

Bridging Multiple Divides in Early Warning and Response: Upgrading the Role of Information Communication Technology¹

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Introduction

The purpose of this paper is to explain how information communication technology, or ICT, can play an effective and tactical role in bridging conflict early warning with early response. The first section of this paper reviews the *raison d'être* of conventional early warning systems, their underlying methodologies and use of ICTs. The second section traces the trend towards more decentralized approaches to disaster management, suggesting that conflict early warning initiatives take heed of the lessons learned and current applications of ICTs in disasters. The third section identifies the tactics and ICTs used by activist citizens and nonviolent movements to highlight the potential of non-conventional approaches to warning and response. The conclusion ties together the ICT threads from the three sections.

In keeping with the theme of the 49th International Studies Association (ISA) Convention of 2008, “Bridging Multiple Divides,” this paper seeks to link the lessons learned in conflict early warning, disaster response and nonviolent action to improve on current responses to violent conflict. The three sections that follow thus assess the effectiveness of conventional approaches to conflict early warning; contrast these approaches with those practiced in disaster response; and draw on survival techniques and civilian resistance studies to outline the potential added value that a tactical approach offers vis-à-vis bridging conflict early warning with response. These three sections are themselves framed into three parts: analysis of the systems, critique of the methodologies and review of the ICTs. Since the purpose of this research is first and foremost to assess the role of information communication technologies in early warning, those parts receive priority—albeit within the contexts of the associated systems and their respective methodologies.

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1.0 - The Emperor's Clothes: Questioning the Establishment

Conventional conflict early warning systems, their underlying methodologies, and their uses of ICTs have prevented dozens of violent conflicts worldwide and have saved thousands of lives each year since the thawing of the Cold War. If only this were true. Like the story of the Emperor's Clothes, both hype and hubris have driven our false perceptions. The prevailing belief was (and regrettably still is) that sophisticated warning systems, advanced quantitative methodologies and computer databases can together predict the escalation of political tensions and violence. Today's early warning models originate from the political sciences but perhaps ultimately begin with Thomas Hobbes; and therein lies part of the problem.

The West has traditionally viewed conflict as the result of natural forces among discrete and independent units. This perspective stems in part from the atomistic-mechanistic and linear worldview championed by Galileo, Descartes and Newton. Their writings had no small influence on the evolution of Western political philosophy and classical political theory. Thomas Hobbes, for example, publicly glorified Galileo, and praised the scientist for his groundbreaking work on the physics of moving bodies; going so far as calling the Italian luminary the most important person ever. Hobbes was so awed by the power and simplicity of Galileo's science of kinetic motion that he took it upon himself to develop an equivalent (necessarily linear) science of society.⁴

In subsequent political writings, Hobbes therefore uses the analogy of a watch and "portrays humans as mechanical systems that pursue what they take to be good; but in cases of scarce resources, conflicts inevitably arise just as bodies in motion in a confined space will eventually collide," hence the apparent need for a Leviathan.⁵ In short, the metaphor for the early political universe is that of the mechanical pocket watch. Later, the revolution in knowledge continued by Isaac Newton led to the formulation of a deterministic billiard ball universe. Shortly thereafter, converts of the Enlightenment would boldly claim that scientists would soon "be able to look into the future and see what course of action is best for humanity."⁶ This may sound familiar.

1.1 – Cloaking Early Warning

Several hundred years later, we academics are still the gatekeepers of early warning models. Our academic centers at Maryland, Harvard, Kansas, the US Naval Academy and Carleton University account for most of the prominent conflict early warning models, frameworks and methodologies in the field. The better-known "early warning" systems such as CIFP, KEDS, FORECITE, PTIF, FAST, WARN and CEWARN all originate from our centers. So too do our more sophisticated models for genocide early warning.

⁴ Wilson 1999.

⁵ Personal email exchange with Professor Doug Jesseph, August 18, 2006

⁶ Meier 2007.

