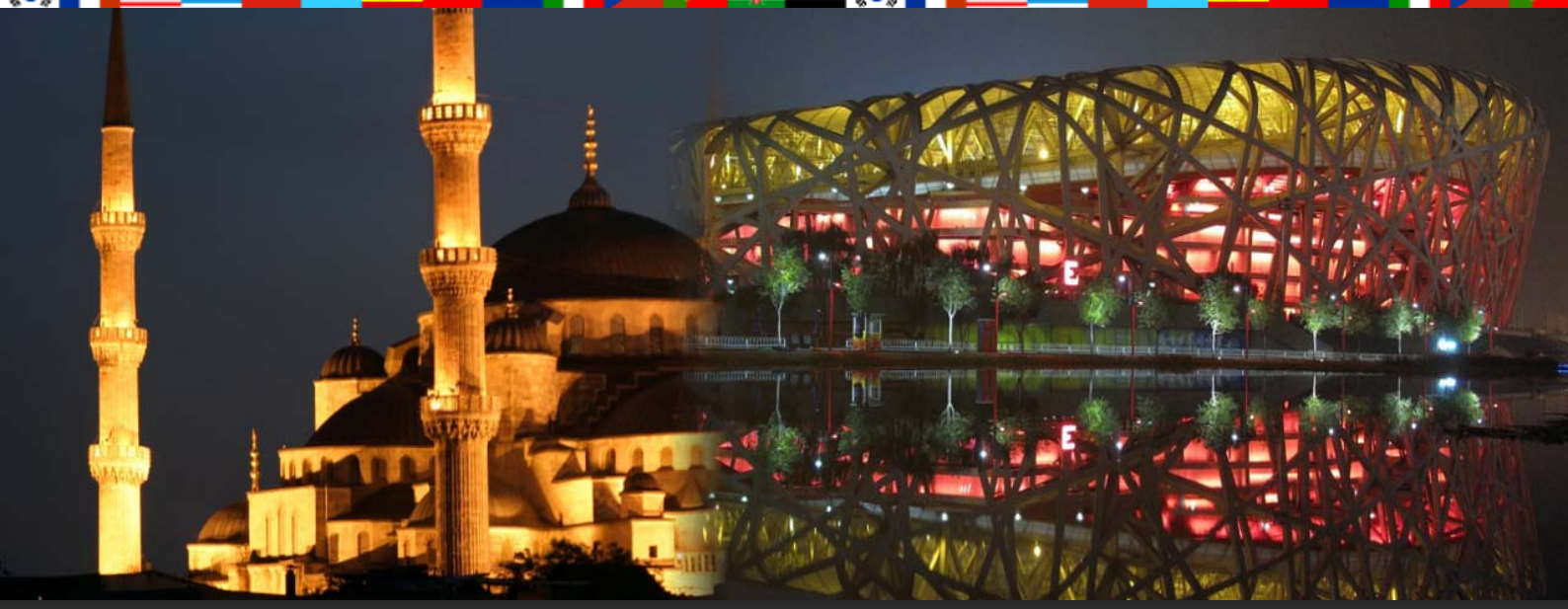
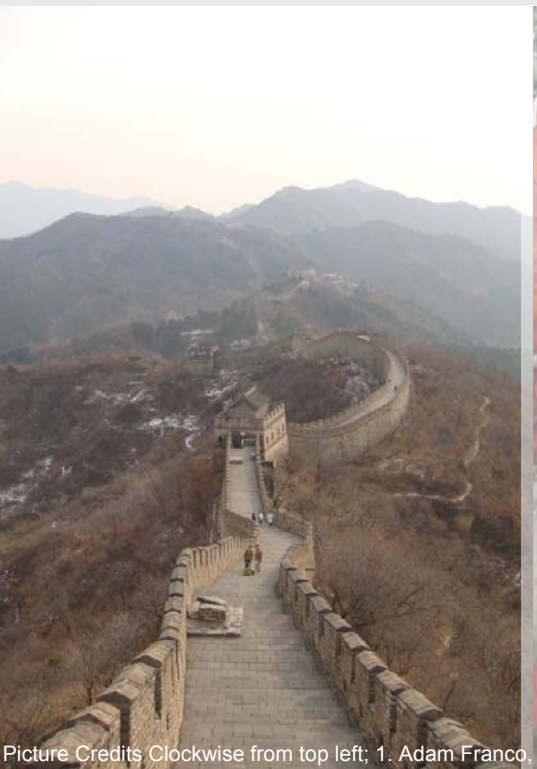
The International Emergency Management Society

Members Newsletter – Issue 9 – August 2009



Memories from Turkey 2009

Looking to China 2010



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Message from the President

Presidents Message

As TIEMS President I am very pleased to introduce this newsletter with some “best practice papers” from TIEMS 2009 annual conference in Istanbul. I think it is very important that presentations at TIEMS annual conferences get a wider distribution and this is one of TIEMS efforts that aims to achieve this objective. TIEMS also has an agreement with the International Journal of Emergency Management (IJEM) and a special issue of IJEM this autumn will include approximately 10 best research papers from the TIEMS 2009 annual conference in Istanbul. Please, enjoy reading the papers presented in this issue of TIEMS Newsletter, and we look forward to many more contributions from members for future issues.

K Harald Drager

Editors Welcome

Editors Message

Dear TIEMS members and supporters. I am very happy to offer you this latest issue of the TIEMS Newsletter, which is dedicated to our 2009 Annual Conference. We hope you will enjoy reading about the special moments from Istanbul and selected “best practice” papers from the proceedings, even if you were unable to attend in person.

There are many ways to get involved over the coming year in the activities of the society, whether through our worldwide workshops or through contributing to our newsletter. Furthermore we hope to welcome as many of you as possible to next years conference in Beijing to feel the spirit and friendship of the TIEMS community.

Snjezana Knezic

Alan Jones
Technical / Sub Editor

From Istanbul to China...

The 16th Annual Conference of The International Emergency Management Society (TIEMS) was convened in Istanbul, Turkey, on June 9th – 11th 2009. Again bringing together scientists, experts and emergency management practitioners from academic and research institutions, industry and governments from many different continents, and proved another successful event for the society.

Istanbul Technical University hosted this year's conference, and in his opening remarks, University President, Professor Muhammed Sahin, welcomed participants and encouraged them to explore practical solutions to mitigate risks of natural disasters, noting that Turkey was highly exposed to these kinds of incident, giving reference to a major earthquake just a couple of years earlier.

Senior officials from the Turkish government attended the conference, including Mr. Hikmet Cakmak, the Vice-Governor of Istanbul, who provided the opening address for the conference. He called upon TIEMS' delegates to draw on the international nature of the event and utilise the global expertise to address local problems facing communities and countries. In particular, he noted that while developing countries were highly exposed, they disproportionately lack the technology and expertise to deal with disaster prevention and management. The platform established by TIEMS could greatly enhance information flow and exchange, providing information for disaster management and preparedness at minimum costs.

Indeed, the conference provided an opportunity to undertake a critical overview of challenges facing countries and regions of the world, concerning all aspects of disaster management. In particular, the conference highlighted the rapid increase in the number of natural disasters, which have grown significantly since the 1980s. The conference also discussed the globalisation of natural disasters, particularly hydro-meteorological hazards and geological hazards, which are exacerbated by global warming. Long-term projections show a global drying trend, with the proportion of land surface affected by extreme droughts predicted to increase from 1% (current rate) to over 30% by the end of the 21st century.

Delegates noted that the distribution of natural disasters was not uniform across regions of the globe, even in the case of global warming. It was noted that while the consequences of global warming were projected into the future for most advanced economies and developed countries, they were already being felt in a number of developing countries. In particular, the overwhelming majority of low-income countries in Sub-Saharan Africa and, most low-income countries lack the technological infrastructure and human resources needed to deal with these crises. In some countries, there is simply no framework for disaster preparedness & management.

The participants recognised that progress in the areas of disaster management depend on advances in research and development, and on the critical support and commitment of governments and international organisations. They called upon scientists and international experts attending the conference to draw upon the platform offered by TIEMS to foster the development and application of new technologies through international collaboration and exchange. They also stressed that progress on this front depended on a number of critical initial steps to be undertaken by countries, including:

- The establishment of an operational national disaster management strategy in countries where such a framework is missing.

- Building national capacities in the areas of risk identification and mitigation, which are critical for effective risk transfer and preparedness.
- Strengthening the linkages between natural disaster management and environmental protection, particularly in light of the growing implications of environmental degradation.
- Increasing investment in scientific research and human resources at the national level, possibly drawing on TIEMS' international expertise and experience.
- Drawing on risk sharing mechanisms, in part through government disaster assistance and the insurance markets. This would improve emergency response and preparedness and mitigate fiscal costs and contingent liabilities associated with natural disasters.
- Expanding TIEMS' international outreach - the participants welcomed the geographical expansion achieved by TIEMS under the leadership of its current President and encouraged the management to work even harder to bring more participants and experts from developing countries on board.

In his closing remarks, the President of TIEMS, K. Harald Drager, thanked the conference participants and the Turkish hosts for their contribution to the success of the 16th Annual Conference. He also praised a number of participants, whose research efforts in the areas of disaster management were awarded prizes for their exceptional quality and contribution to the field. He also encouraged participants to submit their papers for consideration and publication through the International Journal of Emergency Management.

This year's annual conference was marked by strong participation from China, the country selected to host the 17th Annual Conference planned next year in Beijing. K Harald Drager urged participants to work hard to ensure that the 17th international annual conference planned next year in Beijing, China, (see http://www.tiems.org/index.php?id=89) would again be a success, and the society looks forward to welcoming its members to Beijing in 2010.

TIEMS 2009 Annual Conference
Istanbul, Turkey

Special Moments & Memories from Istanbul

By Snjezana Knezic & Alan Jones

The TIEMS 16th Annual Conference took place, at the Istanbul Technical University in June at the stunning Suleyman Demirel Convention Centre, and in spite of the economic climate and severe cost cutting at many universities and companies around the world, which made attendance for some members challenging, around 100 international participants attended. There were participants from: Australia, Belgium, China, Croatia, Czech Republic, Denmark, France, Germany, India, Italy, Netherlands, Norway, Romania, Russia, Serbia, Slovenia, South Korea, Spain, Sweden, Turkey, United Arab Emirates, United Kingdom, United States.

Here we capture some of the memories and highlights of the week

Opening the conference were many distinguished guests and this picture captures the moment of K Harald Drager (TIEMS President) opening speech presenting past achievements and future opportunities for TIEMS, giving delegates a flavour of the future of the society, and the important part they all have to play

During the three days that followed there were keynotes sessions from eminent speakers from the field of emergency management from around the world. This picture to the right capturing Britt-Marie Drottz Sjoberg, professor at NTNU, Norway, delivering her speech

K Harald Drager (TIEMS President)
Opening Speech

Britt-Marie Drottz Sjoberg
Presenting her keynote speech

In addition to the keynotes a further seven parallel sessions / workshops where held with over fifty papers being presented. Captured below are moments from some of these sessions.

Snjezana Knezic presenting her research during one of the session


An opportunity for the audience to find out more with a question and answer session

The society likes to recognise those who's research is felt to be particular well written, and each year there are three winners of the best research papers chosen by the TIEMS Paper Review Committee, special thanks for which must be given to Nils Rosmuller for a great job as Chairman.

Keeping the tradition, this year the winners were announced at the gala dinner, and awarded a financial gift, courtesy of the Korean Chapter (thanks YoungJai Lee!).


Applause for the winners of the best paper awards

A number of special gifts were also presented during the dinner to those who had worked hard to make the conference the success it was with special TIEMS watches dedicated to the event by the Rector of Istanbul Technical University, Muhammed Sahin.

