”
- EU-funded Horizon 2020 project “Driving Innovation In Crisis Management For European Resilience (Driver+)”
- TIEMS QIEM = Qualifications in International Emergency and Disaster Management
- World Bank Study On Typologies And Good Practices Of Civil Protection Systems In The World

After the technical part of the conference Dec. 4-6, 2017, there were two guided tours to the Chernobyl exclusion zone on Dec. 6<sup>th</sup> and 7<sup>th</sup>, 2017, which were kindly hosted by the State Agency of Ukraine of Exclusion Zone Management under the Ministry of Ecology and Natural Resources. Also, we visited the Emergency Medical Care and Disaster Management Center on Dec. 6<sup>th</sup>, 2017.

We have to express our gratitude to our sponsors that strongly trust and shared the TIEMS values and goals. A special thank goes to the technical program committee, which provided a crucial support to define the objective and the contents of the conference. In particular, we are grateful for the large number of high quality submissions and we would like to especially thank the many referees that helped to control and even improve the quality of the presented papers.

Finally, it is clearly worth mentioning, however, that there was enough time reserved for social events like the gala dinner in the traditional Ukrainian restaurant “Taras Bulba”, which allowed people to establish new contacts and to consolidate the TIEMS community.

The all TIEMS Ukraine Chapter and editors of this volume would like to thank again all participants of the conference, all speakers, all members of the local organizing committee, all contributors to this volume, the referees, and finally our generous sponsors.

We hope to see you next year again.

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## **Welcome to TIEMS 2017 Annual Conference in Kyiv from TIEMS President**

In a time of increasing number and severity of disasters, global cooperation and coordination are more vital than ever before. By working together and sharing of experiences and exchange of views among the experts of different countries we can learn from each other to develop better methods and systems and advocate for better policies in emergency and disaster management, to be standardized and implemented all over the world. TIEMS conferences and workshops worldwide are such platforms where all stakeholders can meet and exchange experiences and views and focus on different global and local important subjects in emergency and crisis management. TIEMS 2017 Annual Conference in Kyiv, Ukraine is focusing on local and international important issues in emergency management and crisis response. This should form a good meeting place between the locals and international experts, and give all the opportunity to learn from each other and exchange experiences and find better solutions, which can improve local and international preparedness for disastrous events.

TIEMS is a Global Forum for Education, Certification and Policy in Emergency and Disaster Management and is dedicated to developing and bringing the benefits of modern emergency management tools and techniques and best practice to society for a safer world, through exchanging information of the use of innovative methods, technologies and operations to improve society's ability to avoid, mitigate, respond to and recover from natural and technological disasters. TIEMS provides a platform for all stakeholders within the global emergency and disaster management community to meet and network, learn about technologies and operational methods, and exchange experience on best practice, and influence policy makers worldwide to improve global cooperation and establish global standards within emergency and disaster management.

TIEMS Ukraine Chapter is the host of this conference, and has done a remarkable job in the three months available for preparing the conference, and I especially like to thank Andre Samberg, TIEMS Ukraine Chapter President, and Oleksii Mikhno (Board Member) for taking on this task on so short notice (2 months), and doing such an excellent job with preparation of the conference. Both international and local presentations of high quality form up a comprehensive program comprising 6 workshops and 45 oral presentations and 9 posters, and the event is very international with contributions from 19 countries. Also, a guided tour to the Chernobyl Exclusion Zone after the technical program is something of high interest to all delegates. The above technical program integrated with relaxing social events, showing Ukrainian culture on its best, will certainly make the 4 days at TIEMS 2017 annual conference in Kyiv a memorable event.

The papers and posters will be included in TIEMS 2017 Annual Conference Proceedings, and full papers will be peer reviewed and published in Special Issues of the Information & Security Journal (<http://procon.bg/view-volumes>). Many thanks go to Meen Chhetri, Chair of TIEMS Paper Review Committee, for reviewing all papers and giving good advice to the authors, seeing to it that all papers are of high quality. Many thanks also go to Snjezana Knezic for putting together the conference proceedings together with Meen Chhetri and Andre Samberg. Also great thanks to the conference program committee, local organizing committee and the volunteers, as well as welcome and keynote speakers. It has been great to work with such a professional and dedicated team of professionals. I welcome all participants to the TIEMS 2017 Annual Conference in Kyiv, Ukraine, 4 - 7 December 2017.

Oslo 28<sup>th</sup> November 2017

K. Harald Drager, TIEMS President

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## Volunteers in Disaster Relief and Armed Conflict Zones Case Study: Syrian Refugee Camps in Jordan

*Mohamad Alzaghal, EBCCM, Jordan, malzagha@gmail.com*

### **Abstract:**

Volunteerism plays an essential role in the development of any society. Society's level of culture and awareness are rated by measuring the amount and thrust of volunteerism movements.

According to [1], volunteering is an activity that is conducted by an individual without financial gain.

The base of voluntary action rejects the notion of an 'other'. This enhances integration of the volunteer into the community and encourages a balance in power between the locals and the volunteers. [2]

Volunteerism has proven to be essential in emergency management. Individual volunteers and volunteer groups provide a variety of skills and resources that can be used in emergencies. No country can survive a disaster unless volunteers are involved.