Our methodologies and systems are virtually all focused on prediction using event-data at the expense of operational response and local situational awareness. Most of our models code conflicts as event-data, i.e., discrete quanta of conflict. And so, the enormous academic scholarship on the causes of conflict is basically founded on our quixotic dream of finding the single ‘silver bullet’ or ‘smoking gun’ of early warning.⁷ To be sure, “these systems have been developed in advanced environments where the intention is to gather data so as to predict events in distant places. This leads to a division of labor between those who ‘predict’ and those ‘predicted’ upon.”⁸ Evidently, those who predict are overwhelmingly academics. Those predicted upon however, rarely know of our predictions. “Perhaps 99% of what we read about conflict early warning refers to regional or international mechanisms. They are egocentric in that they are built primarily by outsiders to be used by outsiders.”⁹

Traces of Newton’s thinking still pervades parts of academe’s social sciences to this day: with every action, there is an equal and opposite reaction—so that with every forecast, a response must follow by definition. As long as the event warning is identified early on by us academics and then communicated to them policy makers, we all too often assume that some response will follow—otherwise, why would we publish almost exclusively on conflict prediction rather than response? Unfortunately, most of our systems are not even geared towards influencing existing decision-making structures.¹⁰

In fact, by tracing the genesis of decisions on issues related to early warning and response at the United Nations, a recent study showed that decision-makers in New York seldom, if ever, draw on the analyses of formal conflict early warning systems outside—or even within—the UN.¹¹ As for predictive ability, most of our conflict early warning systems are persistently plagued by their inability to make successful (even semi-accurate) predictions. There is scant evidence that our analyses have led to preventive measures or even been taken into account by decision-makers, let alone shared with at-risk communities.

This is no less true of systems such as CEWARN and FAST. Indeed, the later project was unable to maintain donor support in part because the system did not demonstrate impact, despite a decade’s worth of funding. CEWARN has documented tens of thousands of local violent incidents and deaths over the past five years. Only a handful of anecdotes exist that suggest a few incidents (out of more than 3,000) might have been prevented. If CIFP and KEDS had successfully predicted violent conflicts, we would expect their websites and ensuing publications to prominently demonstrate their academic triumph. No such luck. As for our genocide early warning models, these aren’t without serious problems either.¹²

This is not to suggest that these projects serve no useful purpose, quite on the contrary. Systems like CEWARN and FAST provide invaluable field-level conflict data for subsequent analysis. While the institutional mechanisms in place may not be geared towards effective and operational response, the systems nevertheless document violence incidents of conflict

⁷ Siegfried 2001; Rupesinghe 1988; Brecke 1997.

⁸ Rupesinghe 1988: 224.

⁹ Barrs 2006.

¹⁰ Campbell and Meier 2007.

¹¹ Campbell and Meier 2007.

¹² Woocher 2007.

that would otherwise go unnoticed or unchallenged. For the purposes of human rights monitoring, the CEWARN database provides valuable evidence on the volatility of pastoral conflict in the Horn.

In fact, when CEWARN revealed their first year of conflict data, governments were so taken aback by the intensity and scope of the violence reported, that they refused to make the reports and data public contrary to the terms of protocol they had ratified. They eventually did release the reports. The point here is simple: CEWARN and FAST document incidents of violence that can pressure governments to at least recognize that a problem exists. As the adage in the business world goes, “if you don’t measure it, it doesn’t exist.” These systems render an important service in this regard. However, this does not make them early warning systems per se, but rather tools for lobbying and advocacy.¹³

And yet we still believe that these academic models and systems are early warning systems in the sense of operational prevention. Why and on what basis? Especially when “out of close to a million papers published in politics, finance, and economics, there have only been a small number of checks on the predictive quality of such knowledge.”¹⁴ To rephrase the question, then, why do we excel at making predictions but ignore whether they are at all accurate? Perhaps for some of the same reasons that the Emperor’s entourage praised the majesty’s new clothes?

Recent empirical studies demonstrate that experts, i.e., us (and their sophisticated systems and methodologies) are only marginally better than novices in their ability to accurately forecast political and economic events than novices.¹⁵ Furthermore, these surveys show that neither group’s forecasts are much better than random guessing. Of greater concern still is the empirical observation that experts nevertheless remain consistently overconfident of the accuracy of their own forecasts compared to novices who tend to be more conservative vis-à-vis their forecasting abilities and yet equally (in)effective when it comes to accuracy. A separate study found that “somehow, the analysts’ self-evaluation did not decrease their error margin after their failures to forecast.”¹⁶

Perhaps the most telling test of how academic methods fare in the real world was run by Spyros Makridakis, “who spent part of his career managing competitions between forecasters who practice a ‘scientific method’ called econometrics [...]. Simply put, he made people forecast *in real life* and then he judged their accuracy.”¹⁷ This led to the following lamentable conclusion “statistically sophisticated or complex methods do not provide more accurate forecasts than simpler ones.”¹⁸ And so, despite the fact that “billions of dollars have been invested in developing sophisticated data banks and early warnings, we have to note that even the most expensive systems have shown a striking inability to forecast political events,” not to mention galvanize any preventive measures.¹⁹

¹³ Campbell and Meier 2007.

