

## DOMINafter PROJECT

Rudolf URBAN and Jiri F. URBANEK\*

*University of Defence, Czech Republic*

**Keywords:** European crisis / emergency management integration; Operation management interoperability.

### Abstract

The „DOMINafter“ acronym means: "the Development of Operation Management Interoperability Needful for the Agents of First Toxicosis / Emergency Response". It is known about unsatisfactory interoperability, that it depresses total operability of emergency, rescue and liquidating services at regional and over-border multinational territories. The preparing of continuously international operable professional crisis / emergency management must be able next activities: effective concurrence, collaboration, cooperation and interaction at incident or disaster areas of trans-national extent. They must be able of these activities without predefined scenarios even. A necessity of a creation of a Base is outlined for setup and co-education of crisis / emergency management agents of all European countries. DOMINafter Base creation is our vision. Regional agents of top crisis / emergency managements from whole Europe should have periodically passed through this Base. Important contribution of the Base will be face-to-face contacts, which are founded at the integration and operation procedure tuning of European Integrated Rescue Systems. They would be made at over-border extraordinary events & disasters and subsequent integrated intervention of rescue and liquidating services. Our readiness is discussed and presented for above problem solution in this paper. The „Interoperable outdoor videoconference system, especially for crisis management of civil protection®, is improved for application in DOMINafter project. The importance of this system other modules named "esTou®" and "NETour" is emphasized for future operation.

### Introduction – a Vision Analysis

The project „DOMINafter“ is an outline of our vision of future educational / training Base, which will be responsible for the integration of European first responders management. Future realization of this vision is needful for European security research specification also. The educational and research abilities of Czech University of Defence and its three faculties: economy & management, technological and military health sciences they are fully convenient to this vision. It is ranked among the best qualified and competent universities for security research in Europe. A sense of individual acronym letters is analysed further in the connection to word connotation.

D(O)M(I)Nafter

Total operability of emergency, rescue and liquidating services is depressed by unsatisfactory interoperability at regional and national territories. The interoperability of crisis / emergency

---

\* Kounicova 65, 612 00 BRNO, Czech Republic



operations is evaluated as the critical process of crisis / emergency operations. Poorly prepared and insufficient interoperability may be the restriction at protecting against terrorism. International impacted extraordinary incidents and disasters ask that multinational responders must operate integral even without previous co-training. Successfully solved interoperability brings synergic effects in operational cooperation and collaboration of operation entities. It acts integrally in multidisciplinary environments at multi purpose tasks.

DO (M) I (N) *after*

International operable professional crisis / emergency response managements are needful for continuous & competent preparation and effective response without national restrictions at the European territory. This management must be able to make effective cooperation, collaboration and interaction at disaster areas of trans-national extent and even without predefined scenarios. Modern crisis is hard to predict and plan. All unexpected is possible. This intuition brings an improving of situation awareness in Europe, because technological readiness may or may not be sufficient for all possible situations. But the readiness of crisis / emergency response management is possible, namely in information exchange and sharing of pan-European E-governmental services.

DOMIN (a) *fter*

The readiness, cooperation and co-education of crisis / emergency management agents of all European countries converge to the Base creation. Top and operation crisis / emergency management regional agents from whole Europe should pass through this Base periodically. They will meet mutually here. They will acquaint with contemporary levels of pan-European crisis / emergency management interoperability. They will have a possibility to assert its reminders and suggestions in a mirror of all-European conceptions and programmes forming crisis / emergency operability. They will have the possibility of a tutorial with research & development agents of European security research & engineering and with European industrial I S / IT providers.

DOMINa (f) te (r)

European First Responders Management must be future management of European Integrated Rescue Systems. The managers in future Base will found European security integration and procedure tuning for cross-border extraordinary events & disasters. They will be able to manage subsequent integrated intervention and effective rescue & liquidating services. It will be important contribution of the Base.

D)OMINa *fter*

A DYVELOP<sup>®</sup> (the DYnamical VEctor LOGistic of Processes) [© J.F.UrbaneK. 1998 - 2002, ISBN 80-7204-232-7] is our methodology for DOMINa *fter* project solution and for technologies development. It uses the Blazons<sup>®</sup> as special flowcharts for process productivity & entity's relationships expressions.

### Project Indicia and Methods

Czech University of Defence has rich experiences with above problems solutions, because it solves more like these projects at national level. Our University offers DOMINa *fter* project to the utilizing in the frame of the EU security research.

WiFi (Wireless Fidelity) Pilot Technology of DOMINa *fter* project will be well contributed for Value Added in European economy and for the reinforcement of the competitiveness of European industry. The great potential for exploitation of this project is centred to end users at the PPP principle (Public Private Partnerships). Scientific and/or technological excellence is



in the implementation of COTS principle (Commercial – off - the Shelf) in the created systems and technologies.