Lasting memories from the TIEMS 2009 annual conference


K Harald Drager presenting a gift to the Rector Muhammed Sahin, TIEMS conference host

Everyone who attended the conference had a stunning embroidered bag to take away their own memories from the conference, courtesy of members from the Florida State University.

We hope you will join us in Beijing to share similar memories, and become part of the growing TIEMS growing international network.

COMMON INTELLIGENCE AND TRACEABILITY FOR RESCUE AND IDENTIFICATION OPERATIONS

By Daniela Dell'Amura & Francesca Matarese
SESM – Sistemi Evoluti per la Sistemistica e i Modelli, Italy

Introduction

Nowadays, humanitarian action is impaired by **delay** due to **poor situation assessment** and by organisation problems due to **lack of coordination** between all involved agencies (NGO, Health Services, Civil Protection, Local Authorities, etc.). Recent natural events like earthquakes in Turkey (August and November 1999), Tsunami in Indonesia (December 2004) and hurricane Katrina in New-Orleans (August 2005) emphasized such problems resulting in a large number of casualties and weeks of total disorganisation for protecting endangered populations.

When assessing the situation, each agency partially addresses the situation with regards to its domain of expertise. No overall situation assessment is performed, which often results in misinterpretation and inadequate engagement and action.

CITRINE is a PASR Project co-founded by the European Commission that aims at developing an integrated set of shared information management tools and models to facilitate the efficient integration of diverse emergency and management services for humanitarian operations and rescue tasks. CITRINE has been developed through the active interaction of the following partners: SESM (IT), ELSAG (IT), THALES Security Systems (FR), THALES Research and Technology (FR), EADS Defence and Security Systems (FR), SKYSOFT (PT), UNIVERSIDAD POLITECNICA DE VALENCIA (ES), AMI (PT) and ITTI (PL).

CITRINE integrates state of the art building blocks into a consistent system to develop a first version of a coordination centre, while focusing on the humanitarian mission domain. The system has been demonstrated in the trials.

Stage 1 - Data, models and consequences corresponding to the crisis itself are required. How many casualties are created, of what severities and with what geographic distribution? How many hospitals are damaged and to what degree, how many bridges and roads? Stage 2 - The assets and operational procedures of, and relationships between, the emergency response organisations must be known.

Without the Stage 1 there is no crisis state to be understood, and without Stage 2 there is no awareness of what the responders need to understand, no knowledge of what constitutes situation awareness for those users. For that purpose, a wrong crisis Situation Assessment (SA) is a contributing factor to many accidents and incidents.

Regarding decision making mechanisms, research shows that almost 80% of the time currently spent in the decision cycle is in the information-gathering and collaboration phases, leaving little time for the actual decision and almost no time for action.

CITRINE Decision Support System (DSS) reduces the first two phases, leaving the human with enough time to do humanitarian collaborative operations.

CITRINE explores how co-ordination could be achieved among NGOs mandated by the European Union and humanitarian organisations, both who intervene on the field of a large disaster. The way to improve the overall efficiency relies on technical means, but also on standardisation, common procedures or policies to be implemented at European level.

Thesis

Information is fundamental to successful cooperation in crisis management

operations. Communications interoperability and shared situational awareness are widely recognised as vital to effective emergency response. The proper management of information and the resulting analysis of crisis situations are crucial for informed decision-making and the effective use of resources. A coherent and co-ordinated reaction can only be based on accurate information that must be produced and transmitted with speed and precision.

Nowadays, the only available framework born with the aim of coordinating interventions in the event of major emergencies, which may require urgent response actions at European and International level, is the Community Mechanism for Civil Protection. It acts as a focal point for the exchange of requests and offers of assistance and through the Common Emergency Communication and Information System (CECIS), managing emergencies all over the world as well as inside the EU. CECIS is a tool that allows current information on the situation to be shared, as well as identifying what is required. Its main task is to host a database on potentially available assets for assistance, to handle requests for assistance on the basis of these data, to exchange information and to document all action and message traffic.

This European Civil Protection mechanism supports the National Authorities in preparing the intervention, rather than supporting day-by-day operations, and is accessible only by Civil Protection. CITRINE aims at overcoming these limitations, as well as enhancing the number of available functionalities.

The potential benefits of wider cooperation have historically been mitigated by the unavailability of robust communications or transportation systems to support them. Increasingly however, this barrier is being eliminated. Rapid dissemination and exploitation of usable information can be of great benefit in the first few hours after a crisis strikes. Accurate wide-area damage, casualty and resource assessments can be used to direct responders effectively, guide evacuation efforts and position assets. A key enabling technology for effective information exploitation is Information Fusion.

Mastering information has a lot of meanings, sometimes contradictory:

- Navigating within the information flow subject to the COS (Cognitive Overflow Syndrome) whilst looking for the “good” information,
- Filtering the necessary and sufficient set of data related to the information we want, in order to understand the situations awareness,
- Correlating different information coming from various sources and sensors to standardise their pertinence,
- Merging and fusing the data before analysis and synthesizing afterwards,
- Measuring the impacts and the invariants of the interpretation processes, in order to avoid the complete restart of an analysis process while changing the hypotheses and the data etc

The field of information fusion is an **interdisciplinary** research area embracing mathematical theories (decision theories, game theory, automata, categories, standard and non standards logics), data mining, knowledge rendering, language technologies, ontologies, image and video processing (wavelet transforms, etc.), and perception based on human factors issues. CITRINE federates these skills in order to develop the unified Situation Assessment frame.

CITRINE innovates and brings a breakthrough to DSS. CITRINE’s objectives are to define a unified approach to cognitive information fusion and then to validate it through the design of an innovative information frame enhanced by understanding capabilities through the definition of models for situation perception and comprehension in order to acquire the deep understanding of the situation. This frame provides means for a situation

awareness picture featuring decision-aid mechanisms. For that purpose, CITRINE:

- Captures several types of knowledge: declarative knowledge (what to do), procedural knowledge (how to do it) and operational knowledge (when to do it);
- Overcomes human limitations (cognitive overload, etc.).

Moreover this sequential way (which is currently in use in most of the practical situations, due to a lack of **interoperability** among the different tools in use), in addition to its low performance rate and computing time, generates errors and misinterpretations. These approaches based on the latent concepts of rapidity and of simultaneity must be definitely applied when dealing with multi sources and multi-type information, which will be the future of information Decision and Management systems and which is a key characteristic factor of "Crisis Management" both in anticipative or current management modes.

The ultimate objective of CITRINE is the development of a scalable decision support system based on advanced models and technology for supporting two major issues: the coordination and the logistic of humanitarian and rescue teams and the evacuation of the injured people.

Interoperable framework

CITRINE provides a new systemic approach in crisis monitoring by adapting or developing innovative concepts and techniques from other fields through the facilities provided by an interoperable framework.

Technological software components, whatever their abilities to process data to reach meaningful results, always require manual operations from users (data export and import), to take advantage of them all. Automatic interfaces can speed up processes but can't provide users with possibilities such as navigating through the data, or automatic alerts.

CITRINE implements a new conceptual approach that integrates state-of-the-art software components to achieve the best performing solution possible through an interoperable and scalable architecture. In this area innovation also lays in a new architectural concept, enabling software component to interact together through a generic framework that has interfaces with various legacy systems.

To achieve these results, maximum benefit is taken from the combination of isolated technologies through a robust framework that provides interoperability capabilities and services able to automatically process data in such ways it is of greatest help to organisations working in the area of humanitarian collaborative operations.

Early warning and crisis monitoring

To assist this crisis monitoring process, constructive communication can be used to address misconceptions and misunderstandings over situation change, risks and uncertainties. Indeed, steps should be taken to ensure that the importance of uncertainty to the end decision is effectively communicated in any step of the crisis. This should include providing:

- an appreciation of the overall degree of uncertainty and variability and the confidence that can be placed in the analysis and its findings;
- an understanding of the key sources of variability and uncertainty and their impacts on the analysis;
- an understanding of the critical assumptions and their importance to the analysis and findings; this should include details of any such assumptions which relate to the subjective judgements of the analysts performing the analysis;
- an understanding of the (un)important assumptions and why they are (un)important; and,
- an understanding of the extent to which plausible alternative

assumptions could affect any decision.

Decision support

Dynamic decision making is often complicated by the complexity of the information involved. Much of this complexity arises from context-sensitive variations, multiple levels of details, uncertainty and the dynamic nature of the underlying phenomena. These problems are particularly complicated with regard to both the different types of information and the complexity of events. Therefore, to make decisions in high density and/or ambiguous situations such as crisis situations, a DSS needs to be able to represent and manage such a myriad of information.

Cognitive Decision Support Systems, as successors of DSS, traditionally follow the decision logic line of thinking, and include algorithmic tools found in DSS to improve the choice activity of decision makers. This includes optimisation methods, mathematical programming, multi criteria models etc. The actual weakness of DSS is that they are “structure related”, that is, they normally assume that the decision problem can be formulated mathematically and do not stress information processing and display. By contrast to DSS, Expert System (ES) or knowledge-based systems, as successors of the "General Problem Solver" follow more the process paradigm of cognitive decision theory; they do not necessarily assume that the decision problems can be formulated as mathematical models; they substitute human expertise for missing efficient algorithms and they are not structure, but context related, with much smaller domains of application than DSS. Some consider ES as part of DSS, others see DSS and ES as basically different systems and others combine the two approaches into “Cognitive Decision Support System”.

Emergency and Crisis situations are examples of dynamic decision making where a cognitive decision support is necessary. Equipped with such support system, users will:

- better select appropriate strategies and tactics;
- better determine a course of actions;
- predict possible reactions and consequences;
- optimise the allocation of limited resources;
- provide explanation of decisions made;
- reduce uncertainty and speed up reasoning processes.

CITRINE demonstrates various decision support techniques that can be of high value for the early warnings systems in stressed situations. These techniques do not aim at replacing the system operators, but greatly facilitate their tasks by presenting a set of various actions to undertake and by explaining the advantages/disadvantages of each option. The “intelligent” modules implemented in the system are easily configurable to be adapted to the organisational rules, preferences or working habits of each user. The definition of the HMI (in a broad sense) has therefore been performed in full interaction with an NGO.

Implementation

The next-generation of DSS for crisis management must address two fundamental issues central to the work of CITRINE – cognitive overflow and the integration of structured and unstructured insight.

The analysis components directly addresses cognitive overflow through systematic screening and interpretation of information to identify relevant evidence for analyst consideration. It is essential that mark-up schemas in structured data are maintained and available for analysis in combination with information extracted from unstructured data.