¹⁴ Taleb 2007; Green and Armstrong 2006.

¹⁵ Taleb 2007; Green and Armstrong 2006.

¹⁶ Taleb 2007.

¹⁷ Taleb 2007.

¹⁸ Makridakis and Hibon 2000.

¹⁹ Rupesinghe 1988.

1.2 - ICT Makes a Cameo Appearance

While the above observation was made 20 years ago, few would dispute its validity today; and this in spite of the information revolution, lower technological costs and the many more billions invested since. The fact of the matter is that conventional early warning systems today still use technology in much the same it was used in the 1980s and 1990s, i.e., primarily for data entry and trends analysis. For us academics in the political sciences, the coming of computers meant that our large N envy of the physical sciences became a distant memory. We could now collect and dynamically store more structural, macro-political and economic indicators for deep sea data mining using sophisticated econometric models and advanced statistical software.

However, most of the operational early warning systems listed above are little more than glorified databases.²⁰ Computers don't prevent conflicts, people do. We may share our conflict datasets with other academics, proudly present our regression results at academic conferences and email in the blink of an eye our latest forecasting methodologies to the editors of top-tier journal, but our analyses "rarely touch the ground where the killing happens. They fly through cyberspace, high over the victim's heads. People at risk on the ground might never learn that the *demarches* we write on their behalf even exist."²¹

To bluntly summarize, conflict early warning systems and methodologies that focus on prediction and forecasting are largely ineffective. Event-data methodologies and fancy Hidden-Markov Models have done little to anticipate the escalation of violent conflicts over the past 10 years—and there has been no shortage of conflicts to predict. This should not be surprising, however, since "like any complex social phenomenon, violent conflict does not result from the linear summation of a neatly defined set of causes, but from interactions among multiple phenomena in a complex system with several levels of organization [...]. As complexity and chaos theories show, in such a system behaviors will not respond in a linear way to changes in one variable, however significant that variable may be."²² In other words, quantitative analyses based on *ceteris paribus* assumptions are simply inadequate.²³

The lesson here is perhaps self-evident, "there is something about the complexity of human experience that suggests that a different kind of knowledge [is] needed, the quality called by the ancient Greeks *metis*, or practical wisdom."²⁴ In other words, long-distance expertise and "analytical capacity alone will never be sufficient for generating effective response,"²⁵ since "to have significance operationally, analysis cannot simply be factual but also has to address the issue of perception."²⁶ Furthermore, "prevent[ing] violent conflict requires not merely identifying causes and testing policy instruments but building a political movement" since "the framework for response is inherently political, and the task of advocacy for such response cannot be separated from the analytical tasks of warning."²⁷

²⁰ Personal conversation with Joint Research Center of European Commission, October 8, 2007.

²¹ Barrs 2006.

²² Rubin 2004.

²³ Taleb 2007.

²⁴ Rubin 2002.

²⁵ Carment and Schnabel 2003.

²⁶ Ivanov and Nyheim 2004.

²⁷ Rubin 2002.

Following the theme of this year's ISA conference, "Bridging Multiple Divides," the two sections that follow seek to bridge the lessons learned above with those in disaster response and nonviolent conflict. As will be shown, drawing on these lessons and best practices with the common framework of information communication technology enables us to assess the potential for a tactical approach to conflict early response.

2.0 - Intelligent Design or Natural Evolution: Decentralizing Early Warning

While natural disasters are not directly comparable to violent conflicts, they are comparably complex, which suggests the disaster early warning community faces challenges parallel to those encountered in the conflict early warning field. For example, disaster early warning and response systems must monitor complex trends, detect patterns, forecast extreme events, prevent the loss of life and infrastructure, respond early and mitigate impact.

These parallel functions have real operational consequences for implementing organizations and stakeholders.²⁸ Indeed, both disasters and conflicts "have commonly led to massive internal and external displacements of people," and many disasters, "whether man-made or natural, are interlinked, and disaster-prone regions, countries or groups are vulnerable to any kind of disasters."²⁹ In other words, "despite the different origins of disasters, they share many common elements."³⁰

The sciences involved in the disaster field have long abandoned the Newtonian billiard ball universe. They recognize the astounding complexity of natural phenomena since even modeling the dynamics of mere billiard balls turns out to be a mindboggling challenge. Sure, predicting what happens after the first billiard ball hits a second is rather easy, but predicting the following "knock on" effects of subsequent billiard balls becomes exponentially less trivial very quickly.