The contributions to tangible and demonstrable improvements in the security of our DOMINafter project are in previous patent protecting results. They are centred to interoperability increasing in civil / police / military / fire-brigade / rescue / humanitarian organizations managements. It is on behalf of high operability & efficiency. It brings quality improvement, steadiness consolidation and system & process integrity and harmonizing of civil protection in the context with economic and environmental sustainable development. It all will be made in the environments of democratic establishment & organizations in the modern threats. The project builds effective partnerships among end users (i.e. State, Public and Local Authorities & Integrated Rescue System's Components), among industrial producers and among research & development agents.

Our project team is potentially able to carry out its activities successfully and to ensure its efficient management, including protection of classified information and intellectual properties. It is because, the project team is composed from experienced and skill managers and scientists of various organizations and from civil / military management persons proofed and tested in various situations. DOMINafter project is mission oriented and has close relevance to the proposals of Programme of Work of the EC PASR (Preparatory Action for Security Research) and it respects all its five priority missions:

- Optimising security and protection of networked systems;
- Protecting against terrorism;
- Enhancing crisis management;
- Achieving interoperability and integration of systems for information and communication;
- Improving situation awareness.

PASR priority directions of security research are included automatically, because our project has ability to prevent, to protect, to prepare and to investigate against the terrorism and consequently it create the presumptions for damage minimisation.

External man-powering of DOMINafter project is not necessary. Our financial requirements are dependent at overall PASR project budget and at the frame of whole EC project consortium. Our real potential in security research projects is very high.

### **Top technologies for DOMINafter Project**

Three problems will be especially solved within this project:

- a) Toxicosis prevention via antidotes
- b) Virtual modelling and simulation via 3D + CAD
- c) WiFi Pilot Technology

#### **a) Toxicosis prevention via antidotes**

Czech University of Defence has unique research facility of highly toxicosis substances (real or potential chemical warfare agents using in terrorism threats). It is capable for performing a comprehensive analysis and evaluation of biological, humanitarian, anthroposophy and environmental effects. New original antidotes against nerve agents have been developed and produced here. Our University has many experts for consultative activities and expertises on environmental problems, chemical disasters and management of mass casualties of the CBRN, which act at international cooperation with NATO countries even. Recent research activities at the field of the toxicosis are next:

- Improvement of the effectiveness of antidote pre-treatment of nerve agent acute poisonings by the development of new type of pharmacological pre-treatment of nerve



agent poisoning with the help of enzyme scavengers (butyrylcholinesterase) and hydrolysing enzymes (paraoxonase);

- Improvement of the effectiveness of antidote treatment of nerve agent acute poisonings by the development of new reactivators of acetylcholinesterase inhibited with nerve agents (especially against tabun, cyclosarin and soman);
- More precise diagnosis of nerve agent exposure including the standardization of cholinesterase activity determination;
- The development of new, more efficacious decontamination means (foams, emulsions) to protect exposed soldiers against percutaneous poisonings;
- More precise diagnosis of sulphur mustard exposure using the method for the detection of DNA cross links and breaks (comet assay).

### **b) Virtual modelling and simulation via 3D + CAD**

Digital terrain modeling and visualizations are our contemporary applications. They are directed into the area of 3D (three dimensional) visualization, digital terrain modeling, geographical analyses and optimization processed in real time. Other features are in development process, like remote sensors control, net management, informational sharing and management and other.

Main targeting application is cybernetic operation system of reconnaissance planning, control and management, which is parametric by real time, by virtual terrain (3D + ortho-photo maps) and by optimization functions.

Situation overview and awareness act fully in 3D environments. They bring the features and abilities of management decision making support, which is achieved by specific system of the analyses and optimizations.

Virtual modelling and simulation need more possibilities in detail expression of the entities in closed objects. It brings CAD (Computer Aided Design) modelling.

Main solved items within DOMINafter project:

- 3D visualization of the areas (contemporary whole Czech Republic);
- 2D and 3D map modeling, including cover variability;
- tactical situation modeling and it's interactive modification;
- 3D model creation, the motion and deployment;
- visibility analyses;
- observation point hospitalization;
- terrain altitude modification and visual scheme variability;
- path calculation;
- interactive navigation;
- flight simulation;
- 3D + CAD cycles.

### **c) WiFi Pilot Technology + esTou® +NETour + avaxTour**

Research & development project of Czech University of Defence “WiFi Pilot Technology” was created, developed and evolved of the interoperable communication and technologies as industrial products. Special product of this paper authors is „The Interoperable Outdoor Videoconference System, Especially for Crisis Management of Civil Protection®,,. This WiFi information & communication system and technology are our intellectual property as the technology developer. The application of this cybernetic system and further development of



its WiFi Pilot Technology are our real contribution for the enhancing of European crisis management. They contribute to the interoperability qualitative increasing and to system's integration of information and communication security and information sharing. It fully implements the COTS principle for security optimising and protection of information networked systems in EC PASR and future 7<sup>th</sup> EC framework programme.

