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The need for a digital aid framework in  
humanitarian relief

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# The need for a digital aid framework in humanitarian relief

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## ABSTRACT

Humanitarian relief organizations are increasingly becoming reliant upon the use of Information Technology & Telecommunications (IT&T) for the distribution of aid to refugees and Internally Displaced Persons (IDP) throughout the world. Traditionally, basic telecommunications infrastructure like the public switch telephone network (PSTN) has been used to transmit important information but today humanitarian relief organizations are attempting to utilize emerging technologies such as global positioning systems (GPS) telephones and geographic information systems (GIS). For the greater part IT&T utilization by relief organizations has happened in an ad-hoc manner in response to specific events. This paper proposes the use of a complete end-to-end digital aid framework that will help humanitarian relief organizations respond better to crises. Preliminary findings indicate that web-based information delivery will play a pivotal role in the implementation of this framework.

**Keywords:** Digital Aid, Relief Crises, Web-based Information Delivery

## 1. INTRODUCTION

Between 1992 and 2002 international humanitarian relief organizations have been called upon to assist in numerous refugee and Internally Displaced Person (IDP) interventions including, but certainly not limited to; Somalia (1992-93), Rwanda (1993-94), Bosnia (1993-95), Kosovo (1998-99), East Timor (2000-02) and Afghanistan (2001-2003). This paper serves three functions; first to provide snapshots of IT&T application utilization prevalent in previous relief crises. Second, to provide an overview and analysis of issues raised in significant IT&T-related humanitarian relief publications. Third, this paper serves as a precursor for introducing the Digital Aid Framework. Combined, the cross-sectional analysis of issues raised in the significant publications, and the development of the humanitarian relief specific web portals provide further understanding of the complex state of technology-enabled humanitarian relief. In this light, a comprehensive, conceptual IT&T integration framework (the Digital Aid Framework) can be developed for future refugee and IDP relief crises.

## 2. CASE STUDIES AND META-ANALYSIS

Although there are other examples of technology utilization in refugee and IDP relief theatres from 1992-2002, the discussions of IT&T adoption and integration by relief organizations during

the Somali and Kosovo crises are representative cases that have highlighted some of the commonly used technologies, tools and applications 'before' and 'after' the digital revolution. The Kosovo crisis for example, is significant because it was the first contemporary technology-enabled relief cycle for refugee and IDP operations. The crisis is described in this paper as a harbinger for future technology-enabled humanitarian relief interventions for precisely this reason.

Analyzing specific crises (Somalia and Kosovo) for determining the role IT&T applications have played in supporting humanitarian organizations is not sufficient for understanding the current state of technology-enabled relief. Organizations improve their effectiveness by not only looking at the past and lessons learned but also by seeking out other avenues of gaining knowledge. Innovation is often networked and documented in literature emanating from conferences, symposiums and similar industry-focused events. It is prudent therefore, to examine significant technology-enabled relief literature produced for the international humanitarian community so that pertinent issues, findings or guidelines may be incorporated into the Digital Aid Framework. Meta-analysis is therefore the primary method for data collection both complementing and supplementing the case histories.

## 3. CASE STUDY: THE SOMALI CRISIS

As a cumulative result of famine and civil war, almost 4.5 million Somali's, (more than half the total number in the country) were threatened with starvation, severe malnutrition and related diseases during the early 1990's. From November 1991, humanitarian relief agencies that were operating from Mogadishu in response to the unfolding crisis were faced with heavy fighting in the Somali capital which erupted between armed forces allied to General Mohamed Farah Aidid, or to Mr. Ali Mohamed Mahdi, the appointed interim President. According to the subsequent report into the United Nations Operations in Somalia I (UNISOM I), the country as a whole was without any form of central government and by 1992, the magnitude of suffering was immense. Overall, an estimated 300,000 people, including many children, died. Some 2 million people, violently displaced from their home areas, fled either to neighboring countries or elsewhere within Somalia. All institutions of governance and at least 60 per cent of the country's basic infrastructure disintegrated [1]. In Baidoa 40 per cent of the total population had died including 70 per cent of the children [2]. The number of Non-Governmental Organizations (NGOs) in Somalia from 1992 increased significantly. Kelly adds that each organization brought with them a diverse array of often competing relief strategies and

approaches [3]. In Mogadishu and elsewhere in Somalia, the International Committee of the Red Cross (ICRC) mounted the largest relief operation in its history. To assist with the management of information and communication in this complex relief intervention, relief organizations utilized IT&T applications such as the telephone, radio and computer/information systems.