In fact, just to correctly compute the ninth impact, one would "need to take into account the gravitational pull of someone standing next to the table. And to compute the fifty-sixth impact, every single elementary particle in the universe needs to be present in your assumptions!"³¹ To make matters worse (for political scientists), the world's leading professors in the hard sciences often express signs of relief when they recall that despite the complexity of natural systems, they are ultimately still easier to model than the complex dynamics of social systems.³² This should send early warning alerts to political scientists.

The field of disaster early warning and response long predates our own—both academically and professionally. A comparative analysis of the disaster and conflict prevention literature suggests we are going through similar "growing pains" in terms of lessons learned, albeit with one notable difference—we are seriously lagging behind by more than a decade vis-à-

²⁸ Brauch and Oswald, 2007.

²⁹ Ryan 1992; Kuroda 1992.

³⁰ Helbing *et al.* 2006

³¹ Taleb 2007.

³² Personal conversations with professors at the Santa Fe Institute (SFI) and the Technical University of Zurich in 2006 and 2007.

vis our learning curve.³³ The traditional perception that “aid does not arrive until we arrive” no longer holds currency in disaster response. The question is not whether the conflict early warning community will recognize this fallacy, but rather how much more blood and academic ink need to be spilled before we admit that our current institutional, top-down approaches to conflict early warning and prevention are blatantly archaic and ineffective?

The disaster management field, with its focus on natural disasters, has recognized that centralized and external modes of early warning and response are becoming less and less effective owing to the increasing complexity of humanitarian emergencies.³⁴ Hence the shift to people-centered early warning. The disaster response discourse has evolved beyond the conventional, static division of labor between the “warners” and “responders.” The focus is increasingly on rendering local communities less vulnerable and therefore more resilient to disasters without the need for external intervention, however “intelligently designed”.

This approach is more sustainable in the long run than the traditional “forest fire” strategy to humanitarian relief. Given our own track record, we typically fail to intervene in time to prevent bloodshed. This failure is virtually always blamed on the lack of “political will” or on the use of the sovereignty card played by repressive regimes. When we do act, we often do so belatedly, do more harm, and/or withdraw too early. Furthermore, policymakers are typically risk-averse and unlikely to take decisions based on academic warning systems that more often than not appear to them as a black box. Finally, the Responsibility to Protect (R2P) is a fine and noble principle. But principles don’t necessarily save lives.

2.1 – Decentralizing for Survival

As centralized modes of disaster management lose effectiveness, the disaster management community has sought to explore the capacity of disaster-affected communities to ‘bounce back’ or recover with little or no external assistance following a disaster.³⁵ The shift towards people-centered disaster management explained above reflects the belated recognition that local communities have consistently evolved sophisticated yet flexible strategies to manage the constant threat of insecurity in their lives.³⁶

To this end, the 2006 UN Global Survey of (disaster) Early Warning Systems defines the purpose of people-centered early warning as follows: “to empower individuals and communities threatened by hazards to act in sufficient time and in an appropriate manner so as to reduce the possibility of personal injury, loss of life, damage to property and the environment, and loss of livelihoods.”³⁷ Clearly, the discourse here shifts away from the conventional top-down division of labor between the “warners” and “responders” to one of individual empowerment.

³³ Meier 2007.

³⁴ Meier 2007.

³⁵ Manyena 2006.

³⁶ Bankoff, Frerks and Hilhorst 2004.

³⁷ UN 2006.

The disaster management community cannot prevent earthquakes—or the vast majority of natural hazards for that matter. But they can prevent hazards from becoming disasters by providing local training in contingency planning and preparedness. Millions more would die if their early warning efforts were exclusively focused on prediction. Most hazards, like earthquakes, occur regardless of whether we model them or not; hence the disaster management’s focus on planning and preparedness that empower local communities to survive disasters.

Since we are virtually incapable of accurately predicting the outbreak of violent conflict in such a way that these predictions translate into preventive measures, should we not also turn to contingency planning and preparedness to save lives today? Ultimately, what more is early warning than advance information for contingency planning and preparedness?