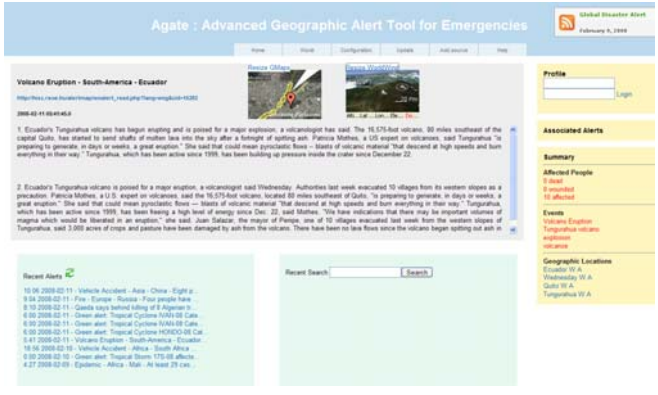
Seven modules, one hardware and six software compose the CITRINE system:

- PSS (Patrol Support System)
- AGATE (Advanced Geographic Alert Tool for Emergency)
- GEOXCIA (GEOgraphic eXpedite Crisis Information Assessment)
- EMERALD (Electronic Management of Elements Representation And Location Database)
- OPAL (Operative Procedures Advanced Lab and Messaging Tool)
- AMETRINE (Assistant Management Enhanced Tool for Refugees and Internally displaced people camps)
- SAPPHIRE (Strategic Action Plan Preparation for improving Humanitarian Rescue Efficiency)

Here below a synthetic description of them.
Figure 1: Example of PSS interface

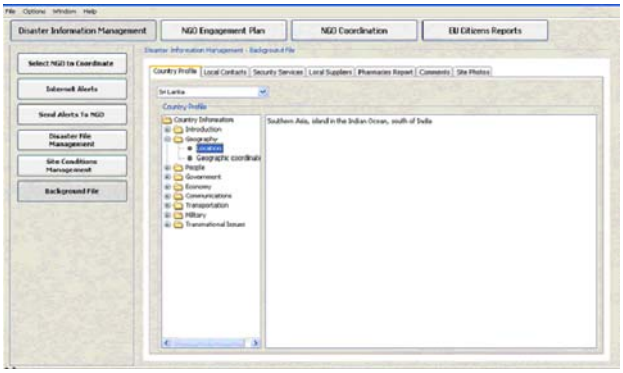
PSS is a palm-held device mounted in a shock-resistant, water-proof, protective shell, which acquires pictures (even in night vision), audio, text notes and fingerprints; it associates GPS references to acquired data and downloads information on a central database for further elaborations. PSS allows people in the field to capture relevant information useful to support rescue operations and coordination.

Figure 2: Example of AGATE interface



AGATE is a module for data acquisition and information fusion. It monitors news from the Internet and processes it using semantic analysis techniques. AGATE automatically extracts key features of relevant news: disaster, geographic location, number of affected people.

Figure 3: Example of GEOXCIA interface

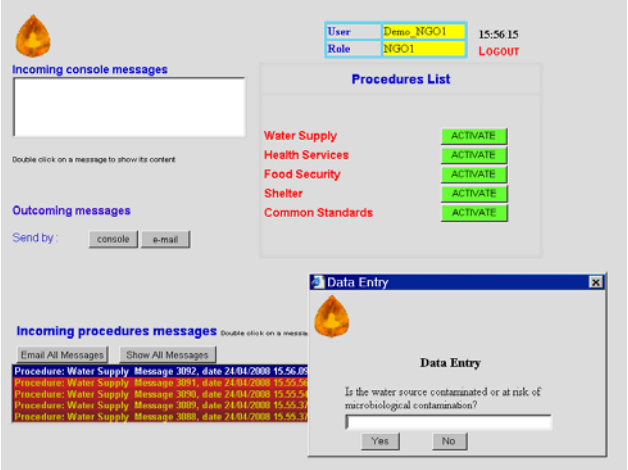


GEOXCIA is a network-centric distributed system for overall situation awareness and common picture. GEOXCIA provides up-to-date reports on the disaster situation and background.

Figure 4: Example of EMERALD interface

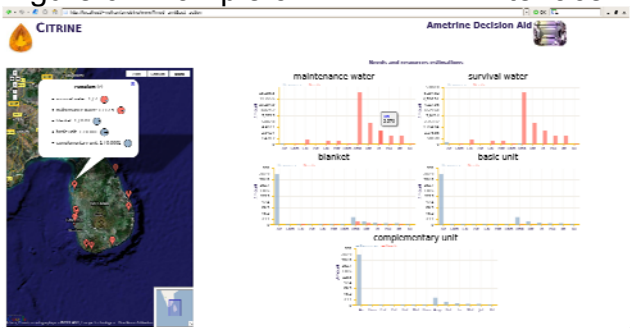
EMERALD is an object representation display for situation awareness, supporting situation assessment. EMERALD is also the database of the overall CITRINE application for all the information to be stored with many interfaces and data synchronisation. This database is specially designed for emergency relief management systems based on international standards for such a situation system, which guarantees interoperability with other agencies systems (police, sanitarian, etc.). EMERALD uses the schematic map with the most important information about roads and communications.

Figure 5: Example of OPAL interface



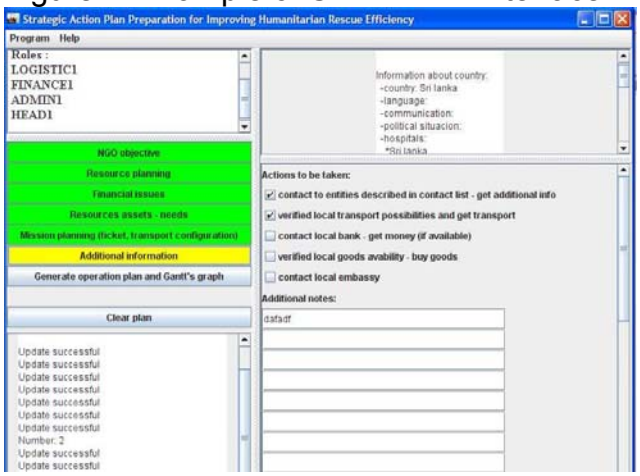
OPAL supports activity coordination, allows the correct information flow, suggests to the operators what to do, monitors the evolution of the events and reports the decisions and actions taken. OPAL collects at coordination level, information and alerts coming from other modules, dispatches useful information to all stakeholders involved in the humanitarian crisis management in each operational phase, provides procedural guidelines to on-field operators, and produces operational reports.

Figure 6: Example of AMETRINE interface



AMETRINE is a disaster camp management support tool. As inputs, it uses disaster planned resources and camp residents database. AMETRINE performs, at tactical level: resources and needs assessment, needs forecast, resources allocation, alarms triggering. AMETRINE uses algorithm for extrapolation and statistical modelling, constraints programming and genetic algorithms.

Figure 7: Example of SAPPHIRE interface



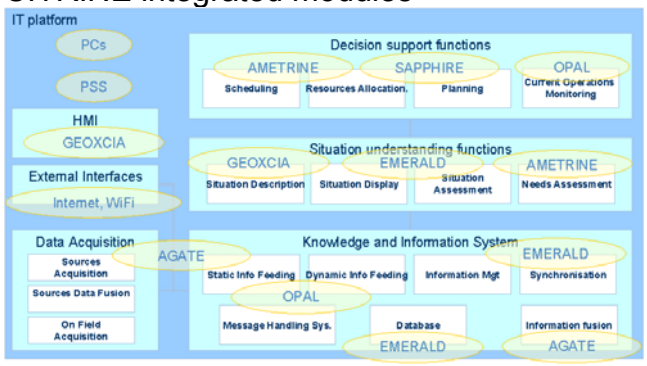
SAPPHIRE's objective is to help NGOs to prepare the operational plan for the humanitarian operation and coordinate it with the plans of other NGOs. SAPPHIRE provides resource plan and operational plan (including Gantt graph).0

CITRINE provides four main functionalities:

- Data Acquisition
- Knowledge and information repository
- Situation understanding
- Decision support

The following picture shows how software modules provide these functionalities.

Figure 8: Functional representation of CITRINE integrated modules



Application

In order to demonstrate CITRINE's effectiveness in managing humanitarian crisis, a demonstration has been organised in Lisbon in May 2008.

One of the partners, AMI, is a NGO and its role in CITRINE's project was user requirements definition and demo validation. AMI tested, as an end user, the final release of the system during the demonstration, analysing also usability and portability functions, in order to validate the overall solution. The test session covered a complete crisis process, from detection of humanitarian disaster to on field tasks.

CITRINE system is a software solution not having specific constraints on hardware, it is able to work on standard PCs. Moreover, the architecture of CITRINE allows it to be fully operational offline and synchronise when a connection is present. CITRINE system is by essence modular. Each module has a specific role and the modules shares a common database for the system.

Findings

The flow of operation shown during the demonstration has been divided in nine functions. All functions and results obtained from the demonstration were validated from AMI.

1. *Day to day monitoring of real events*

CITRINE's system scans approximately 10 simulated sources (generating dispatches), giving information on 3 distinct kinds of disasters. An alert triggering about the Tsunami disaster in Sri Lanka is shown.
AMI comment: CITRINE would allow a fuller overview of a disaster scenario. Although information about a disaster are available through the media or in the Internet, CITRINE gives access to organised, useful and up-dated information which will help NGOs in the decision process.

2. *ALERT in EU Agency centre for coordinating humanitarian operations*

CITRINE broadcasts alarms to all users. CITRINE provides informal exchange of messages between EU Agency and NGOs headquarter to coordinate.

AMI comment: It is extremely important that the humanitarian aid provided by European NGOs becomes more coordinated and consequently more effective. Considering this, the fact that CITRINE allows NGOs to have a direct contact with EU Agency, from the moment the disaster occurs to all the aid process, is certainly an added value. CITRINE is crucial to strengthen the sequence of events that occurs in disasters.

3. *Disaster: impact evaluation, info gathering, file creation. NGOs decision to go*

A disaster file is automatically pre-fed by CITRINE and completed with information provided by the EU Coordinator. CITRINE shows a MAP with the situation of disaster. NGOs consult the early status of the disaster file created, then the related background information.

AMI comment: the disaster file should be available in a very short period of time, due to the fact that NGOs will take the decision to go to the field in the first 24 hours after the disaster and will send the exploratory mission to the field in the first 48 to 72 hours. This helps the NGO to arrange things in a much more reliable and efficient manner. Having a map of disaster area indicating which kind of aid is already being provided (health, nutrition, water sanitation) and which geographical areas are already covered, will help NGOs to choose in which area the intervention will be more useful.

4. *Mission planning, Planning Coordination*

NGOs perform their mission planning. CITRINE compares the expression of needs in the disaster file with the cumulated expression of the goods made available by the NGOs responses. Messages go back

and forth between NGO and EU Agency to coordinate the intervention through CITRINE. NGOs update their planning after discussion and finally the EU Coordinator communicates his validation of plans of intervention.

AMI comment: CITRINE allows the definition of all the humanitarian services to be provided (either to be achieved in Europe or in the disaster area) according to the real needs in the field. Having an overall picture of the several humanitarian interventions in the disaster area, the EU coordinator can provide NGOs important information to the definition of their intervention. CITRINE helps communication and coordination between NGO's and the EU Coordinator.

5. *Deployment: exploratory team, area survey, NGOs Sites selection, full deployment*

The EU Delegate takes control over the disaster file, and updates it in CITRINE with all available information from the field. All localised objects are entered on a geographical map and the EU Delegate in the field enters information that was not yet localised. The NGO Exploratory Teams performs a site survey in the area of the disaster. CITRINE helps them in localising and taking pictures of important aspects. Information can be updated directly on the map and be viewable by all NGOs.

AMI comment: CITRINE helps in terms of preparation and continuation whilst in the field and helps to visualise the real scenario in the field. Through its PSS module, CITRINE helps in identifying missing or deceased persons in the field. This is vital in a catastrophic situation.

6. *Daily activities*

CITRINE allows the easy production of day to day reports from the NGO Team to the NGO HQ and EU Delegates. The EU Delegate in the field checks the situation regarding NGOs on CITRINE Map.

AMI comment: CITRINE provides detailed information from the team in the field to the headquarters and helps to localise what has been done and what still needs to be taken care of.

7. *CAMP management - Resources and needs assessment*

CITRINE displays for each camp: resources and needs assessments (set-up, medical, water and food) and resources and needs forecasts. CITRINE also proposes a new allocation of resources as required.

AMI comment: NGOs need CITRINE to optimise their resources in the refugee camp and to assure that any essential humanitarian good will not have been missed. It helps in the preparation of sending new materials, medical aid, equipment etc.

8. *Additional threatening event over the disaster*

If the NGO Team is driving across the area of disaster and discovers something unexpected. CITRINE helps to dispatch this information.

