Knowledge-Intensive Fusion for Situational Awareness
Band Sultan Dam Failure Scenario

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Abstract:

This report provides a detailed specification of a humanitarian relief scenario involving significant civil-military cooperation. The scenario aims to highlight some challenges and opportunities for semantic integration and knowledge processing in support of humanitarian relief efforts undertaken against a backdrop of military conflict. The scenario depicts an earthquake and associated flood event occurring in Afghanistan at the time of the US-led coalition effort to displace the former Taliban regime. The flood event occurs as a secondary phenomenon to the earthquake and precipitates a full-scale humanitarian relief effort co-opting the resources of both humanitarian and military agencies. This scenario will serve to showcase the capabilities of the AKTiveSA TDS with respect to enhanced situation awareness and improved information fusion. Such capabilities depend on the ability to exploit multiple sources of information and sophisticated query capabilities in order to expedite the dissemination of relevant information to executive agencies in a timely and appropriate fashion. The scenario narrative draws attention to some of the information requirements demanded by military and humanitarian decision makers in the context of complex emergency situations. It also serves to illustrate the critical knowledge processing capabilities of agents with respect to the assessment of disaster situations and relief effort planning. Finally, the scenario provides an indication of the requirements for visualization and interaction that should be afforded to end-user agents in order to optimise their exploitation of system capabilities. This report also provides background information about the Standard Operating Procedures (SOPs) of humanitarian agencies with respect to disaster relief and reviews guidelines on the nature of civil-military coordination in the context of disaster relief efforts in conflict situations.

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1 Introduction

1.1 Project Background

This project (contract no: 8.14, codename: AKTiveSA) addresses the development of a Technical Demonstrator System (TDS) to showcase the role played by Semantic Web technologies in knowledge-intensive information fusion and enhanced situation awareness. The work is being undertaken by the University of Southampton as part of the MoDs (Ministry of Defence) DTC (Defence Technology Centre) initiative[1]. The DTCs represent a formal collaborative agreement between industry and academic experts to enhance the defensive capabilities of UK (United Kingdom) military forces.

This project is an extension to an earlier initiative, called FloodSim[2], which demonstrated how semantically-enriched information, interpreted against the backdrop of formal ontologies, could be used to improve situation awareness with respect to humanitarian relief operations. The current project has a similar objective in that it aims to improve operational effectiveness in the planning, coordination and delivery of humanitarian relief efforts by enhancing the situation awareness of executive decision makers.

1.2 Document Purpose

This document provides a detailed specification of a humanitarian relief scenario involving significant civil-military cooperation. An initial scenario specification was delivered at the outset of the AKTiveSA project (DTC/WP100/Scenario), which aimed to provide a basis for scoping activities in the context of the ontology engineering initiative (WP200). Since the status of the AKTiveSA project is now moving into its development phase (WP300) it is important to flesh out aspects of the initial scenario specification in order to delineate the actual objects and events that feature in the scenario, the knowledge and reasoning capabilities of the system with respect to the scenario and the kinds of user interaction supported by the AKTiveSA framework. This document provides a specification of one scenario that forms part of the larger scenario specification.

1.3 Document Structure

The structure of the current document reflects the aims outlined in Section 1.2. Section 2 provides background information about the scenario in the form of preceding events and actions. To a large extent this information is derived from actual events that occurred in the context of Operation Enduring Freedom, i.e. the strategic operations in Afghanistan by the US-led coalition in 2001/2002. Section 3 provides an overview of the scenario described throughout the remainder of this document. It provides information about the kinds of objects that feature in the scenario and the main events that occur throughout the scenario timeline. Section 4 provides further information about the scenario in the form of a timeline of events. This is the most important section from the perspective of the scenario specification initiative since it describes the timeline of the scenario, decomposed into a number of distinct phases. It also provides views of the tactical picture with

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[1] http://www.mod.uk/dtc/index.html
[2] http://www.aktors.org/technologies/floodsim/

respect to scenario snapshots created using the Google Earth client[3]. Section 5 provides an overview of the background information upon which the scenario specification is based. This information was assimilated as part of the research effort devoted to describing the scenario.

As a description of a knowledge-rich application domain, namely the domain of military operations and humanitarian relief efforts, this document uses a number of acronyms and abbreviations. These are detailed in Appendix A. Appendix B and Appendix C present some standard materials used by humanitarian aid agencies in the context of relief efforts. These materials are reproduced here in order to provide an indication of the information requirements associated with needs assessment and relief planning.

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[3] http://earth.google.com/

2 Scenario Background

The scenario is set in Afghanistan in the year 2002. US and UK forces have been deployed in Afghanistan to conduct strategic operations against the Taliban regime. Following a successful air campaign and land-based assault, the Taliban have been overthrown and major conflict operations have been concluded. Despite this, pockets of resistance remain in the southern and western regions of Afghanistan and the risk of both terrorist attacks against the local civilian population and assaults on coalition forces remains high. Thus far the occurrence of such incidents has been largely restricted to the Kandahar, Oruzgan, Zabul, Helmand and Farah provinces. US and UK ground forces have been deployed in-theatre both in the north and south of Afghanistan and these units continue to undertake strategic operations against Taliban insurgents largely within the provinces of Kandahar and Oruzgan. These operations are backed up by CAS (Close Air Support) and air strikes against strategic targets in Kandahar. Ground forces have also been tasked with peace support, counter-terrorism and humanitarian relief activities in the occupied areas, mostly in the eastern provinces. In addition, the UN has deployed an International Security Assistance Force (ISAF[4]) to assist with peace support operations.

A number of humanitarian aid groups are currently operating in then occupied areas. These include:

- UNAMA[5] (United Nations Assistance Mission in Afghanistan)
- CARE International[6]
- ACTED[7] (Agency for Technical Cooperation and Development)
- DACAAR[8] (Danish Committee for Aid to Afghan Refugees)
- UNOPS[9] (United Nations Offices for Projects Services)
- UNHCR[10] (United Nations High Commissioner for Refugees)
- WFP[11] (World Food Programme)
- OXFAM International[12]
- ActionAID[13]
- ICRC[14] (International Committee of the Red Cross)
- WHO[15] (World Health Organization)
- FAO[16] (Food and Agriculture Organization of the United Nations)

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[4] http://www.afnorth.nato.int/ISAF/
[5] http://www.unama-afg.org/
[6] http://www.care.org/
[7] http://www.acted.org/english/
[8] http://www.dacaar.org/
[9] http://www.unops.org/unops/
[10] http://www.unhcr.ch/
[11] http://www.wfp.org/
[12] http://www.oxfam.org/
[13] http://www.actionaid.org/
[14] http://www.icrc.org/
[15] http://www.who.int/en/

- MSF[17] (Médecins Sans Frontières)

These organizations provide humanitarian assistance in the form of food and medical supplies, fresh water, and shelter (in the form of refugee camps). The ongoing military conflict has created a refugee crisis in which many local residents have moved east to leave Afghanistan via the Pakistan border. Following the closure of this border a number of IDP (Internally Displaced Person) camps have been established in the east of the country and these continue to receive new inhabitants from both conflict zones and areas affected by military conflict. Humanitarian aid organizations are assisted in their duties by military units who provide both logistical support and security for aid distribution.

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[16] http://www.fao.org/
[17] http://www.msf.org/

3   Scenario Overview

Figure 3.1: Flood Zone North of Ghazni

At 12:10 hours on 29th March 2002, seismometer readings indicate the occurrence of a large earthquake in the region of the Baghlan/Bamyan border region. Information about the earthquake is provided by NEIC[18] (National Earthquake Information Center), who indicate the magnitude and location (epicentre and hypocentre) of the Earthquake. This initial information is subsequently corroborated by other seismic monitoring centres. The location and magnitude of the earthquake indicate a medium intensity earthquake with associated structural damage and possible civilian casualties. Information from GDACS[19] (Global Disaster Alert and Coordination System) provides a characterization of the earthquake and also indicates its likely humanitarian impact. Unfortunately, in addition to the devastation caused by the earthquake in the immediate vicinity (mostly mediated by the collapse of buildings local settlements) the magnitude of the earthquake is sufficient to cause the Band Sultan dam, located north of Ghazni, to collapse and cause massive inundation of the surrounding region due to the accumulation of water from melted snow in the dam reservoir. The resulting flood is responsible for the destruction of hundreds of houses, the death of at least 1000 people and the displacement of many more. In response to the Earthquake, US-led coalition and ISAF forces in concert with humanitarian aid organizations aim to provide humanitarian assistance to the afflicted region. The immediate humanitarian response assumes the form of food, shelter and medical aid provision. Military units are also tasked with search and rescue operations in the flooded region, the transport of aid supplies and the provision of security for aid efforts. The relief effort is complicated by both the security situation and the damage caused to the local road network by the flood water. A number of land routes in the region of the disaster zone have been blocked by rising flood water, which affects the overland transport of aid supplies. In addition, the security situation makes both land-based and airborne vehicles vulnerable to enemy fire thereby making some transport routes hazardous and others impassable. As the crisis develops over the next few days

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[18] http://neic.usgs.gov/
[19] http://www.gdacs.org/

there are reports of a number of outbreaks of water borne diseases and the possibility of an epidemic becomes a realistic possibility.

There are also longer term concerns. The inundation has washed away thousands of hectares of cultivation land (including young wheat crops that are a bulk of the livelihood of some farmers), destroyed hundreds of shops and compromised a valuable source of water irrigation to many thousands of families and farms. This causes longer term concerns for the economic viability of the region and the impact of the inundation on future food security.

Figure 3.2: Flood Devastation in Ghazni

4   Scenario Timeline

4.1   Overview

This section details the timeline of the scenario. The timeline is decomposed into a number of distinct phases[20]:

- **Pre-Crisis Phase:** the period immediately before the crisis. This period is dominated by military activities in the form of air strikes against Taliban strongholds in Kandahar. IDP movements are apparent in the east of the country.

- **Crisis Phase:** the period encompassing the actual occurrence of the earthquake and associated flood. This period is dominated by the acquisition of information and preparation for the relief effort. Key knowledge-intensive tasks undertaken by humanitarian actors at this phase of the scenario include needs assessment and relief planning.

- **Emergency Response Phase:** the period associated with initial relief efforts. This includes the distribution of food and water aid, the establishment of a relief camp on the outskirts of Ghazni and the search and rescue of individuals affected by the flood.

- **Post-Crisis Phase[21]:** the period in which the immediate threat to human life has been contained. In the context of the current scenario this phase marks the period in which the flood waters are contained and flood levels are stable. Humanitarian relief has been provided to most people affected by the flood and injured individuals have been evacuated to the relief camp or to field hospitals in Kabul. The main humanitarian threat at this stage of the scenario is the possibility of disease outbreaks caused by the flood, mostly due to the contamination of drinking water.

- **Durable Solution Phase:** the period in which attention focuses on rehabilitation, rebuilding and resettlement activities. This phase is marked by a consideration of the possible long term impacts of the flood on local inhabitants and the country as a whole. Key issues in this phase concern the economic impact of the flood and the possibility of future food insecurity caused by damage to crops and agricultural land.

Each phase is characterized in terms of the following:

- **Time Period:** the time period encompassed by the phase.

- **Timeline:** a table indicating the temporal location of events within the timeline. A graphic display of the timeline is also provided.

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[20] The Federal Emergency Management Agency (http://www.fema.gov) describes three phases associated with a humanitarian emergency situation: the pre-crisis phase, which is concerned with the collection and updating of disaster data and monitoring of disaster-related information sources for early warning purposes; the crisis phase, which is concerned with the exchange of information among the participating organizations, the dissemination of aid requirements, and the coordination of the relief effort and supply of aid resources; finally, the post-crisis phase, which summarizes the lessons learned and proposes adjustments of existing tools or methods. These phases have been expanded somewhat in the current scenario specification in order to provide a more detailed temporal profile of the scenario timeline.

[21] In the current scenario the post-emergency phase and durable solution phase have been combined for purposes of brevity. Most of the knowledge processing and situation monitoring activities occur in the first three phases of the scenario, i.e. the pre-crisis, crisis, and emergency response phases.

- **Figures:** references to illustrations that indicate the tactical picture(s)[22] with respect to humanitarian relief efforts and/or military action.

- **Synopsis:** a brief textual description of the main events within the phase.

- **Focus Task Areas:** an indication of the kinds of activities, including knowledge-intensive tasks, undertaken by humanitarian, military and knowledge system agents during the scenario. These tasks subsume those that can be undertaken autonomously by the knowledge system component of the AKTiveSA framework and those that have to be undertaken in collaboration with external agents[23]. In the current context, a knowledge-intensive task is deemed to be any task that requires the use of a reasoning service and associated rule sets or which exploits the formal semantics of the ontology language. This includes the use of OWL (Ontology Web Language) subsumption reasoning services.

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[22] In the context of the scenario narrative we describe the tactical picture from a limited 'God's eye view', i.e. we assume that the tactical picture is a composite of both of the humanitarian and military tactical pictures. The illustrations are limited in the sense that they do not represent all entities in the theatre of operations. Instead, they represent those that are deemed relevant to the humanitarian crisis centred on the flood event or those that are deemed important from the perspective of demonstrating the multi-functional capabilities of the AKTiveSA TDS. It should be remembered that this is unlikely to be the case in the context of most real-world operations, since the military may not be interested in certain information deemed important to relief workers and humanitarian agencies, for their part, will not have access to classified military information, e.g. the disposition and activities of military agents.

[23] From the perspective of the AKTiveSA TDS, these tasks should be accessible from a task hierarchy within the main application interface. An agent should be able to invoke the task and specify the required parameters of the task in terms of the ontology elements. In some cases, the task will have to be undertaken in a collaborative fashion in which the user provides information and receives feedback at each stage of the reasoning process. User interaction in the context of these tasks could be mediated via a wizard-like interface component. The execution of each task at the level of the AKTiveSA framework relies on the invocation of a reasoning service agent.