### **3.1 Limitations in IT&T Technology for Relief Efforts**

During the late 1980's and early 1990's several significant IT&T developments occurred which were to impact upon the way relief organizations would utilize technology applications to carry out their traditional activities and processes in future relief interventions. In March 1989 at CERN, Tim Berners-Lee circulated his original proposal for the World Wide Web; CERN subsequently launched the World Wide Web in 1991. In the same year the independent US government agency, the National Science Foundation (NSF) lifted restrictions on the commercial use of the Internet [4].

#### **3.1.1 The Plain Old Telephone System (POTS)**

The IT&T applications deployed during relief operations in Somalia by humanitarian agencies during 1992-93 however, corresponded to the types of technologies commercially available at the time and the impact from the Internet and WWW would not be seen until later relief interventions such as those in Rwanda, Bosnia, Kosovo and Afghanistan. During the Somali crisis, typically the century old inventions of the telephone and radio played a major role for providing communication and information exchange between agencies, staff in the field and relief partners. This was suitable considering the lack of infrastructure available and previously described. Fraser explains that the telephone was CARE Australia's primary means of communication. It provided a link between the agency, staff and external support partners (central office, other NGOs, logistics service providers, food and medical suppliers). The telephone (traditional landline and satellite phone) was: "...our mainstay, our only connection to Australia, to our supplies of both food and goods, and people"[5].

Relief efforts throughout the country highlighted the issue of access to infrastructure as being an important aspect of the ability of agencies to function effectively. The process of distributing aid, deploying staff and managing the complex environment of humanitarian assistance in a pseudo-war zone requires communication infrastructure to already be in place. At times, when the electricity supply was unavailable, alternative power generation was required: "...at night we'd sit on the verandah with the car bonnet up, our computer and printer attached to the twelve-volt battery converter, and madly type our contracts and daily situation reports"[5].

#### **3.1.2 Mobility through the Satellite Telephone**

Satellite telephone communications were also used in this manner. Present day, commercially available satellite phones, adapters and antennae, being slightly larger than a commercial mobile phone, enable communications to be carried out on the move. This aspect of portability is in stark contrast to the sheer bulk of the hardware and the time necessary to setup and configure components which marked the use of the technology in the early 1990's. Mobile satellite equipment utilized in Somalia provided the advantage of remote communications regardless of infrastructure in country however, the size and portability of the equipment and the cost of transmission

prevented it from being adopted on a scale large enough to be deployed except in centralized locations and the most urgent of situations. The progressive improvement in the availability, affordability and reduction in size of the hardware, along with growing user familiarity with integrated technology applications, highlight some of the reasons why IT&T utilization has increased between relief operations in Somalia and those which have occurred since, particularly Kosovo and Afghanistan.

#### **3.1.3 The Importance of Radio Communications**

As previously indicated, radio played a vital role for humanitarian agency communications but involved the added risks of compromising relief assistance abilities and security of remote agency staff operations as the messages could be easily intercepted by militias. Details regarding the transport of vital food, water or medical supplies could be intercepted by rebel forces or bandits. The compromise of radio transmission security resulted in messages which should have been routinely passed by radio instead being delivered in person by utilized organizations to camps or feeding and processing stations remote from the central planning and staging areas of the humanitarian relief efforts in Mogadishu and the southern port town of Baidoa. This process ultimately compromised the security of staff that had to undertake those journeys through lawless country rife with banditry. One worker stated: "...we lived carefully, radio contact was of paramount importance. Often conversations were potentially too sensitive for open-air radio..." [5]

#### **3.2 IT&T in 1992 in Relation to Humanitarian Relief**

As brief as this discussion of common technology utilized by international relief organizations during the Somali crisis may be, it can be seen that traditional applications such as the telephone and radio were still the primary means of communication and information management and exchange. Many systems were still paper-based and involved meticulous co-ordination on the part of relief field workers and indigenous staff in order to overcome information duplication and data redundancy. Computer hardware and software information systems were certainly used, as evidenced by Fraser's account of the role of a CARE Australia aid worker in the crisis. However, the impending change to the way in which relief organizations and partner businesses in general were to technology-enable their functions as a result of the development of the Internet had little impact in Somali relief operations. Closer investigation of the prevailing state of commercial IT&T indicates why this was so.