2.2 – Uncertainty Favors the Prepared

While the disaster management community allocates great importance *and* resources to planning and preparedness, the terms rarely appear in the discourse on conflict early warning and response. Instead, conflict early warning systems continue to focus exclusively on prediction of discrete events despite a history of failure. Moreover, in addition to our failures in prediction, we also fail—or rather we choose not—to prepare communities to face impending violence when the international staff is airlifted to safety.

While our counterparts in the disaster management and humanitarian response community may also get airlifted out of disaster zones, they do so with the knowledge that the local communities they leave behind have been trained in planning and preparedness. In other words, a people-centered approach to early warning empowers local populations via preparedness and contingency training. These communities then have increased capacity to manage local disasters without the immediate need for external intervention.

If the disaster management community were to suddenly decide to focus their energies exclusively on hazard prediction, this shift would surely cause uproar, not to mention a significant explosion in disaster deaths. We may not know the precise odds of an earthquake, but we do know, based on a mix of experience and modeling, how San Francisco might be affected were an earthquake of a given magnitude to occur. We know what measures we need to take for preparedness and contingency planning purposes. To this end, conflict early warning initiatives need to focus at least as much on the consequences of an event (which we can know) rather than exclusively on the exact probability (which we cannot know).³⁸

If conflict early warning and response is ultimately about saving lives, then training local communities to get out of harm’s way may well be considered as a fundamental component of conflict early warning and conflict prevention. Contingency planning and preparedness necessarily requires us to work with vulnerable communities at a more local and tactical level.³⁹ Ultimately, uncertainty favors the prepared.

³⁸ Taleb 2007; Green and Armstrong 2006.

³⁹ Barrs 2008; Barrs 2006.

2.3 – ICT as Best Supporting Actor

Compared to systems like CEWARN and FAST, the disaster response community is more agile in their adoption of ICTs for operational purposes. Field-based organizations such as UN agencies are increasingly realizing the potential of decentralized, distributed and mobile technologies. At the same time, local communities in developing countries are also benefiting from the information revolution.

While not as visible, there is evidence to suggest that affected communities are increasingly making use of ICTs to get out of harm's way and/or protect their livelihoods during complex emergencies. This would imply that ICTs are an important source of individual empowerment—particularly Peer-to-Peer (P2P) technology. To be sure, P2P ICTs can dramatically improve an individual's situational awareness and therefore human security without depending on external support. Recall that the purpose of people-centered early warning is to empower local at-risk communities.

The World Food Program (WFP) is particularly active in employing ICTs for emergency response. The UN agency is partnering with the University of Turin to manufacture Unmanned Aerial Vehicles (UAVs), also known as drones, to improve real time geospatial information collection and situation awareness in disaster zones. The field-based agency is also partnering with Vodafone to overhaul the organization's emergency telecommunication systems.⁴⁰ Mobile ICTs are playing an increasingly pivotal role in disaster response. Together with UNHCR (the UN Refugee Agency), WFP sent over 10,000 text messages last Fall to communicate information on relief operations to some 50,000 Iraqi refugees in Syria.⁴¹ SMS text messages were also used to coordinate air traffic control in Banda Aceh in the wake of the 2004 tsunami.⁴²

In terms of dynamic mapping, the Office for the Coordination of Humanitarian Action (OCHA), UNHCR and UN Humanitarian Information Centers (HICs) are actively using Global Positioning System (GPS) units and Google Earth to map and share dynamic, geo-referenced information that improve situational awareness and humanitarian coordination.⁴³ The HIC set up shortly after Israel's violent incursion into Southern Lebanon, made active use of Google Earth. The Global Disaster Alert and Coordination System (GDAC) and OCHA's Virtual On-Site Operations Coordination Center (Virtual OSSOC) continuously provide near real-time alerts on disasters around the world and the tools to facilitate response coordination.

Open Source Software (OSS) is also making headway in disaster information systems with Sahana and RisePak being just two examples of non-proprietary systems. The non-profit group "Innovative Support to Emergencies, Diseases and Disasters," or InSTEDD, was founded by Google.org's Larry Brilliant with the support of Google.com and TED to improve humanitarian collaboration through technological innovation.

⁴⁰ Reuters, February 13, 2008.

⁴¹ Bloomberg, August 31, 2007.

⁴² Personal conversation with Microsoft's Nigel Snoad, New York, September 13, 2007.

⁴³ Admittedly however, OCHA's dynamic mapping is no different to the organization's traditional mapping initiatives in that Google Earth is mainly used for more effective display and presentation.