4.2 Pre-Crisis Phase
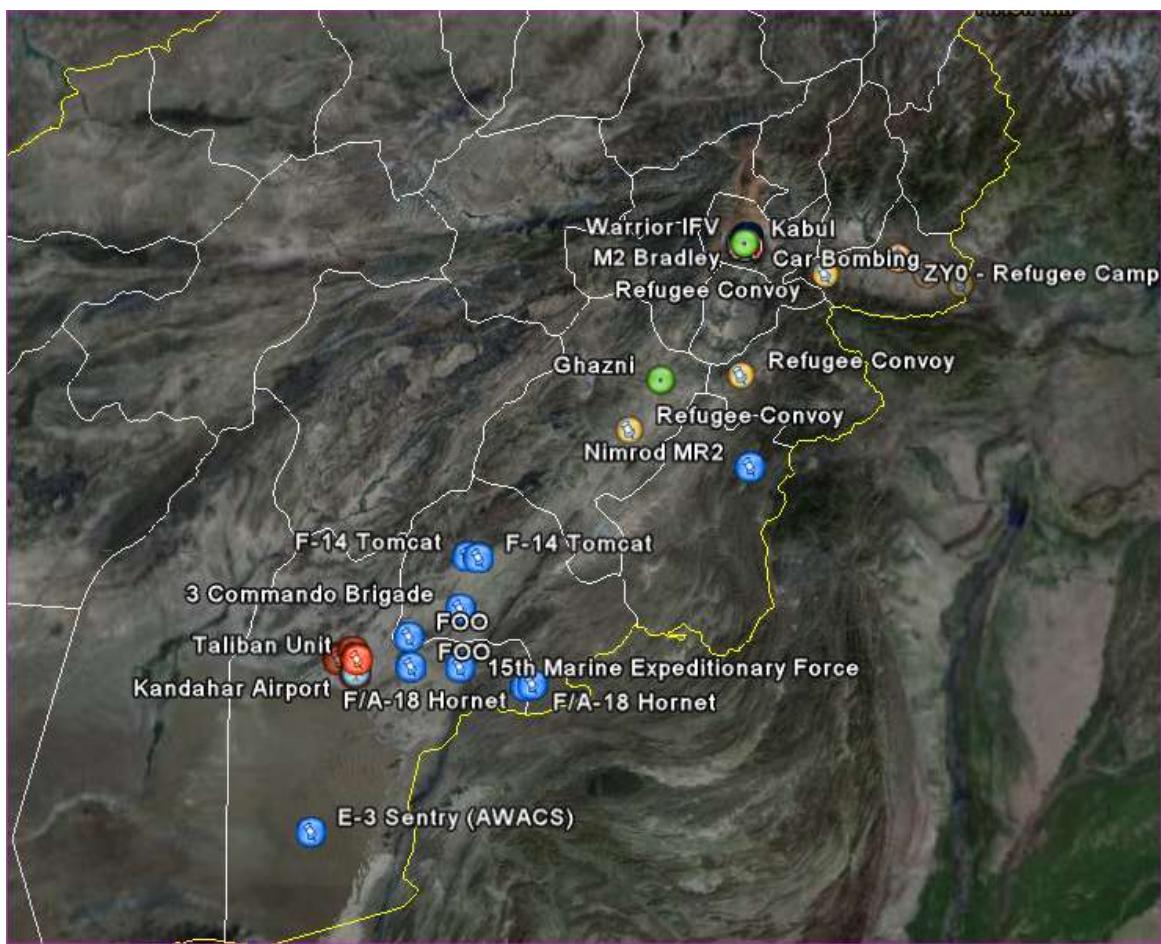
Figure 4.1: Scenario Overview
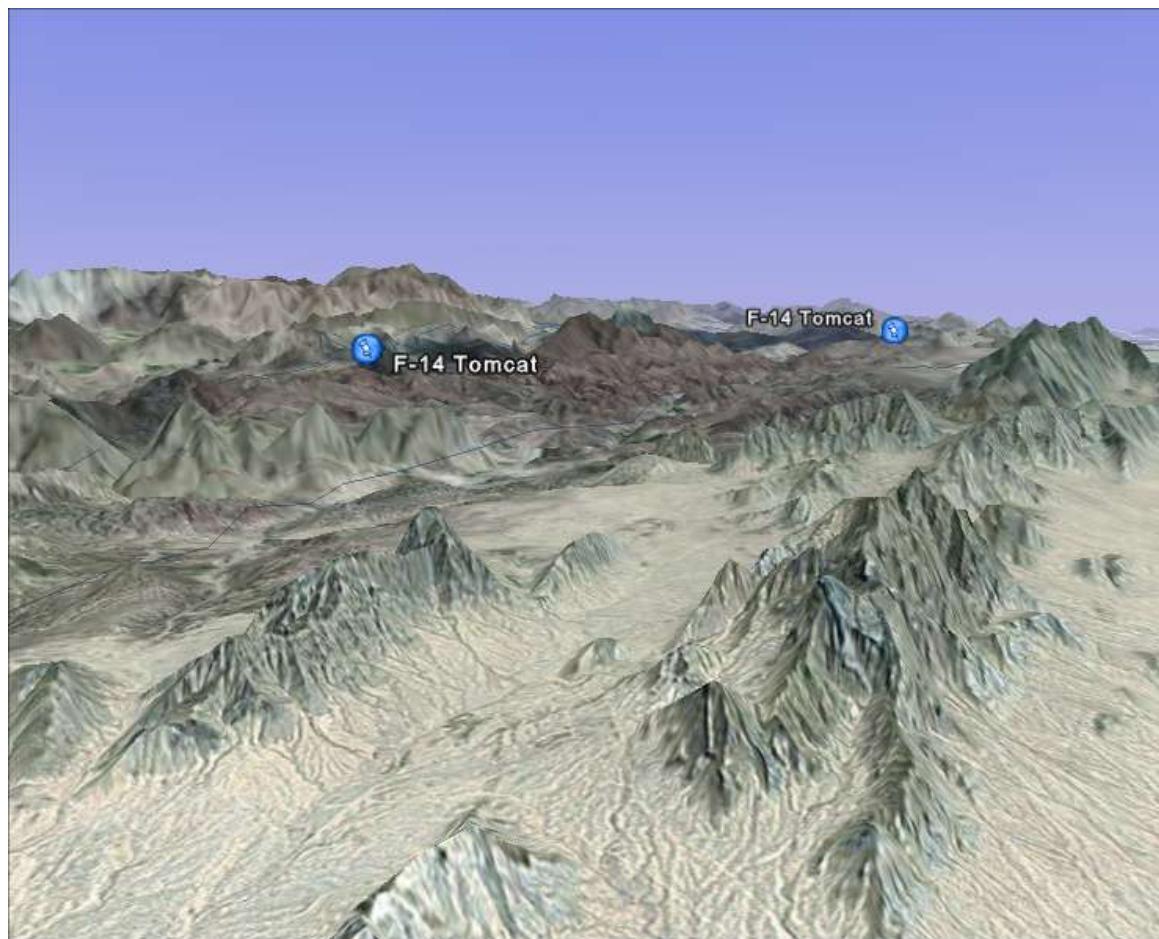
Figure 4.2: Inbound Air Strike Force

Figure 4.3: Tactical Picture – Kandahar

Figure 4.4: Tactical Picture – Kabul
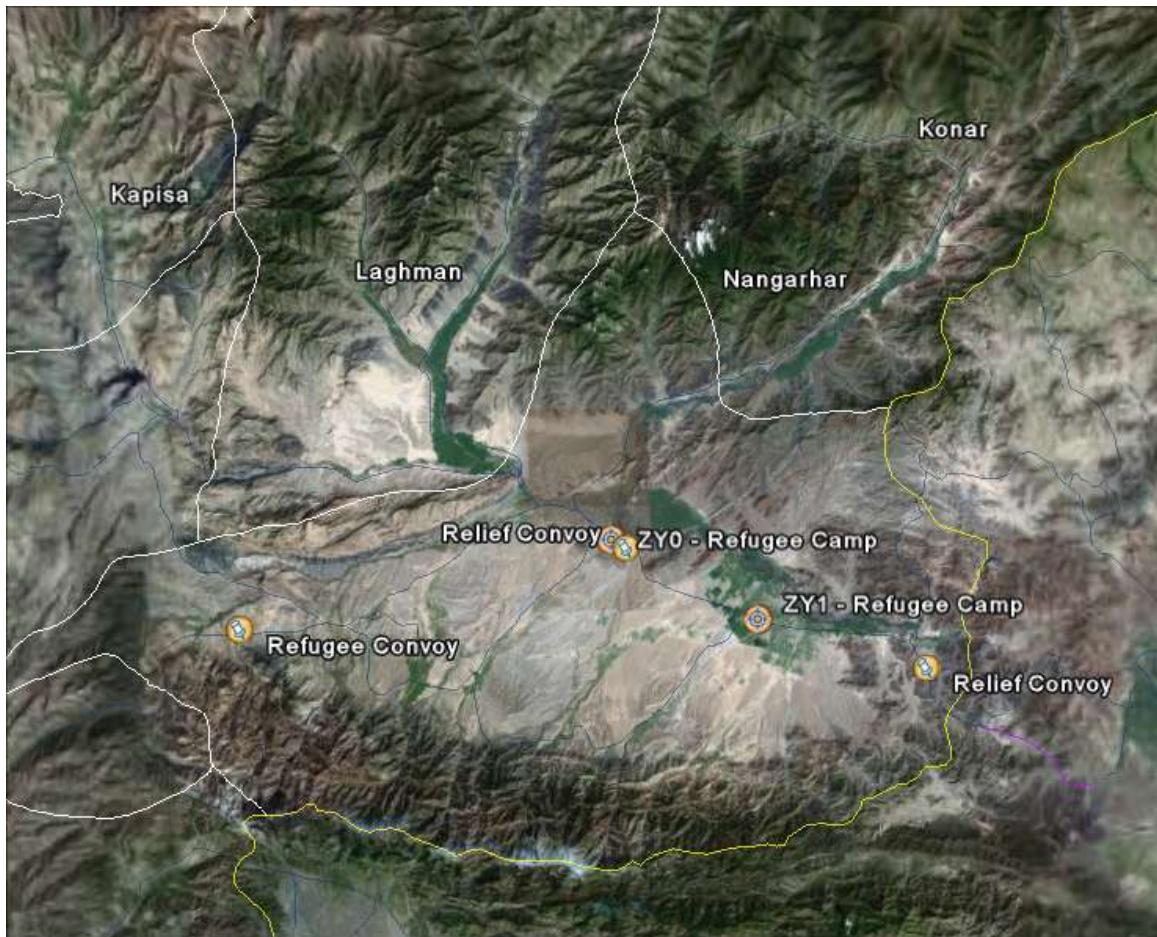
Figure 4.5: IDP Camps & IDP Movements

4.2.1 Time Period

- 29/03/2002 00:00 - 29/03/2002 12:00

4.2.2 Timeline
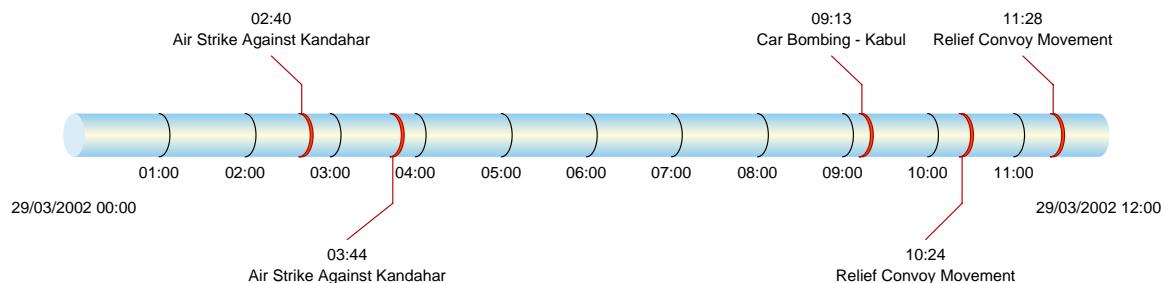
Figure 4.6: Pre-Crisis Phase Timeline

Time	Event	Description
29/03/2002 02:40	Air Strike Against Kandahar	Air strikes against strategic targets in Kandahar by F-14 Tomcats.
29/03/2002 03:44	Air Strike Against Kandahar	Air strikes against strategic targets at Kandahar airport by F/A-18 Hornets.
29/03/2002 09:13	Car Bombing – Kabul	Terrorist incident in the form of a car bombing within Kabul.
29/03/2002 10:24	Relief Convoy Movement	Translocation of relief convoy moving from Pakistan border region.
29/03/2002 11:28	Relief Convoy Movement	Translocation of relief convoy moving from Pakistan border region.

4.2.3 Figures

- Figure 4.1
- Figure 4.2
- Figure 4.3
- Figure 4.4
- Figure 4.5

4.2.4 Synopsis

This phase marks the beginning of the scenario and features a number of either static or dynamic entities. Both air and ground military assets are operating in-theatre with air strikes against strategic targets in Kandahar, including military headquarters, the airport control tower and radar installations. The tactical picture indicates a number of enemy positions in and around Kandahar. These are largely the focus of coalition strategic operations, which aim to neutralize the threat posed by these enemy units. Ground forces in the form of 3 Command Brigade[24] (UK) and the 15th Marine Expeditionary Force[25] (US) occupy positions to the east of Kandahar with FOO (Forward Observation Officer) units in situ at strategic locations. A single Nimrod aircraft is responsible for performing electronic and photo reconnaissance and an E-3 AWACS (Airborne Warning and Control System) aircraft is deployed to the south west providing surveillance and command and control communications. The tactical picture indicates a number of strike aircraft undertaking night-time raids on Kandahar from carrier bases in the Arabian Sea. These units receive C4I (Command, Control, Communications, Computers and Intelligence) support from the aforementioned E-3 AWACS platform.

UK and US military forces have established a command HQ (Head Quarters) on the outskirts of Kabul in the vicinity of Kabul Airport. Coalition forces have also established a FOB (Forward Operating Base) in Mazar-e Sharif, approximately 180 miles north-west of Kabul. In the morning of the 29th a terrorist incident in the form of a car bombing is reported in the capital city. This serves to indicate the inherent instability of the current situation.

IDP camps are established in the east of the country to accommodate Afghan citizens attempting to flee the conflict. IDP movements are apparent throughout the entire timeline of the scenario. One group of IDPs is reported south-west of Ghazni and is clearly heading to Ghazni by virtue of the local road network.

A number of humanitarian aid organizations are operating in the region. The ERC (Emergency Relief Coordinator), in collaboration with the IASC (Inter-Agency Standing Committee) and acting on behalf of the UN Secretary General, has appointed the UNHCR to serve as the lead agency (Humanitarian Coordinator) in coordinating and overseeing all relief efforts. The UNHCR have established a significant presence in the east of country in the form of the IDP camps and they have also established a HIC (Humanitarian Information Centre) in Kabul. The HIC is situated in a former embassy within Kabul and serves as the focus point for information gathering, exchange and dissemination activities with respect to relief activities. In order to enable coordination and communication with military forces, the UN has deployed a number of MLOs (Military Liaison

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[24] http://www.royal-navy.mod.uk/static/pages/1905.html
[25] http://www.usmc.mil/15thmeu/

Officers) who operate though the HIC to establish a communication link to CJCMOTF (Coalition Joint Civil-Military Operations Task Force), which serves as the strategic command HQ for civil-military coordination on behalf of the US-led coalition forces.

4.2.5 Focus Task Areas

The main knowledge processing activity to be undertaken in this phase of the scenario is the interpretation and integration of datalink message feeds from tactical datalink sources. It is assumed that tactical datalink messages will be instantiated within the knowledge store according to the constraints of the AKTiveSA domain ontology, which provides knowledge-level representations of the information content provided by datalink messages[26]. The AKTiveSA framework will use a TacticalDatalinkIntergrationService agent to effect the interpretation and integration of tactical datalink information within the core ontology framework. A number of tactical datalinks are available, including Link16, Link22 and BOWMAN. In some cases the information content of messages exchanged via the datalink are governed by international standards - Link 16, for example, is a NATO standard. As the primary information exchange medium for military organizations, tactical datalinks serve as an important source of information about environmental conditions and the disposition, status and activities of military assets. Unfortunately, inter-operation and information exchange between datalinks is somewhat problematic because the information exchange protocols, information content and message structure are customized for particular military purposes (e.g. Link 16 for airborne assets; BOWMAN for ground forces). Semantically-enriched representations in the form of domain ontologies represent a potentially useful means to facilitate the successful interoperation and exchange of information between datalinks because the meaning of the information content is made explicit (which facilitates interpretation) and rules can be defined which operate over the semantic annotations to effect data integration (which facilitates information exchange and interoperation).

The ability to exploit semantic integration for the purposes of information exchange serves to enhance situation awareness and improve force coordination/integration. The tactical picture is enriched because force commanders can visualize the juxtaposition of multiple military assets in a manner that transcends the boundaries of service division, environment category and national identity. This improved situation awareness yields many advantages at the strategic, tactical and operational levels, including

- the ability to opportunistically exploit situation contingencies in a manner commensurate with strategic objectives;
- the ability to avoid blue-on-blue engagements;
- the ability to avoid duplication of effort and;
- the ability to inform decision processes about the most effective COA (Course of Action) required to fulfil mission objectives.

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[26] The current service portfolio is limited to the integration of information derived from the Link 16 interface. Our aim is to show how the information content of Link 16 messages can be integrated with domain ontologies as the basis for establishing a Common Relevant Operational Picture (or CROP). Although, we do not show how this approach could be extended to other types of tactical datalink, the current strategy should apply equally well to these communication systems.

Semantic integration also facilitates the exchange of information between military communities thereby enabling the capability for self-synchronization and cross-force integration, key components of the UK's Defence Capability Framework (*The UK Joint High Level Operational Concept: An Analysis of the Components of the UK Defence Capability Framework*, 2005).

In order to unleash the capability for improved situation awareness, the AKTiveSA TDS should provide a means for agents to visualize different elements of the tactical picture according to their particular epistemic requirements. An agent should, for example, be able to selectively view all airborne assets, enemy positions, the activity status of military units, the disposition of all military assets, etc. In general, the key capability here will be the visualization of information sets in a manner that cross cuts the traditional boundaries of the land, air, and maritime operational environments. In other words, an agent should be able to view the disposition of all military assets as a means to facilitate cross-force synchronization and enhance situation awareness across service division and environment category. An example is the juxtaposition of land components with airborne assets within the context of a unitary tactical picture. The interface should, in addition, enable users to access more detailed information about any of the elements that are visible in the tactical picture display[27], e.g. affiliations at the organizational and national level, mission focus, activity status, platform status and so on. It may also be helpful to retrieve all information reports that are provided by a particular element, e.g. datalink information sourced from a particular airborne platform and field reports from FOO entities.

In order to demonstrate the capability for opportunistic exploitation of situation contingencies by military agents, a specific task could be included in this phase of the scenario, namely, for a land-based UK FOO unit to report a convoy of Taliban armoured vehicles en route to Kandahar concurrent with strategic air strikes in Kandahar. In this case a US aircraft (e.g. F-14 Tomcat) that was previously assigned to a deep strike mission against targets in Kandahar could be re-tasked with the objective of neutralizing a higher value asset, identified by UK land forces. The FOO unit could provide laser designation for the purposes of targeting information to the inbound strike aircraft.

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[27] Perhaps using a pop-up display dialog.