The number of world-wide Internet hosts at this time numbered 1,136,000, and state of the art desktop-based operating systems and processing power included Microsoft's Windows 3.1 (released in April, 1992) with X386 and X486 processors [6]. Significantly smaller and more expensive hard disk storage than presently available, modem transmission rates of 2400 bits per second and 4, 8, or 16 megabytes of memory were considered the norm. In a few short years however, the ways in which relief organizations utilized IT&T in support of, and to transform traditional relief functions would change as a result of the digital revolution which emanated from the introduction of the Internet and the WWW.

#### 4. CASE STUDY: THE KOSOVAR DISPLACEMENT

The rise of Slobodan Milosevic to power in Serbia in 1989 saw the relatively autonomous existence of Kosovo in the former Yugoslav republic begin to diminish. Serbians, who were in the minority of Kosovo's ethnic mix had felt increasingly vulnerable in a province where local government and services were dominated by the Kosovar Albanian majority. The radicalization of elements of the Kosovo Albanian population and the emergence of the Kosovo Liberation Army (KLA) resulted in open conflict breaking out between these and Serb forces in the province in 1998. By mid September, an estimated 250,000 Kosovar Albanians had become IDP. On 23 September, the UN Security Council adopted Resolution 1199, which noted the numbers displaced and without shelter, and expressed alarm at the impending human catastrophe in Kosovo [7]. The UN High Commissioner for Refugees reported that by 23 March 1999, assistance had been provided to 400,000 people displaced or otherwise affected by fighting within Kosovo, and to 90,000 refugees outside the province, altogether about a quarter of the total population of the province. On the same day NATO began air operations against the Milosevic regime adding to the perilous environment in which international relief agencies found themselves.

##### 4.1 The Fragmented Use of Emerging IT&T Technologies

The impact of IT&T application integration upon humanitarian relief interventions which occurred in support of Kosovar and ethnic Albanian refugees and IDP during 1998-99 was greater than upon those having occurred previously in relief theatres such as Somalia (1992-93), Bosnia (1994-95) and Rwanda (1994). This was a result of transforming IT&T applications through the integration of web-based services emerging from the digital revolution which surfaced in the early to mid 1990's and manifested in the widespread adoption of the Internet as an information and communication tool. This IT&T communications advancement enabled relief organizations to access shared relief information, communicate remotely with field personnel (infrastructure permitting) and comprehensively plan and co-ordinate relief intervention functions. As a result, traditional relief activities and processes were greatly transformed.

Where once relief-related information retrieval and inter or intra communication between organizations and personnel was performed using paper-based or decades old methods (visits to libraries, letters, memos, and the like), the initial stages of the development of an electronic information medium i.e. the Internet and the World Wide Web and its subsequent widespread adoption by both commercial and private enterprise opened up new possibilities. Online collaboration between partners could be carried out across the globe in a timelier manner than had previously been possible with standard postal mail, telephones, faxes, telegrams and cables. No longer was it necessary to take faxes or telegrams to service providers (such as a post office) for transmission. The personal computer and modem enabled the transmission of such electronic documents over the WWW. The emergent technology of the Internet empowered relief personnel to seek out information and make use of the advantages offered through the medium. It was within this context that relief organizations found themselves while planning and operating in the humanitarian refugee relief intervention in Kosovo.

#### 4.2 The Digital Transformation

Utilization of technology applications such as integrated circuit smartcards, affordable mobile satellite communication systems, Internet information centers/ kiosks and the geographical data tools of GIS and GPS, all evidenced during Kosovo have since become increasingly mainstream for recent crisis interventions. Integrated circuit smartcards made their first fully-fledged implementation into relief functions in the Balkan crisis. Generally, the smartcards were incorporated into identification systems whereby ID badges contained key biographical data from refugees and IDP. At the time Lisa Russell, a program officer for Relief International noted that in the refugee camp situated in Korce, Albania: "...ID cards [would] help us manage the daily affairs and [could] assist in data gathering and program planning for relief services in the Korce camp" [8].