Starting restrictive conditions of WiFi Pilot Technology consist in a necessity to give the technology for an involving of final and end users "on key", which will be sufficiently secure and reliable, outdoor – mobile, compatible and purpose-built with using hardware / software and telecommunication resources. This Technology is setting up at commercial and globally approachable hardware and next components. It is investment modest, enough resistant to violators, user's friendly working in low-cost operation and environmentally friendly. This Technology derives a benefit from international reputable software for crisis/emergency management (e.g. Emergency OFFICE = „EMOFF“). Competitive advantages of this Technology and its relevant hardware & software consist in the fact that they are operating on the system's, process', arrangement's and network's environments, which are currently and without special secrecy commercially and freely approachable (COTS).

The Processes and them relevant Process Systems (PrSs) acting in specific Environments (ENVs) and their Productivities (PRs) are possible to model at the Blazon<sup>©</sup> in the Figure. It is a part of descriptive, analytic and evaluative phases of the production and next innovation of the WiFi Pilot Technology. It is instrumented via dynamic - process – value – vector expression of informatics'-logistical relations of the technology and others objective entities.

## **The Conclusion**

The developments of the a) and b) items are dependent at DOMINafter project realization. The development of the c) item is fully in the management of this paper authors. The impact of WiFi Pilot Technology allows qualitative and efficient information & technological support of crisis / emergency managements. It makes possible for first responders management and other agents to operate in “Mission Area ENV” in the frame of the „Crisis Operation PrS” – see Blazon<sup>©</sup> at the Figure. The Blazon<sup>©</sup> identifies two critical interoperable interfaces: The “EVENT Mngmnt” and “SECURITY”.

The “EVENT Mngmnt” is the most important interface for information logistics. Interpreted monitoring, reporting, revising and controlling information go through this interface. The “SECURITY” is the most important interface for information security. The interoperability improvements at the both interfaces bring a new implementation of on-line / off-line duplex broadcasting among mobile nodes of special local wireless network “NETour” (WLAN, WiFi). Transit (booster) NETour nodes are equipped by separate battery-powered Access-Points (APs) and directional synchronizing Antenna System (AS). These ASs are stationary or mobile. Quite new component of WiFi Pilot Technology is booster flying means - “avaxTour” ( Aerial Vehicle Axial Telecommunication Outdoor Unmanned (Registered)). Beside a retranslation, it has several further functions, important for crisis EVENT management. They make from the avaxTour, NETour and WiFi Pilot Technology necessary modules for future European crisis / emergency management's integrity. WiFi will be replaced by DVB (Data Video Broadcasting) technologies in the future.

## **References**

Dvořáková, M. Heretík, J. Pešková, K. (2005). Interoperability Improvement of Czech Civil Protection Integrated Management, *International conference The International Emergency Management Society*. Faroe Islands. Danmark.



Urban,R. (2005). Integrated Management - Environmental and Process Approach. AARMS – Academic and Applied Research in Military Science. *En International Journal of Security, Strategic, Defense Studies and Military Technology*. 2005. Hungaria.

Urban,R. Urbánek,J.F. (2005). Crisis/ Emergency Management Implementation to Integrated Management. *International Conference - New challenges in the Field of Military Sciences 2005*. Budapest 2005. Hungary.

Urbánek,J.F. Urban,R. Pešková, K. Heretík,J. (2005). Global implementation of risk and crisis management to Integrated Management. Major Risk Challenging Publics, Scientiscs and Government, *14<sup>th</sup> SRA EUROPE ANNUAL MEETING 2005*, Como 2005. Italy.

Urbánek,J.F. Barta,J. Pešková, K. Heretík,J. (2005). New Information Systems & Technologies for Risk/Crisis/Emergency Management. Major Risk Challenging Publics, Scientiscs and Government, *14<sup>th</sup> SRA EUROPE ANNUAL MEETING 2005*, Como 2005. Italy.

Urbánek,J.F. „*Interoperabilní terénní videokonferenční systém, zejména pro krizový management ochrany obyvatelstva*“<sup>®</sup>. 8. odborná konference s mezinárodní účastí Současnost a budoucnost krizového řízení. Praha. 2005. ISBN 80-239-4734-6.

### Authors Biographies

Brigade general, professor, Rudolf Urban, PhD. – University of Defence Rector, Chief of Civil Protection Department. E-mail: rudolf.urban@unob.cz.

Associate professor, Jiří F. Urbánek, PhD. – University of Defence Professor, Civil Protection Department. E-mail: jiri.urbanek@unob.cz.

