

## **Toward an International System Model in Emergency Management**

### **Information, Communication, and Coordination in Emergency Management – Public and Private Sector Approaches in Different Countries and Systems**

**By Eelco H. Dykstra, MD**

#### ***Introduction***

The purpose of this concept paper is to draw attention to the international dimension of emergency management, particularly as it relates to information sharing, integration, and interoperability. It discusses a number of challenges and frames the activities of different stakeholders and sectors, emphasizing the need for connectivity, seamless exchanges, and widespread access to information.

With this concept paper, the Public Entity Risk Institute is issuing a solicitation for Issues and Ideas Papers that further discuss ideas and information on what approaches and elements exist for developing an Integrated System Model for emergency managers. Contributed papers will be considered for a PERI Virtual Symposium, *Toward an International System Model in Emergency Management*, which will be conducted September 22-26, 2003. This international, all-electronic Symposium will be held on PERI's Web site ([www.riskinstitute.org](http://www.riskinstitute.org)), and via e-mail.

All Issues and Ideas Papers received, and the proceedings of the Symposium, will also be considered for inclusion in a white paper, which PERI anticipates publishing in early 2004.

This concept paper, the call for papers, the Symposium, and the publication of the white paper are being conducted in conjunction with a research project known as the International Strategic Master Plan, 1<sup>st</sup> Phase (or ISMP-1). The ISMP-1 project is also described in this concept paper.

The content of this concept paper is the sole responsibility of the author and does not necessarily represent formal positions of PERI or any other member in the ISMP-1 consortium. Where the tone is provocative, it should be born in mind that this is done to facilitate reactions and inspire contributions of thoughtful papers.

## **Challenges**

### **Global Threats Lead to Vulnerability in Infrastructure**

A more crowded and more networked world brings us higher levels of inter-dependency between sectors, communities, jurisdictions, regions, and nations. This increased dependency leads to increased levels of vulnerability.

Crucial services like energy, food, health, transportation, communication, public safety, and finance may be delivered locally, but have become so global, so interlinked, that single events may threaten economic continuity and the personal well-being of millions of people in many countries. Imagine the consequences of a breakdown in food security of an international fast food chain that has 43 million visitors worldwide each day.

The HIV-AIDS pandemic, the terrorist attacks known around the world as “9/11,” the ensuing global war on terrorism, and the recent SARS outbreak, merely confirm these global dimensions. Particularly since 9/11, we have witnessed a dramatic increase in public awareness of threats and risks, and concern about how best to prepare for, and respond to, emergencies. Around the world, many communities, sectors, jurisdictions, nations, and systems are reviewing their emergency preparedness and response capabilities and investing enormous amounts of resources, talent, energy, and skills.

But where are the central clearinghouses that tell us who is doing what? Where are the organizations with the mandate, funding, and legislation to run these clearinghouses? And where they do exist, how well are they connected, and what platforms exist for expert interaction and information sharing? Do all communities, sectors, jurisdictions, nations, and systems utilize a similar frame of reference?

### **How Do We Resolve Differences in Semantics and Terminology?**

Words used in emergency management may have different connotations for different people in different parts of the world. Words such as:

- emergency,
- threat,
- risk,
- vulnerability,
- resilience,
- mitigation,
- preparedness,
- advocacy,
- complex emergencies,
- interdisciplinary,
- stakeholders,
- command and control,

- knowledge-based systems,
- early warning,
- coordination,
- systems approach,
- security,
- safety,
- disaster,
- integration, and
- interoperability.

These differences in understanding and connotation can adversely impact the way information is shared and integrated between different people, systems, and technologies.

Similar to what happened with emergency medicine, the acceptance of *Emergency Management* as an independent profession has been largely restricted to countries that follow the Anglo-American model. The predominant use of “American” semantics and terminology should therefore not come as too big a surprise. In her excellent paper “*Emergency Management in the 21<sup>st</sup> Century*,” Rubin uses the term emergency management to “encompass the expert systems that manage people and resources to deal with disasters.”

This concept paper uses a functional definition of emergency management as “Activities that include prevention, preparedness, response, recovery, rehabilitation, advocacy, and legislation, of emergencies irrespective of their type, size, and location, and whose purpose is reduction in death, disability, damage, and destruction.”