##### 4.2.1 Refugee Electronic Identification

Similarly refugee field kits, portable refugee registration systems designed and supplied through a cooperative venture by Microsoft, Hewlett-Packard, Compaq and two European ID-card companies, were introduced during the later stages of the Kosovo intervention. Technology hardware and software applications incorporated into the kits included notebook computers, digital cameras, ID card printers and specialized software. Importantly, the kits were ready-made for utilization in remote locations, packaged in metal cases and powered and cooled by generators. Benner describes two typically useful refugee relief applications of the field kits as their ability to link information from all refugee camps in the area and develop a demographic profile of the refugee population. The field kits and smartcard-enabled identification systems were the culmination of the process of moving from a paper-based system to a computer-based refugee identification and camp management system. "...There was a very real need to get these people (refugee children and the elderly) into a system because having 800,000 pieces of paper sitting around wasn't a very efficient way to run the operation"[9]. The kits however were not without their faults. The software was modified for crises occurring post-Kosovo so as to enable relief personnel to enter data more quickly.

##### 4.2.2 War Crimes Software and Data Collection

A particularly important application of IT during the socio-political Kosovo crisis was the utilization of technology for the development of war crime databases for prosecution of war crimes against refugees and IDP in the newly convened international criminal court. Similar technology applications had been utilized in Bosnia 3 years previous, however the international mandate and mechanism for prosecution had yet to be established. Evolving from Project Bosnia, Project Kosovo (Illinois Institute of Technology's IPRO) created the War Crimes Documentation Database (WCDD) for recording and analyzing war crimes data gathered from different human rights organizations in the Balkans. The database application used a commercially available GIS (ESRI's MapObjects) to create a software module that allowed users to spatially query the war crimes database [10]. Features of the database included digital audio recording of testimony (in Albanian) and digital video recordings of crime scenes or scanned documents.

##### 4.2.3 Smaller GPS Receivers for Portability

Other technology applications which were once generally the domain of the military such as mobile modular satellite communication systems were at the time of the Kosovo crisis increasingly integrated into relief operations. These systems,

designed for rapid deployment, are suitable for most terrain and can be fitted to a variety of civilian vehicle chassis, require minimal manpower and possessed a self contained power supply [11]. The portability aspect of the evolving satellite technology utilized in Kosovo is in stark contrast to the mobile satellite technology which was deployed during relief operations in Somalia. In Kosovo, the modular system used was known as 'Dagger' which acted to increase communication coverage to allow for the use of the global system of mobile (GSM) telephones.

## **5. THE IMPORTANCE OF BEING DIGITAL**

### **5.1 The Impact of Mobility**

As a consequence of the digital revolution, the utilization and impact upon humanitarian relief activities and processes from IT&T adoption and integration increased significantly from the Somali crisis (1992-93) to that of Kosovo (1998-99). Collaboration between international relief organizations and technology partners became a necessity for integrating the right application to meet the needs of relief participants in an ever-increasingly complex relief environment. This process of collaboration is now commonplace as evidenced by Telecoms Sans Frontieres (TSF) being tasked with setting up communications infrastructure in Baghdad, Iraq, for the utilization by CARE relief workers prior to their arrival. Advantages of utilizing mobile hardware and software applications such as notebook computers, mobile satellite telephones and GPS were highlighted as mobility became the medium for adaptable, flexible and portable applications. These characteristics quickly translated from commercial enterprise applications into a variety of suitable and feasible mobile humanitarian relief applications.

### **5.2 The Requirement for IT&T Training of Relief Personnel**

The technology skills set required by relief field workers and support personnel utilizing IT&T applications such as smartcards, GIS, the Internet and an assortment of crisis stage-specific software programs also continued to be developed from those which were seen as a pre-requisite for effective IT-related information management. This in itself necessitated a greater role for the training of users so as to continue the effective utilization and integration of a broad range of technology applications into relief contexts. Importantly though, the significant issue of access to infrastructure in country still played a critical role in determining the level of utilization and integration, particularly in crises resulting from on-going civil war and military interventions in rugged, remote and under-developed countries and locations. It appears this may be the case for future relief interventions performed in response to socio-political triggers for some time to come.