4.3   Crisis Phase

Figure 4.7: Ghazni Flood Zone

Figure 4.8: Ghazni Flood Zone – Detail View
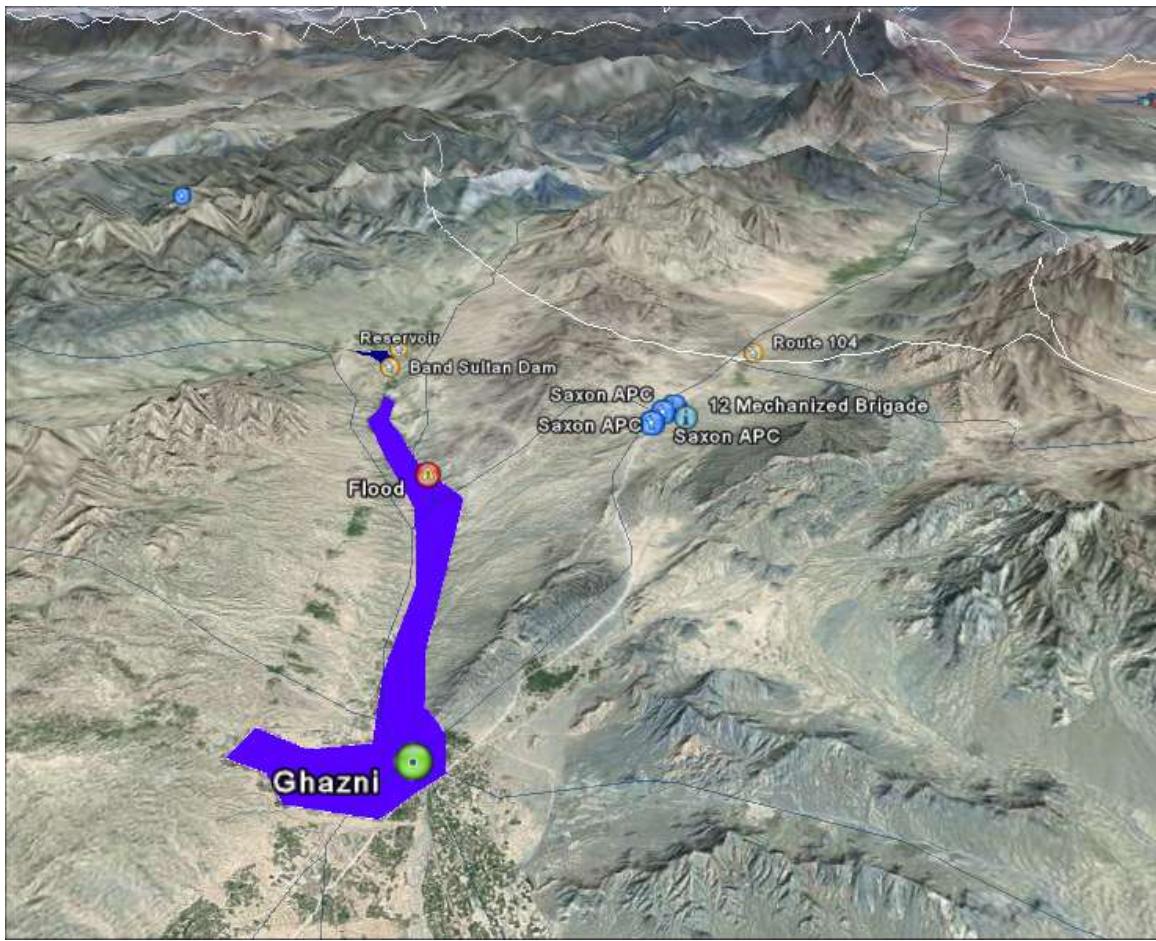
Figure 4.9: Ghazni Flood Zone – 3D Relief View

4.3.1 Time Period

- 29/03/2002 12:00 - 30/03/2002 00:00

4.3.2 Timeline
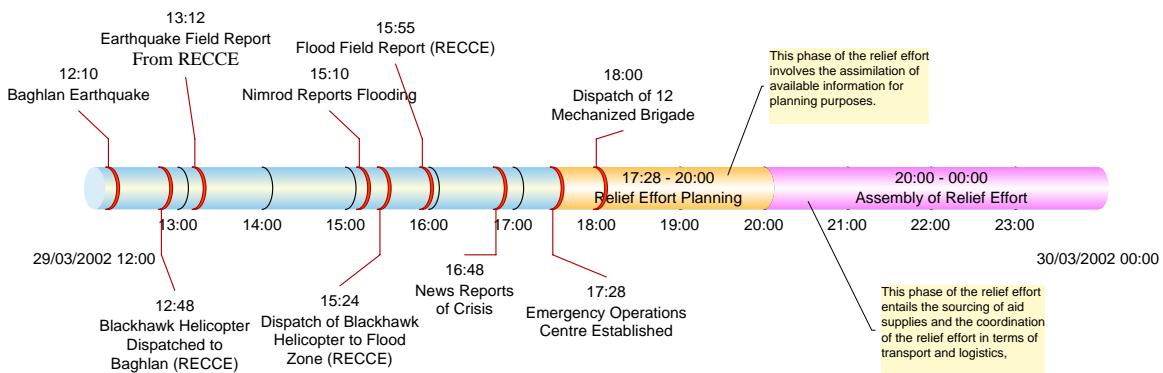
Figure 4.10: Crisis Phase Timeline

Time	Event	Description
29/03/2002 12:10	Baghlan Earthquake	A seismic event occurs in the Baghlan/Bamyan border region. Information about the seismic event is provided in the form of a report from NEIC.
29/03/2002 12:48	Blackhawk Helicopter Dispatched to Baghlan (RECCE)	A Blackhawk helicopter is dispatched to the earthquake region to provide reconnaissance information regarding the impact of the earthquake on surrounding communities.

Time	Event	Description
29/03/2002 13:12	Earthquake SITREP From RECCE	Information about the impact of the earthquake is provided by the aforementioned RECCE (reconnaissance) unit. The report contains information about structural damage associated with the earthquake in local communities. It also provides information about the likely number of civilian causalities associated with the event.
29/03/2002 15:10	Nimrod Reports Flooding	A Nimrod MR2, engaged in unrelated photo reconnaissance activities, reports flooding in the north-west districts of Ghazni.
29/03/2002 15.24	Dispatch of Blackhawk Helicopter to Flood Zone (RECCE)	A Blackhawk helicopter is dispatched to reconnoitre the flood zone and provide information about the extent of the flood, the kind of damage caused and the likely number of civilian causalities.
29/03/2002 15:55	Flood Zone SITREP from RECCE	Report from Blackhawk RECCE unit arrives at military HQ in Kabul.
29/03/2002 16:48	News Reports of Crisis	News reports from news agencies and broadcasters begin to arrive regarding earthquake and flood events.
29/03/2002 17:28	Emergency Operations Centre Established	An emergency operation centre is established to oversee the planning of the relief effort and to coordinate the distribution of humanitarian aid.
29/03/2002 17:28 - 29/03/2002 20:00	Relief Effort Planning	Multiple working groups composed of coalition forces and aid organizations engage in planning activities directed to the proposed relief effort. The focus of the planning at this stage concerns the kind and amount of aid distributions that are required, the organizations that will participate in the relief effort, the security situation and extent of military involvement, and so forth.
29/03/2002 18:00	Dispatch of 12 Mechanized Brigade	12 Mechanized Brigade dispatched to Ghazni to determine security situation en route to Ghazni and possible obstructions to aid distribution effort.
29/03/2002 20:00 – 30/03/2002 06:00	Assembly of Relief Effort	The relief effort is assembled based on the outcome of the aforementioned planning activities. Aid supplies are requested from relief camps in the east of the country and additional supplies are provided by airlift to Kabul airport from the international community. The key problems faced by the relief effort at this stage of the scenario relate to the sourcing and aggregation of aid supplies. Overland transport of goods from the relief camps depends on the existence of viable and secure land transport routes. In addition, airlift operations require coordination with the military in order to avoid blue-on-blue engagements with airborne assets. In essence the reasoning activities associated with this stage of the scenario are geared to providing answers to the following questions: • What are the aid requirements for the current relief effort? • Where are these supplies sourced from? • How long will it take to dispatch the supplies to the affected area and begin the distribution effort? • Given the possible locations from which aid supplies can be sourced what problems are faced in terms of transporting these goods to the aid distribution centre? Problems include the viability of transport routes and the ongoing security situation. What, for example, is the risk that relief convoys could be the target of blue-on-blue engagements by friendly forces operating in the area of transport routes and way stations? • What are the requirements for aid distribution? For example, does the supply effort require military support for protection against hostile militia groups? Who needs to be contacted with respect to the supply effort, e.g. military authorities may need to be contacted with respect to inbound air traffic. • Will the relief effort detract from ongoing relief

Time	Event	Description
		efforts? If so what are the priorities concerning the allocation of aid to different components of the relief mission? • What additional resources are required in terms of the distribution of the designated aid resources? What types of personnel are required to assist with the relief effort? Are these resources readily available?

4.3.3 Figures

- Figure 4.7
- Figure 4.8
- Figure 4.9

4.3.4 Synopsis

At 12.10 reports emerge from NEIC of a large seismic event in the region of the Baghlan/Bamian border. Information about the earthquake is derived from information presented in an NEIC report and indicates the existence of a large magnitude earthquake. GDACS infers that structural damage is a possibility in the vicinity of the earthquake and that such structural damage may have contributed to civilian causalities. This information provides the impetus for further information gathering activities. Inherent insecurity with respect to the air environment prohibits the use of UN helicopters to investigate the earthquake, but following consultation with CA (Civil Affairs) units, a reconnaissance aircraft (US Blackhawk helicopter) is dispatched from military HQ in Kabul to investigate possible damage associated with the earthquake and to report on the status of local communities in the area. The result of this surveillance activity is a report that approximately 80% of buildings within a 20 mile radius of the earthquake epicentre have been damaged or destroyed. In response to this information humanitarian aid organizations begin planning relief operations[28].

At 15:10 a Nimrod aircraft reports signs of flooding as part of its photo reconnaissance activities. The flood is reported to affect villages in the district of Khoja Omari (also known as Khaaja Umari), as well as the city of Ghazni. This information is disseminated to the humanitarian community via the civil-military interface of the coalition forces and the HC (Humanitarian Coordinator) requests more detailed aerial reconnaissance information from the force commander. A military helicopter (UH-60 Blackhawk), carrying humanitarian representatives is dispatched to further investigate this report and confirms that the earthquake has caused structural damage to the Band Sultan dam resulting in the release of large volumes of water and inundation of the local area subsuming a number of settlements in the region as well as agricultural land. It is unclear what the scale of the flood is and how many people have been affected, but based on information about the population size of the affected region it is possible to derive estimates of the number of people displaced or made homeless by the flood. Reconnaissance reports from the aforementioned military helicopter, in association with photographic evidence derived from the Nimrod aerial photoreconnaissance unit

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[28] In the context of this scenario no further information is presented about this phenomenon or the planning processes associated with the relief effort. Rather, the focus for the current scenario is the flood event resulting form the earthquake in the form of the structural disintegration of the Band Sultan dam. The earthquake phenomenon itself could provide the basis for a second scenario in which the focus of attention is limited to the immediate effects of the earthquake, e.g. structural damage and disruption to the transport infrastructure.

indicates that water continues to escape from the dam and, as such, the extent of the flooded region may increase over time. In addition to these reconnaissance activities high resolution satellite imagery is obtained of the flooded region, especially of the area in and around Ghazni. The aim of these images is to resolve the extent of the flooding within Ghazni and to determine whether transport routes in and out of Ghazni have been compromised by flood water.

In anticipation of an impending operational requirement to inter-operate with humanitarian agencies with respect to the flood disaster, the CJCMOTF creates a specific CMOC (Civil-Military Operations Centre) to deal with the information demands and security requests of the humanitarian community. Humanitarian aid agencies begin preparations for relief efforts directed at regions affected by the flood. Background information is assimilated about the affected regions in Ghazni province which includes both the Ghazni and Khawja Omari districts. This information includes population density information, land use maps, road transport network information and maps indicating the location of settlements within the region. Information from military sources is also assimilated into the humanitarian tactical picture to facilitate threat assessment and emergency response planning. Such information is provided by military authorities in response to a request by the lead agency and is disseminated by the civil-military lines of communications via the CMOC.

The HC establishes an emergency operations centre within the HIC, which serves as the focal point for the planning and assessment activities associated with the relief effort. Seven sectorial committees are created within the operations centre to address different aspects of the emergency situation. Such committees are responsible for coordinating relief work in a designated sector and reporting back to the lead agency. Representatives of the coalition forces from the aforementioned CMOC are in attendance at some of these sectorial committee meetings in order to provide information on the security situation and to provide a link with military authorities regarding requests for military assets.

- The first group focuses on the causes for the flood and the steps that need to be taken to contain further flooding. The group is joined remotely by civil and hydrological engineering consultants in the UK and is attended by engineering specialists from within the military and humanitarian community. The group is primarily responsible for undertaking an assessment of the dam, the reasons for its collapse and the remedial strategies that can be undertaken to reduce the risk of further flooding. As part of its analysis, the group requires information about the purpose of the dam and the likely amount of flood water contained in the reservoir. This information is largely derived from satellite imagery and geo-spatial databases, which indicate an increase in reservoir capacity in recent months due to melting winter snow. In order to predict the likely extent of the flood they require information about the topography of the local terrain and information from weather forecasts about the risk of future rainfall that may exacerbate the flood situation. This meteorological information is sourced from weather reports for the Ghazni region. Background information about the reservoir, the dam and the river drainage region for the river Ghazni are all important considerations here[29]. Any information relevant to the causes for the flood is important. Satellite imagery and news reports about the flood situation in Ghazni suggest that a blockage to the Ghazni River in the vicinity of the city is contributing to the flood, especially flooding within the city itself. This information indicates that one remedial strategy is to

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[29] Note that meteorological reports for the Ghazni province itself are not necessarily adequate because the drainage basin of the Ghazni River may extend beyond the boundaries of the (independently delimited) political region.

remove the blockage of the river, but this may cause further flooding to, as yet unaffected, downstream regions. The use of sand bags is ruled out because it is believed that this will divert the flood water to unaffected regions or intensify the problem in already flooded areas. The group considers strategies for temporarily repairing the dam or stemming the water flow from the reservoir. In order to accomplish this, further information about the structural integrity of the dam is required and this necessitates the retrieval of reconnaissance photographs from both surveillance aircraft and satellite imagery as well as perhaps ground reports from dispatched personnel. It is decided that engineering personnel will be dispatched to the dam via military airlift to make 'on-the-ground' visual inspections.

- The second group is led by representatives of the WHO and focuses on the current health situation and likely health impacts of the disaster. This group aims to determine the health risk posed by the flood and the impact this has on the nature of relief efforts. Based on the extent of the flood it is predicted that wells within the region may have been contaminated and that the risk of both water- and vector-borne diseases is therefore high. Risk factors for a number of types of diseases are assessed based on information about possible vector agents and predisposing factors. This information influences decisions about the type of medical supplies that may be required in the course of the relief effort. The number of people affected by the flood indicates the amount of medical supplies and number of medical personnel required for the prospective mission. The team decides that causalities requiring emergency treatment will be transported to a field hospital in Kabul. If possible a temporary morgue is to be established in Ghazni to store recovered bodies. The team requires information about the likely contamination of the local water supplies. Any reports (from news agencies or otherwise) about causalities (number and severity), as well as estimates of the number of fatalities are relevant here as is information about the number of livestock in the affected region, since animal carcasses may also serve as a source of flood water contamination.

- The third team, led by the WFP, focuses on the requirement for food and non-food items. Based on information about the number of people involved in the crisis it is possible to derive an initial estimate of the number of food items required. The extent of damage to homes and properties indicates a requirement for shelter, blankets and plastic sheeting. Information about the extent of structural damage within Ghazni is provided largely by satellite imagery. Information about the expected meteorological conditions, as well as the seasonal average temperature (both day and night) serves as a further constraint on the types of aid resources to be supplied. It is decided that temporary emergency shelter will be provided in a refugee camp on the outskirts of Ghazni. The location of the camp is informed by information about the extent of the flood water, the risk associated with future flooding and the viability of transport and supply routes to and from the affected region. Based on information about the flood damage within Ghazni it is anticipated that individuals in the worst affected regions, as well as survivors from the surrounding rural regions will be evacuated to this camp. The number of people affected by the flood informs estimates about the likely size of the camp and the scale of the relief effort required[30].

- The fourth team is responsible for assessing the demand for fresh water and the amount of fresh water supplies required by the relief effort. The extent of the flood indicates that wells used for drinking water may have been contaminated and thus water testing kits may be required to assess the suitability of drinking water for human consumption. Some of these kits may need to be distributed to outlying rural communities that fall within the water table

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[30] It is worth noting that the scenario depicts a convoy of IDPs moving from the south towards Ghazni in the early stages of the scenario. This relief planning exercise needs to anticipate this likely influx of people and plan the relief effort accordingly.

of the flooded regions. The team also concludes that water purification tablets may be required for distribution to outlying communities.

- The fifth group is responsible for planning the search and rescue effort as well as the evacuation of people from both rural and urban areas. This group is joined by representatives of coalition forces based on a request from the HC. The military offer to provide Blackhawk helicopters for civilian evacuation and airborne search and rescue; however, the humanitarian representatives reject this offer based on the previous use of this platform in combat operations. Finally, it is decided that ICRC helicopters will be used for SAR (Search and Rescue) operations, since these are visibly marked and recognized as humanitarian aid vehicles. Approval from military authorities is required since they have secured complete control of the airspace in the theatre of operations and the presence of civilian airborne assets poses a potential problem in terms of the tactical air picture. In particular, there is a need to avoid inadvertent targeting of neutral aircraft by coalition forces who continue to conduct AEW (Airborne Early Warning) and air strike missions over Afghanistan. Situation awareness in this context is thus a key anti-fratricidal measure. The successful planning of the SAR effort requires approximate estimates of the number of people likely to be stranded in flooded regions.