A volunteering system is the first line of defense against emergencies of all kinds before the intervention of the central government. Volunteering plays a vital role in minimizing human and monetary losses due to natural and man-made disasters. [3]

In Jordan, the volunteerism concept started to have a considerable role in both the economy and in social development. Several agencies and NGOs started to push for a better volunteerism environment in the country, especially for the Syrian refugees' camp management.

In this paper, implementation of current and future trends for volunteerism systems in Syrian refugees' camp management in Jordan are discussed along with a social analysis of why (or why not) people volunteer in different aspects of society. A volunteer system for disaster management is proposed to enhance mitigation and response capabilities for future disasters. [4]

**Keywords:** Volunteerism, Syrian Refugees, Economical & Social Development, Volunteering System, Non-Governmental Organization (NGO).

[1] Clary, E., Snyder, M., & Stukas, A. A. (1998). Volunteer motivations, Findings from a national survey. *Nonprofit and Voluntary Sector Quarterly*, 25(4), 485-505.

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## [Facing disasters from the financial perspective: available tools and adopted practices](#)

*Simona Cavallini, TIEMS Italian Chapter, Italy, s.cavallini@formit.org*

### **Abstract:**

Disasters generate economic loss of the affected society. They directly affect the societal “wealth” of citizens, businesses and government as well as their capacity to daily generate income through work, production of goods and delivery of services. The economic impact of a disaster can be mitigated with financial management tools provided by both private actors and government themselves. Risk transfer mechanisms and compensation tools are used to prevent overwhelming reduction of wealth, to guarantee resilience allowing rapid response and to reduce post-disaster costs for recovery. The current paper aims at summarizing key elements of financial strategies accompanying operational activities adopted in the disaster life cycle. Type of hazards, risk assessment practices, actors leading the ex-ante strategies as well actors in charge of the ex-post costs make the difference. Points of strength and weakness of different strategies for facing occurred disasters or mitigating their impact are highlighted with good practices adopted in disasters occurred in the last five years. An overview of the available and effective financial strategies as well as risk assessment approaches are essential for informed tactical and strategic investments and optimal allocation of resources done by decision makers.

**Keywords:** Disaster risk financing, Investment in emergency management, Socio-economic impact

## [A model of recreation management of abandoned territories after armed conflicts](#)

**Sergiy Chumachenko**, Institute of Environmental Geochemistry, Ukraine,  
*sergiy23.chumachenko@gmail.com*

**Sergei Ponomarenko**, National Technical University of Ukraine "Igor Sikorsky Kiev Polytechnic Institute", Ukraine, *sol\_@ukr.net*

**Sergei Hopersky**, NGO "Civil Protection Manager's Assosiation Kyiv", Ukraine, *ssvh@ukr.net*

**V Popel**, OBLANA Limited, Ukraine, *tiemsukr@gmail.com*

**Andre Samberg**, TIEMS, Finland, *spieandre@gmail.com*

### **Abstract:**

Different countries face and tackle the same general problems in case of natural or man-made disasters. Abandoned territories and their recreation management after armed conflicts is the topic of research of increasing interest. The problems are typically cross-cultural and multinational. A coordination of efforts of different countries requires the continues updates of legal, methodological, technical, organizational, and other issues. This paper describers the challenges and proposes a systematic approach to resolving such issues as the assessment of relevant natural and technogenic threats and risks. A model of management of abandoned territories and their industry recreation is presented based on the lessons leaned in Ukraine.

**Keywords:** Emergency management, Armed conflict, Abandoned territories



## Education in Geomatics for First Line Emergency Management in Ukraine

**Liudmila Datsenko**, Faculty of Geography, Taras Shevchenko National University of Kyiv, Ukraine, ua-dln@ukr.net

**Oleksii Mikhno**, Faculty of Geography, Taras Shevchenko National University of Kyiv, Ukraine, almikhno@ukr.net

**Mykola Molochko**, Faculty of Geography, Taras Shevchenko National University of Kyiv, Ukraine, knumolochko@gmail.com

**Andre Samberg**, TIEMS Ukraine, Ukraine, spieandre@gmail.com

### **Abstract:**

This paper will describe the education in geomatics in university for First Line Emergency Management in Ukraine. Geographic Information System has become the integrated part of various ICT solutions for emergency management in Ukraine. First line emergency management is composed of first responders, shift managers and team leaders.