AMI comment: When already settled in the field, NGOs are a very important local source of information, because they can detect dangerous situations, goods shortages or any other kind of needs and they can alert other stakeholders. CITRINE is very important at this level because it allows NGOs to communicate with other NGOs or any other stakeholders in the field.

9. *Sphere handbook support procedures*

CITRINE helps in following best practices by using a checklist.

AMI comment: CITRINE aims at making the procedure consultation quicker and more effective.0

Discussion

CITRINE allows a full overview of a disaster scenario, giving access to organised, useful and up-dated information that will help

NGOs in the decision process of intervention. It is extremely important that the humanitarian aid provided by European NGOs becomes more coordinated and consequently more effective. Under this perspective, CITRINE allows NGOs to have a direct contact with EU Agency for coordinating humanitarian operations, from the moment the disaster occurs to all the aid process.

CITRINE allows the definition of all the humanitarian services to be provided according to the real needs in the field. It helps in terms of preparation and continuation whilst in the field and in localising and identifying missing or deceased persons found.

CITRINE supports the exchange of information between NGOs headquarters and their teams in the field, reporting what has been done and what still needs to be taken care of.

CITRINE helps in optimising resources and tasks in a refugee camp and to assure that any essential humanitarian service will not be missing.

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Disaster Preparedness & Response: A Challenge for Hospitals in India

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Introduction

The Asia-Pacific region where India is located geographically has experienced 60 percent of the world's natural disasters. India is located within the Himalayan belt which is one of the most active seismic regions of the world. The Sikkim earthquake of February 14, 2006 impacted the southern districts of Sikkim, India and represented the third significant earthquake this region had experienced in the past 50 years. A review of the record of disasters worldwide found India had the highest number of individuals affected by disasters in the world between the years 1966-1990 reporting 1,552 million individuals. India reported 216 separate disasters between the years of 1966-1990. When India was compared to other developing countries for this same period, India ranked second for experiencing the most disasters in the world. India ranked ninth out of the top twenty countries with 91,400 deaths during 1966-1990. More recently, India reported experiencing 18 disasters during 2007 (Noji, 1997) (International Disaster Database, n.d.).

Since a high rate of natural disasters is projected to continue and/or increase in India, all health care facilities need to create, practice and implement efficient and effective disaster response planning to provide an adequate medical disaster response (Noji, 1997), (Kaushik et al., 2006), (Dara et al., 2005). In India, health care is primarily a state function with the central government involved mainly in policy and specific disease control programs. While there are formal private sector medical care facilities and informal sector practitioners, the level of care varies. Regulatory problems for India include no database of private providers, no ability to enforce regulations and a lack of resources for regulatory bodies (Merson et al., 2006). Thus, attention to disaster preparedness in India needs to include both public and private sector hospitals.

Thesis

India has been cited in the world as "one of the worst affected countries in terms of disaster" (Metri, 2006, p.621). Continuous improvement of medical responses by healthcare facilities and government agencies is critical to reduce the impact of natural disasters on citizens. The purpose of this paper will focus on hospitals responding to disasters; however, "hospitals" are used throughout the paper in a general way to reflect any health care facility that would be in a position to provide medical care during and after a disaster. In describing disasters, the authors elected to focus on earthquakes given the frequency of occurrence, and the high mortality and morbidity rates reported following this natural disaster.

Applications

"Hospitals have always been an important link in the chain of disaster response and are assuming even more importance as advanced pre-hospital care capabilities lead to improved survival-to-hospital rate" (Dara et al., 2005, p.S3). Individuals in disaster medicine reported the need to improve the ability of health care facilities to rapidly respond to a disaster and for professionals to coordinate activities of multiple agencies. This report also urged hospitals in India to incorporate "surge" capacity in their planning. A relatively small number of injured persons can create a surge and overwhelm the normal capacity of a local health care facility even if the facility is not damaged by the earthquake. When health care facilities plan for an effective medical response following a natural disaster such as an earthquake, it is important to be familiar with types of injuries and illnesses

that have occurred during past disasters. A study by Jain et al. (2008) found casualties after the 2001 earthquake in Gujarat, India to be 250,000 injured people.

The preparedness and response capacity of the health care facilities were evaluated by Dr. Rannveig Bremer following the January 2001 earthquake in Gujarat, India. Bremer's (2003) findings indicated "substantial deficiencies in the existing health care system available in this region added to the severity of the disaster" (p.370). Bremer's analysis found efficient coordination was lacking, and policies on the delivery of disaster relief had not been developed.

The earthquake of 2001 in Gujarat, India demonstrated the ability of a natural disaster with rapid onset to shake the "lifeline and health system of about two-thirds of the population of India's Gujarat state" (Nanda, 2008, p.1). An assessment of the impact of this natural disaster found the "earthquake claimed more women and children as victims and resulted in 14,000 deaths and thousands injured, maimed, or rendered homeless and destitute" (Nanda, 2008, p.1). Most foreign field hospitals did not arrive in Gujarat until five to seven days after the earthquake occurred. This predicable lag in international support generated a huge surge locally in medical demand for the first week. Only one of the two major hospitals still functioned without critical structural damage after the earthquake. Also a temporary hospital was established by private and government doctors from nearby areas and tent field hospitals were provided by the Indian army. Completing an assessment of medical disaster response following the earthquake, Bremer (2003) and Nanda (2008) recommended that effective disaster planning and coordination between facilities and organizations would have improved the Guijarat earthquake post-disaster medical response.

A further assessment completed by Roy et al. (2002) of the Gujarat earthquake supported the importance of local doctors from secondary and primary health centers in the buffer region to provide ambulances and limited supplies. While emphasizing the importance of local medical staff in response since "outside medical assistance arrived too late for immediate care" (Roy et al., 2002, p.193). Investigators emphasized the lack of formal orthopedic care. Since crush injuries are reported as a major cause of death from those injured following an earthquake, providing adequate and prompt care for "crush" injuries is critical in the prevention of deaths (Roy et al., 2002). Roy and his colleagues found that the early discharge of those injured and the resistance of patients to be transferred to tertiary hospitals far away from the patient's relatives contributed to higher post-operative complications from earthquake injuries (Roy et al., 2002).

Speed in providing effective emergency medical services and health care within the first 24 hours following a disaster is critical to minimize deaths and permanent disability following a natural disaster such as an earthquake. The heavy demand placed on local hospital services for immediate disaster medical care demonstrates the need for every hospital to be prepared to handle an unpredicted surge in workload. Hospitals must be prepared prior to a natural disaster occurring to have an adequate medical response when the disaster strikes (Mehta, 2006).

The Indian government took action to enhance national and state level responses addressed by creating a National Response Plan. A national disaster planning effort created the National Disaster Management Authority that requires each state in India to establish a Disaster Management Authority and district disaster management committees. Also, the Ministry of Health in India has initiated a process to assess existing gaps in the management of disasters and issued policy guidelines to improve the disaster management system. To improve disaster response, the health sector of the national Indian government also has initiated support for mobile hospitals, specialized search and rescue medical teams, and building capacity for the management of mass casualties (Kaur,

2006). The primary responsibility for disaster response in India is similar to the United States and is at the state level. Additional responsibility for disaster coordination is at the national level. A National Crisis Management committee was created in 2005 composed of high ranking India government officials and coordinators to implement disaster response measures (Dara et al., 2005) (Kaur, 2006).

However, a report authored by USAID in 2006 reported individual states within India with limited resources still lacked state level plans. The shortcomings focused on delayed response, lack of resources to implement a mass evacuation, failure to keep an essential inventory of medicines and life saving equipment in "ready stock," and a lack of coordination among government departments. This same USAID publication (2005) documented recent case studies of disasters. This review found operating procedures to provide relief following a disaster were in some cases "non-existent." An additional study by Metri (2006) discussed methods to improve disaster mitigation and management and reported community awareness and disaster management effort to be "poorly coordinated."

Findings

In this section attention will be given to measures that would be beneficial to hospitals in responding to disasters. However, hospitals are valued resources in a community and medical care personnel need support from other service and public health workers to adequately address human needs during a disaster. Based upon a collective response to disasters, the authors have selected to focus on literature describing the Indian government's response, accreditation standards for hospitals, training needs, and the use of check lists to determine response capacity.

The impact of a lack of adequate disaster planning by health care facilities and government will impact disproportionately those individuals who are the most vulnerable following a disaster which include children and the elderly. Kaur's (2006) work based upon evaluating the responses of the local health care facilities, state, regional and national governments to past natural disasters in India found the following factors impacted the effectiveness of a disaster response:

- Poor coordination at the local level and the lack of an early warning system
- Very slow response times
- Limited number of trained and dedicated clinicians
- ·Lack of a systematic search and rescue system and equipment
- Poor community empowerment and participation

These factors have contributed to the poor response from disaster relief and health care facilities to past disasters in India according to professionals associated with the Ministry of Health and Family Welfare of India.

The national institutional framework for health policy and coordination was created by the Indian government to strengthen the ability of the state and national governments of India to support an effective relief and emergency medical response to disaster. This framework did not require each health care facility to create, practice and maintain an up-to-date disaster medical plan for each facility. Although the federal government established a national framework plan, specific actions must still be taken by each health care facility in India to adopt and implement disaster medical plans. Thus, improvement could be evident in the medical response capacity of each health care facility (Kaur, 2006).

Accreditation Standards

National accreditation systems have been used successfully to provide needed impetus for health care facilities to maintain and practice up-to-date disaster/emergency plans. To assist medical care personnel with

critical disaster situations, it is helpful to know that accreditation standards provide guidance to those responsible for maintaining accreditation standards for hospitals.

Knowledge of the availability and quality of trauma-care systems in different regions of India is critical for those planning to respond to the increase in injuries following a natural disaster. Unintentional injuries remain a major public health problem in India. An assessment by Joshipura et al. (2003) reported, "The Government of India has failed to recognize it (injury) as a priority." (p.686). It was also reported in 2003 that trauma center access in India varies by state, region, wealth of a community and population even in non-disaster periods. Since "crush" injuries are one of the primary health problems following an earthquake, a medical disaster response plan must address the increased demand for trauma care and surgery during a disaster surge (Joshipura et al., 2003).

In addition to increasing access for potential victims to trauma medical services, it is important for health care facilities to address the need for maintaining quality at each trauma center. The effort to accomplish this consistency in quality should be addressed through the development of national accrediting system for health care facilities. A study found that "No mechanism for accreditation of trauma centres and professionals exists" in India (Joshipura et al., 2003, p.686).

In many developed countries, including the United States, hospitals are required to have an emergency/disaster response plan as a part of the requirements for accreditation. In the United States this accreditation process is operated by the Joint Commission on Accreditation of Healthcare Organizations (JCAHO). However, as late as 2006 India, like many other countries, had "no statutory body to regulate and accredit," hospitals (Mehta, 2006, pg. 89).

In May 2008 it was reported by Sharma et al. that only a few hospitals in India have sought and received accreditation for their services. This reported group included five hospitals and several medical institutes who had received accreditation from the Joint Commission International (JCI). The international organization JCI is affiliated with the leading accrediting agency JCAHO which is focused on health care quality in the United States. Sharma et al. (2008) reported that Delhi-based Escorts Hospital was accredited by the British Standards Institute.

An accredited program contributes to a viable disaster medical response. In 2008 one group of analysts provided the following assessment, "The attitude of Hospitals toward quality certification [accreditation] is very cold," (Cheerukara & Manlel, 2008, p.375). This statement was made at a May 2008 professional conference concerning medical care quality and the need for improvement. Thus, the Quality Council of India, which "operates a national accreditation structure and obtains international recognition for its accreditation schemes," remains challenged to reach a goal of having a majority of health care facilities in India nationally accredited (Sharma et al., 2008 p.467).