- The sixth group is responsible for assessing the security situation in the affected region. The aim of this group is to assess the risk associated with the relief effort, the likely resource requirements in terms of military personnel and equipment, and the impact the disaster has on ongoing military operations. The key information input for this group is the history of previous conflict incidents in the area and surrounding region, intelligence reports about ongoing military operations, evidence of civil disorder within Ghazni, and other security-related information, such as minefields and UXO (Unexploded Ordnance). An important information input for this team concerns the nature of previous military operations in this region. An analysis of this information reveals that coalition forces conducted air strike operations against Taliban forces in Ghazni in the early stages of the conflict and there is thus a considerable risk of UXO in the form of cluster bombs in an around Ghazni. The extent of such campaigns in the vicinity of Ghazni airport prohibits any relief activity in that region.

- The seventh group is responsible for assessing the transport situation. The aim of this group is to assess the transport infrastructure of the region affected by the flood and to understand which transport routes are deemed impassable. Information of relevance here concerns the various land routes into and out of the affected region, the likely impact of the flood on these routes and whether there are any constraints in terms of the transit of particular types of vehicles along them. The primary source of information for this task is satellite imagery and background information about the transport infrastructure within the region, although there is a clear operational requirement to obtain more information about the integrity of transport routes. There is considerable concern about the security situation with respect to the transit of aid supplies to the affected region. Based on the prevailing security situation the military authorities advocate the use of armed escorts for the relief convoy, but representatives from the ICRC are strongly opposed to this option and threaten to withdraw from the relief effort. In order to balance the need to establish a secure operating environment and simultaneously to preserve the perceived neutrality and impartiality of humanitarian agencies, the HC requests that military defence assets be forward deployed into the area in order to establish a secure environment for the transport or relief supplies. In response to this request the coalition commander sanctions the dispatch of a battalion from the 12 Mechanized Brigade (based in Kabul) along Route 104 to undertake reconnaissance activities and to secure the highway for the transit of a relief convoy. This battalion is subsequently able to provide field reports regarding the structural integrity of roads in the vicinity of Ghazni. Air transport is considered to be a relatively

unconstrained means of transport, although there are limits on the quantity of supplies that can be provided by this means. In addition, the risk of missile attacks from insurgent groups is a possibility, so information about recent conflict or militia activity in any of the regions associated with proposed transport routes is required. Intelligence information about the likely weapons capabilities of hostile forces operating in this region is deemed relevant to the use of airlift operations, since only certain types of weapons capability will provide a threat to the use of airborne assets. The type of aircraft to be used for aid distribution is constrained by the accessibility of the region in terms of landing strips. In fact Ghazni has an airport, but the knowledge store indicates that this airport was the target of allied air strikes early on in the military campaign and details about these air strikes indicate that the airport will not support landings by fixed wing aircraft. This limits the use of air cargo transport to rotary wing aircraft.

Following the deliberations of the working group, information needs to be shared between the groups in order to inform the planning process and enable the coordination of the relief effort. Planning activities at this stage involve the logistics of the relief effort (where supplies are to be sourced from and how they are to be distributed), the likely resource composition of the relief effort, the number and type of personnel to be involved in the relief effort[31], etc. Key information required at this stage of the planning process relates to the availability of required resources within the country and the international community, largely in the form of existing stockpiles. The knowledge system plays a role here in terms of the retrieval of information about what humanitarian agencies are operating in the region, what their current activities are and what resources they possess[32].

Given the ongoing conflict and plan for post-conflict reconciliation, a primary objective for the military is to 'win hearts and minds'. This necessitates a prompt and efficient emergency response to the disaster, in which the military is seen to provide an active and constructive role. It is also important that the relief effort is undertaken in a manner that takes into account the relative cultural sensitivities of the individuals involved. As such, there is a distinct requirement to gather background cultural information about the people involved in the disaster, their ethnicity, political commitments[33] and language. Such information indicates the requisite level of military involvement (as well as the potential problems associated with military involvement), the possibility of conflict, the need for cooperation with provincial leadership and the need for support staff in the form of translators. It also provides information about the possibility for tension if people from this region are temporarily relocated to camps containing a mixture of individuals from different ethnic groups.

4.3.5 Focus Task Areas

During this phase of the scenario the knowledge system is required to make inferences about the likely effects of the earthquake. For this task the knowledge system agent relies on information about the population of a given region, magnitude of the earthquake and the epicentral location of the earthquake. It should be able to infer that the earthquake is sufficient to cause structural

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[31] In addition to aid supplies there is also a requirement to ensure sufficient capacity for the successful deployment of the relief effort. This capacity can assume the form of ancillary equipment and provisions for relief staff as well as translators to help enlist the cooperation of provincial leaders.

[32] This is otherwise known as a WDWW (Who's Doing What Where) analysis.

[33] It is important to be aware of the likely political commitments of the communities affected by the flood as a means of anticipating the response of the affected community to military involvement with the relief effort. This information is also a key factor in the security assessment of the relief operation.

damage and that the proximity of a number of settlements to the epicentre of the earthquake entails a high probability of civilian causalities. This information is confirmed by surveillance reports provided by the military helicopter dispatched to the region. Inferences about the number of people affected by the earthquake should be provided by a web service that accepts as inputs the target region about which information is required, the magnitude of the earthquake and the epicentral location of the earthquake. The information returned by this service indicates the number of people affected by the earthquake phenomenon. A similar task could be used to estimate the likely intensity of the earthquake using either European or International earthquake intensity scales[34].

The system is also required to provide estimates of the number of people affected by the flood. For this task it requires information about the spatial extent of the flooded region and the population size of the region. In this case the number of people affected by the flood subsumes causalities, fatalities and those displaced or made homeless by the flood water.

As part of the strategic planning activities for the relief effort, the system is required to assist with the process of needs assessment and relief planning. Based on a characterization of the disaster (the type of crisis, the number of people involved, etc.), the system should be able to determine the type and quantity of relief supplies to made available[35]. Once these supplies have been identified, the system can also assist with the process of sourcing these aid resources by retrieving information about which aid agencies are operating in Afghanistan and what aid provisions they possess, the locations of stockpiles and so on. In the case of medical supplies for example, the system may be required to identify types of diseases that may be caused by the flood and the types of remedial actions that needs to be undertaken in the case of a disease outbreak.

The system should be able to return estimates of the amount of rainfall for a given region, where the region is specified as a task parameter. It should be able to estimate this information based on available meteorological data accumulated from various weather reports. For example, in the current scenario, analysts are required to define a region or select a pre-defined region from the knowledge store (as an instance of the Region class), e.g. river drainage basin for the river Ghazni. They are also required to specify a future time period over which the total amount of rainfall will be calculated. The value returned by the service is a value indicating the total amount of precipitation in millimetres.

In order to predict the maximum extent of the flood, the application could provide a visualization service based on the terrain topography of a given region. The aim of this service is to indicate the extent of flood waters in the specified region given an input parameter that specifies the total amount of rainfall expected across the entire region. The input parameter is used to calculate and increase in flood levels and distribution of flood waters across the specified region. This task may prove overly complicated for the purposes of the AKTiveSA demonstration and thus its inclusion should not be considered mandatory.

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[34] Some of this information is already inferred by the GDACS (http://www.gdacs.org/) system and as such it may be desirable to simply access the information provided by GDACS where possible, or at least to co-opt this inferred information into the AKTiveSA knowledge system output.

[35] The knowledge used for the form of reasoning activity is provided by the SPHERE project (http://www.sphereproject.org/).

Finally, the system is required to provide information on transport routes within a given region. The system should be able to infer the types of transport vehicle that these transport routes will support and whether these transport routes are currently blocked. The system should also be able to return any information about damage to these routes that may make them unusable. This is particularly so in the case of Ghazni airport, where the incidence of previous military air strikes has made the airport unusable for air cargo transport.

In general there should be a query hierarchy providing access to query services. A similar hierarchy can be provided for reasoning services. Once invoked these services require information to be specified by the user regarding the data objects serving as input parameters. These can be selected from the individuals defined in the ontology. A service invocation mechanism similar to that used in the CoSAR-TS[36] framework could be used to provide an implementation strategy for service invocation.

4.4   Emergency Response Phase
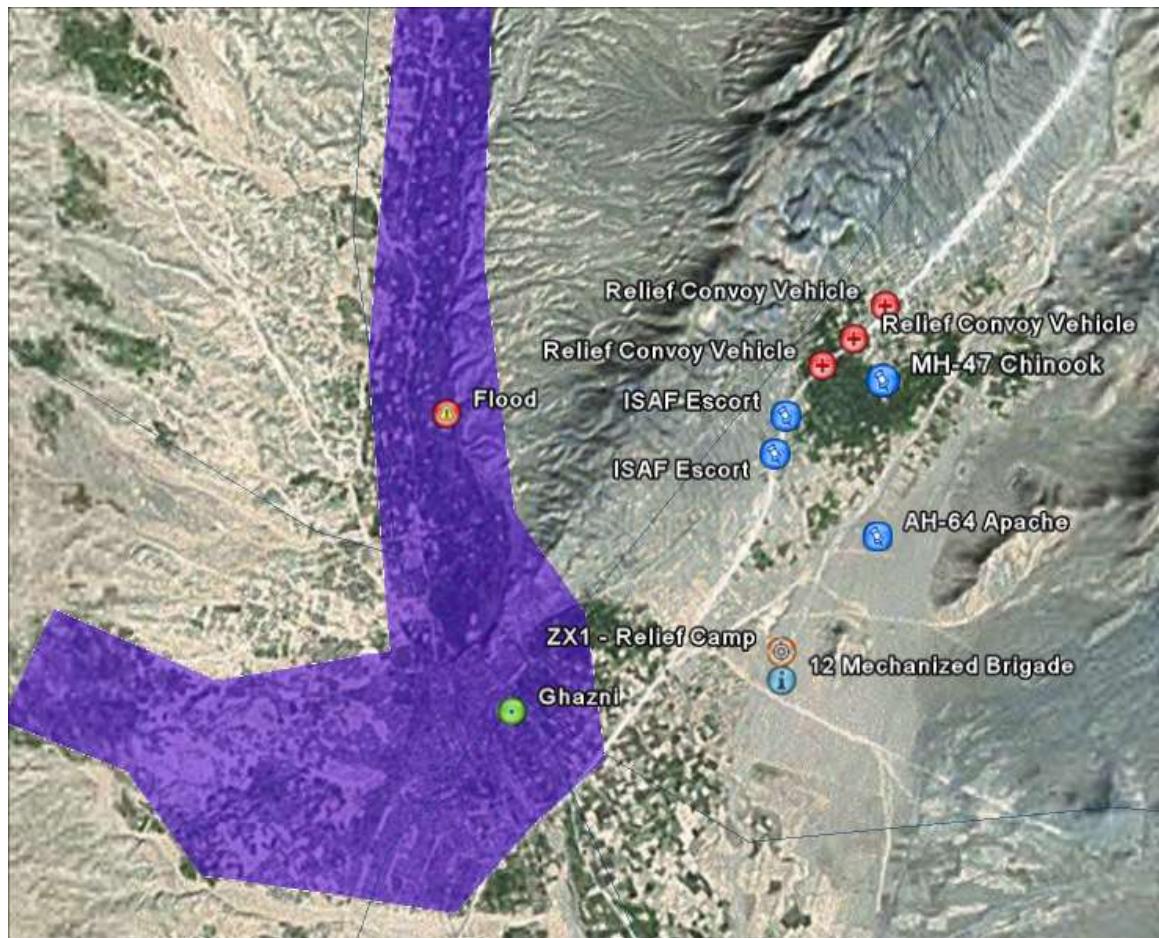
Figure 4.11: eResponse Tactical Picture – Deployment of Aid Convoy
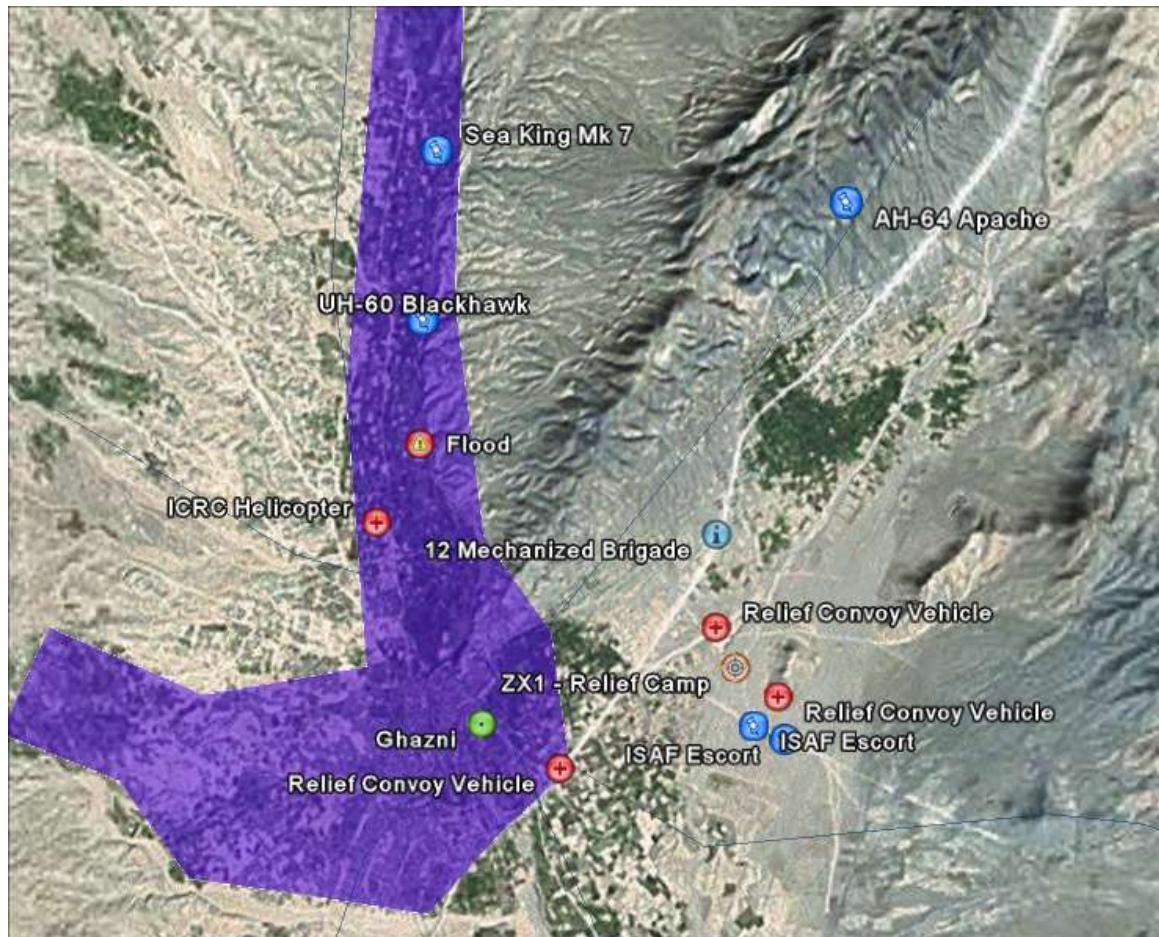
Figure 4.12: Distribution of Aid Supplies and SAR Operations
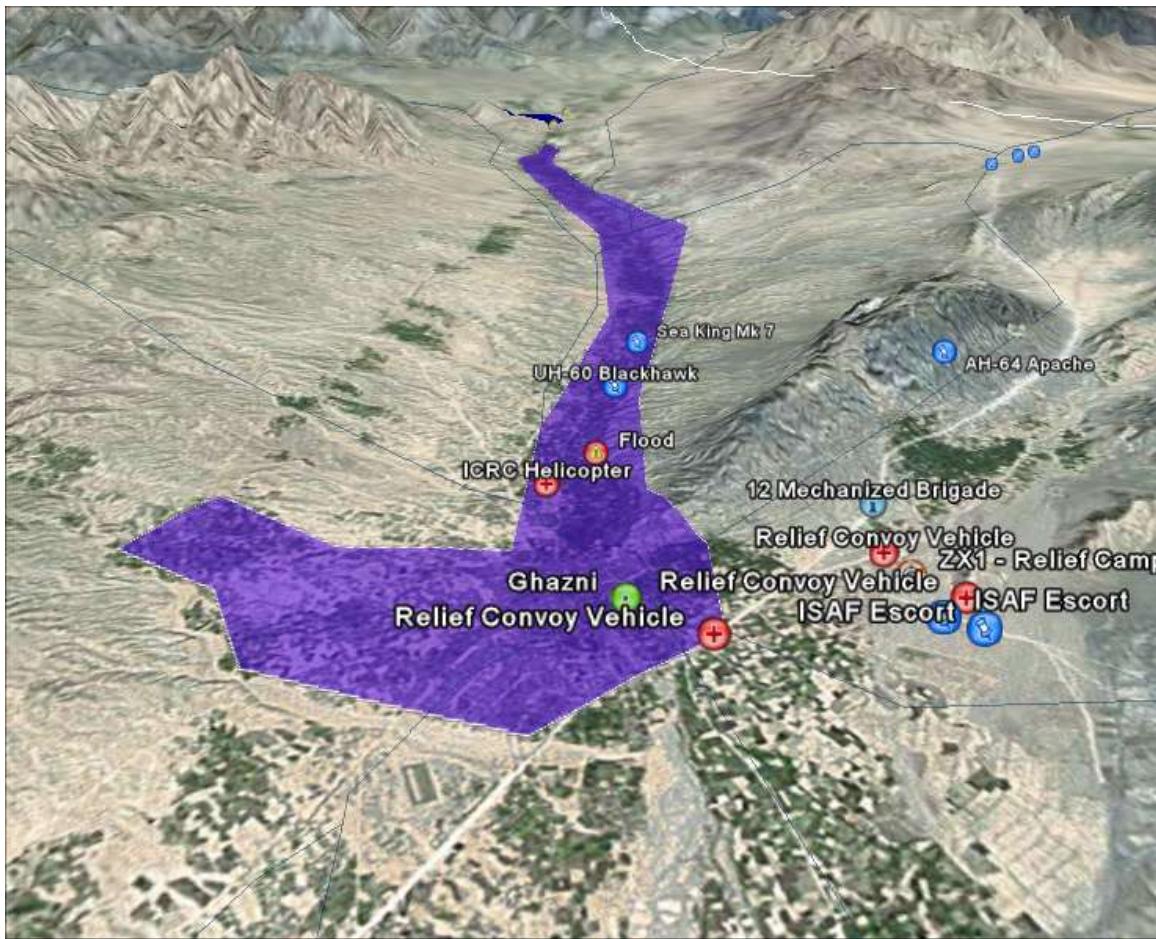
Figure 4.13: Distribution of Aid Supplies and SAR Operations – 3D Relief View