**Keywords:** First responders, Education, Emergency management

[Radon emanation as a source of radiation hazard to the environment: the case of Ukrainian Shield](#)

*Tamara Dudar, Institute of Environmental Geochemistry, Ukraine, dtv.nau@gmail.com*

*Valentin Verkhovtsev, Institute of Environmental Geochemistry, Ukraine, verkhovtsev@ukr.net*

*Georgii Lysychenko, Institute of Environmental Geochemistry, Ukraine, lysychenko@ukr.net*

*Yurii Tyshchenko, Institute of Environmental Geochemistry, Ukraine, froi@ukr.net*

**Abstract:**

Severe impact of uranium mining and radon emanations from the point of view of radiation hazard to the environment are considered for the region of the Ukrainian Shield and its slopes, namely within the Central Ukrainian Uranium Province. The approaches towards “radon-prone areas” are emphasized according to the European Basic Safety Standards

**Keywords:** radon emanation, uranium deposits, Ukrainian Shield, Central Ukrainian Uranium Province

## [Semantic modelling in disaster and emergency management: an overview and perspectives](#)

*Snjezana Knezic, University of Split, Faculty of Civil Engineering, Architecture and Geodesy, Croatia, knezic@gradst.hr*

### **Abstract:**

The ever emerging IT technology and its usage give a vast opportunity for the implementation of semantics in all phases of disaster and emergency management. The implementation is usually focused on real-time resource management and semantic interoperability in the context of shared situation awareness. This paper explores the application of methods and tools already used for semantic modelling of processes and resources in disaster and emergency management. An overview and comparison applied models and tools are provided. Based on the present situation and gap between potential opportunities and real implementation the paper envisages future directions and perspectives of semantic modelling in this particular field.

**Keywords:** disaster and emergency management, semantics, interoperability

## [A Case Study on Improvements of Safety Index related Leisure in Korean Local Area](#)

*Youngt Jai Lee, Dongguk University, South Korea, yjlee@dgu.edu*

*In U Cho, Na Da Lab Institute, South Korea, inuh@hotmail.de*

### **Abstract:**

Recently, the frequency of disaster and safety accidents has been rapidly rising and the public awareness and needs have also been increasing. The Ministry of Public Safety and Security has been publishing the regional safety index every year, showing evaluated details of traffic, crime, suicide, infectious disease, fire, safety accident, and natural disasters. This research suggests the analysis of the status quo and measures to improve the safety index of a region in relation to safety accident among 7 categories. For the analysis of the status quo, we analyze core indicators and spatial information based on statistical data. We select vulnerable leisure points through interviews with related organizations, and using GeoPros which is map of safety analysis prediction. Also, we conduct actual inspection on the spot and evaluate vulnerability of leisure professionals with regards to safety regulation, lighting, application, layout, and appearance. As a result of the evaluation, the necessity to improve overall utilization facilities is shown, suggesting the need for improvement in infrastructure projects and safety culture activities.

**Keywords:** Regional Safety Index, Leisure, Improvement in infrastructures, Safety culture activities

## Self-Regulation as Risk Mitigation Tool in Formation of Critical Infrastructure

**Oksana Medvedchuk**, Public Union “Interstate Consultants Engineers Guild”, Ukraine,  
medvedchuk\_o@ukr.net

### **Abstract:**

Objects of critical infrastructure have a strategic significance for the functioning of economics, security of a state, society and population. Their breakdown or destruction has a considerable impact on the national security and defense, natural environment, leads to material and financial losses and casualties. For this reason ensuring quality and reliability of such infrastructure is a priority of the state policy.

State policy is implemented through state regulation mechanisms aimed to protect life, health, property, environmental protection, as well as establishing ways of organizing or conducting activities, licensing rules, place and time of activities, volume of production or provision of services, etc. Control and supervision functions are also important elements of the state regulation.

Traditional mechanisms of state regulation, from the Ukrainian experience, do not ensure relevant culture in construction. Thus, it is necessary to study and implement the best international practice of risk avoidance in construction, particularly – by means of self-regulation. This paper presents exposition self-regulation as risk mitigation tool in formation of critical infrastructure.

**Keywords:** construction, exploitation, critical infrastructure, security, risk management, self-regulation

**Using of Expert Evaluation Methods for Estimation Characteristics of Integrated System of Monitoring and Emergencies Alert**

***Aliona Mykhailova***, *The Ukrainian Civil Protection Research Institute, Ukraine,*  
*mihajlova-a-v@ukr.net*

***Serhii Chumachenko***, *The Ukrainian Civil Protection Research Institute, Ukraine,*  
*sergiy23.chumachenko@gmail.com*

***Andre Samberg***, *TIEMS International Program Committee, Belgium, spieandre@gmail.com*

**Abstract:**

An analysis of expert evaluation methods is provided. The most optimal one, which is good for estimation characteristics of integrated system of monitoring and emergencies alert, is defined

**Keywords:** Public safety, Alert system, Emergency management

## Methodology of Risk Management in Providing Sustainable Development of Settlements

*Oleksandr Nepomnyashchyy, Public Union "Interstate Consultants Engineers Guild", Ukraine,  
n\_a\_m@ukr.net*

*Iryna Lahunova, Public Union "Interstate Consultants Engineers Guild", Ukraine*

### **Abstract:**

Any activity deals with internal and external factors having a direct impact on its results and which are determined as "risks". Countries stand up to threats in economy, politics, environment, social risks, man-made disasters capable to destabilize social and economic life. In the national circumstances these risks are tangled by geopolitical instability, the military conflict in the East of the country, a high level of corruption and a burden of the Soviet heritage of economy regulation. Construction and operation of real estate units throughout their life cycle (from shaping investment intents, including design, construction, operation, repair, reconstruction, - up to demolition and reclamation of materials and waste) is a dramatic example for development and implementation of risk management models. That is why there is an increasing applied significance of the issue of forming the methodology of risk management in providing sustainable development of settlements by means of technical regulation in construction.