Within this definition, *Emergency Management* encompasses a variety of sectors, issues, and activities we do not always think of as being connected, such as:

- humanitarian assistance,
- relief and development,
- conflict prevention and resolution,
- crisis management,
- civil military cooperation,
- homeland security,
- consequence management,
- all-hazard approach,
- emergency and disaster medicine,
- military-operations-other-than-war,
- first responders,
- business continuity,
- peace keeping,
- emergency medical services,
- critical infrastructure protection,
- public health,

- search and rescue, and
- catastrophic loss prevention.

One characteristic they all share is the pursuit of “*improving the livelihoods of individuals, communities and nations by measures required to put a stop to unwarranted deaths, disability, damage, and destruction.*” Consequently, yet another possible definition of emergency management.

In the same vein, it should be pointed out that the term “*mitigation,*” routinely used in systems that follow the Anglo-American approach to emergency management, may lead to considerable international confusion. Is it part of the emergency life cycle, or a main reason to invest in emergency management?

### **Different Stakeholders, Different (Vested) interests?**

Based on previous involvement in the design, monitoring, and evaluation (D, M&E) of emergency systems, the author has developed and uses the following list of stakeholder categories.

- 1. General Public** -- Obviously this means all of us, for whatever else we may do, we are also members of the public at large. By choice or by design, our thoughts and actions are influenced by public opinion and expectations.
- 2. Responders** -- It can be helpful to make a distinction between individual and institutional responders. This category includes a wide range of different responders such as community volunteers, firefighters, law enforcement, emergency medical services, and the military. Depending on type, location, and size of the emergency, a wide range of other service providers and expert personnel can be placed here as well.
- 3. Legislators** -- This category distinguishes - as much for political as for practical reasons - between elected officials and career staff.
- 4. Financiers** -- Somebody has to pay. Depending on the split between private versus public responsibilities as well as type, size and location of a given emergency, we find insurance companies, government agencies, and non-government organizations (NGO) in this category.
- 5. Facilitators** -- This category includes think-tank type organizations, universities, training institutes, and consultancy firms.
- 6. Administrators** -- Often forgotten, but important: when administrative, mid-level management see no tangible benefit or added value, progress can be slow or halted.
- 7. Industry** -- Not only important in their role as “suppliers,” but also a resource for innovation and research and development (R&D).

As far as different (vested) interests within and between stakeholder categories are concerned, these tend to fade during the acute phase of most emergencies, when all are equally focused on a common purpose (reduction in death, disability, damage, and destruction). It cannot be denied however, that particularly in category 2, responders, conflicts do occur. In the absence of agencies or individuals who function as a central authority backed by strong mandates, policies, and legislation, these conflicting interests may very well escalate into regular “turf battles.”

### **Threat Perceptions: Emotions vs. Logic and Reason**

Different stakeholders may have different views on what constitutes a “threat.” Such differences are often based on the *perception* of threat. Essentially, this amounts to a battle between emotion and rationality. Without the benefit of experience or formal training in emergency management, it is easy to get confused between emotion and logic/reason. The general advice is not to mix it up, but keep emotions - also your own - from influencing rationality. Particularly during a response phase, it is important to make a choice: either cry with the bereaved, or table emotions for later and first manage the emergency as well as you can.

Not only does the use of logic and reason depend heavily on the quality of the information, it also comes with a commitment to point-counterpoint discussions as this creates knowledge and consensus. Experience however, particularly in conflict situations, shows us how difficult it can be to reason with unreasonable people. In fact, emergencies like earthquakes, floods, and hurricanes in and by themselves have no emotions and are therefore more predictable and easier to handle than conflicts between people.

When emotions are not kept separate but become mixed in with the use of logic and reason, people may lose sight of the problem or priorities. The result can be that people no longer discuss whether a given threat is unavoidable, preventable, or curable, but question the existence of the threat itself: “what threat was that again?” Put in medical terms, heated discussions are now taking place on the pro’s and con’s of aspirin instead of what caused the severe headache in the first place.

Because of the considerable motivating power that accompanies threats and risks, emergency management can be used as a natural driver for change in many areas. To avoid abuse in this respect, it is necessary for emergency professionals to stay focused on “hard” information, if only because the use of scientific rigor, minimum standards, protocols, and independent verification tends to be variable, particularly on a global scale.