### **5.3 The Importance of the Internet**

The main enabler of IT&T change and transformation was the adoption of the Internet as an electronic communication and information exchange medium. Bernstein et al. [12] described information as the commodity of the 1990's and that having access to the Internet allowed operational decisions to be based on the latest and most comprehensive data available. The number of world-wide Internet hosts increased from 1,313,000 to 56,218,000 (an increase of some 4,200%) between the Somali and Kosovo crises. This coincided with countless Intranets and Internet websites being developed by relief organizations to act as information repositories. As early as 1995, in minutes taken from the UN Working Group on Emergency

Telecommunications (WGET), [13] the IFRC understood the potential benefits of the Internet: "...the Internet should not be under-estimated, and it provides lots of information / user-data."

From the analysis of the selected crises, IT&T application adoption and integration appears to have been performed in an evolutionary manner and using a hybrid approach of strategic planning and experiential learning. Technology applications which have been integrated into central office functions, such as the Internet, have gradually filtered down to relief field operations. The conditions and contexts in which these applications are used (central, secure office buildings compared to remote refugee or IDP camps situated in hostile crisis regions) are in stark contrast. However, this contrast, and the way in which the applications have been adapted for such conditions from feedback from relief workers using the applications, has enabled improvements to be made for IT&T adoption and integration in future crises. The prime example of the experiential nature of adoption and integration is the field-related feedback on refugee identification kits which were modified post-Kosovo so as to permit faster entering of data and the reduction of errors which had hampered the full and effective utilization of the kits in Kosovo. As the impact of IT&T upon relief functions increased from the Somali to the Kosovo crisis, the level and body of knowledge in respect to the potentially supportive roles in which technology can assist relief field personnel in caring for refugees and IDPs was also beginning to expand and the need had arisen for reliable and comprehensive web-based (online) information delivery.

## **6. PRECURSORS TO THE DIGITAL AID FRAMEWORK**

From the time of official cessation of hostilities in Kosovo and the winding down of the international humanitarian effort in 1999 (as a result of the Dayton Peace Accord), a small number of important IT-related relief documents have been produced. Three of the most significant documents are: OCHA (2002), Hummelink's (2002), and Johns Hopkins and IFRC (n.d.). These are significant due to the types of forums and international humanitarian bodies for which they were presented and produced (the UN, OCHA, the Red Cross and Johns Hopkins), the quantity of referrals to these documents within relief literature freely available on the Internet and through online information services, and their relative currency. Through a process of meta-analysis, the key points contained in each can be considered for incorporation into the proposed Digital Aid Framework.

### **6.1 OCHA's (2002) Final Statement**

In opening remarks made in the Final Statement (a succinct six page document prepared by OCHA for the 2002 'Symposium on Best Practices in Humanitarian Information Exchange') it is noted that considerable progress had been made in developing humanitarian information systems, tools and websites but more is needed to be done to build upon these approaches [14]. The final statement is divided into four sections; Operational Principles, Key Issues, Best Practices and Recommendations and Follow-up Actions. Ten principles are provided to guide the information management and exchange activities for international humanitarian organizations. These principles relate to Accessibility, Inclusiveness, Interoperability, Accountability, Verifiability, Relevance, Objectivity, Humanity, Timeliness and Sustainability. Some of these principles have been directly considered and adapted for the development of the Digital Aid Framework. The statement takes stock of the current state of

information exchange, technologies engaged by humanitarian relief organizations in meeting information needs during crises, and acts as a guideline for organizations to consider for improvements in effective response to future crises.

Recommendations and follow-up actions are discussed with particular emphasis on six key points: [14]

1. User requirements– how to improve the processes and linkage between data, information and decision-making;
2. Quality of Information– standards, ethical guidelines and codes of conduct;
3. Technology– how to identify, evaluate and report on successful applications of relief-related technology and discuss these applications in a future forum;
4. Partnerships– the need to improve relationships between systems, stakeholders and relief recipients, at all levels;
5. Preparedness– the need for base data and risk assessments;
6. Field-level Coordination– acknowledge the multitude of relief ‘actors’ in any intervention.

These recommendations will be further assessed for their suitability in the development of the Digital Aid Framework.

## **6.2 Johns Hopkins and the IFRC ‘New Technologies in Humanitarian Emergencies’**

Chapter 13, ‘New Technologies in Humanitarian Emergencies’ forms part of the comprehensive fourteen chapter ‘Public guide for emergencies’ which has been developed in a collaborative effort between the IFRC and Johns Hopkins University’s School of Hygiene and Public Health. Discussions of technologies suitable for integration into relief organization mechanisms are made with regards to health applications. While refugee and IDP operations are not specifically mentioned, the scope and way in which the integration methods for technology-enabling relief functions are stated permit easy translation to refugee and IDP operations.