4.4.1 Time Period

- 30/03/2002 06:00 - 30/04/2002 21:00

4.4.2 Timeline
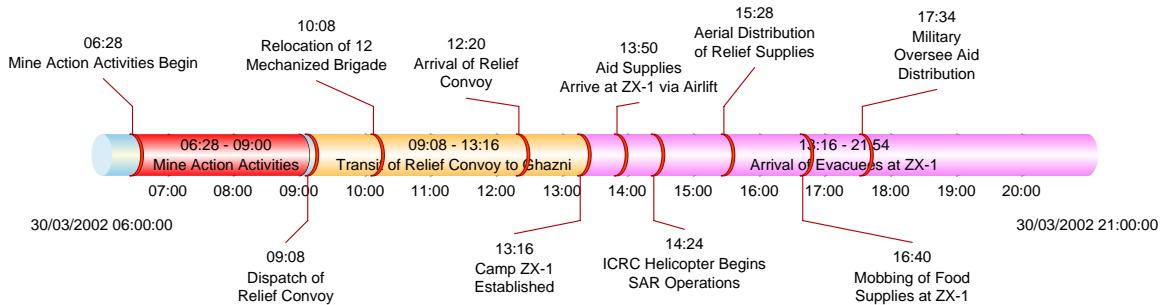
Figure 4.14: eResponse Phase Timeline

Time	Event	Description
30/03/2002 06.28	Mine Action Activities	12 Mechanized Brigade surveys the area of the proposed relief camp, which will also serve as an operational centre for the relief effort, to determine the risk posed by UXO. There is no intelligence information to support the presence of land mines, although since Ghazni has been the focus of previous air strikes there is a considerable risk of cluster bombs. These were previously used against Taliban forces in the early stages of the conflict.
30/03/2002 09.08	Dispatch of Relief Convoy	The initial relief convoy is dispatched from Kabul to Ghazni.

Time	Event	Description
30/03/2002 10:08	Relocation of 12 Mechanized Brigade	12 Mechanized Brigade are re-positioned to the north of Ghazni on standby.
29/03/2002 12:20	Arrival of Relief Convoy	The relief convoy arrives at the proposed site for the relief camp outside Ghazni.
29/03/2002 13:16	Camp ZX-1 Established	The relief camp is established. It serves an operational centre for the relief effort and includes provisions for displaced persons and medical aid.
29/03/2002 13.50	Aid Supplies Arrive via Airlift	Additional aid supplies are delivered to ZX-1 via airlift using Chinook helicopters
29/03/2002 14.24	ICRC Helicopter Begins SAR Operations	SAR operations are undertaken by an ICRC helicopter in the rural regions affected by the flood.
29/03/2002 15:28	Aerial Distribution of Relief Supplies	The Blackhawk helicopter is re-tasked with the aerial distribution of relief supplies to outlying rural regions. It is joined in this task by a Sea King helicopter.
29/03/2002 16:40	Civil Disturbance in Ghazni	Reports emerge of civil unrest in Ghazni in the form of mobbing of aid supplies and a number of shooting incidents.
29/03/2002 17:34	Military Oversee Aid Distribution	Military assets are called in to oversee the distribution effort. Ground forces are deployed in Ghazni and Apache and Blackhawk helicopters provide air-based surveillance and security.

4.4.3 Figures

- Figure 4.11

- Figure 4.12

- Figure 4.13

4.4.4 Synopsis

This period is marked by the distribution of humanitarian aid. The humanitarian relief effort codenamed (Sultan Relief) is initiated. A relief convoy is assembled to supply aid to the affected region using the main route from Kabul to Ghazni (Route 104). This route is deemed passable to trucks used by the coalition relief effort. The humanitarian agencies wish to set up a relief camp on the outskirts of Ghazni to deal with people temporarily made homeless as a result of the flood. Units from 12 Mechanized Brigade are deployed into this area well ahead of the arrival of the relief convoy in order to secure the area and to investigate the risk with respect to UXO.

The security situation is deemed sufficiently hazardous for the HC to request an armed escort for the relief convoy to Ghazni. The reluctance of the ICRC to accept armed escorts by those directly involved in combat operations, namely the US-led coalition forces, necessitates the use of careful measures on behalf of the military to preserve the perceived neutrality of humanitarian actors. Eventually, it is decided that military support will be provided to the convoy using airborne assets in the form of an Apache helicopter with ground support provided by ISAF elements, which operate under a UN mandate. In accordance with IASC guidelines a clear distinction is to be made between humanitarian and military escort vehicles in the context of the transport of relief supplies to the affected region.

The relief convoy is deployed to Ghazni at 09.08. On arrival, an operations centre and relief camp is established on the outskirts of Ghazni to the north-east (codenamed ZX1). Some aid supplies are distributed via airlift into this base using Chinook helicopters requisitioned from the US Army. Aid representatives are deployed into Ghazni and the provincial leadership is contacted to assist with the supervision of the support efforts. Some aid supplies are deployed directly into Ghazni. Following the wish of the humanitarian agencies to operate without military supervision in the distribution of aid supplies, military agents do not assist with the distribution of aid. A Blackhawk

helicopter is, however, tasked with overseeing the humanitarian relief effort from the air within Ghazni. Units from the 12 Mechanised Brigade are re-positioned to the north of Ghazni along Route 104 on standby. An evacuation operation is initiated to transfer all inhabitants made homeless by the flood water to Zulu-Xray.

The ICRC helicopter begins SAR operations in the flooded region north of Ghazni and begins to transport rescued civilians from the rural regions into Zulu-Xray. The helicopter reports that significant numbers of people are made homeless by the flood and this necessitates the deployment of aid supplies directly to the affected communities. The humanitarian community wants to deliver aid supplies by air to these communities and this requires close inter-operation with military agencies regarding the security of the airspace in the region affected by the flood. Sea King Mk7 and Blackhawk helicopters (the one previously tasked with surveillance of the relief distribution effort in Ghazni) are enlisted into the aid distribution effort to outlying rural regions. As the air picture in the affected region becomes increasingly busy, the need for situation awareness is heightened. At this stage of the scenario, as at other stages, a key operational requirement is an awareness of what actors are deployed into the theatre of operations and what they are doing. This is necessary in order to avoid inadvertent targeting of neutral assets as well as coalition forces. The tactical picture at this juncture in the scenario is highly complicated, featuring a complex mixture of both airborne and land-based agents with different operational foci. This complexity is compounded by the presence of agents with very different organizational affiliations and roles, i.e. US-led coalition forces, ISAF, Afghan civilians, humanitarian agencies and news agency representatives.

As aid supplies are distributed within Ghazni, the relief camp and surrounding regions, the security situation within Ghazni deteriorates. News reports emerge of civil disturbance in Ghazni in the form of widespread looting and mobbing of food supply vehicles. It is also reported that a number of humanitarians and civilians have been the target of shooting incidents. While reports from humanitarian agencies are unable to confirm the use of arms, they do confirm that the situation in the vicinity of the aid distribution point is increasingly hostile and threatening. Mobile phones are used by humanitarian aid personnel to transmit images of the situation in Ghazni back to base. At this point there is a conflict between the interpretations of the situation between the humanitarian and military agencies. The military agencies perceive the situation as necessitating the deployment of military assets, while the humanitarians perceive the situation as manageable and under control. Finally, the military is able to provide the HC with video footage derived from news reports that confirms looting and shooting incidents within Ghazni. This is sufficient for the HC to ask for military assistance with respect to the security situation in Ghazni. Military personnel, in the form of 12 Mechanized Brigade, are subsequently called on to control the situation and supervise the distribution of food and water in Ghazni. An Apache helicopter is also called in to oversee the distribution of food aid from the air. All reports about the security situation are monitored to detect any worsening of the situation, but the presence of military forces on the scene is sufficient to bring the situation under control.

Throughout this phase of the operation multiple information sources are monitored to provide feedback about the success of the operation and acquire information about situation contingencies that may require significant re-planning or reorganization of the relief effort. Information of interest includes changes in the flood levels, the meteorological outlook, incidences of civil disorder or unrest, military attacks on relief convoys and coalition forces, information about fatalities and the

international response to the disaster. In addition, military agencies are interested in monitoring changes in the background level of conflict throughout the country that may indicate civil unrest in light of the disaster. Weather reports for the local region are monitored for evidence of any precipitation events that might adversely affect the relief effort. The military provide access to further satellite imagery products, although these can only be used at periodic intervals throughout the scenario. News reports from various news agencies provide information about the situation in Ghazni and elsewhere, including the national and international response to the humanitarian crisis. The military's concern with the political impact of the crisis warrants an interest in all news reports that provide information about the flood. They are particularly concerned with the manner in which the flood is presented in the media. Any information sources that provide information about the disaster are relevant in this respect, including information sources that may misrepresent the military's position or deliberately attempt to misinform the public as a means to undermine political support for continued military action. Incidents such as these are deemed relevant to the military's media operations and strategic information campaign.

4.4.5   Focus Task Areas

The key focus task area for this phase of the scenario is purely one of situation monitoring. Situation awareness is enhanced via the ability to integrate information from multiple sources and to visualize the situation in a manner the permits of the juxtaposition of very different situation elements. Users of the system at this point should have the capability to view the tactical picture from a variety of different perspectives. The humanitarian tactical picture will consist of humanitarian agents and their activities, while the military picture will consist primarily of military assets (both land and air components). It should, however, be possible to arbitrarily compose any form of tactical picture based on semantic queries, which indicate the types of situation elements of interest with respect to the monitoring objectives of an observer agent. In addition, this phase of the scenario clearly demonstrates the use and exploitation of a number of diverse information sources, which are used to alert agencies of the occurrence of particular events and are exchanged with other agencies in order to coordinate activities and improve operational effectiveness (this is clearly the case when military agents consolidate information from the Blackhawk helicopter and news reports in order to provide evidence of the worsening security situation to humanitarian agencies).

This phase of the scenario does not feature any conventional rules-based reasoning. It does however avail itself of the considerable power afforded by subsumption reasoning in terms of the automatic classification of situation elements. The ability to exploit the semantic meta-data associated with information products is also crucial in terms of identifying the semantic referents of diverse information sources, such as field reports, imagery and video products. As such, this phase of the scenario provides an opportunity to highlight the advantages of semantic web technology with respect to information integration, semiometric filtering and improved search and retrieval capabilities.

4.5   Post-Emergency & Durable Solution Phase

4.5.1   Time Period
- 01/04/2002 00:00 - 30/06/2002 00:00

4.5.2   Timeline
None

4.5.3 Figures

- None

4.5.4 Synopsis

Humanitarian relief efforts continue. At this stage of the scenario the flood water levels are deemed stable. The majority of military units are removed from the crisis zone, although a battalion of the 12 Mechanized brigade remains in situ to oversee relief distribution efforts and local security. A medical clinic is established at camp Zulu-Xray to treat the wounded and deal with possible disease outbreaks. Any incidence of water borne diseases such as cholera, typhoid fever and Hepatitis A are immediately reported to the commanding authorities at HIC.

This phase of the scenario is concerned with an assessment of the long term impact of the flood. A working group with input from subject matter experts from multiple disciplines is established to assess the long term effects of the flood, the actions required throughout the recovery phase and the future assistance required by inhabitants of the region. The key issues for the working group relate to the following:

- There has been a substantial loss of irrigation water from the reservoir. This reservoir provided extensive irrigation support to multiple communities, some of whom are currently unaffected by the flood. The irrigation served not only as a supply of drinking water, but also as a supply of water for agricultural purposes. As such it is expected that future crop yields in the region may be affected which may result in long term food insecurity and economic problems for the region. This is a source of concern, not only from a humanitarian perspective, but also from the perspective of the campaign to win 'hearts and minds'. There is a need to avoid civil unrest or undue economic hardship in the post-war period, which may intensify ill feeling against the allied powers.

- Related to the previous point is the long term damage done to agricultural land in the immediate vicinity of the flood. Thousands of hectares of arable land have been washed away destroying young wheat crops, which is a valuable economic and food resource in the province. In addition, the flood has destroyed orchards, which may take years to fully recover and may hamper the economic recovery of the region in the wake of the conflict period. Significant numbers of livestock have also been destroyed by the flood

- Although the flood waters have receded there is still a risk of disease due to the contamination of fresh water wells used for drinking water. There is a need to continually monitor the viability of these fresh water supplies in order to prevent future disease outbreaks.

- The flood has destroyed thousands of homes and shops in the city of Ghazni, which previously served as a major cultural centre. A failure to address the economic impact of the flood, vis-à-vis the destruction of Ghazni, may contribute to long term resentment against the occupying forces and destabilise future peace efforts.

4.5.5 Focus Task Areas

Knowledge processing at this stage of the scenario could be directed towards assessing the likely impacts of the flood in terms of future food insecurity and economic hardship. This will not, however, be a central focus for demonstrating the capability of the AKTiveSA TDS at this point. Rather the emphasis will be on access to information required for these kinds of decision-making capabilities, namely information about land use, the type of crops produced, the importance of these crop products to the local economy, etc. From a situation monitoring perspective the

emphasis should be on detecting incidences of disease. For instance, humanitarian agencies will require notification about all incidences of disease in the flooded region and they should be able to view this information in graphical format in order to detect a rapid increase in disease cases.

5   Background Information

This section reviews the information and knowledge backdrop of the scenario presented in this report based on current guidelines and SOPs (Standard Operating Procedures) adopted by humanitarian agencies. The scenario presented in this document makes a number of assumptions regarding the extent of cooperation with military agencies, knowledge and reasoning capabilities of executive decision makers, the kinds of information exploited in the context of decision-making tasks and the institutional structures and procedures for exchanging information and coordinating activities. This section aims to provide background information relevant to these assumptions based on current codes of practice and the mandates of actors featured in the scenario.

5.1   Humanitarian Knowledge-Intensive Tasks

The deployment of an operationally-effective aid solution incorporates a number of knowledge-intensive tasks, which are typically completed by agents in a collaborative fashion. Besides the issues related to disaster preparedness[37], prediction and disaster notification, a coordinated relief effort typically entails the following task components:

- **Situation Assessment:** an assessment of the situation including what has happened and where. Much of the information required for this activity can be gleaned from reports, such as SITREPs (Situation Reports), and physical descriptions of the phenomenon responsible for the emergency situation.

- **Needs Assessment:** an assessment of what needs to be done in terms of relief actions and supply requirements in order to minimize further harm and alleviate human suffering.

- **Relief Planning:** the actual planning of a relief effort in terms sourcing, delivery and dissemination of aid supplies.

- **Future Vulnerability Assessment:** an assessment of the long term implications of the disaster with respect to future humanitarian action.

5.1.1   Needs Assessment

In order to provide effective humanitarian relief, aid agencies need access to reliable information about the implications of a humanitarian emergency in terms of its resource requirements. The process of determining the kind and quantity of resources required to deal with a humanitarian emergency is referred to as 'needs assessment' and its aim is to understand the demands of an emergency in terms of the following types of activities and resources (*Post-Disaster Damage Assessment and Need Analysis*, 2000)[38]:

- Search and Rescue

- Evacuation

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[37] This topic is not covered in this report.

[38] Needs assessment also tends to involve an element of prediction in which there is a need to identify major secondary threats to survivors, such as secondary flooding or landslides, damage to chemical plants or fuel storage fires, etc. (Disaster Emergency Needs Assessment, 2000).