**Keywords:** construction, operation, emergency situations, risk management, technical regulation, methodology

## [Disaster Response in Violent Marginal Urban Settings. Is There a Role for Violent Gangs?](#)

*Diego Fernandez Otegui, Imara International Humanitarian Group, United States,  
diegootegui@yahoo.com.ar*

### **Abstract:**

The expansion of violent gangs in the developing world has increased the concern of emergency managers as they pose a challenge for relief operations and impede the efficient distribution of aid. Oftentimes, they also hamper the continuity of preparedness efforts with the consequent reduction of community resilience.

The “emergence” model has made significant contributions to our understanding of organized behavior in the aftermath of disasters but it has never been applied to these conflicting circumstances. The model presents a typology of the organizations that are active in the post-disaster stage but fails to include gangs and similar organizations. I contend that the incorporation of these organizations into the model would increase our understanding of those characteristics that are relevant for the entire disaster cycle.

During the presentation I will scrutinize the reasons why organizations engaged in deviant activities can be actually considered beneficial and helpful to response operations. I will outline the conclusions of such analysis and I will discuss the implications for emergency managers who need to develop appropriate mechanisms to deal with them. To do so, I will describe the main characteristics of the model and discuss the theoretical benefits and harms of using it to understand better human behavior in the presence of violent hierarchical organizations. I will also expand on some of the basic characteristics of the Incident Command System that prevents an adequate integration with these organizations.

I conclude the presentation with suggestions on how to improve the model to be more widely applicable in developing contexts and with the daring suggestion that these organizations are in fact an important part of societal life and should not be considered a threat to emergency management but a strategic partner.

**Keywords:** violence, gangs, incident command system, emergence model, disaster response, urban settings



## [Determination of Anthropogenic Influence on Space Images in Conducting Environmental Monitoring of Territories](#)

*Dmytro Pashkov, The State Ecology Academy of Postgraduate Education and Management, Ukraine, n.0980301681@gmail.com*

*Roman Shevchenko, The State Ecology Academy of Postgraduate Education and Management, Ukraine, n.0980301681@ukr.net*

### **Abstract:**

One of the main directions for increasing environmental safety is the research and localization of human-induced environmental impacts, the identification of the epicenter and zones of influence, and the nature of pollution. This is due to the development and expansion of industrial objects that pose a potential threat to the environment associated with the development of dangerous high-tech processes (physical, chemical, thermal, radiation, etc.), which leads to a significant change in the state of natural conditions. The report considers the possibility of conducting environmental monitoring with the help of modern space and geoinformation technologies based on the processing of space images and the identification of anthropogenic impact on the territory of industrial facilities.

**Keywords:** Cartography, Environmental safety, Space monitoring, GIS

## Security Aspects of Smart Cities

*Jaroslav Pejcoch, T-SOFT a.s., Czech Republic, pejcoch@tsoft.cz*

### **Abstract:**

What does security mean for slowly emerging smart cities? Is it about how reliable it is to operate? Is it about how safe we can feel in it? Or if it would help us better in the emergency? Will smart city limit our risks ... or ... will it be vulnerable to be misused for the mischievous intentions of skilled psychopaths? It will be all together. The paper will look to the smart cities functionality and architecture from the point of view of risk management, which will have to take into account the critical infrastructure of the city and new features available both to the citizens and city management, but also for the "bad guys".

**Keywords:** smart city, security, crisis management, critical infrastructure, energy safety

## [Automated distributed system for monitoring of radiation in Chernobyl exclusion zone](#)

*Volodymyr Petrovskyy, EcoTest Limited, Ukraine, v.petrovskyy@ecotest.ua*

*Viktor Korobra, Sparing-Wist Center, Ukraine, korobka.v.p@gmail.com*

*Andre Samberg, TIEMS Ukraine, Ukraine, spieandre@gmail.com*

### **Abstract:**

The paper describes the current approach and the system of distributed sensor network for monitoring in the Chernobyl zone.

**Keywords:** Radioecology, Environmental safety, Public safety, Chernobyl zone

## Expert-Analytical Prediction of Nuclear Focus in The Monitoring of Military Emergencies

**Leonid Pisnya**, Ukrainian scientific research institute of ecological problems, Ukraine,  
leonid\_pisnya@ukr.net

**Igor Cherniavskiy**, Ukrainian scientific research institute of ecological problems, Ukraine,  
chern.igor.71@gmail.com

**Sergey Petrukhin**, Ukrainian scientific research institute of ecological problems, Ukraine,  
s\_petruhin@ukr.net

**Serhii Chumachenko**, Ukrainian Civil Protection Research Institute, Ukraine,  
sergiy23.chumachenko@gmail.com

**Andre Samberg**, TIEMS Ukraine, Ukraine, spieandre@gmail.com

### **Abstract:**

The paper presents the results of expert-analytical assessment of possible focus of nuclear damage in emergency situations of a military nature in the context of uncertainty of the initial information during the detection of nuclear explosions. For a correct assessment of the situation in the nuclear focus and predicting the necessary measures, an attempt was made to evaluate the contribution of the initial "necessary and sufficient" parameters of the detecting nuclear explosion of different power, type and type of ammunition, and the measurement criteria using the method of analyzing T. Saati hierarchies adapted for the problems under consideration.