The guidelines use several tables to highlight the advantages of a broad range of technology applications for emergencies such as radio, satellite communication and computer-based communications. Perhaps the most important issues raised in the guidelines involve assessing the technology needs for a crisis, successful steps for adopting new technology and the often overlooked issue of on-going technology maintenance. This is important as the vulnerability of a technology application should never compromise the ability of a field worker to provide care and relief to any individual in need.

Understanding the need in the international relief community for such comprehensive guidelines, and noting the importance of information sharing between organizations so as to reduce the level of duplication and redundant data, the IFRC and Johns Hopkins have made the entire fourteen chapters available for dissemination over the Internet. The selection of guidelines for relief organizations to follow is instead with providing a flexible and adaptable base from which to build upon in technology-enabled humanitarian relief operations. In a similar way, the proposed Digital Aid Framework should use a conceptual framework which acts as a substructure for relief organizations to follow and adapt their traditional relief activities and processes around.

## **6.3 Hummelink’s ‘Evaluation of IT Humanitarian Platforms and their Possible Utilization as Coordination Instruments’**

Produced at the request of the European Commission’s Humanitarian Aid Office (ECHO) and presented at the ECHO –

Partners’ Annual Conference, Brussels 14 and 15 October 2002, Marcel Hummelink’s evaluation is more in-depth in regards to the discussion of IT&T concepts than the two previous relief documents. As the title suggests, the focus of the report is on coordination of international humanitarian relief information. Hummelink raises an important point when he states “some aid workers regard information technology as a necessary evil that the aid community simply has to accept, even though its advantages may never weigh up to its costs. Yet at the same time there are others who consider the advent of IT as an opportunity and a stimulus to improve the quality of their work and to strengthen the coordination of scattered initiatives”.

Four sections are contained in the report:

- Section 1: Conclusions, recommendations and questions regarding the present and future role of information technology in the coordination of humanitarian aid;
- Section 2: Present and future role of information technology in coordination of humanitarian aid;
- Section 3: Reference materials (including a copy of the Final Statement of the OCHA Symposium on Best Practices in Humanitarian Information Exchange); and
- Section 4: Questionnaire on IT tools in humanitarian aid.

In total, twelve recommendations are made in regards to the future role of IT in the coordination of humanitarian aid and cover issues such as funding, training and information standards. In particular, recommendation 4 holds significance to the proposed framework, “...Under the heading of disaster preparedness humanitarian organizations should continue to develop information products that can easily be used under a variety of field conditions...” and further more, “...[t]he sharing of these IT tools should be encouraged: as a matter of fact, a culture of sharing information and IT among humanitarian organizations should be promoted” [15].

This recommendation and the previously mentioned issues of funding, training and information standards should be incorporated into any IT&T integration platform or framework such as the proposed Digital Aid Framework. Hummelink’s evaluation also makes mention to the ‘14 point fax system’ which was originally designed to provide an updated view of the European Union’s efforts in any given humanitarian crisis. As times change and technology improves or new applications emerge, legacy systems need to be transformed. As a result of the digital revolution OCHA have conceded the importance of utilizing up-to-date technology by indicating that: “...this system of information exchange [the ‘14 point fax system’] has proven to provide decision makers with important and relevant information and it therefore still survives– although the old-fashioned fax system has been changed into an Internet system.” This concession to the overwhelming adoption and integration of the Internet into business practice suggests that using an Internet-centric design for the proposed Digital Aid Framework is suitable.

## **7. WEB-BASED INFORMATION SERVICES FOR THE RELIEF COMMUNITY**

With the advent and subsequent widespread adoption of the Internet as an information and communication tool, the number of websites developed for the international humanitarian relief community has been continuing to grow. As with commercial and personal websites, the quality of the site and the reliability of information contained therein varies widely. It appears standards set by the World Wide Web Consortium (W3C) for

website development have so far been followed sparingly by web developers. It has been established in this paper that for relief interventions to be managed effectively and planning put in place for future relief interventions, that up-to-date information is required and that information should be readily available and shared between those who provide relief services. Successful examples of technology-enabled relief activities and processes need to be made known to relief participants and other interested parties so as to highlight the potential of similar procedures for future interventions.