### **Human vs. Non-human Assets: Death and Disability vs. Damage and Destruction**

It is not difficult to assess the damage and destruction of buildings and assign a monetary value. But how do we calculate the cost of deaths and disabilities of individuals? Do we get value for money? How do we make the business case for investing in emergency preparedness and response?

Emergency managers may find themselves in a situation where they have to prioritize what resources to invest in the protection of human versus non-human assets. There may not always be a conflict between the two, but when there is, it can lead to emotionally disturbing questions such as “what is the value of a human life?”

Statistics, by definition, relate to large numbers and groups of people, but have limitations when one has to deal with individuals. Exploring the human dimensions of the “return on investment” (ROI) of emergency management may be difficult, but without it we cannot quantify the impact of what we do.

### **The "Disaster Triad": Information, Communication, and Coordination**

Without information, we have nothing. When things go wrong in emergency management, they are generally related to breakdowns in information, communication, and/or coordination. Emergency managers from around the world are keenly aware of this “ICC disaster triad.”

On the one hand, it is true that effective management of information, communication, and coordination under adverse conditions goes far beyond what traditional management training can offer: emergencies are event driven processes that do not necessarily adhere to scheduling, time tables, or traditional planning tools. On the other hand, it is equally well known that technology-based knowledge systems provide valuable intelligence and early warnings to enable effective preparedness for, and even prevention of pending disasters. Information technology can also bypass some of the human emotions and potential errors in judgment described in the previous challenges, but are we ready for that?

### ***The Information Challenge***

#### **“One cannot manage what one cannot measure”**

When information is most needed, it is generally least available, i.e., during an emergency. This is as true for an emergency medical services team routinely responding to individual patients as it is for rapid assessment teams deployed to survey the damage after an earthquake. But too much data without being able to process it into usable information can be equally confusing.

It is difficult, even for the professional emergency manager and IT specialist, not to feel overwhelmed by the sheer amount of data, recommendations, checklists, guidelines, requirements, and information that circulates within and between different sectors and jurisdictions. True as this already may have been before 9/11, a veritable floodgate of new initiatives and activities has opened since then, with concern about bio-terrorism and weapons of mass destruction (WMD) among the primary drivers for this process. The ensuing danger of duplicity of effort and the problem of interoperability are but two of the many challenges we face in transforming data into usable information. In this light, it is of

interest to note that single-source information without verification is a major cause for inconsistencies found in cross-disaster database comparison.

Traditional approaches to information in emergency and disaster management have tended to focus on the **response phase of overt, rapid onset, local, and single events**. The increased global character of many threats such as bio-terrorism has since changed the way we manage information: we increasingly look at **prevention/ preparedness of covert, slow onset, multi-jurisdictional, and multiple events**. Al-Qaeda inspired terrorist attacks immediately come to mind, but there are other problems as well. Globalization also means that whereas the influenza pandemic of 1918 took 4 months to circle the globe, it might now only take days or several weeks at most. The recent SARS outbreak is a clear illustration of the serious consequences when one has little or no time or resources available for local detection, preparedness, and response. When functional requirements change, information technology also needs to change with it.

### **Functional Requirements vs. Technological Specifications**

Few will argue the point that “functional requirements should drive technological specifications, not the other way around.” The planners and developers in information technology (IT), however, cannot do much unless the field operators agree not only on what they need, but answer the crucial question “*how good is good enough?*” Conversely, the language (acronyms!), architectural concepts, and technologies used in IT modeling, messaging, and simulation, scare off many of the emergency professionals who work in the field. As a result, the functional disconnect between IT developers and field operators can be large.

According to one source, the solution for bridging this divide will come from increased interaction and consultations on business process management systems that adhere to the “UML Profile for Enterprise Distributed Object Computing” (EDOC) standard. With field operators and IT planners/developers thus separated by more than language alone, some regulatory entities have stepped up to explore (minimum) standards and frameworks. Adding to the confusion, suppliers may offer fragmented solutions that are based on costly, highly proprietary technology or on much cheaper, easily available off-the-shelf (OTS) products. What we need are integrated solutions, standards to ensure interoperability, and worldwide access to up-to-date, verifiable information tools. Given the importance of the ICC disaster triad in emergency management as previously described, there is clearly a need for better connections between these stakeholders:

- Regulators,
- Planners/Developers,
- Field Operators, and
- Suppliers.