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- Protection

- Medical and Health

- Shelter and Clothing

- Food (including cooking utensils and cooking fuel

- Water

- Sanitation

- Lifeline Systems (e.g. communications, power supplies, transport, etc.)

The needs assessment process is informed by the results of a situation assessment (a description of what has happened). Some of the data required for the needs assessment is already available in the form of baseline data (maps, population statistics, etc), but often these baseline data must be supplemented by real-time information (mostly in the form of incoming reports from various sources after the disaster).

In quantifying needs it is often appropriate to use internationally accepted standards for assigning resource requirements based on the characteristics of the emergency situation. The AKTiveSA project relies on the standards promulgated by the SPHERE project[39]. The SPHERE Handbook (*Humanitarian Charter and Minimum Standards in Disaster Response*, 2003) includes information on the following sectors:

- Water Supply and Sanitation

- Nutrition

- Food Aid

- Shelter and Site Planning

- Health Services

In addition, to these sectors, assessment teams may also be required to collect information on personal and household needs; agricultural, economic and infrastructure damage; and the political and security situation, etc. In some cases this additional information is important in terms of assessing future vulnerability (see Section 5.1.3) after the emergency phase of the disaster has ended.

In general, needs assessment should be an ongoing and repetitive process (*Disaster Emergency Needs Assessment*, 2000). This reflects the fact that circumstances, information availability, and emergency needs change over time. When and how often different assessments are conducted will depend on the type of disaster, available resources and specific information needs. Generally, information should be collected more frequently the more a situation changes and when there are critical developments, such as a secondary disaster, new population movements or an epidemic outbreak.

Given the importance of situation information for needs assessment, it is important for responding agencies to trust the information they receive. Particular concerns relate to the expertise of those involved in the assessment and the possibility for bias. The ICRC, for example, recommends the

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[39] http://www.sphereproject.org/

evaluation of all assessment information with respect to the following criteria (*Disaster Emergency Needs Assessment*, 2000):

- Who did the assessment? What experience/expertise do they have in this area?

- How much time did the assessment team spend on-site? Did they visit the site?

- Whom did the assessment team interview? What important beneficiary groups did they fail to consider?

- If the assessment report contains statistical data, are they primary or secondary data? If they are secondary data, what is the original source? Does the team have the expertise to judge the validity of statistical information? If not, which experts should they consult?

- What is the possibility of a segment of the population (e.g. an ethnic, class, national, geographic, religious, or vulnerable group) being inadequately assessed?

- Considering the source of information, what biases may be reflected in the assessment findings?

- Does the NGO (Non-Governmental Organization) or government have an interest in presenting biased information?

- What are the government's interests in presenting biased information? Does the government's information appear misleading?

There is clearly a role here for knowledge-based evaluation of certainty assigned to information based on the relative trust invested in information sources. In addition, it is likely that mechanisms of information fusion can be used to evaluate the reliability of assessment information, a mechanism that is analogous to the ICRC proposed technique of 'triangulation'[40] (*Disaster Emergency Needs Assessment*, 2000).

A variety of tools exist for performing needs assessment. These mostly assume the form of checklists and forms. The Rapid Needs Assessment Checklist of the ICRC is reproduced in Appendix B illustrates the forms used by the ICRC to undertake needs assessment. Such resources provide a valuable source of information regarding the information requirements of the needs assessment process. Original copies of these forms are available from the ICRC 'Disaster Emergency Needs Assessment' (2000) manual.

5.1.2   Relief Planning

Relief planning entails the translation of humanitarian needs (resulting from needs assessment) into an operational plan for aid delivery. The task of planning the relief effort entails the ability to identify the sources for aid supplies (perhaps in the form of organization-specific stockpiles) as well as to determine the needed capacity to use these resources effectively. Identifying the needed capacity of a relief effort is important because it is easy for planning efforts to focus on the resource aspects of an emergency situation while ignoring the capacity of an organization to effectively deploy those resources. The UNHCR, for example, comments:

> *"Capacity is the internal organizational capability which includes planning, staffing, structure, systems, procedures, guidelines, information flow,*

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[40] Triangulation may be achieved through the use of different assessment techniques or approaches or by using different indicators of the same phenomenon and consulting different sources.

communication, decision-making and administrative support. Resources are the financial and human resources, relief materials, support equipment, tools and facilities…Capacity is an aspect of emergency management which is sometimes not given adequate priority. Resources are often given more emphasis during both the planning and operational stages since they are a more tangible element. But it is capacity that determines the quality of an emergency response. A well capacitated organization is more likely to be able to mount a credible and effective operation, attracting the necessary resources." (Handbook For Emergencies, 2001; pg. 30)

In general, the Gap Identification chart is an essential ingredient of relief planning. The chart enables an analyst to allocate responsibilities effectively and allocate gaps in resource allocation with respect to different aid sectors (see Table 5-1).

	Site 1	Site 2	Site 3
Overall Site Management			
Protection & Security			
Registration			
Shelter			
Water			
Health			
Nutrition			
Sanitation			
Distribution			

Table 5-1: Blank Gap Identification Chart

5.1.3 Future Vulnerability Assessment

Future vulnerability assessment concerns the long term impacts of a humanitarian emergency in terms of the recovery and rehabilitation of the affected communities. The current scenario highlights the need for this kind of assessment in terms of the long-term economic and agricultural impact of the flood on the affected regions. The aim of future vulnerability assessments are to provide an indication of the long term humanitarian aid required by a community, in terms of both supplies and aid actions, as well as an indication of the time period over which such aid is to be provided.

5.2 Use of Satellite Imagery

The scenario described in this document features the exploitation of satellite imagery for the purposes of situation assessment and relief planning. A number of humanitarian organizations currently exploit satellite images for similar purposes in the context of relief efforts and this exploitation is predicted to grow as commercial satellite products become more accessible and cost effective (Bjorgo, 2002). Both the recent UN General Assembly's "Report of the Panel on United Nations Peace Operations" (A/55/305 - S/2000/809, also referred to as the 'Brahimi Report')[41] and "Strengthening of the Coordination of Emergency Humanitarian Assistance of the United Nations: Report of the Secretary-General" (A/55/82 - S/2000/61) acknowledge the importance of using

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[41] http://www.un.org/peace/reports/peace_operations/

modern technologies, including GIS (Geographic Information System) and related tools such as satellite imagery, during complex and humanitarian emergencies. To this end the UNHCR, in coordination with OCHA (United Nations Office for the Coordination of Humanitarian Affairs), has recently implemented a new initiative for the increased use of Landsat 7 derived information for the benefit of the humanitarian community, within the framework of the GIST (Geographic Information Support Team) initiative. This work includes developing and updating a web site[42] in cooperation with the University of Georgia (US) and its Information Technology Outreach Service (ITOS), dedicated to the free sharing of Landsat 7 satellite imagery as part of a broader data repository. The web site stores a significant amount of useful Landsat 7 imagery, which is regularly updated for the benefit of the global humanitarian relief community. The site is expected to contribute more quality geographic information and, accordingly, to increase the use of EO (Earth Observation) technology within the humanitarian community. Recently, the UN also established UNOSAT[43] to provide the humanitarian community with access to satellite imagery and GIS services. UNOSAT is implemented by the UN Institute for Training and Research (UNITAR) and managed by the UN Office for Project Services (UNOPS). The goal of UNOSAT is to make satellite imagery and geographic information easily accessible to the humanitarian community and to experts worldwide working to reduce disasters and plan sustainable development. UNOSAT acquires satellite images from all commercial providers.

The GIST, an informal support group for sharing geographic information between actors in the humanitarian relief community, has developed a set of core standards for information sharing (King & Dilley, 2001). These standards follow the Structured Humanitarian Assistance Reporting Exchange (SHARE) approach, which encourages actors to include:

1. geographic reference or location information on where data were collected;

2. time-stamp information indicating when data were collected, and where suitable, at what frequency new data are collected;

3. metadata (information about the data themselves), including information on sources of data, what the data values represent, which standards were used, and how the data was measured or derived.

One of the main benefits of satellite imagery is that service providers already follow these standards[44]. This makes satellite data particularly suitable to be included in GIS and to be shared with other actors. Hence, there is no need to develop new formats for the relief community.

For the most part, humanitarian agencies tend to use commercial satellite products rather than military sources; however, military sources of imagery are often preferred to commercial sources because they offer greater detail and in some cases the images have already been interpreted and are ready to use (Bjorgo, 2002).

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[42] https://gist.itos.uga.edu/
[43] http://unosat.web.cern.ch/unosat/
[44] Satellite images are normally delivered as raster data, either already geo-referenced (e.g., in the GeoTIF format) or with header files (metadata) containing information on image centre and corner coordinates.

5.3 Civil-Military Interoperation in Relief Efforts

5.3.1 Overview

Since the end of the Cold War period military forces have been increasingly involved in crisis management and disaster relief efforts. The ICRC (*The ICRC and Civil-Military Conflict Relations in Armed Conflict*, 2001) proposes a number of reasons to account for this increased participation:

- **Reforms in the armed forces:** The traditional emphasis on territorial defence has to some extent shifted to other functions, including peace support operations and emergency aid in natural disasters. States are thus seeking new ways to devote their military capabilities to new tasks.

- **The changing nature of conflicts:** Geopolitical developments over the past ten years have triggered a new type of conflict. The end of the Cold War brought several proxy wars to a close, but it also means that weak States have become more vulnerable to internal strife and, in some cases, have disintegrated into failed States torn apart by armed combat between a host of local power centres. One of the most disturbing features of these new conflicts is that, very often, civilians are no longer "caught in the crossfire" but are deliberately targeted on account of their group identity. The high price paid by the civilian population and the destabilization of entire regions has given rise to a greater need for military intervention to restore peace and security.

- **Developing Role of the United Nations Security Council:** The United Nations Security Council has taken on a new importance. The Permanent Members are much more likely now than during the Cold War to reach a consensus in favour of military intervention on humanitarian grounds, or at least to abstain from using their veto. This has provided greater scope not only for peace-keeping but also for peace-enforcement.

The UNHCR (*Use of Military or Armed Escorts for Humanitarian Convoys*, 2001) also identifies a number of factors encouraging increased participation of military actors in relief efforts. These include:

- **Military factors:** humanitarian actions may be undertaken as part of an effort to secure the good will of the population within which a force is operating. This is otherwise known as Civil Affairs Operations (CAOs).

- **Institutional factors:** military forces may be tasked with peace support and relief operations because there is a need to foster the impression that they are active during periods of low threat.

- **Political factors:** military involvement may be encouraged as part of a public relations effort directed towards constituencies in the sending state.

5.3.2 Advantages and Disadvantages of Military Involvement

There is a widespread unease in the humanitarian community regarding the trend towards increasing military involvement in humanitarian affairs. International humanitarian law has sought to build on the distinction between the military domain and the non-military domain, seeking to create what is now sometimes referred to as the 'humanitarian space' (*The ICRC and Civil-Military Conflict Relations in Armed Conflict*, 2001). In seeking to consolidate this humanitarian space, the use or involvement of military assets for humanitarian relief has generally been regarded as undesirable, threatening to compromise the neutrality, impartiality and other humanitarian principles of humanitarian actors. The potential for perceived loss of neutrality is a particular cause for concern

since it can result in relief workers becoming the targets of hostile activity and being denied access to the affected population, not only in the current emergency, but also in future humanitarian crises. In addition, the loss of neutrality can result in the affected population becoming direct targets of the belligerents.

Despite these concerns within the humanitarian community, there is also a recognition of the value of military forces in at least some aspects of humanitarian relief operations. The military often have the capability to help secure an enabling environment on the ground in which humanitarian activities can take place in relative safety. The military may also have the practical means to assist in the delivery of aid efforts, e.g. the rapid deployment of large numbers of personnel, equipment, logistics and supplies. They may also serve as information providers with respect to situation and needs assessment[45]. There is thus a need to counterbalance the concerns of the humanitarian community with respect to military involvement, against the wider concern to expedite humanitarian action in an operationally effective manner within a relatively secure operating environment.

5.3.3   Guidelines on Civil-Military Interoperation

Whatever the concerns about the effective blurring of the military and humanitarian spaces, the fact is that humanitarian actors often need to inter-operate with military agencies, perhaps with respect to the coordination of their activities and the exchange of information, even if these efforts do not necessarily aim to co-opt military assets into an ongoing relief effort. The operational necessity of this inter-operation has prompted the IASC to propose the following 'operating principles' with respect to the use of all military assets in support of humanitarian operations (*The Use of Military and Civil Defence Assets in Support of Humanitarian Operations*, 1995):

1. Decisions to accept military assets must be made by humanitarian organizations, not political authorities, and based solely on humanitarian criteria. Requests for military assets must be made by the Humanitarian Coordinator or Resident Coordinator.

2. Military assets should be requested only where there is no comparable civilian alternative and only the use of military assets can meet a critical humanitarian need. The military asset must therefore be unique in nature or timeliness of deployment, and its use should be a last resort.

3. A humanitarian operation using military assets must retain its civilian nature and character. The operation must remain under the overall authority and control of the humanitarian organization responsible for that operation, whatever the specific command arrangements for the military asset itself. To the extent possible, the military asset should operate unarmed and be civilian in appearance.

4. Countries providing military personnel to support humanitarian operations should ensure that they respect the code of conduct and principles of the humanitarian organization responsible for that deployment.

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[45] These roles as information providers should not be confused with the situation and needs assessment activities undertaken by relief personnel. In general, humanitarian expertise – including beneficiary identification, needs and vulnerability assessment, impartial and neutral distribution of relief aid, and monitoring and evaluation are considered essential to an effective and successful humanitarian operation (*Civil-Military Relationship in Complex Emergencies: An IASC Reference Paper*, 2004) and military participation in these kinds of activities is to be avoided.

5. The large-scale involvement of military personnel in the direct delivery of humanitarian assistance should be avoided.

6. Any use of military assets should ensure that the humanitarian operation retains its international and multilateral character.

In general there is a recognition that where civilian/humanitarian capacities are not adequate or cannot be obtained in a timely manner to meet urgent humanitarian needs, military and civil defence assets, including military aircraft, may be deployed in accordance with the aforementioned guidelines.

The nature of the cooperation between humanitarian and military agencies may assume a number of forms. The mandate of the UN peace keeping force in Afghanistan, i.e. ISAF, for example, includes limited support to the UN humanitarian and recovery effort and it has a CIMIC (Civil-Military Cooperation) group to perform this function. Information can be shared freely with ISAF. ISAF may also be used to provide indirect assistance (e.g. the transport of goods, or the maintenance of camps, schools and other facilities where beneficiaries are present) or infrastructure support (e.g. the construction or repair of bridges, roads, airfields, power, communications or other facilities that benefit the population but involve limited contact with the beneficiary population).

5.3.4 Military Escorts

In general the greatest area of controversy regarding the inter-operation of military and humanitarian agencies concerns the use of military forces for security purposes, e.g. the provision of armed escorts. Several factors affect the security situation: complex emergencies by definition entail civil strife and high levels of violence; landmines, unexploded ordnance, and small arms are prevalent in communities and cities where humanitarian agencies operate; also because the number of NGOs operating in complex emergencies has steadily increased over the past decade, the probability of incidents involving relief workers has also increased thereby escalating security concerns. The use of military escorts for humanitarian convoys has both advantages and disadvantages. On the positive side, military escorts provide deterrence against potential aggressors. Where armoured vehicles are used in the convoy escort, greater physical security (not to mention psychological security) is offered. In addition, in the actual event of an attack, escorts provide a self-defensive capability. On the negative side, however, escorted convoys tend to move slowly, especially where heavy armoured vehicles are used. Aggressors also tend not to differentiate between convoys and their escorts, and may therefore target unarmed humanitarian workers.

Within the community of the humanitarian organizations outside the UN there is a broad view regarding the extent to which the military should be used for armed escorts of humanitarian convoys. The Red Cross Movement, for example, holds that:

> *"as a general principle any armed protection for any component of Movement is in conflict with the following Fundamental principles: humanity, independence, impartiality and neutrality." (cited in, Use of Military or Armed Escorts for Humanitarian Convoys, 2001; pg 8)*

Other organizations, especially the implementing partners of the UN agencies, have no such policy objections.

In 2001, the IASC advocated the following criteria regarding the use of armed escorts for humanitarian relief convoys:

1. **Sovereignty.** The sovereign power or local controlling authority ('the local authorities') is unwilling or unable to provide a secure environment without the use of military or armed escorts.

2. **Need.** The level of humanitarian need is such that the lack of humanitarian assistance would lead to unacceptable human suffering, yet assistance cannot be delivered without the use of military or armed escorts.

3. **Safety.** Armed or military escorts can be provided in a way which would provide the credible deterrent needed to enhance the safety of humanitarian personnel and the capacity to provide assistance to intended beneficiaries without compromising the security of beneficiaries and other local populations.

4. **Sustainability.** The use of an armed or military escort would not compromise the longer-term capacity of the organization safely and effectively to fulfil its mandate.

If the use of armed escorts is deemed necessary, then the relationship between the humanitarian community and external military forces should be based on the following guiding principles (*Use of Military or Armed Escorts for Humanitarian Convoys*, 2001):

1. **The primacy of the humanitarian organizations in humanitarian work.** In the first instance, humanitarian work should be performed by humanitarian organizations. Insofar as military organizations have an immediate role to play in supporting humanitarian work, it should be in the provision of a secure environment and/or in the provision of logistics support when requested by humanitarian organizations.