**Keywords:** Environmental disaster, Radiation safety, Risk assessment

## Trends in Armed Forces' Support to Civilian Authorities

*Valeri Ratchev, Centre for Security and Defence Management, Bulgaria, ratchevv@gmail.com*

*Todor Tagarev, IICT, tagarev@gmail.com*

### **Abstract:**

This paper reviews this portion of the so-called 'internal roles of the armed forces' that relates to crisis situations emerging as a result of natural or man-made disasters. It addresses the ability of the armed forces (norms, procedures and relevant capabilities) to provide valuable support to civilian authorities in such crises.

The term 'support to civilian authorities' (SCA) refers to normative requirements to the national armed forces to contribute to the civil protection against natural and other disasters, as well as to the process by which local authorities can request military assistance from the central government in times of emergency. It also relates to the regulations and procedures for sending the country's military personnel abroad to provide emergency support in cases of natural or other disasters.

The selected countries represent variety of historical traditions, constitutional arrangements and/or legal provisions that determine mechanisms of using armed forces' personnel and equipment for emergency response, rescue and relief. In this diversity some countries continue to view all military functions within the concept of the 'total defence,' while others have moved more quickly towards separation of civil protection from national defence. The common characteristic throughout the cases studied is that countries tend to expand the functions beyond mere defence in an attempt to make the national military more relevant to both to the widening spectrum of threats to security of the state and the people and to citizens' expectations and demands. Most countries, and especially the members of NATO, EU, and other European countries, have determined three basic roles of the armed forces: (1) defence (collective/ national), (2) contribution to international peace and stability and (3) support to the civil authorities and the population in cases of emergencies.

For the relevant understanding of the third role, it is important to underline that it is as important as the other two, but the core military capabilities are usually built around the first and, to some extent, to the second role. In most cases the military are seen as 'the last resort' and in a support role to civilian authorities responding to crises of natural or technogenic origin.

The practice, however, very much depends on additional factors such as maturity of the civil society (level of volunteerism), decentralisation of the state power, size of the country and the military, and most of all, on the frequency, scope and destructiveness of the natural and man-made disasters.

The international contribution by military personnel and assets in providing emergency support is also on the increase. Efforts within EU and NATO have an inspiring effect on national preparations in three main dimensions: strengthening regional co-operation (cross-border missions), increasing the distance of engagement from national territory (across Europe and beyond), and strengthening military-specific niche capabilities for rapid response, rescue and recovery operations (fire-fighting from the air, response to chemical, biological and radiological threats, pandemics, etc.).

**Keywords:** The military in emergency management, CIMIC, international cooperation, niche capabilities

## [Engaging the Public to Improve Response to Public Health Emergencies](#)

*Thomas Robertson, Thinking Teams, United States, tvrobertson@yahoo.com*

### **Abstract:**

The European Commission's four-year ASSET program (Action Plan on Science in Society related Issues in Epidemics and Total Pandemics) has investigated how to better prepare for and respond to public health emergencies, using strategies that enhance consideration of participatory governance, open research, ethics, gender equality, and public measures in response to bioterrorism. This presentation summarizes the objectives, activities, and results of this program, which has developed a variety of measures to engage stakeholders from government, commercial, research, and public sectors to improve response to public health emergencies.

**Keywords:** Public health emergencies, Pandemics, Ebola, Vaccination, Participatory governance

## [Preserving Cultural Heritage in as the World's Climate Changes](#)

*Thomas Robertson, Thinking Teams, United States, tvrobertson@yahoo.com*

### **Abstract:**

The European Commission's HERACLES program (Heritage Resilience Against Climate Events on Site) is integrating an impressive range of science and technology, into a system that helps predict how extreme weather events and long-term effects due to climate change will affect cultural heritage sites, and how best to reply limited resources to improve the resilience of thesis sites. This presentation will review the objectives and activities of this project, and describe how it is using technologies such as remote sensing, flood models, and materials and microclimate analysis.

**Keywords:** Climate change, Cultural heritage sites, Remote sensing, Materials analysis, Decision support

## [Emergency Medical services in Iraq using “S.W.O.T Analysis”](#)

*Shakir Kadhim Katea Rubayi, TIEMS IRAQ, Iraq, shakirkatea@yahoo.com*

### **Abstract:**

#### Background:

Since the middle of year 2003 Iraqi people is continuously suffering armed conflicts with massive recurrent violence attacks which lead to collapse of health system including Emergency Medical Services (EMS); due to the increasing demand for EMS in same time there is a big lack of capabilities including efficient, professional and effective the first responders to emergencies and resources and damage of a lot of infrastructures due violence.