Checklist to Record Response Capacity

While accreditation may be too involved for smaller hospitals to undertake, a disaster capacity assessment may be accomplished through the use of a check list. In countries without a strong hospital accrediting system, a check list or a disaster training program has been implemented. The check list allows for the uniform documentation of a health facility's disaster response capacity. While check list criteria have been generated by agencies, the following ten evaluation criteria developed and used for hospitals in Nepal provide an overview of the main areas that should be addressed by a check list. The criteria provided here were generated by the World Health Organization's Emergency and Humanitarian Action Team (Emergency and Humanitarian Action Newsletter, 2006).

The criteria categories used to evaluate a health care facility's capacity to provide medical care services following a disaster included:

- Current Disaster Planning Strategy
- Bed Capacity
- Surgical Capacity
- Blood Transfusion Resources
- Supplies of Medicines and Equipment
- Staff Availability
- Staff Training
- Communication Facilities
- Transport Availability
- Disease Surveillance and Control

When a survey tool was designed using the criteria, the tool was reviewed and field tested by an epidemiologist from the London School of Hygiene and Tropical Medicine. The Emergency and Humanitarian Action group chose to implement the data collection project in Nepal. The project was designed to provide a national perspective on the health care system's disaster medical response plan in Nepal. A similar project could be used to gather information on the medical response capacity of hospitals in India (Emergency and Humanitarian Action Newsletter, 2006).

Disaster Response Training for Health care Workers

Check lists can focus on many aspects essential to medical care response; however, the persons delivering care are critical responders to ensure injuries are reduced and lives are saved.

Following the 2004 disaster response to the tsunami in Sri Lanka, an assessment of post-disaster health care services by Wickramasinghe, et al. (2007) identified the need to provide targeted training to prepare health care workers for future medical disaster responses. This group identified "the development and implementation of a disaster management course for healthcare workers" (p. 765) as a priority to improve medical disaster response. Disaster medicine physicians promote disaster education and training as one of their primary professional roles and can be effective advocates to ensure disaster preparedness training is implemented (Dara et al., 2005).

The International Strategy for Disaster Reduction, The World Health Organization and the World Bank partnered with governments, organizations and individuals worldwide to raise awareness through the "2008-2009 World Disaster Reduction Campaign." A critical component of the campaign is supporting the need for "preparing and training the health workforce to act in emergency situations" (United Nations, 2009), (p.na).

Experience from the October 8, 2005 earthquake that struck Pakistan illustrated the lack of preparation by final-year medical students to provide the medical response to a disaster. "…we were entirely unprepared for the task of treating casualties of the Kashmir earthquake—we had not had any disaster management training or exposure to real-time emergency situations" (Sabri and Qayyum, 2006, p. 1452). These medical students were quickly confronted with challenges associated with search and rescue, unsupervised emergency care for patients, personal emotions from viewing the rubble and human suffering, prioritizing medical attention, managing children's injuries and the obstacles associated with gender issues (Sabi and Qayyum, 2006). Ofrin and Salunke (2006) have cited the importance of using training and regular drills to build capacity for medical disaster response. These challenges and others need to be included in the curricula that is used to train medical personnel and hospital staff to respond in a disaster. Additionally, any training effort for medical and hospital personnel needs to incorporate effective communication skills.

Discussion

There is a need for hospital and other health care facilities to create an effective response capacity for earthquake disasters. This can be accomplished through preparing and

practicing disaster plans, participation in accreditation processes and by conducting training for hospital personnel.

Local medical personnel who typically practice outside the hospital need to practice disaster response in collaboration with their hospital counterparts. These drills should be conducted using available health care facilities and by using alternate locations as practice sites. This second action is necessary because medical building structures can be rendered unsafe or destroyed by an earthquake.

The earthquake challenges facing India are not unique. Rather, the global community is positioned to share best practices with nations affected by earthquakes. India is making progress in disaster response; however, issues pertaining to hospital accreditation, training curricula on disaster preparedness, qualified personnel, adequate resources including health expenditures for disasters and assessment of response capabilities are universal needs. Governments are in a positioned to provide leadership but it takes collaboration among public and private health care sectors to protect and care for populations affected by natural disasters. Emergency preparedness is a universal global need.

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Turkish Disaster Time Line: Is The Past Prologue?

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Introduction

Throughout the world, emergency management planners and practitioners have been busy putting the pieces together in terms of identifying what went wrong after major disasters that devastate their economy and the society as a whole. Not only emergency response, but all phases of emergency management –mitigation, preparedness, response, and recovery- are put under test in such significant events. Over the last several decades, Turkey witnessed a significant number of natural and man made disaster events that posed major challenges to the government, nongovernmental organizations (NGOs) and the society as a whole in terms of loss of life, property, and economic distress. This paper discusses a systematic methodology that would help identify focusing events that shaped Turkish emergency management history, and understand their policy ramifications. The method was developed in an earlier study conducted by Claire Rubin, William Cumming, and Irmak Renda-Tanali. The earlier study was first conceived in year 2000 and was later developed, maintained and has been made available for researchers and practitioners via a website and hard copy charts since then with updates (see (The Disaster Time Line) www.disaster-timeline.com). Over the years, with much input from practitioners and policy makers in the field, these "Disaster Time Line charts" were refined and updated. The focus of these charts is the history of major disasters in the United States. The time line charts offer a multi-decade history of disasters and their outcomes in terms of legislation, regulations, organizational changes, and policy and program changes. Over 20,000 copies of the charts have been distributed in various conferences and other gatherings about emergency management, and countless number of copies of these charts has been downloaded from the website by various researchers, students, policy makers, practitioners and other people. The charts have proven to be useful to those who wish to understand the policy implications of events that shaped the U.S. emergency management system. Same method was used to depict the history of Canadian emergency management also. These authors' intention is that Turkey's Emergency Management System can be studied using the time line chart methodology.

This paper introduces a systematic overview of the Turkish Emergency Management System beginning from the early decades of the modern Republic until present. This paper will first discuss the methodology used in creating the Turkish Disaster Time Line chart and then discuss the logical relationships identified between focusing disaster events and their causal relationships to policy outcomes. The authors relied primarily on government sources and scholarly articles to construct the cause and effect relationships and documented each. The study can be useful to practitioners, researchers and students of emergency management in understanding the historical and policy background of the current systems in place in terms of managing large scale national disasters.

Theory and Method

Major Disasters as Focusing Events

The graphic displays of boxes and arrows allow reader to see patterns and gaps in terms of major focusing events and policies over time. As indicated above, the chart intends to provide a factual, neutral, and sequential set of facts that may facilitate analyses and understanding of emergency management of a specific nation. According

to (Rubin, 2006) and Rubin, Cumming, Renda-Tanali and Birkland (2003) focusing events have some, but not necessarily all, of the following characteristics:

- Large Magnitude. Natural disasters, such as catastrophic earthquakes, hurricanes and tsunamis, are likely to affect a broader area than is true of industrial/ technological disasters or terrorist events. For example, the Marmara Earthquake accounted for nearly 90% of the death toll and more than 95% of the financial toll that was created within the past 15 years by earthquake disasters.
- High Visibility. Again, the 1999 Marmara Earthquake struck the major industrial hub of Turkey which is also one of the most populous areas with higher income and education level and this feature instantly captured media attention. Another obvious example of high visibility from international experience is the 9/11 targeting of the Pentagon near Washington, D.C., and the World Trade Center in the heart of New York City's financial district.
- Location of Incidents. Some locations are less prepared for high-impact events, with a greater likelihood of poorly managed, ad hoc response and recovery. In the past, with a few exceptions such as the 1934 and 1992 Erzincan Earthquakes, earthquakes occurred in rural communities composed of mortar and brick homes resulting with fever casualties rather than in densely populated regions where multi-storey buildings are common and collapse of reinforced concrete buildings are potentially more hazardous.
- High Impact. If the duration and impacts of the event are widespread and damaging to physical, economic, environmental, social, and political structures, the disaster is more likely to become a focusing event. Besides the Marmara Earthquake, Hurricane Katrina of the U.S. is an example of a high impact event, particularly for the city of New Orleans.
- Surprise. When no warning is received, like a sudden jolt of an earthquake in the middle of the night or a sudden onset of a flood, people are caught by surprise. Surprise was a major factor for both the Marmara Earthquake which occurred around 3 a.m. in the morning when most people were in bed and asleep; and the 2001 World Trade Center and Pentagon attacks, in which terrorists used commercial airliners as weapons of mass destruction.
- Received a National Disaster Declaration (or likely to be eligible for one). In constructing the disaster time line chart for the U.S. events, this process was used as a measure of the magnitude and impacts of a disaster event, using the federal government's threshold for determining which events warrant federal assistance. In Turkish experience, the involvement of the central government is far more due to the non-federalist government. Federalism is different in that state and local governments have far more autonomy than the federal government in countries like the U.S. and Germany unlike countries like Turkey where central government bears far more legislative authority and response capability.

Event-Driven Outcomes

Certain focusing events drive changes in laws, regulations, systems and practices. This was typically observed while constructing and studying the disaster time lines developed for the U.S.

A group of categories of outcomes was used in order to systematically analyze the Turkish disaster events and their ramifications in the national emergency management system. It should be noted though, that these authors are at the preliminary stages of a much comprehensive systematic study about the

Turkish Emergency Management System. The focusing events are analyzed in terms of the following outcomes: Statutes, Governmental Decrees, Bylaws, Cabinet Decisions (i.e. Cabinet Decrees or Law Amending Ordinances), Regulations, Circulars/ Communiqués, Major Plans, Major Reports/Documents

The study described here begins the documentation and analysis of major defining disaster events and their policy outcomes in terms of essential emergency management infrastructure. The outcome of this study will enable researchers and policy makers to compare and contrast the authorities, programs, plans and systems used for the three categories of disasters in Turkey: natural, industrial/technological, and human induced. Like the disaster time line studies conducted earlier (Rubin, Cumming, Renda-Tanali, & Birkland, 2003), the objectives of the Turkish Disaster Time Line study are to: (a) stimulate thinking by researchers and practitioners, (b) identify gaps in legislation and other essential emergency management infrastructure, and (c) identify long-term research needs concerning the Turkish emergency management infrastructure. The systematic and visual nature of this study also enables comparative studies across nations and jurisdictions.

The causal relationships are inserted on the chart based on supporting literature identified in scholarly journal articles, governmental documents regarding laws, decrees, cabinet decisions, regulations, circulars, communiqués, and reports.

Results: A look back on Turkey's Focusing Events and Their Outcomes

The Turkish Disaster Management policy framework has evolved as a reaction to frequent occurrence and losses by natural disasters, particularly devastating earthquakes over in the modern history of Turkey (Mancebo & Renda-Tanali, 2009). At the national level, frameworks for dealing with natural hazards and those that involve civil conflicts and terrorist attacks have been separate. Active military presence in the Turkish government system provides the Staff special powers to deal with the latter. However, declaration of state-wide disasters is provided in the same law.