At present, the most suitable medium for achieving this aim is through online information services. With many levels and sectors of relief, the ability to quickly search out reliable and current information for the relief community is vital. Hummelink notes that the web sites of most humanitarian organizations are not sophisticated enough however to uphold their role as portals. To properly guide users to relevant information on the WWW, a portal should at the very least provide reliable search facilities and web guides. Two of the most significant humanitarian web portals which meet these requirements are:

- Reuters AlertNet (<http://www.alertnet.org/>); and
- ReliefWeb (<http://www.reliefweb.int/>).

These online information services have been developed specifically for the international humanitarian relief community. They also highlight another stage of innovation whereby these services sit atop a layer of technologies utilized in an IT&T-enabled relief crisis and therefore their selection for discussion in this paper is justified. A brief background and description of site components follows for these two recognized leaders in the provision of online information delivery and dissemination for the international humanitarian relief community.

### 7.1 Reuters AlertNet

AlertNet was established in 1997 through Reuters Foundation, the education and humanitarian trust of Reuters which acts as an international news and information group. The aim of the website is “to put Reuters core skills of accuracy, speed and freedom from bias at the service of the humanitarian community”. The AlertNet site contains a vast array of data on disaster relief and is comprised of two sections; a public area with information and current news items and a restricted area for NGOs with additional reference material and the ability to exchange information between agencies. This restricted part of the site is accessed by password. Useful features of the site are the automated email newsletter delivery service and the search function. These links to international relief organizations help the site meet the requirements for an effective and comprehensive information portal described by Hummelink in regards to humanitarian online services. The significance of the site is that it is provided by Reuters rather than a UN body or directly-related humanitarian relief organization, available for gathering humanitarian news and information. This focus on news and information also enables the site to be used in conjunction with the industry developed (UN OCHA) ReliefWeb which has a more specific relief focus simply because of its UN humanitarian mandate.

### 7.2 ReliefWeb

ReliefWeb was established by the United Nations OCHA as a portal and platform for the humanitarian community. The site was launched in 1996 and further mandated by General Assembly Resolution GA 51/194 on 10 February, 1997. ReliefWeb is aimed more towards personnel within the

humanitarian industry, yet contains similar site components and functions as those previously described for AlertNet. Certainly the site does not discriminate between users with the general public able to easily find most of the relief information or statistics which they seek through the site. The level of information available, disseminated online by the UN and humanitarian organizations is more comprehensive than AlertNet with the ability to search a database of documents dating back to 1981. The significance of the site can be seen from the number of documents served (in excess of 20 million) since the inception of the website. This highlights that the reliance upon the site by the international relief community and general public cannot be underestimated with ongoing access of approximately 1 million hits for the site each week.

## 8. DISCUSSION: TOWARD THE DEVELOPMENT OF A DIGITAL AID FRAMEWORK

Overall, the discussion in this paper has identified a variety of IT&T applications and associated issues which impact upon the way international relief organization carry out and transform their traditional relief functions by adopting and integrating IT&T applications. Such applications have included the telephone, radio, satellite, IS, databases, smartcards, the Internet and the WWW (table 1). Issues have included access to infrastructure, funding, collaboration, ethics, interoperability, training, field-level coordination, user requirements, making the relief recipient the priority in any technology-enabled relief function among others. In order to develop a comprehensive framework which acts as a technology integration platform for the international humanitarian community and to constructively add to the body of technology-enabled humanitarian relief literature, these applications and issues need to be considered in unison. The result of this process will be the construction of the Digital Aid Framework.

Table 1 The Evolution of IT&T Technologies Used in Humanitarian Relief Crises Between 1992 and 2002

Event (Date)	Technologies Utilised	Comments
Somalia	Telephone (landlines, Satellite) Notebooks, Radio, IS	Piecemeal integration, Limited access to infrastructure, infrastructure 'in-country' destroyed
Rwanda	Telephone, Radio, Satellites IS, Internet, WWW	Predominantly NGO intervention beginning of Internet and Web
Bosnia	Mobile Telephone, Internet, WWW, Digital cameras, GPS	Greater impact of digital revolution paper-based to IS-based
Kosovo	Internet & Internet kiosks, WWW, Digital cameras, Smartcards, Satellites, GIS, GPS, Biometrics, Radio, Telephone	Fully-fledged Internet adoption, mobile applications, portability Increase in generic IT&T skills
Afghanistan	Internet, WWW, Biometrics, GIS, GPS, Smartcards, LBS Telephone, Radio	Potential of supportive IT&T applications being realised, true mobility and portability, maturation of Internet, Transformation from paper-based to IS-based