2. **Primacy of humanitarian criteria.** The decision to request or accept the use of military or armed escorts must be made by humanitarian organizations, not political or military authorities, based solely on humanitarian criteria.

3. **Humanitarian identity.** Humanitarian convoys must retain their civilian nature and character. Other than the vehicles, weapons and personnel providing the escorts, the convoys must remain exclusively humanitarian and armed personnel should remain in separate vehicles. In order to give visibility to the civilian character of humanitarian convoys, vehicles other than the ones used to transport armed escorts may be fitted with "No Weapons" stickers.

Of course, issues of security and insecurity are relative. A situation that might be a security concern for the military may not be one for the International Committee of the Red Cross or for a local organization. Interpreting the situation and transmitting an assessment about the nature and perception of threats and vulnerabilities specifically to relief organizations is an important role that CA personnel can perform in support of humanitarian security.

5.3.5 Civil-Military Communication

In order to successfully coordinate their activities, communicative interfaces between military and humanitarian actors needs to be established at an institutional level. This is generally problematic because of the differing cultural and institutional mandates of the military and humanitarian community:

> *"On one level, basic terms often differ impeding communications. The military has its own acronym-filled jargon just as humanitarians do. CA personnel are*

taught one definition for "refugee" while there is different one common among humanitarians. Humanitarians who arrived in Afghanistan, for example, familiar with CMOCs from other conflicts were confronted with CHLCs. On another level, communication hardware systems differ. Maps are not common and humanitarians rely on satellite phones and e-mail which CMOC's do not necessarily have." (James, 2003)

Military agencies typically provide points of contact and coordination for humanitarian agencies as part of their Civil Affairs procedures. Civil Affairs units act as a liaison between the civilian inhabitants of a war zone or disaster area and the military presence, both informing the local commander of the status of the civilian populace as well as effecting assistance to locals by either coordinating military operations with NGOs or distributing aid and supplies directly to vulnerable communities. As part of CAO, military agencies will typically aim to establish CIMICs or CMOCs, which serve as the focus point for communication between the military and humanitarian actors. Typically, located within military headquarters, these units provide a convenient focus for civilian agencies' requests for military assistance. They also have the significant advantage of providing a meeting place where all members of the military chain of command can have access to civilian actors and organizations. For civilian actors, they provide convenient access to the military, and help overcome problems associated with a lack of familiarity with the military structure. In the context of Operation Enduring Freedom, communication between US-led coalition forces and humanitarian agencies was mediated through the establishment of a number of Coalitional Humanitarian Liaison Cells (CHLCs – pronounced "chicklets"). After the liberation of Kabul in early December 2001, the CJCMOTF was established for strategic command of CA assets. At the tactical level, following the deployment of Special Forces operational detachment's in key areas, the Coalition deployed CHLCs in several urban areas around Afghanistan. The CHLCs in many ways functioned as CMOCs but did not open "store front" offices as was common practice in the Balkans and other post-conflict situations. This departure from the traditional use of CMOCs by the military has been criticized as an impediment to effective communication, information sharing and a source of considerable confusion for humanitarian agencies (James, 2003).

In terms of the humanitarian community's efforts to establish communication and coordination links with the military, there are a number of initiatives within the UN system that focus on preparing humanitarian personnel on civil-military issues and practical liaison arrangements in complex emergencies. This includes the UNCMCoord (United Nations Civil-Military Coordination) induction courses, organised by OCHA's Military and Civil Defence Unit (MCDU). In addition to UNCMCoord Officers deployed by OCHA, UN agencies may deploy Military Liaison Officers (MLOs) to focus on specific sectorial and operational civil military issues and DPKO (Department of Peace Keeping Operations) may deploy Civil-Military Liaison Officers (CMLOs). Where established, the United Nations Joint Logistics Centre (UNJLC), an inter-agency facility, also provides a civil-military coordination function on an operational logistics level.

In an emergency situation, the UN Secretary General may appoint a Special Representative (SRSG) to be the overall coordinator for a United Nations operation. A Special Representative's role is to provide leadership and coordination of policy and operational objectives for the mission. The Special Representative will generally provide guidance in an effort to harmonise the operational objectives of the political, military and humanitarian components of the mission. In some cases the special

representative may take the form of a lead agency (e.g. UNHCR)[46] or HC. The decision about who to appoint as HC is made by the ERC, in consultation with the IASC. When an HC or Lead Agency has been designated, he or she is responsible for initiating requests for UN MCDA (Military and Civil Defence Assets) or approving the use of other military and civil defence resources. The ERC, in consultation with the IASC, provides the overall guidance for a particular complex emergency including parameters for the use of UN MCDA and other military and civil defence resources to support UN humanitarian activities. The HC will then initiate the request for the use of military and civil defence resources in the field, within the parameters specified by the ERC and IASC.

In response to a request for military assistance the supporting military or civil defence commander will determine whether he/she can complete the task within his/her means and capabilities given his/her primary mission requirements. Provided that the means indicated by the military or civil defence commander respects the principles of the IASC guidelines, the HC will then authorise the tasks to be undertaken by the designated unit. In general, requests for military assistance, in whatever form, are initiated by the HC and are communicated to the force commander for evaluation and review; in turn, military forces should aim to coordinate all activities that may affect humanitarian assistance operations with the HC through the missions' civil-military coordination structure. Timely coordination of such actions will avert inappropriate action, allow, where necessary, appropriate military-humanitarian delineation and promote an increased impact for the affected population. Typically, a HIC will be established to coordinate relief efforts within the humanitarian community in the case of a complex emergency, and it is recommended that such units should include a military link, such as CIMIC/CMOC or civil affairs representatives, as part of civil-military coordination activities.

5.3.6 Information Exchange

Whatever the formal arrangements between military and humanitarian agencies regarding civil-military coordination, there will always be a requirement to share information. Critical areas for information exchange include security, logistics, medical aid, transportation, and communications. In these areas the steady flow of timely information is essential for the success of humanitarian missions. Considerable quantities of humanitarian information can be gleaned by military forces going about their military business (e.g. state of the affected population, availability of key services and critical infrastructure). Conversely, humanitarian agencies can provide information regarding their activities in order that any military operations can be reconciled with those of humanitarian actors. Such information exchange is important if inadvertent damage, disruption and destruction of relief assets and unnecessary risks to humanitarian personnel and the civilian population are to be avoided.

The IASC (*Civil-Military Relationship in Complex Emergencies: An IASC Reference Paper*, 2004) identifies a number of types of information that may be shared between military and humanitarian agencies, including:

- **Security Information:** information relevant to the security of civilians and to the security situation in the area of operations.

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[46] For example, in November 1991, The Secretary General requested UNHCR to act as 'lead agency' in the former Yugoslavia, to coordinate humanitarian assistance on behalf of all UN agencies.

- **Humanitarian Locations:** the coordinates of humanitarian staff and facilities inside the military theatre of operations.

- **Humanitarian Activities:** the humanitarian plans and intentions, including routes and timing of humanitarian convoys and airlifts in order to coordinate planned operations, to avoid accidental strikes on humanitarian operations or to warn of any conflicting activities.

- **Mine Action Activities:** information relevant to mine action activities.

- **Population Movements:** information on the major movements of civilians.

- **Military Relief Activities:** information on the relief effort undertaken by the military.

- **Post-Strike Information:** information on strike locations and explosive munitions used during military campaigns to assist the prioritisation and planning of humanitarian relief and mine action/UXO activities.

- **Transport Infrastructure Information:** the integrity of roads and bridges and other transport routes.

- **Communication Infrastructure:** e.g. the best location for radio repeaters.

Unfortunately, there are a number of problems confronting the free exchange of information between military and humanitarian agencies. The military, for example, cannot disclose classified information; whereas humanitarian relief organizations are reluctant to share information that may look like 'intelligence' about the conflict and thus threaten the security of their staff and operations in the field (*Good Practices: Information Sharing in Complex Emergencies*, 2002).

While the efforts of civil affairs personnel can help to filter classified from unclassified and 'intelligence' from logistical information and deliver appropriately useful information to field-based relief organizations, a number of key issues remain for any emergency situation occurring against a backdrop of military intervention:

- What information should/could be shared, with whom and when?

- How can information that may be important for humanitarian purposes be differentiated from information that is politically, militarily or economically sensitive?

- How do we determine which information might serve purposes other than those which are strictly humanitarian? For example, how do we ensure that information on population movements or aid beneficiaries will not be misused for military purposes?

- Should information that is shared with one military group be shared with all other military and/or political groups as well? How should we ensure that no side is favoured over another while being mindful of the sensitivities involved in information exchange?

- When and how should information provided by the military be independently verified?

5.3.7   Conclusion

Any humanitarian operation using military assets must retain its civilian nature and character. While military assets will remain under military control, the operation as a whole must remain under the overall authority and control of the responsible HC. Military and civil defence assets that have been placed under the control of the humanitarian agencies and deployed on a full-time basis purely for humanitarian purposes must be visibly identified in a manner that clearly differentiates them from military assets being used for military purposes.

5.4 Knowledge Management

Humanitarian organizations have a number of knowledge management requirements with respect to the delivery of humanitarian relief. They need to be able to identify what information they require, where to find it, and how best to share, present and disseminate this information. Many of these challenges can be addressed by knowledge-based systems approaches (King, 2005; Smart et al., 2005; Zhang et al., 2002). Knowledge system solutions can assist humanitarian organizations with respect to information search and retrieval, knowledge distillation and decision making, all of which serve to improve situation awareness and enhance operational effectiveness in the delivery of aid solutions. Many aid organizations are recognizing the potential value of such initiatives in leveraging their latent knowledge to propitiate more effective response outcomes with respect to relief efforts. Oxfam, for example, has adopted a long term knowledge management strategy as part of its Strategic Plan (Powell, 2003; Stephen, 2001).

Typically, different types of information at varying levels of resolution are required by individuals involved in relief efforts:

> *"Certain background and situational information is needed by all humanitarian organizations: NGOs, UN agencies, governments and donors. Other types of information are more specifically needed by different personnel within these aid organizations. For example, humanitarian organization policy makers want 'big picture snapshot' analysis in order to understand the issues, to make decisions on providing assistance, and to be alerted to problems and obstacles. Field personnel and project desk officers in aid organizations, on the other hand, need more detailed operational and programmatic information in order to plan and implement humanitarian assistance and reconstruction programs."(King, 2005; pg. 1)*

Potential uses of knowledge systems include (Zhang et al., 2002):

- the prediction of the general nature or trend of a disaster;
- the evaluation of disaster severity so that planning, training, and stockpiling can be done quickly for medical supply, engineering, security, communications and other functions;
- the generation of timely, specific warnings to local authorities in the disaster region, thereby reducing the effects on resources and the population;
- disaster mitigation;
- the real-time distributed collaborative planning and coordination of relief actions.

King (2005) proposes some general guidelines in terms of best practice for knowledge management initiatives related to humanitarian relief. These include:

- Conduct an assessment of information needs and existing knowledge resources in advance, and identify the gaps in data, information and knowledge;
- Provide standardized meta-data (source, date, geo-reference, definitions) along with all collected and shared information, so that it can be pooled, compared, verified, mapped, and used for analysis;

- Establish and use collaboration networks to create communities of interest among individuals in multiple organizations as a means to capture and share tacit knowledge and dismantle organizational stovepipes47;

- Employ visualization to represent complex data and information, display patterns and relationships, and depict a geo-spatial common operating picture;

- Demonstrate the practical applications of new information tools and technologies and use collected data and information to answer questions and respond to identified information needs;

- Recognize the value of tacit knowledge gained from field experience, collaboration and learned expertise;

- Promote the use of new tools and technologies, such as Personal Digital Assistants (PDAs), Global Positioning Systems (GPS), Geographic Information Systems (GIS), and virtual collaboration networks and provide advance training in order to ensure that personnel use them effectively and routinely in their work.

As yet, few examples of comprehensive knowledge system solutions in the domain humanitarian relief can be provided. One description of such a system is provided by Zhang et al (2002) who propose a framework composed of a disaster case base, a catalogue of relief organizations and a knowledge store aimed at:

- providing recommendations of courses of action for humanitarian assistance/disaster relief decision-makers;

- maintaining both historical and newly updated information for pre-disaster prediction or systematic disaster analysis;

- enabling information and knowledge sharing;

- functioning as a federated resource for creating new knowledge.

Unfortunately, it is unclear from Zhang et al's (2002) paper whether the description they provide is a description of an extant knowledge system or merely a proposal for a potential knowledge system solution.

5.5 Humanitarian Information Centres

The scenario described in this document features the deployment of a HIC in Kabul, which serves as the focus for information dissemination, coordination and inter-agent communication. When an emergency occurs OCHA, acting on behalf of the UN and at the request of the HC, will typically establish a HIC in cooperation with other agencies and NGOs. The HIC is a semi-permanent facility that aims to provide information and professional services to humanitarian organizations as they implement relief and rehabilitation projects. Typically, the HIC establishes a physical space where those involved in relief efforts can meet and coordinate their activities[48]. In this sense the HIC serves

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[47] Zhang et al (2002) also advocate the use of collaborative technologies, such as Web-based groupware and on-line bulletin boards because decision making in humanitarian contexts typically requires the collaboration of multiple relief agencies or organizations.

[48] It may also provide a virtual space in the form of a website, which serves to disseminate information via the internet. In the case of Afghanistan, the AIMS (Afghanistan Information Management Service) organization exists as an HIC, providing information about ongoing relief efforts in the country as well as access to geographical and population datasets (http://www.aims.org.af/).

as hub for inter-agency coordination and information exchange. The main purposes of the HIC are to support:

> *"the coordination of humanitarian assistance through the provision of information products and services; and the decision making process at the headquarters and field level by contributing to the creation of a common framework for information management within the humanitarian community."*
> *(An Evaluation of Humanitarian Information Centers, 2004)*

In their evaluation of HICs, USAID (US Agency for International Development) note that humanitarian organizations typically find certain forms of information particularly useful in the early stages of an emergency (*An Evaluation of Humanitarian Information Centers*, 2004). These include basic maps showing the geography of the country, the location of, for example, settlements, roads, IDP camps, and offices. Maps showing security-related information, such as incidents of civil disturbance or military conflict, the location of UXO and IDP/refugee movements were also deemed to be of great value. Another popular information product is a WDWW analysis, i.e. an analysis of the agencies already operating in the region, their location and sectorial focus and aid activities. This information is arguably important in terms of improved situation awareness, and better coordination and communication between relief agencies, especially in regard to the planning of relief efforts. A number of NGOs also commented on the value of contact lists for enabling communication in the context of the USAID report.

5.6 Early Warning Systems & Disaster Notification

Early warning and disaster notification systems are an essential element of effective humanitarian assistance. For many types of natural disasters - flash floods, storms, forest fires, volcanoes, tsunamis - forecasting and early warning information and communication systems need to be in place. These systems collect and disseminate information on the potential development of the disaster, and determine the extent of its humanitarian impact. In the first few hours of a disaster, decisive action is necessary. In sudden onset disasters, local officials should issue a preliminary "disaster early notification" as soon as possible after the disaster occurs - preferably within the first 10 hours after a disaster. This early notification alerts headquarters that a disaster has occurred and approximates the magnitude and location of the disaster and immediate priorities, such as search and rescue, and on-site first aid.

A number of information sources provide early warning and disaster notification capabilities. These include:

- Reuters AlertNet[49]: a humanitarian news network based around a popular website. It aims to keep relief professionals and the wider public up-to-date on humanitarian crises around the globe.

- GDACS[50]: provides near real-time alerts about natural disasters around the world

- ReliefWeb[51]: a World Wide Web site for humanitarian emergencies. This is a project of UN OCHA that was initiated in 1996. It serves as an electronic central repository to meet the

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[49] http://www.alertnet.org/
[50] http://www.gdacs.org/
[51] http://www.reliefweb.int/

information needs of the humanitarian relief community. ReliefWeb enables users to access the information via the Internet at any time, any place. It contains daily-updated disaster information in a variety of forms, including situation reports, maps, press releases, appeals, and so on. Information is organized into multiple categories and indexes are established. This enables users to slice and dice information.

- Virtual OSOCC[52] (Virtual Operations On Site Coordination Center): this site provides a portal for information sharing between the humanitarian community and government agencies. Its purpose is not strictly to provide a disaster notification capability so much as to enable the exchange of information between participants in a relief effort.

- HEWS[53] (Humanitarian Early Warning Service): HEWS is the humanitarian early warning system provided by the IASC. It aims to provide a common platform for humanitarian early warnings and forecasts for natural hazards and worldwide socio-political developments.

- EMM (Europe Media Monitor) news Brief[54]: The EMM News Brief is a summary of news stories from around the world. The EMM alert system detects and classifies articles as they appear in the media. Each alert definition consists of keywords, which are matched to media reports. When matched, a reference to the article is placed in the appropriate alert category.