There are governmental studies and a number of recent journal articles and reports about the history of Turkish Emergency Management framework. One detailed chronological history that examines the Turkish Disaster Management System as related to earthquakes was conducted by a parliamentary investigation commission that was formed immediately after the Marmara Earthquake in 1999 (TBMM, 1999) -- note that although the two terms differ slightly, for purposes of this study disaster management and emergency management are used synonymously-- a similar effort to the congressional hearing reports prepared after a major incident in the U.S. The TBMM report outlines the Turkish Disaster Management history in 3 distinct phases: (1) before the year 1944; (2) between the years 1944 and 1958; and (3) the year 1958 and beyond. This approach has been adopted along with the inclusion of a fourth period, by other researchers as well (See for example Yılmaz (2000), Göktürk & Yılmaz (2001), Çorbacıoğlu & Kapucu (2006)), since as will be discussed later, the years 1944, 1958, and 1999 mark major policy changes in the emergency management structure of Turkey. While time and space limitations prohibit the provision of an in-depth analysis regarding a comprehensive history of emergency management in Turkey, in this paper, some of the highlights of focusing events and their policy ramifications about each period that link disaster events and their ramifications, are discussed below and identified causal links are marked using arrows and boxes on the visual time line. Reference is provided in separate figures for each period:

1923-1944 period

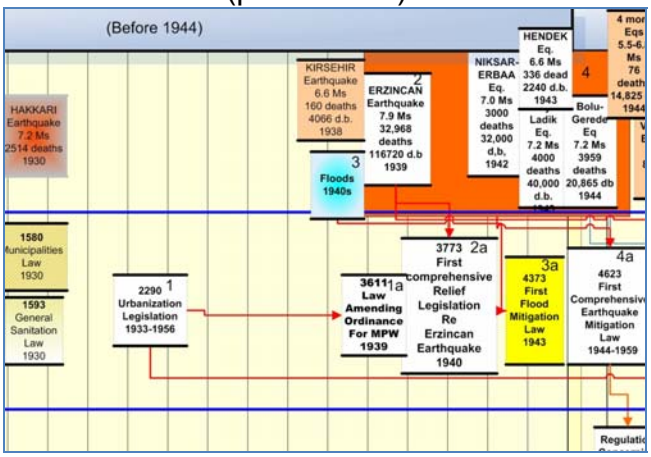
This period encompasses the formation years of the Turkish Republic, where departmental level organizations were first created, such as the Ministry of Construction

and Settlement, later Ministry of Public Works that was tasked with developing and controlling urban development policies. This period also marks the formation of urbanization legislation (Law No. 2290: enacted 1933) (See Figure 1, box #1) that required more modern practices of the formation of urban areas rather than haphazard practices observed in the past (TBMM, 1999), (Yilmaz, 2000). This legislation formed a basis for the Development Law (See Figure 3, Box #11) that was introduced later, which concerns settlement practices that affect disaster mitigation. As a result of recurring earthquakes and losses of lives and property, recognizing the need for technical specialization for pre-disaster mitigation, another major legislation was issued by the parliament that concerned the formation of a departmental unit within the Ministry of Public Works that was tasked with aiding with the technical aspects of disaster mitigation to the Turkish Red Cross and the Ministry of the Interior (Law No. 3611:1939) (See Figure 1, Box#1a) (TBMM, 1999).

The 1939 Erzincan earthquake that resulted in more than 30,000 deaths pressed the parliament to issue its first comprehensive relief legislation (Law No. 3773: 1940) that specified the financial, housing, and family aid for victims of the disaster (Simsek, 1998), p.51) as cited in (Yilmaz, 2000) (See Figure 1, Box#2 & 2a). This legislation prompted the later politically-engrained and socially expected prolonged practice of the issuance of comprehensive relief legislation as a reaction to large scale devastating disaster occurrences in the Turkish Emergency Management arena (Mancebo & Renda-Tanali, 2009). As a separate matter, continuous floods in the early 1940s led the legislative branch to introduce the first flood mitigation legislation (Law no. 4373) in 1943 (Çorbacioglu & Kapucu, 2006) (See Figure 1, box#3 & 3a).

The main characteristics of this pre-1944 period are: (a) the disaster mitigation policies developed in this period were not harmonious with the nation's settlement, urbanization, and industrialization policies (Turkiye'de Deprem Tehlikesi ve Zararlari Azaltmaya Yonelik Calismalar ve Alinmasi Gereken Onlemler Hakkinda Rapor, 1980) (p.4), (b) during this period, no actions were taken to mitigate disaster hazards (TBMM, 1999, p.2), and (c) no effective policies were developed that were geared towards hazard risk mitigation, preparedness, rescue and reconstruction activities (Ergünay,1999, p.96) as cited in (Yilmaz, 2000).

Figure 1- Disaster Time Line Between Years 1923 and 1944 (partial view)



1944-1958 period

Five destructive earthquakes that started with 1939 Erzincan Earthquake (see Figure 2, box #2) and continued until 1944 with Niksar-Erbaa, Adapazarı-Hendek, Tosya-Ladik, and Bolu-Gerede earthquakes (see Figure 2, box#4) cost more than 40,000 lives, injuring 75,000 people, and demolishing 200,000 homes and businesses in about 5 years. Thus, the year of 1944 marked among legislators the first awakening that mere relief legislation did not help prevent or lessen disaster losses but rather provided further incentives to build new settlements on top of ruined ones (TBMM, 1999).

Thus, Law No. 4623 (1944) (see Figure 2, box #4a) the first comprehensive mitigation law, titled "Measures to be taken before and after ground shaking" mandated three important provisions: (a) identification of seismic risks in Turkey; (b) a nationwide study that determined the geophysical formation of new settlement zones and hazardous zones through a collaborative

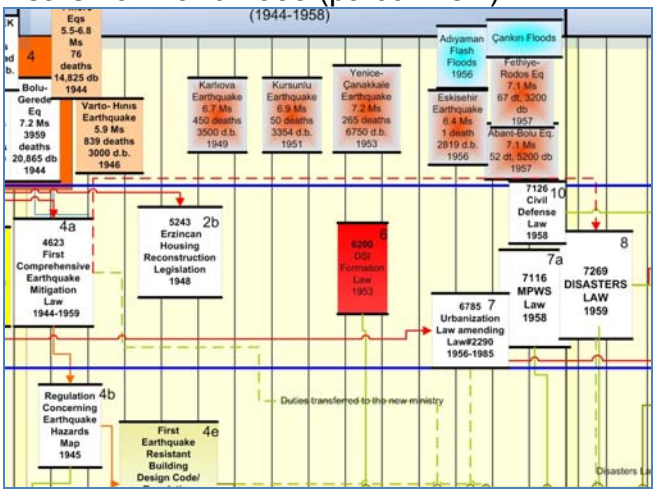
effort with various engineering schools of Turkish universities; and (c) preparation of response and relief programs in advance ((TBMM, 1944), p.1213-1221), (TBMM, 1999, p.13).

Law No. 4623, with its provisions, was comparable to the then-laws of Japan (1924), US (1933), and Italy (1940) which elevated Turkey to the 4th nation that had legislation in place dealing with disaster loss mitigation based on scientific studies (TBMM, 1999). Through this effort, the first national earthquake zoning map was produced in 1945 (See Figure 2, box#4d), along with the first earthquake resistant design code (see Figure 2, box 4e) for buildings, which was modified numerous times since then (TBMM, 1999).

With the Law No. 4623, the central government was tasked the first time before an earthquake occurred, such as identifying public structures that needed retrofitting (TBMM, 1999) (Yilmaz, 2000). However, according to (Ergunay, 1999) Law 4623 was deficient mainly because it did not cover all hazards and did not necessarily address permanent settlement practices. This deficiency was later fulfilled by the issuance of Law No 7269 (See Figure 2, Box#8).

The mid-1950s marked the mass urbanization as a result of massive industrialization of the country. With the shortcoming of existing legislation and lack of long-term strategic settlement policies, hastily built structures on hazardous zones spawned urban areas rapidly with disasters waiting to happen. Realizing the threat, Law No. 6785 (1956) (See Figure 2, Box#7) was issued that dealt with urban development practices based on the principle of avoiding hazardous zones and tasking the Ministry of Public Works to carry out the mandate (TBMM, 1999) (Ministry of Public Works and Settlement). Law No.6785 supersedes Law No.2290 of 1933. (See the link between Box#1 and Box#7) A series of relief and reconstruction legislation to aid the victims of earthquakes were also issued within this period of time (TBMM, 1999).

Figure 2- Disaster Time Line Between Years 1944 and 1958 (partial view)



1958-1999

The year 1958 marked a major improvement with the assignment of a departmental level duty in developing disaster mitigation policies for urban planning. With the organic Law 7116, a separate ministry, Ministry of Public Works and Housing was created whose responsibilities included creating disaster mitigation policies along with developing long-term solutions to housing and settlement problems for regions, urban areas, towns, and villages (See Figure 2, Box#7a) (TBMM, 1999).

Another milestone was the issuance of Civil Defence Law (No. 7126, 1958) that included a mandate tasking Ministry of Civil Defence (later became General Directorate of Civil Defence under the Ministry of Interior) with response and rescue activities in the aftermath of disasters involving “enemy attacks”, natural disasters, and wide scale fires (See Figure 2, Box#10) (ITU, 2002).

The most major improvement in terms of disaster legislation was the issuance of the Disasters Law (No. 7269, 1959) (See Figure 2, Box#8), which is still in use with modifications today. This law has a cumbersome name as “Law Concerning the Precautions and Help to be Maintained Against Disasters Effective on Public Life” combines discrete laws under one law (Balamir, 2002). The detailed issues for emergency planning and organization were left out under Law 7269 (Çorbacioglu &

Kapucu, 2006). Thus, this law later received several amendments seeking each time additional funding and remediation efforts due to frequent and destructive earthquakes and flooding events (1968/1051, 1981/2479, 1985/3177). Two important features of Law 7269 are that (a) it encompasses other types of hazards other than the earthquakes such as floods, landslides, rock falls, fires etc. and (b) the creation of a Disasters Fund outside the state budget that avoids the extraordinary appropriation that had been released separately after each and every major disaster (Yilmaz, 2000). MPWS became the major actor in the implementation of disaster law 7269 through its General Directorate of Disaster Affairs (GDDA). The GDDA and its Earthquake Research Department were founded under MPWS in 1964 and 1971 respectively. The GDDA was specifically concerned with nation-wide disaster management. The failure to coordinate organizations and resources in a bureaucratic structure driven by hierarchic coordination, the policy maker shifted the responsibility of post disaster operations from Ministry of Public Works and Settlement to the Prime Ministry in 1996 (See Figure 3, Box#21) (Çorbacioglu & Kapucu, 2006). To this date, GDDA retains its function as the main reconstruction agency.

Concerning man-made hazards, in 1982, a law concerning nuclear energy production and distribution, control, and securing its use, protecting and ensuring the physical security of the nuclear production facilities, was passed and is executed through the Turkish Atomic Energy Council which is still in effect today (ITU, 2002) (See Figure 3, Box# 23).

The state declaration of a disaster, or "extraordinary situation" is tied to a law (Law No.2935) issued in 1983 (See Figure 3, Box#24). The authority vests with the Cabinet. The law concerns natural disasters, pandemic event, heavy economic depression, and use of violence threatening free democratic regime, and personal rights and freedoms (ITU, 2002). According to (Yilmaz, 2000), the legislation needs clarification in terms of how personal rights and freedoms will be curbed and the powers will be exercised in terms of extraordinary administration.

In 1985, the Development Law (Law No.3194) that superseded Law No. 6785, was issued of which the authority vests with the MPWS. See the discussion regarding this law below (TBMM, 1999) (See Figure 3, Box#11).

1999-Present

Adding to the momentum initiated by the 1999 Kocaeli (or the Marmara) and Düzce Earthquakes, dozens of laws, decrees, law-amending ordinances, and by laws have been issued that sought improvement to emergency management operations and organizations (See Figure 4). In 2000, the General Directorate of Civil Defense for Rescue and Emergency, within the Ministry of Interior was created (See Figure 4, Box#28). A major step in improving intergovernmental coordination and communications in disasters after the lessons learned from the Kocaeli earthquake was the establishment of the Turkey General Directorate of Emergency Management, (TEMAD) (law amending ordinance 583/1999 and 600/2000) (See Figure 4, Box #22) within the Prime Ministry. Modelled after the United States Federal Emergency Management Agency, TEMAD directly reports to the Prime Minister's office. However, this organization has not been fully activated due to lack of resources and lack of requisite authority in order to act as a coordination agency.