Table 1 shows the importance for carefully constructing a Digital Aid Framework that is flexible enough to incorporate the continual evolution of new technologies at the infrastructure, application and device levels. It is unanimous that a Framework such as that being proposed must have the Internet at its foundation. But more than the actual technologies themselves, which change over time, it is the process that the Framework must try to capture, the workflow of all the different stakeholders involved in humanitarian relief (diagrams 1 & 2). The Digital Aid Framework is distinguished by its 'Internet-centric' design, iterative nature, and phased development across modules and the use of numerous conceptual elements such as

Awareness, Transformation, Interoperability, Collaboration, Training and Transparency. Elements of the framework are suggestive, indicating ways relief organizations may consider integrating IT&T applications into their traditional activities and process in readiness for future relief interventions. Conceptual elements help an organization understand the relationships between the various needs of the organization, personnel and relief recipients. The most important foundation aspect of the Digital Aid Framework is that relief organizations should always utilize IT&T as a supplementary support system in performing the critical process of relief provision for recipients.

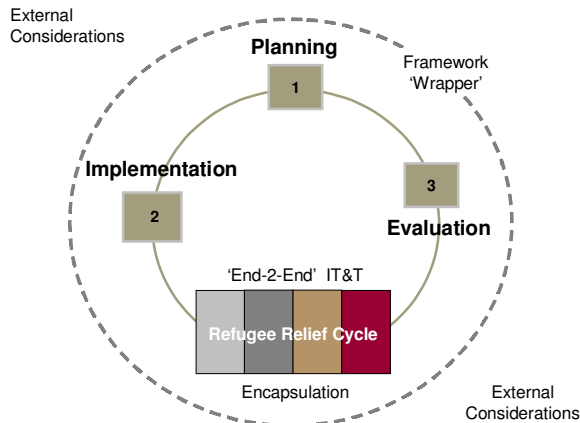


Diagram 1 The Digital Aid Framework- High Level View

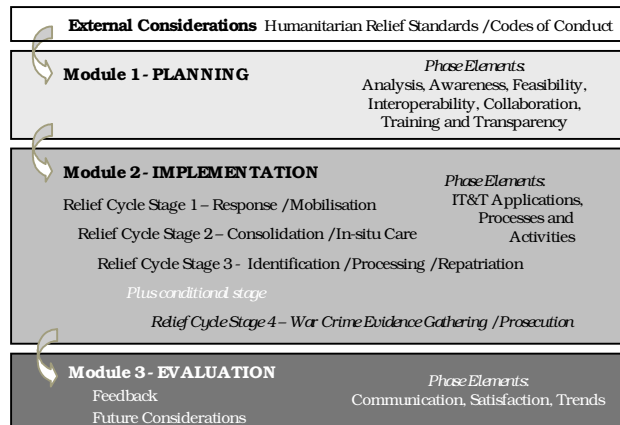


Diagram 2 Framework Modules - Components and Phases

Diagram 1 and 2 form the basis for another paper filled with explanatory descriptions of each framework module, and the overall “end-to-end” relief cycle. The framework can only work successfully when non-technical external considerations are taking into account every step of the way. It is hoped that this framework be evaluated by large relief organizations and eventually adopted as a standard.

## 9. CONCLUSION

This paper has served several functions, including the identification of different types, levels and modes of adoption and integration of IT&T applications by humanitarian relief organizations, and to provide an overview of significant documentation and online information services produced and developed for the international relief community between 1992

and 2002. The impact on the transformation of IT&T relief functions was highlighted by exploring relief theatres having occurred each side of the digital revolution paradigm shift of the mid 1990’s. It was concluded that the mode of IT&T adoption and integration of applications into and in support of traditional relief activities and processes was a hybrid approach with elements that were experiential in nature (i.e. learning by doing) and strategically planned. This paper serves the groundwork toward the construction of a Digital Aid Framework that can be adopted by any humanitarian relief organization.

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