The aim of this article is to draw attention to reassess EMS to fill gaps of lacks and improve the system to save lives.

#### Methods:

By using S.W.O.T Analysis (Strength, Weakness, Opportunities and Threats. make plan of preparedness using what available resources to overcome challenges.

#### Results:

Although there is a lack but at meantime there is promising fruitful changes that are required to do for best practice. And using opportunities where available.

#### Discussion:

Focusing on continuing training of first responders to emergencies and disasters is the corner stone to upgrade the EMS system; using best Triage system at mass casualties management using priorities for initiate rapid rescuing lifesaving of injuries make satisfying outcome from scene to health facilities.

**Keywords:** Iraq, Emergency, Medical, Services, Triage



## [Alternative Voice Communication system for Emergency and Disaster situation APM-40](#)

*Matjaz Serazin, MVM TEL d.o.o., Slovenia, matjaz.serazin@mvmtel.com*

### **Abstract:**

In emergency and disaster situations, the functioning telecom networks are of vital importance. Loss of telecommunications can completely paralyze rescue operations. However, it happens many times that even dedicated public safety networks fail in disaster and emergency situations. That is why an alternative communication system is an absolute necessity for civil protection organizations and for protection of critical infrastructure (i.e. nuclear power plants).

The main reason why telecom network fail in the disaster situations are

- Physical disruption of telecommunication infrastructure (caused by earthquake, floods, landslide, sleet, strong winds- hurricane etc )! Wireline and Wireless communications are affected (damaged cables, broken towers/antennas)
- Supporting infrastructure (electrical power system) is damaged and non-operational. Back-up system typically works for a few hours – if not damaged. You have no energy available to power your networks
- Disrupted transport networks impact the supply of fuel for electric power generators

For the first responders it is necessary that they have some back-up telecommunication system if they want to manage the disaster situation. Wireless communication, which might look as a technology of choice at first sight, in reality may be useless. Wireless technology is power hungry while source of power might be scarce. Other limitations are: it cannot work underground (tunnels, metros, shelters, garages) or in remote areas and it is susceptible to disturbances, jamming, eavesdropping etc.

Despite high technology, The APM-40 is a very simple but also very effective solution. Network can be establish very quickly from scratch. It allows making 7 simultaneous duplex conversations over one pair of wires which can be 14 km long (field wire D10 or WD-1/TT), a conference call of 10 users or a broadcast call. It has many other useful PBX functionalities, but does not need any central PBX for operation. All functionality is embedded in each telephone terminal (reliability!). One of the most important features of the system is that it has EXTREMELY small power consumption and each terminal can work for many weeks just on a set of standard AA batteries... Besides that, the APM-40 system allows also connection to radio (UHF, VHF, TETRA, PMR...), PSTN (telephone) and GSM network.

APM-40 system is an excellent complement to the existing system of public safety telecom networks. APM-40 allows for a rapid deployment of voice communication network in disaster affected areas even when all other infrastructure (telecom, critical, electro-energetic) is down.

**Keywords:** emergency telephone system, ad-hoc telephone network, alternative communication system, standalone communications system, communications system for emergency and disaster, public safety networks, autonomous communication system, wireline emergency communication system, critical communications, emergency communications, disaster management

## Development and application for mobile emergency drainage system in urban flood rescue

**Zhang Shifu**, National Engineering Research Center for Disaster and Emergency Rescue Equipment of China, China, zshifu@sina.com

**Deng Xianyi**, Hubei 3611 Mechanical Co., Ltd, China, 20257319@qq.com

**Mao Yuwen**, National Engineering Research Center for Disaster and Emergency Rescue Equipment of China, China, maoyuwen111@126.com

**Zhang Dongmei**, National Engineering Research Center for Disaster and Emergency Rescue Equipment of China, China, 13638332111@sina.com

**Li Cunjing**, Hubei 3611 Mechanical Co., Ltd, China, 2567725760@qq.com

### **Abstract:**

In order to solve the urgent need of large-flow persistent water supply and drainage equipment for emergency rescue of urban flood and firefighting, the vehicle-mounted emergency water pipeline system is developed. The systems consist of two basic units, which are pump station vehicle and flexible pipeline operating vehicle. The pump station vehicle is used for water drawing and pressurized transport in the field. The flexible pipeline operating vehicle is used for pipeline storage, development and fold. The systems can reach the max flow rates of 1500m<sup>3</sup>/h, and the transport distance can reach as far as 2000m. The mechanized rapid development and wrap of large-caliber flexible pipeline is designed. The system can be used independently as well as combined. The use of vehicle-based integration, pipeline mechanized development, automatic station laying and operation scheduling, lightweight floating water pump and other comprehensive technical means significantly increases the operation efficiency and mobility of the system. A production base is built in Hubei 3611 Mechanical Co., Ltd in China to achieve industrialization. The system is sold to more than 30 provinces and cities in China, and plays important roles in many major disaster rescue tasks in recent years.