A large number of specific early warning systems also exist in addition to these more generic services, e.g. FEWS[55] (Famine Early Warning System), USGS[56] (US Geological Survey), TSR[57] (Tropical Storm Risk), PTWC[58] (Pacific Tsunami Warning Center), etc. Of the aforementioned systems, GDACS provides a particularly interesting exemplar in the case in of the AKTiveSA project. GDACS relies on a knowledge system and modelling system to infer information about the likely humanitarian impact of a hazardous phenomenon. Each phenomenon is characterised in terms of its essential features, the likely impact of the phenomenon (e.g. the number of people affected), the coping capacity and vulnerability of the affected region and any secondary affects that may occur as a result of the phenomenon. This information is used to generate a natural language textual summary of the phenomenon vis-à-vis its likely humanitarian impact, e.g.

> *"On 2005-09-26 01:55:19 +0000 UTC+2 an earthquake of magnitude 7.15 has struck the moderately populated region of Loreto, Peru. Whether international humanitarian aid is needed must be decided by an expert. However, the following automatically calculated elements can help. This earthquake has potentially a low humanitarian impact. The affected region has a medium vulnerability to natural disasters and the population has a high coping capacity."[59]*

5.7 Information Requirements

If officials responsible for organizing post-disaster relief operations are to make effective decisions about the deployment of resources it is essential that they be properly informed. Humanitarian actors require appropriate and timely information about what has happened, what needs to be

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[52] http://ocha.unog.ch/virtualosocc/

[53] http://www.hewsweb.org/home_page/default.asp

[54] http://press.jrc.it/NewsBrief/worldedition/en/en.html

[55] http://www.fews.net/

[56] http://earthquake.usgs.gov/

[57] http://tsr.mssl.ucl.ac.uk/

[58] http://www.prh.noaa.gov/ptwc/

[59] http://www.gdacs.org/reports.asp?eventType=EQ&location=PER&ID=46528&system=asgard

done, and what resources are available. King (2005) argues that humanitarian organizations typically require four types of information, viz.:

- **Information relevant to situation awareness:** Aid organizations need to know the latest about the situation on the ground and information about the conditions, needs, and locations of affected populations. For example:

  o What is the latest/current humanitarian situation in the country?

  o What are the most recent severity indicators? (death tolls, mortality rates, malnutrition rates, economic impact, infrastructure damage, etc.)

  o Who are the affected populations (refugees, IDPs, children and other vulnerable groups, resident populations, etc), how many are there, and where are they located?

  o What are the conditions and humanitarian needs of the affected populations?

  o What is the assessment of damage to infrastructure? (transport, buildings, housing, communications, etc)

  o What is the latest/current security situation in the affected areas of the country?

- **Operational/Programmatic Information:** information necessary to plan and implement humanitarian assistance programs. Information relevant to this category includes:

  o Where are and what are the conditions of the logistical access routes for delivering humanitarian assistance?

  o Who's Doing What Where? What humanitarian organizations are working in the country, what are their programs, what are their capacities and where are they working?

  o How is the host country/government responding and can it provide more?

  o What are the programmatic/financial needs of the humanitarian organizations?

  o What and how much is being provided to the humanitarian response organizations and who are the donors?

- **Background Information:** information that is needed to provide knowledge about the unique history, geography, population, political and economic structure, infrastructure and culture of the country. Baseline data are also necessary for aid organizations in order to be able to compare the emergency situation and conditions to previous normal conditions. Information relevant to this category includes:

  o What is the country's population (national, province/state, city/town) and its composition (ethnicity, religion, age cohorts, urban/rural, political, etc)?

  o What is the geography of the country?

  o What are the country's past disasters and natural hazards?

  o What are the most recent annual baseline health indicators for the population? (Crude Mortality Rate, Infant/Child Mortality Rates, HIV adult prevalence, malnutrition, etc)

  o What are the annual economic indicators? (GDP, GNP, agricultural/food production, staple food prices, etc)

- **Analysis-Related Information:** information that needs to be interpreted in context and related to other thematic information, for example:

- o What are the causes and contributing factors of the emergency?
- o What are the constraints to providing humanitarian assistance? (insecurity, inaccessibility, government interference, etc)
- o How effective are humanitarian assistance programs and responses?
- o What are the future impacts of the emergency?
- o What are the options and recommendations for action?

There are multiple sources of information that need to be integrated in the context of humanitarian activities. Situational information is reported in the news, but more directly in the situation reports and field assessments from the humanitarian response organizations working in the affected countries. These humanitarian organizations also produce and issue appeals, proposals, and project monitoring documents that provide operational and programmatic information. Useful background/baseline information can be found in country profiles, maps, databases, and chronologies. Analysis is also derived from evaluations, lessons learned, research studies and policy recommendations.

Information is typically available in a number of formats including plain text, photos, satellite imagery, video footage, hand sketches and maps. Of course not everything that aid organizations need to know can be found in databases, documents and visual products. There is also tacit knowledge that is usually not documented, but derived from expertise, collaboration and field experience (King, 2005).

6   References

1   Bjorgo, E. (2002) Space Aid: Current and Potential Uses of Satellite Imagery in UN Humanitarian Organizations. United States Institute of Peace (USIP).

2   Civil-Military Relationship in Complex Emergencies: An IASC Reference Paper. (2004) Inter-Agency Standing Committee (IASC).

3   *Disaster Emergency Needs Assessment.* (2000) International Federation of Red Cross and Red Crescent Societies.

4   *An Evaluation of Humanitarian Information Centers.* (2004) United States Agency for International Development (USAID).

5   Good Practices: Information Sharing in Complex Emergencies. (2002) United States Institute of Peace (USIP).

6   *Handbook For Emergencies.* (2001) United Nations High Commissioner for Refugees (UNHCR).

7   Humanitarian Charter and Minimum Standards in Disaster Response. (2003) Sphere Project.

8   The ICRC and Civil-Military Conflict Relations in Armed Conflict. (2001) International Committee of the Red Cross (ICRC).

9   James, E. (2003) Two steps back: relearning the humanitarian military lessons learned in Afghanistan and Iraq. *Journal of Humanitarian Assistance*.

10 King, D. (2005) *Humanitarian Knowledge Management.* Paper presented at the Second International ISCRAM Conference, Brussels, Belgium.

11 King, D., & Dilley, M. (2001) How to share information in a complex emergency. *Humanitarian Affairs Review*, 10-13.

12 *Post-Disaster Damage Assessment and Need Analysis.* (2000) Asian Disaster Preparedness Center (ADPC).

13 Powell, M. (2003) *Information Management For Development Organizations* (2nd ed.). Oxford, UK.: Oxfam Publishing.

14 Smart, P. R., Shadbolt, N. R., Carr, L. A., & schraefel, m. c. (2005) *Knowledge-Based Information Fusion for Improved Situational Awareness.* Paper presented at the 8th International Conference on Information Fusion, Philadelphia, USA.

15 Stephen, J. (2001) Knowledge Management in Oxfam. *Information Development, 17*(2), 107-110.

16 The UK Joint High Level Operational Concept: An Analysis of the Components of the UK Defence Capability Framework. (2005) Joint Doctrine and Concepts Centre, Ministry of Defence, UK. (Joint HLOC)

17 The Use of Military and Civil Defence Assets in Support of Humanitarian Operations. (1995) Inter-Agency Standing Committee (IASC).

18 Use of Military or Armed Escorts for Humanitarian Convoys. (2001) Inter-Agency Standing Committee (IASC).

19 Zhang, D., Zhou, L., & Nunamaker, J. (2002) A knowledge management framework for the support of decision making in humanitarian assistance/disaster relief. *Knowledge and Information Systems, 4*, 370-385.

Appendix A Acronyms & Abbreviations

ACTED	Agency for Technical Cooperation and Development
AEW	Airborne Early Warning
APC	Armoured Personnel Carrier
AWACS	Airborne Warning And Control System
C4I	Command, Control, Communications, Computers, & Intelligence
CA	Civil Affairs
CAO	Civil Affairs Operations
CAS	Close Air Support
CHLC	Coalition Humanitarian Liaison Center
CIMIC	Civil Military Coordination
CJCMOTF	Coalition Joint Civil Military Operations Task Force
CMLO	Civil-Military Liaison Officers
CMOC	Civil-Military Operations Center
COA	Courses of Action
CoSAR-TS	Coalition Search and Rescue - Task Support
DACAAR	Danish Committee for Aid to Afghan Refugees
DPKO	Department of Peace Keeping Operations
DTC	Defence Technology Centre
EMM	Europe Media Monitor
EO	Earth Observation
ERC	Emergency Relief Coordinator
FAO	Food and Agriculture Organization of the United Nations
FEWS	Famine Early Warning System
FOB	Forward Operating Base

FOO	Forward Observer Officer
GDACS	Global Disaster Alert and Coordination System
GDP	Gross Domestic Product
GIS	Geographic Information System
GIST	Geographic Information Support Team
GNP	Gross National Product
GPS	Global Positioning System
HC	Humanitarian Coordinator
HEWS	Humanitarian Early Warning Service
HIC	Humanitarian Information Center
HIV	Human Immunodeficiency Virus
HQ	Headquarters
IASC	Inter-Agency Standing Committee
ICRC	International Committee of the Red Cross
IDP	Internally Displaced Person
IFV	Infantry Fighting Vehicle
ISAF	International Security Assistance Force
ITOS	Information Technology Outreach Service
MCDA	Military and Civil Defence Assets
MCDU	Military and Civil Defence Unit
MLO	Military Liaison Officer
MoD	Ministry of Defence
MSF	Médecin Sans Frontières
NATO	North Atlantic Treaty Organization
NEIC	National Earthquake Information Center

NGO	Non-Governmental Organization
OCHA	UN Office for the Coordination of Humanitarian Affairs
OWL	Web Ontology Language (W3C)
PDA	Personal Digital Assistant
PTWC	Pacific Tsunami Warning Center
RECCE	Reconnaissance
SAR	Search And Rescue
SHARE	Structured Humanitarian Assistance Reporting Exchange
SITREP	Situation Report
SOP	Standard Operating Procedure
SRSG	Special Representative to the Secretary General
TDS	Technical Demonstrator System
TSR	Tropical Storm Risk
UK	United Kingdom
UN	United Nations
UNAMA	United Nations Assistant Mission in Afghanistan
UNCMCoord	United Nations Civil-Military Coordination
UNHCR	United Nations High Commissioner for Refugees
UNITAR	UN Institute for Training and Research
UNJLC	United Nations Joint Logistics Centre
UNOPS	United Nations Office for Project Services
US	United States
USAID	United States Agency for International Development
USGS	United States Geological Survey

UXO	Unexploded Ordnance
Virtual OSOCC	Virtual Operations On Site Coordination Center
WFP	World Food Programme
WHO	World Health Organization

Appendix B Needs Assessment Checklist

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Annex 2: Rapid Needs Assessment Checklist

☐ **Number of affected people requiring assistance**. This figure will determine all other estimates and calculations, and therefore, needs to be established as precisely as possible.

☐ **Water needs**. Ideally each person should be provided with 15 litres of potable water per day to cover drinking, cooking and personal hygiene needs. For hospitals the target is 100 litres per person per day for patients and staff. There should be one water point per 250 people and the maximum distance from any shelter to the nearest water point should be 500 metres. Each family should have two water collecting vessels of 10-20 litres, plus water storage vessels of 20 litres.

☐ **Shelter needs**. If using tents, calculate one tent for 4-6 people—ideally of the same family. Decide whether you need summer or winter tents. Do they have to be waterproofed or coated? Can locally made emergency shelter be used instead? Is an extra roof for protection against heat or rain needed? Should a canvas floor be included? Are plastic sheets needed for roofing? If using public buildings, calculate 3.5 m^2 of floor space for every person. Is shelter heating planned? If yes, with kerosene or diesel stoves?

☐ **Nutritional needs**. A food ration ideally should provide a minimum of 2,100 kilocalories per person per day. The survival energy level for an adult is a minimum of 1,000 kilocalories per day. For supplementary feedings add what is needed to reach the total of 2,100 kilocalories per day, as well as special food to treat severely malnourished individuals. Monitor malnutrition using international standards (e.g. Sphere minimum standards) and methods such as weight-for-height, etc.

☐ **Sanitation needs**. Maximum of 20 people per toilet. Use of toilets is arranged by household and/or segregated by sex. Toilets should be no more than 50 metres from dwellings or no more than a one minute walk. Toilets should be at least 30 metres away from any groundwater sources and the bottom of the latrine should be at least 1.5 metres above the water table. Containers or a system must exist for disposing of solid waste. One 100-litre refuse container should be available per 10 families where domestic refuse is not buried on site. Identify the need and methods for vector control (flies, rats, etc.)

☐ **Fuel needs**. Access of people to firewood, coal or other fuel is often overlooked in needs assessments. There is no general rule for calculating the needs, since climate, traditions and quality of fuel vary considerably. Assessments should specify what type of fuel is appropriate, where to get it, how to transport and distribute it and an estimate of the need.

☐ **Health care needs**. There should be approximately one small clinic per 10,000-35,000 people and there should be one referral hospital facility with surgical capacity for every 250,000-500,000 people. Mortality and morbidity should be monitored using generally accepted international standards and methods (e.g. Sphere minimum standards).

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Appendix C Needs Assessment Report Form

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Annex 1b: Disaster Needs Assessment Report Form

Based on format developed by the International Federation Pacific Region disaster preparedness office.

PREPARED BY:	COUNTRY:	DISTRICT/REGION:
YOUR ORGANIZATION:	DATE:	REPORT NUMBER:

When preparing the form, provide the most complete & recent information available. If the information is not known, write, "Not Known at this time."

I. The Disaster

A. **Type of Disaster:** (Circle one)

Cyclone   Earthquake   Flood   Landslide

Drought   Tsunami   Volcanic eruption

Chemical explosion or spill   Other (specify)

E. **When did the disaster event occur?**

....

F. **Briefly describe the disaster (attach additional sheets if necessary)**

....

....

....

....

....

G. **Precise geographic areas and locations impacted (districts, states, towns?)**

....

....

....

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II. Disaster Impacts/Effects

K. How many people are affected and what percentage of the overall population is this number?

....

L. How many deaths have been attributed to this disaster? If possible, specify the gender and age composition of those affected.

....

M. How many injuries have been attributed to this disaster? If possible, specify the gender and age composition of those affected, and the cause of their injuries.

....

N. How many people are displaced or evacuated? Also identify where they have gone and if possible, specify the gender, age and family composition of those affected.

....

O. How many families are affected? If possible, specify the gender and age composition of those affected.

....

P. How many households or dwellings have been completely destroyed?

....

Q. How many households or dwellings have been partially damaged but not completely destroyed?

....

R. What is the physical and/or financial damage to other property, buildings and infrastructure in the affected area?

....

S. What is the physical and/or financial damage to crops and livestock?

....

T. What are the expected financial damages and costs to businesses in the affected area?

....

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III. Local Financial, Material and Human Resources

E. What resources and capacities do the local population have for responding to this disaster, and how might these resources be used?

LOCAL CAPACITY OR RESOURCE	SUGGESTIONS FOR USE
E.g. Local neighbourhood association volunteer group	Prepare and serve food for displaced and homeless

F. What transport and storage facilities (commercial, government, Red Cross/Red Crescent) are available locally for immediate use?

....

....

....

G. What is the availability, location and condition of roads, airports, ports and railways?

....

....

....

H. What is the capacity of the local and national RC Society for dealing with this disaster?

....

....

....

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IV. Immediate Needs

Provide the most complete and up-to-date answers as you can to these questions:

B.   **Has a detailed needs assessment been carried out?** Please attach a copy if available or give a summary of the priority needs below.

Describe the unmet needs in shelter, water, sanitation, food, household supplies (clothes, blankets, cooking utensils, cooking fuel, etc.) and health (medical supplies, equipment, facilities). Quantify and qualify the targeted needs (for example, 110 adults and 200 children need food and water for at least the next 20 days.) Attach additional sheets as necessary.

....

....

....

....

C.   **Who carried out the needs assessment?**

....

D.   **What is needed immediately and who will supply it? Please check or fill in the boxes below as appropriate.**

		TO BE SUPPLIED BY:			
ITEM	QUANTITY NEEDED	GOVERN-MENT	RED CROSS	NGO'S (specify)	OTHERS (specify)

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V. Longer-Term Needs

E. **What will be needed in the longer term (after the first month) and who will supply it?** One should anticipate serious problems or needs that may arise in the coming months resulting from the disaster and potential future events (winter or rainy season approaching, etc.)

ITEM	QUANTITY NEEDED	TO BE SUPPLIED BY:			
		GOVERN-MENT	RED CROSS	NGO'S (specify)	OTHERS (specify)

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VI. National Society Operation

H.   Give a brief description of what the National Society proposes to do. (Attach additional sheets if necessary)

....

....

....

....

I.   What is the proposed duration of this NS operation?

....

J.   Which groups of people were chosen for assistance and why?

....

....

....

K.   What transport will be required and who will provide it?

....

....

L.   Who will carry out the operation (e.g. NS volunteers, staff, etc.)?

....

....

....

M.   Who is responsible for reporting to donors and when will the reports be made?

....

....

....

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