The introduction of the Decree of Compulsory Earthquake Insurance (CEI) (No: 587, 1999) which authorized the formation of a Natural Disasters Insurance Administration (DASK) within the Treasury to administer the operation of the Turkish Catastrophe Insurance Pool, terminated the statutory authority determined by the Disaster Law for compensation of losses of disaster victims (See Figure 4, Box#17). This can be considered as a major ailment to the existing disaster assistance policy,

since the unconditional commitment to help every disaster victim whose home suffered damages from a disaster apparently have been reduced to only those who had their property insured. It also leaves lesser room for political manoeuvrings (Balamir, 2002); (Gulkan, 2002).

At the state level, the main actors that are tasked with emergency management are the Turkish General Directorate of Disaster Affairs (GDDA) (an agency level directorate within the Ministry of Public Works and Settlement), Civil Defense General Directorate (CDGD) (within the Ministry of Interior), the Turkish Red Crescent (a semi-state humanitarian organization), and the General Directorate of Emergency Management (TEMAD). In addition, the organic laws of several ministries including those that deal with transportation; social welfare; interior; energy and natural resources; industry and trade; and forestry have responsibilities at various stages of disaster operations (Keles, 2003). Responding to major industrial accidents such as hazmat, oil spills, and explosions involve related ministries such as the ministry of transportation, and/or energy and natural resources, depending on the size and nature of the event. A multiplicity of responsible authorities and redundancy of their responsibilities adds too much complexity and chaos to the system. The current bureaucratic system in emergency response does not allow flexibility of response that would allow adaptation to the dynamic and changing nature of disasters (Keles, 2003) (Çorbacioglu & Kapucu, 2006) (Mancebo & Renda-Tanali, 2009). Lawmakers have proposed a draft legislation to the Head of the Grand National Assembly in June 2008 to target this obvious problem. According to this major reorganization legislation, TEMAD (within the Prime Minister's Office), CDCG (within the Ministry of Interior), and GDDA (within the Ministry of Public Works and Settlement) will be disbanded, and a new Emergency Management Agency will be established. This Agency will consist of the Office of Planning and Preparation, Response Office, Recovery Office, Civil Protection Office, Earthquake Office, and Administration Services Office. The legislation also calls for the establishment of provincial disaster and emergency management directorates that will work towards all-hazards planning and response activities. Another formation that is proposed is the formation of a Emergency Management Higher Council that would consist of permanent undersecretaries of the involved ministries as well as the Turkish Red Cross. The new organization would be better suited to cope with the cyclical nature of emergency management that do not necessarily follow a linear fashion (mitigation, preparedness, response and recovery) (Tum Gazeteler). The details of capital and budget allocation are also in the works. It is hoped that more stringent control mechanisms are exerted in the permissions and use of the resources in spending by multiple local and central authorities.

Figure 3- Disaster Time Line Between Years 1958 and 1999 (partial view)

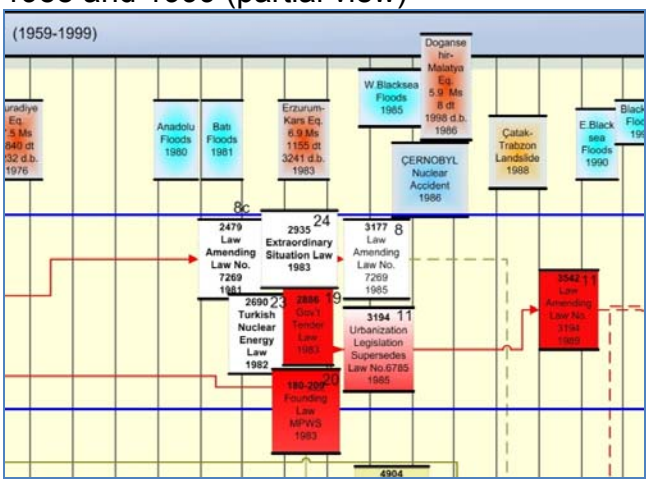
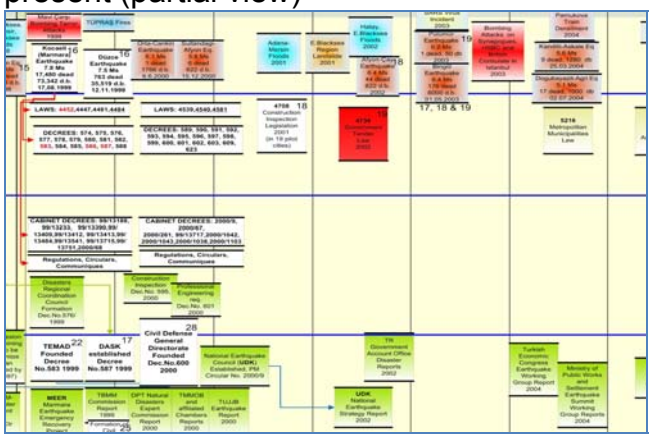


Figure 4- Disaster Time Line 1999 to present (partial view)



Summary of Milestone Events

Table 1 below summarizes the key events and identified linkages to outcomes discussed in the paper. Note that this study is still a work in progress and the table below summarizes only the events discussed in the paper and does not assume to be an exhaustive list. There was no relative ranking of events in terms of severity and outcome. The economic losses of the events are left out of the discussion in this paper due to the unavailability of reliable data except for the most recent events.

Table 1 – Summary of Milestone Events and their Outcomes

Year	Event	No. of Deaths	Outcomes or legislative changes	Source
1939	Erzincan Earthquake	30,000	First comprehensive relief legislation (no.3773, 1940)	Şimşek, 1998; Yılmaz, 2000
1940s	Flooding events		First flood mitigation legislation (no.4373, 1943)	TBMM, 1999; Çorbacıoğlu and Kapucu, 2006
1940-1944	Niksar-Erbaa, Hendek, Ladik, Bolu-Gerede, and 5 more earthquakes*	11,000+	First comprehensive earthquake mitigation law (no.4623, 1944-1955); first earthquake zoning map; first earthquake code (1944)*	TBMM, 1944; TBMM 1999; Yılmaz, 2000; Ergünay 1999
1946-1959	Varto-Hınıs, Karlıova, Kurşunlu, Yenice, Eskişehir earthquakes, Adıyaman and Çankırı flash floods, Fethiye and Abant earthquakes **	880+	Urbanization Law (no. 6785, 1956); Law 7116 creating MPWH in 1958; Civil Defense Law (no.7126, 1958); Disasters Law (no.7269, 1959)**	TBMM, 1999; MPWS, 2009; ITÜ, 2002; Balamir, 2002; Çorbacıoğlu & Kapucu, 2006
1959-1968	Varto, Mudurnu, Pülümür, Bartın earthquakes, Mersin floods**	2600+	Law No. 1051 amending Law no. 7269**	TBMM, 1999; Yilmaz, 2000; Corbacioglu & Kapucu, 2006,
1969-1971	Alaşehir, Gediz, Burdur, Bingöl	2000+	Earthquakes Fund (law no. 1571) created, GDDA Earthquake Research Directorate founded (1971)	TBMM, 1999; Çorbacıoğlu & Kapucu, 2006
1983-1985	Erzurum-Kars earthquakes**	1155+	Extraordinary situation law (no.2935, 1983); Development Law (no.3194) supercedes no.6785	Yılmaz, 2000; ITÜ 2002; TBMM 1999
1999-2001	Kocaeli and Düzce earthquakes	18,200+	TEMAD (no.583, 1999, 600/2000), CEI and DASK (no.587,1999); NEC 8 major laws; 32 major decrees; 13 major cabinet decrees; numerous circulars	Gülkan, 2002; Balamir, 2002; Keleş, 2003, Mançebo & Renda-Tanalı; 2009; Çorbacıoğlu & Kapucu, 2006; www.tumgazeteler.com

*Erzincan earthquake is also a main influence together with the earthquakes of 1940-1944 for the outcomes listed, ** No direct linkages were identified from literature between these disasters and the listed legislation outcomes. However, the disasters preceding the legislation outcomes imply indirect relationship at the very least. A more rigorous breakdown of the events and their linkages may be identified at later stages of the research.

Discussion

From research on historic events, a pattern emerges from those events that cause massive loss of life and property. Catastrophic events such as the Erzincan Earthquakes in 1992, or the Kocaeli Earthquake in 1999 that caused massive loss of life in urban areas, and outstanding property losses, dominate the Turkish Disaster and Emergency Management System and drive changes in laws, regulations, systems and practice. As Rubin (2006) notes, [as observed from U.S. practice] virtually all major laws, executive directives, programs, policies, organizational changes, and response systems result from major disaster events. She goes on to assert that sometimes changes occur in a month or less while other times change may take years or decades which seems to be true for the Turkish practice as well. For example, as discussed above, the Disasters Law (No. 7269) and the Development Law (No. 3194) have been amended many times after major disaster events. The positive changes since the catastrophic Marmara earthquake included those that aimed at greater attention to risk mitigation (e.g. legislations on the improvement of

construction quality), risk transfer (e.g. introduction of compulsive earthquake insurance), and move from one-hazard approach to all-hazards approach, from separate functional approach to all-phases approach (e.g. draft legislation to combine several existing organizations into one ministerial level organization) and changes in response mechanisms. These efforts all are geared towards mitigating the risk of loss of life and property. Turkish government has come a long way from being the healer of a fatalist society. With the aid of positive science and technology as well as advances in organizational management, Turkey is on a path for major improvement in terms of lessening losses of lives, property, and preventing the negative effects on Gross Domestic Product after disaster events, as was the case in past disasters. As we progress along the time line, we observe from the pieces of legislation and the formation and evolution of the government organizations that there is a positive change toward a more systematic approach for managing disasters and emergencies in Turkey.

Although the study outlined in this paper is far from being complete –see some of the events and actions do not have links and may later be eliminated from the chart-, the visual aid as shown here that is supported with factual evidence may help further in identifying the patterns as time progresses along, and aid in policy makers, researchers and the new generations in understanding the political and policy actions in terms of causes and effects and identifying the evolution patterns.

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Crisis Management Mobile Centre

By Ludek Stolba, TTC Telekomunikace, Ltd

Introduction

In the whole world people face up serious threats nowadays. Not only wars, earthquakes, drought but also industrial accidents strike every day. Capital of the Czech Republic, City of Prague in 2008 decided to fully renew existing information system used for Crisis Management. Its territory represents more than 1.2 million of inhabitants and its area is 496 km2. Over 300 thousand people commute to the metropolis everyday. Local authorities requested not only renew Crisis Management Information System in the stationary Operation Centre but also newly build up its mobile part, Crisis Management Mobile Centre.

TTC TELEKOMUNIKACE, Ltd. is perceived as a company with a long tradition of developing and manufacturing telecommunication equipment. This equipment is used in the public networks of telecommunication operators and state organisations both in the Czech Republic and abroad. Because of much experience with a similar communication, TTC was addressed by the Crisis Management Information System supplier to build up Crisis Management Mobile Centre.

Thesis

Basic solutions for Crisis Management Mobile Centre proposal were defined by City of Prague Crisis Management personnel and described in the appropriate documents. All demands were discussed in the analysis phase and our effort was focused, first of all, on:

- learning all about current Crisis Management Mobile Centre (if any),
- learning all about current ICT used in CMMC and its communication infrastructure,
- learning all about current communication infrastructure,
- verifying the facts and feasibility of required solution,
- processing of final solution.