**Keywords:** emergency flood control and drainage in cities, urban flood disaster rescue, drainage system for long distant

## [Training as tool of fostering a CIP concept implementation: results of Table Top Exercise on Critical Energy Infrastructure Resilience](#)

*Oleksandr Sukhodolia, National Institute for Strategic Studies, Ukraine, sukhodolia@gmail.com*

### **Abstract:**

Establishing state critical infrastructure protection system requires significant efforts. This task is even more difficult for the countries that introduce this new approach into everyday activity of the state agencies within existing state systems and procedures. The absence of working common language, unified procedures of communication and interactions seriously hinders the process of establishing the critical infrastructure protection system in Ukraine. Training programs are believed to be useful tools to apply for the purpose of building up proper foundation for further improvement of legislation and procedures in the field. One of educational training tools is collective exercise, which are the most relevant for developing common understanding of the problem by participants, who usually mostly work separately. This article describe the Ukrainian efforts in providing personnel of the involved state agencies students with knowledge of the policies, plans, methods and tools of critical infrastructure protection. The description of planning and results of the first national level Table-Top Exercise on Critical Energy Infrastructure Protection “Coherent Resilience 2017” are presented in the paper as well.

**Keywords:** Critical infrastructure protection, training, energy safety, CIP resilience

## [Urban area geodynamic risk mapping using long-term time series of Sentinel-1 satellite radar interferometry](#)

**Sergey Stankevich**, Scientific Centre for Aerospace Research of the Earth, Ukraine,  
*st@casre.kiev.ua*

**Iryna Piestova**, Scientific Centre for Aerospace Research of the Earth, Ukraine, *pestovai@ukr.net*

**Olga Titarenko**, Scientific Centre for Aerospace Research of the Earth, Ukraine,  
*olgatitarenko@casre.kiev.ua*

**Volodymyr Filipovych**, Scientific Centre for Aerospace Research of the Earth, Ukraine,  
*filin@casre.kiev.ua*

**Tamara Dudar**, National Aviation University, Ukraine, *dudar@nau.edu.ua*

**Mykhailo Svideniuk**, Scientific Centre for Aerospace Research of the Earth, Ukraine,  
*m.shved@ukr.net*

### **Abstract:**

The Kryvyi Rih city central part geodynamic risk mapping by satellite radar interferometry time series analysis and geological/geophysical data is described. Long-term time series of Sentinel-1 satellite differential InSAR measurements was engaged for this task. Ones provide detecting and mapping the high-precision land surface movement dynamics, which is very important indicator of potential hazard.

The technique for time series of land surface small displacements analysis and interpreting is described. Geological and geophysical data are auxiliary for risk forecasting. Finally, the geodynamic risk maps are produced for study area.

**Keywords:** Geodynamic risk mapping, Synthetic aperture radar, Satellite radar interferometry, Time series analysis, Kryvyi Rih city central part

## [Towards a taxonomy of crisis management functions](#)

*Todor Tagarev, Institute of ICT, Bulgaria, tagarev@gmail.com*

*Valeri Ratchev, Centre for Security and Defence Management, Bulgaria, ratchevv@gmail.com*

### **Abstract:**

This paper will present a taxonomy of crisis management functions, developed within the DRIVER+ project. DRIVER+ (DRiving InnoVation in crisis management for European Resilience) has three main objectives: 1) Develop a pan-European Test-bed for crisis management capability development; 2) Develop a well-balanced comprehensive portfolio of crisis management solutions, and 3) Facilitate a shared understanding of crisis management across Europe.

While reflecting relevant UN and EU documents, results of FP7 and H2020 projects, and the generic task list of the US Department of Homeland Security, the design of the taxonomy was an interactive, participatory process with contributions by researchers, solution providers and practitioners.

The taxonomy serves as one of the inputs to the functional design of the online DRIVER+ database and will facilitate the classification and matching of crisis management needs, gaps, and solutions. This paper will present the taxonomy, the process of its development, and the model of its consequent governance.

**Keywords:** crisis management, emergency management, capability development

## Vulnerability Analysis for Urban Natural Gas Pipeline Network System

**Qiuju You**, Beijing Research Center of Urban Systems Engineering, China, yqjbyq@163.com

**Wei Zhu**, Beijing Research Center of Urban Systems Engineering, China, zhuweianquan@126.com

**Jianchun Zheng**, Beijing Research Center of Urban Systems Engineering, China,  
zheng\_jianchun@sina.com

**Shaohu Tang**, Beijing Research Center of Urban Systems Engineering, China,  
tshaohu@163.com

### **Abstract:**

In order to identify the vulnerable links in urban natural gas pipeline network systems, this study established a concept for the vulnerability analysis of the network system, providing a basis for quantitative analysis of vulnerability. The criteria for selecting nodes in the network were determined based on the network composition. Based on the theory of disaster chain, the vulnerability factors were analyzed thoroughly, the hazard factors causing vulnerability were determined and the vulnerable parts of the network system identified. A model for the calculation of the structural threats from the network itself was established. This calculation is done in two steps, and the first is to identify the interdiction point of single pipeline sections through the same calculation method for friction resistance loss. The second step is to determine the key nodes with the maximum or minimum vulnerability of the entire network, thereby realizing point-to-net analysis of the network. With geographical information system ArcGIS, Java programming language, and Lingo optimization software, the FIM model was implemented. Using a natural gas pipeline network in Beijing as a case study, the distribution of vulnerable points in the network was plotted and the key nodes with high vulnerability were identified by the vulnerability and importance analyses.