## **Case Studies**

### **Department of Homeland Security (DHS)**

This newly created department brings together 190,000 employees from 22 units of 12 different organizations under one roof to improve domestic security in the United States of America. For the first time, DHS brings all transport security and border agencies together and will function as a central clearinghouse for threats and vulnerability of Americans at home. Four mission directorates (Border and Transportation Security, Emergency Preparedness and Response, Science and Technology, Information Analysis and Infrastructure Protection) share a 2004 budget of \$36.2 billion. The Emergency Preparedness and Response Directorate will include the formerly independent Federal Emergency Management Agency (FEMA).

In February 2003, Steve Cooper, Chief Information Officer of DHS, spoke with emergency managers about the challenges in the areas of information, communication, and coordination, both internally as well as externally. A central theme in his presentation was a multipurpose, federal “information super highway backbone” to which the information systems of local communities need to be (made) compatible to qualify for federal funding. Connectivity between local, state, and federal levels, and interoperability between the first responders from different providers were also referred to as issues of high priority.

Despite the global dimensions of terrorist and other threats, it is worth noting that DHS – like FEMA before it – has no international mandate and will work with/through other agencies such as the State Department and the National Security Council. In the meantime, the world is closely following the developments at DHS, eager to pick up some of the lessons that DHS and the USA will learn. Because of the international dimensions of terrorism, one could ask why DHS does not at least have an office for international affairs.

### **The United Nations**

The UN Office for the Co-ordination of Humanitarian Affairs (OCHA) is very much involved in projects that focus on information management as a tool for improved inter-agency emergency response. An example is its mandate to develop a network of (Joint Humanitarian) Information Centers (IC) around the world, many of which are inter-agency efforts. In a report commissioned by UNOCHA’s Field Information Support (FIS) Unit, the following constraints to evaluating this network of ICs were identified:

- the lack of any centralised information about the work of ICs;
- the fact that many IC staff have now moved on, not necessarily staying in the sector; and
- the ever-present limitations of time.



With ICs increasingly positioned as honest “information brokers,” the report further suggests that the key to success is effective marketing, and the best tools for this marketing are practical responses to real problems.

Some examples given of practical responses to real problems are:

- Public Information Publications -- Contact lists, sitreps, meeting schedules.
- Public Information Resources -- E-mail/internet access, meeting space, photocopy, mailboxes.
- Data Co-ordination -- Data standards, database support, advocacy.
- Operational Support -- Logistics tracking, security briefings.
- Liaison Services -- Field Liaison, CIMIC, government, NGO.
- Electronic Dissemination -- CD-ROMs, E-mailing lists, website.
- Information Gathering/Analysis -- Primary data collection, policy work.
- Geographic Information Systems (GIS) -- Data standards, analysis/planning.
- Communication -- Intranet, file management, bulletin boards.
- Capacity Building -- Training, facilitation of local NGO contacts.
- Advocacy -- Information co-ordination groups.

(From: Humanitarian Information Centres: Establishing Coherent Approaches to Field-Based Information Management in Emergencies. A report commissioned by the Field Information Support (FIS) Unit of the Office for the Co-ordination of Humanitarian Affairs (OCHA), March 2001, Paul Currión.)

In February 2003, a symposium was held in Geneva, Switzerland, on “Best Practices in Humanitarian Information Exchange.” The meeting confirmed OCHA’s role as a focal point and produced a list of areas for further activity:

- User requirements,
- Quality of information,
- Technology,
- Partnerships,
- Preparedness, and
- Field-level coordination.

### **International Standards Organization (ISO)**

ISO Technical Committee 215 (Medical Informatics) has adopted, through one of its Working Groups (WG 1 - Coordination of Records and Modelling), a new work item entitled “Framework for Emergency Data Sets.” At a recent meeting in Oslo, Norway, WG 1 decided to establish an executive committee (with representatives of Japan, Canada, the UK, and Finland/the Netherlands) to help produce a technical report on this work item. Given the myriad of technical committees within ISO, it is conceivable that similar initiatives exist in domains other than medical informatics.

The US-based Object Management Group (OMG) is also linked to ISO and another (industry-driven) entity developing standards in information management. Based in part

on collaboration with the Crisis Management Initiative of (former) President Athisaari of Finland, OMG recently organized a 1-day workshop on Homeland Security and Crisis Response to examine interoperability problems between different jurisdictions.