CMMC makes possible internal and external communications between all Crisis Management Personnel, work in the Crisis Management Information System environment, public information systems access and public-relation presentations.

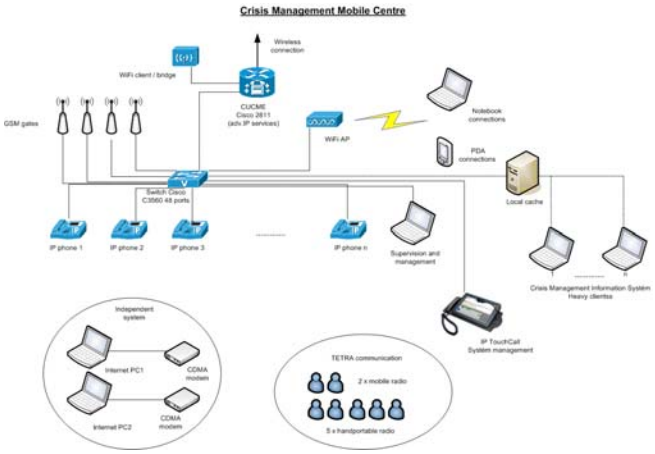
Based on the results discovered during the analysis phase the CMMC was created as a system with the open architecture, designed as a versatile and rugged platform, ready for the future enhancement. Information and communication technology used inside is very easy managed and controlled by CMMC operator.

Applications

As you can see on the picture bellow the CMMC system allows next functions:

- TETRA voice communications via City radio network. CMMC system is equipped by two mobile radios and five handportable radios. TETRA radio communication system is managed from the stationary Operation Centre,
- CMMC system has possibility to access and use information from the City Camera System from all over the City of Prague territory. Quality of pictures depends on line speed of data communication. These pictures are also possible to use during the public-relation presentation given by the local authorities (e.g. mayor),
- on-line access into the Crisis Management Information System environment. This application is accessible via heavy clients to all CMMC personnel,
- on-line access into all information systems of the City of Prague,

- GSM voice communications. Four GSM networks (Telefonika O2, T-Mobile, Vodafone, uFon),
- Internet access. The CMM allows system Internet access via two dedicated personal computers. Because of security reason these PCs are not connected into the local CMMC network (LAN).
- WiFi Access Point. This function allows data communication between the CMMC and Crisis Management personnel outside the CMMC system (e.g. via notebooks and PDAs),
- WiFi client/bridge. This function allows data communication between the CMMC and WiFi hot spots located on the City of Prague territory,
- IP telephony. The CMMC allows access to Crisis Management and PSTN networks.



As a basic medium for data communication among CMMC and stationary Operation Centre was used DVB-RCS satellite connection. It allows 4 Mbps up/downlink transmission rate and full mobility on the whole territory. Between its capabilities belong:

- 99.6% accessibility of connection,
- high readiness,
- monitoring 24/7/365 and helpdesk,
- antenna automatic routing.

Between very important abilities belongs also spatial arrangement. In this case the CMMC was divided into two mutually connected rooms - crisis staff/public relation workplace and technological unit.

Crisis staff/public relation workplace is dedicated as a main workplace. Eleven Crisis Managers can use 11 PCs, 11 IP phones, TETRA radio communication, Internet access and LCD panel for internal need and public-relation presentations.

Core of the ICT system is located in the technological unit. The ICT operator manages all CMMC technologies from here.

Findings and Discussion

Internal security plays an important role on all levels of human life (government or municipal). Crisis Management Information System this role significantly supports. Crisis Management Mobile Centre created by the TTC company offers one of the possibilities how to save lives and property and how to minimize impact of crisis situation on inhabitant's life.

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September 2009

Crisis Leadership in Government forum
2nd September 2009
Canberra, Australia

Discussion will cover the principle features of crisis leadership including how to promote high reliability in the provision of critical services.

http://www.ema.gov.au/www/emaweb/emaweb.nsf/Page/Education_Forums

ANZSOG Annual Conference 2009: Governing and managing in times of crisis
3rd – 4th September 2009
Canberra, Australia

The Australia and New Zealand School of Government's 2009 conference will explore the issue of governing and managing in times of crisis. It brings together public sector leaders and distinguished scholars and offers delegates a rich array of opportunities for discussion and reflection.

http://www.anzsog.edu.au/Events/?Id=85

Seven things you need to know about high reliability management / High reliability management: findings and challenges in control room operations.
7th September 2009
Sydney, Australia

The first of these sessions examines how High Reliability Management differs from crisis prevention and crisis management. The discussion will include the principle features of high reliability management, including how to promote high reliability in the provision of critical services.

The next session looks at how High Reliability Management plays out in the critical services industries and the implications of control room operations for corporate business models and risk management practices.

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Sydney, Australia

This one-day connected forum will provide you with an opportunity to listen to timely and topical case studies on Business Continuity Management and to interact and network with presenters and attendees.

http://www.arkgroupaustralia.com.au/Events-C086BCM.htm

11th Plinius Conference on Mediterranean Storms
7th - 11th September, 2009
Barcelona, Spain

Interdisciplinary forum to improve the understanding of hazardous storms in the Mediterranean. Session topics include the nature and physical processes of extreme events, possible changes in storm behaviour resulting from anticipated changes in climate, advanced techniques to track and predict storms, and relationships between atmospheric and surface processes.

http://gama.am.ub.es/plinius/index.html

Investing in Floodplains for Future Generations
8th – 11th September 2009
San Jose, California

This conference addresses critical issues in floodplain management including new floodplain infrastructure, leveraging local, state, and federal resources, floodplain mapping tools, and improving relationships with community based organizations.

http://www.floodplain.org/conference.php

China-U.S. Conference on Emergency Medical Services
9th – 19th September 2009
Beijing, China

Topics will include: Planning and Preparation, Mass Gatherings, Personal Safety of Providers, Chemical, Biological, Nuclear and Explosives, Special Needs Populations, Incident Management Systems, Mass Decontamination, Training, Search & Rescue, and Medical Assistants Teams.

http://www.globalinteractions.org/2009-program-and-events/2009-EMS.aspx

10th International Conference on Structural Safety and Reliability
13th – 17th September 2009
Osaka, Japan

This conference provides the opportunity for scientists and engineers to share knowledge, experience, and information on structural safety and reliability. Special emphasis will be placed on advanced technologies, analytical and computational methods of risk analysis, damage assessment, social aspects, and urban planning.

http://www.sc.kutc.kansai-u.ac.jp/icossar2009

African Aid Relief and Disaster Management
17th – 19th September 2009
Johannesburg, South Africa

The expo seeks to put aid agencies in touch with suppliers to the UN and NGO market, and provides an insight into the initiatives to address the disaster management challenges in the region.

http://www.fairconsultants.com/

World Conference on Disaster Management Summit Series
22nd – 23rd September 2009
Los Angeles, USA

The WCDM Summit Series is a two day event replicating the Canadian conference dealing with international and regional issues affecting the State of California. The format will consist of Plenary's, concurrent sessions, Advanced Master Workshops combined with Round Table Discussions, Panel Discussions and Networking Receptions with the Sponsors.

http://www.wcdm.org/California/california.html

AFAC/Bushfire CRC Conference 2009: Meeting Expectations
22nd – 24th September 2009
Gold Coast, Australia

The Australasian Fire and Emergency Services Authorities Council (AFAC) Bushfire CRC Conference is Australasia's foremost annual emergency services conference. The theme of the AFAC CRC 2009 conference is 'Meeting Expectations' and will examine the expectations of government, community, industry, emergency services.

http://www.afac2009.org.au/

Disaster Management 2009 – Disaster Management and Human Health Risk: Reducing Risk, Improving Outcomes
23rd – 25th September 2009
New Forest, UK

This conference focuses on the current global health risks and how best to prepare for, respond to and recover from disasters in order to reduce the human health impacts.

http://www.wessex.ac.uk/09-conferences/disaster-management-2009.html

Oil, Gas & Chemicals Safety & Disaster Management - 2nd TIEMS Benelux International Workshop
25th - 26th September 2009
Antwerp, Belgium

The second TIEMS international workshop on "Oil, Gas & Chemicals Safety & Disaster Management" will follow the original idea to bridge a gap between the academic world and the industry the main topics of the workshop will include: storage, transportation, distribution, retail activities, risk analysis, incident investigation, terrorism and security, critical infrastructure, the role of the media, business continuity, etc.

www.tiems.org
Or contact TIEMS.Benelux.2009@skynet.be

October 2009

Crisis Communication for the Public Sector
7th – 8th October 2009
Sydney, Australia

This one-day connected forum with workshops will provide you with opportunities to hear timely and practical crisis communication case studies from the public sector and to interact and network with presenters and attendees.

http://www.arkgroupaustralia.com.au/Events-c091CrisisComms.htm

Fifth European Conference on Severe Storms
12th – 16th October, 2009
Landshut, Germany

This conference covers all aspects of severe convective weather. Session topics include severe weather climatology and hazards assessment, climate change impacts on severe storms and adaptation concepts, and severe storms forecasting, nowcasting, and warning.

http://www.essl.org/ECSS/

10th Annual International Disaster & Emergency Resilience (IDER) Conference & Exhibition
20th – 21st October 2009
Karlstad, Sweden

The 10th IDER is being hosted by MSB (Swedish Civil Contingencies Agency) IDER is the conference and exhibition where best practice for readiness, response and recovery for disasters and major emergencies are identified and implemented.

http://www.iderweb.org/

Symposium on Building Safer Communities—Improving Disaster Resilience
22nd – 23rd October, 2009
Charleston, South Carolina

This symposium commemorates the 20th Anniversary of Hurricane Hugo by exploring changes in coastal construction practices, improved building safety and community resilience, and addressing unresolved building safety and damage reduction issues.

http://www.atcouncil.org/

Emergency services, policy and partnerships: challenges for Australia
29th – 30th October 2009-08-31
Melbourne, Australia

Bringing together local and international experts on emergency services policy and disaster management, this conference will explore the role of policy and partnerships in emergency services management, notably in the context of bushfires.

http://www.public-policy.unimelb.edu.au/fire09/index.html

International Association of Emergency Managers USA 57th Annual Conference and EMEX 2009
31st October – 5th November 2009
Florida, USA

The IAEM-USA Annual Conference provides a forum for current trends and topics, information about the latest tools and technology in emergency management and homeland security. Sessions encourage stakeholders at all levels of government, the private sector, public health and related professions to exchange ideas on collaborating to protect lives and property from disaster.

http://www.iaem.com/events/annual/intro.htm

November 2009

Disaster Risk Reduction for Natural Hazards
4th – 6th November, 2009
London, England

This meeting examines the concepts and processes of disaster risk reduction and stresses multihazard environments and multidisciplinary approaches in natural hazards research. Defining ways to make disaster risk reduction more effective in the future is emphasized.

http://www.ucl.ac.uk/drrconference/index.htm

Civil Protection Forum "Towards a More Resilient Society"
Offered by EU Civil Protection
25th – 26th November 2009
Brussels

The Civil Protection Forum Towards a more resilient society aims to explore the concept of resilience, which is new to civil protection. Climate change is likely to increase the frequency and impact of disasters, and Europe has to be prepared for this challenge.

http://ec.europa.eu/environment/civil/forum2009/index.htm

December 2009

Australian Earthquake Engineering Society (AEER) 2009 Conference
11th – 13th December 2009
Newcastle, Australia

The 2009 AEES conference will be held in Newcastle, New South Wales to mark the 20th anniversary of the 1989 Newcastle earthquake.

http://www.aees.org.au/Conferences/Conferences.html

MORE EVENTS AND INFORMATION ON THE TIEMS CALENDER WWW.TIEMS.ORG

If you would like to publicise your event please email details to:
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