**Keywords:** Natural gas pipeline network, Structural threats from the network itself, Vulnerability analysis, Importance

## [Driving Innovation in Crisis Management for European Resilience \(DRIVER+\)](#)

*Peter Petiet, The Netherlands Organisation for Applied Research (TNO), Netherlands, peter.petiet@tno.nl*

*Marcel van Berlo, The Netherlands Organisation for Applied Research (TNO), Netherlands, marcel.vanberlo@tno.nl*

### **Abstract:**

Current and future challenges due to increasingly severe consequences of natural disasters and terrorist threats require the development and uptake of innovative solutions that are addressing the operational needs of practitioners dealing with Crisis Management. DRIVER+ (Driving Innovation in Crisis Management for European Resilience) is a FP7 Crisis Management demonstration project aiming at improving the way capability development and innovation management is tackled. DRIVER+ has three main objectives:

1. Develop a pan-European Test-bed for Crisis Management capability development:
  - Develop a common guidance methodology and tool (supporting trials and the gathering of lessons learned);
  - Develop an infrastructure to create relevant environments, for enabling the trialing of new solutions and to explore and share CM capabilities;
  - Run trials in order to assess the value of solutions addressing specific needs using guidance and infrastructure;
  - Ensure the sustainability of the pan-European Test-bed;
2. Develop a well-balanced comprehensive Portfolio of Crisis Management Solutions:
  - Facilitate the usage of the Portfolio of Solutions;
  - Ensure the sustainability of the Portfolio of Solutions;
3. Facilitate a shared understanding of Crisis Management across Europe:
  - Establish a common background;
  - Cooperate with external partners in joint trials;
  - Disseminate project results;

In order to achieve these objectives, five Subprojects (SPs) have been established. SP91 Project Management is devoted to consortium level project management, and it is also in charge of the alignment of DRIVER+ with external initiatives on crisis management for the benefit of DRIVER+ and its stakeholders. In DRIVER+, all activities related to Societal Impact Assessment are part of SP91 as well. SP92 Testbed will deliver a Guidance methodology and guidance tool supporting the design, conduct and analysis of trials and will develop a reference implementation of the test-bed. It will also create the scenario simulation capability to support execution of the Trials. SP93 Solutions will deliver the Portfolio of Solutions (PoS) which is a database driven website that documents all the available DRIVER+ solutions, as well as solutions from external organisations. Adapting solutions to fit the needs addressed in trials, will be done in SP93. SP94 Trials will organize four series of trials as well as the final demonstration. SP95 Impact, Engagement and Sustainability, is in charge of communication and dissemination, and also addresses issues related to improving sustainability, market aspects of solutions, and standardization.

The DRIVER+ trials and the final demonstration will benefit from the DRIVER+ Test-bed, providing the technological infrastructure, the necessary supporting methodology and adequate support tools to prepare, conduct and evaluate the trials. All results from the trials will be stored and made available in the Portfolio of Solutions, being a central platform to present innovative solutions from consortium partners and third parties and to share experiences and best practices with

respect to their application. In order to enhance the current European cooperation framework within the Crisis Management domain and to facilitate a shared understanding of Crisis Management across Europe, DRIVER+ will carry out a wide range of activities, whose most important will be to build and structure a dedicated Community of Practice in Crisis Management (CoPCM), thereby connecting and fostering the exchange on lessons learnt and best practices between Crisis Management practitioners as well as technological solution providers.

**Keywords:** Driving Innovation in Crisis Management for European Resilience, EU FP7, Innovation, Crisis Management (CM), European Resilience, Test-bed, Guidance, Reference implementation, Portfolio of Solutions (PoS), Trialling solutions, Shared understanding, Standardisation, Community of Practice in Crisis Management (CoPCM)



## Implementation of CIP Concept in Ukraine: achievements and challenges

*Oleksandr Sukhodolia, National Institute for Strategic Studies, Ukraine, sukhodolia@gmail.com*

### **Abstract:**

Enhancing critical infrastructure protection and resilience has become a priority of national security policy in many countries. World best practice demonstrate the need to build critical infrastructure protection system capable to prevent, mitigate and respond to all types of threats (i.e. natural, man-made, criminal and terrorist threats) and their possible combinations. Establishment of such system requires legislatively defining its fundamental principles of operation, application of common approaches to management of critical infrastructure security at all levels, clear identification of the principles of interaction and cooperation among state authorities, private business, society and public. Despite achieving some progress in implementing new approach Ukraine has still a lot of work ahead to build the effective state system of critical infrastructure protection. Successful implementation of the system will mean for Ukraine the transition to a new level of state management in this field based on modern approaches to security risks management, optimal use of available resources, and timely respond to security and safety incidents and crisis resolving national security and defense issues.

**Keywords:** Critical infrastructure protection, crisis management, emergency management

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