### ***The ISMP-1 Project***

There are many more initiatives than those listed under Case Studies. What they all show is that the need for information sharing, integration, and interoperability, and the need for better communication solutions within and between communities, jurisdictions, systems and nations, is clear.

The ISMP-1 project (International Strategic Master Plan – 1<sup>st</sup> phase) is an exploratory survey of different approaches to emergency management. With a focus on information, communication, and coordination, ISMP-1 seeks to collect information to find a balance between technology and people, systems, and organizational change.

The primary objective of this research project is: ***“To conduct an assessment of barriers and opportunities for developing a common framework or system model in emergency management, and recommend qualitative and quantitative parameters for improved connectivity and information sharing”***

During a 6-month period between May and December of 2003, the project seeks to collect as much information and different views, opinions, and contributions as possible by conducting surveys, structured interviews, and web-based interactive activity. This call for papers and the resulting PERI Symposium are key components of this activity.

The project is supported by a consortium consisting of representatives from 25 public and private entities which all share concern regarding integration, information sharing, and interoperability in emergency management. All information collected will be condensed into a report and distributed as a white paper, to include recommendations for follow-on activities.

Coordination of the project rests with the University of Kuopio (Finland) with support provided by the Public Entity Risk Institute (USA), and the Emergency Infrastructure Information Partnership (USA). Participants in the consortium represent professional associations, government entities, non-governmental organizations, as well as private companies.

For more information or participation, please contact the project coordinator, Eelco H. Dykstra, MD, professor (visiting) in International Emergency Management at the University of Kuopio, at [eelco.dykstra@uku.fi](mailto:eelco.dykstra@uku.fi) or [cordialissimo@hotmail.com](mailto:cordialissimo@hotmail.com).

## ***Call for Papers***

The Public Entity Risk Institute is coordinating the collection and preparation of the Issues and Ideas Papers that will be presented during the Symposium, "Toward an International System Model in Emergency Management." The Symposium is intended to draw attention to the international dimension of emergency management, particularly in the problems and opportunities for information sharing, integration, and interoperability among communities, jurisdictions, and nations. The program will be presented Sept. 22-26, 2003.

### **Paper Topics**

Papers should discuss the barriers and opportunities for developing a common framework or system model in emergency management, and the recommended qualitative and quantitative parameters for improved connectivity and information sharing. All papers (whether presented during the Symposium) and responses received, and the proceedings of the Symposium, will be considered for inclusion in the ISMP-1 white paper on the topic of an international system model in emergency management. PERI will consider publishing the white paper in early 2004.

The papers should build upon the issues identified out by Dr. Dykstra in the concept paper (above). Papers may also use his identification of problems in order to discuss other issues and aspects that need to be addressed to establish a common framework or system model in emergency management.

(Dr. Dykstra's paper is also available for viewing on PERI's Web site in the Symposium Center ([www.riskinstitute.org/symposium\\_papers.asp](http://www.riskinstitute.org/symposium_papers.asp)), and in the Library ([www.riskinstitute.org/lib.asp](http://www.riskinstitute.org/lib.asp), in the Disaster Management and Hazard Mitigation section).

### **Paper Specifications**

Submitted Issues and Ideas Papers should be in the range of 3,500 to 6,000 words in length, and should be supplied in English. Preferred formats for submission are in MS Word, or plain text.

### **Where to Submit a Paper**

Papers are being accepted now through August 31, 2003. Anyone wishing to write a paper for the program should contact PERI's Symposium coordinator, Dennis Kouba, at [dkouba@riskinstitute.org](mailto:dkouba@riskinstitute.org).

Papers can be sent electronically to [dkouba@riskinstitute.org](mailto:dkouba@riskinstitute.org), or can be mailed on disk (with an accompanying printed copy) to: Dennis Kouba, DMK Communications, 63 Graystone Lane, Portland, Maine, USA, 04103, telephone (207) 780-8901.

## **About the Author**

Eelco H. Dykstra, MD, is professor (visiting) in International Emergency Management, Department of Health Policy and Management, Faculty of Social Sciences, at the University of Kuopio in Finland, and International Adviser of the Home Islands Security Authority (HI-SA) in Tokyo, Japan. He is included on the emergency roster of the UNDP Bureau for Conflict Prevention and Resolution (BCPR), New York, USA.

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