Several of the technologies being developed and/or tested by InSTEDD include: An interface to display text messages from the field on Google Earth in real time and fully geo-referenced; A camera with build-in GPS and wireless that can send images straight to a laptop and on a map via satellite; Equipment that enables online communication via satellite; Cellphone-laptop, laptop-cellphone communication; An inflatable satellite communications device for short-term emergency outbreaks; Simultaneous IM translation in 17 languages; and Spot Tracker, a satellite personnel track that maps your movements on Google Earth every ten minutes and includes an emergency “help” button for rapid evacuation.⁴⁴ InSTEDD is also exploring the use of tagging and 2-way RSS feeds for the purposes of asynchronous database updates and data sharing.⁴⁵

In Fall 2007, the group used UAVs to provide real time situational information to firefighters and emergency services responding to fires in southern California.⁴⁶ In addition, the non-profit developed a social network software application called “Contacts Nearby” which integrates Facebook, Twitter and Google Maps.⁴⁷ In fact, Twitter was also used by the Los Angeles and San Diego Fire Departments as well the Red Cross: “Cell towers and communication lines were being burnt, [so] SMS and websites were the best ways to get info, and Twitter was perfect in that sense because it published directly to SMS.”⁴⁸

Equally telling is the following comment by the LA Fire Department: “We can no longer afford to work at the speed of government. We have responsibilities to the *public* to move the information as quickly as possible... so that *they* can make key decisions.”⁴⁹ Just how fast is Twitter? Earlier that year, “Twitters beat the US Geological Survey by several minutes” when they were first to report the Mexico City earthquake on April 17th. The Twitter alerts, or microblogs, are all documented and time stamped on the Twitter website and also available on TwitterVision.⁵⁰

InSTEDD has rapidly formed a wide range of partnerships with multiple groups—including Twitter—and many expect that the technologies described above will go a long way to improving the effectiveness of disaster early warning and humanitarian response.

Microsoft’s Humanitarian Information Systems Group is also developing open source software to facilitate communication and interoperability of diverse information systems in crisis areas.⁵¹ In fact, private sector companies operating in the telecommunications sector are increasingly viewing the humanitarian industry as an ideal testing ground for new and

⁴⁴ Blog entry available online at: <http://www.lunchoverip.com/2008/03/instedd-update.html>

⁴⁵ Personal conversation with InSTEDD team, New York, April 30, 2007. Note, however, that Spot Tracker is not global. The company would need to link up with the Thuraya network.

⁴⁶ Personal conversations with InSTEDD team, Boston and Geneva, September 13, October 23 and November 19, 2007.

⁴⁷ Personal conversations with InSTEDD team, Boston and Geneva, September 13, October 23 and November 19, 2007.

⁴⁸ MobileActive, Blog entry available online at: <http://mobileactive.org/using-twitter-emergencies>

⁴⁹ PC World, available online at: <http://www.pcworld.com/article/id,135518-c.webservices/article.html>

⁵⁰ Scobleizer, Blog entry available online at: <http://scobleizer.com/2007/04/12/mexico-city-earthquake-reported-on-twitter-first/>

⁵¹ Personal conversation with Microsoft’s Nigel Snoad, New York, September 13, 2007.

innovative technologies.⁵² To be sure, if ICTs withstand the test of crisis environments, they can be spun off in more traditional markets much like military technology that has been adapted for commercial purposes—a particularly lucrative business.

Decentralized, distributed and mobile ICTs are also used effectively when placed in the hands of local communities. Unlike international organizations, however, the latter seldom capture airtime—that is, the interest of the international media (or academics) when they use technology to get out of harm’s way. This lack of visibility should not be taken to suggest that ICTs play a less important a role in empowering local communities in disaster environments. To this end, more anecdotes need to be collected; seasoned fieldworkers need to be interviewed and their stories documented; local communities need to be given the means and incentives to document their own uses of ICTs in disaster zones.

Take, as just one example, the case of Mohammed Sokor, a Somali refugee at a camp in northern Kenya. When no one seemed to listen to his concerns on the decreasing food supply, he sent the following SMS text message to WFP spokesperson Greg Barrow in London: “My name is Mohammed Sokor, writing to you from Dagahaley refugee camp in Dadaab. Dear Sir, there is an alarming issue here. People are given too few kilogrammes (*sic*) of food. You must help.”⁵³ ICT suddenly collides these two worlds:

“The sender is a man driven from his country by war, living at the very edge of existence in a refugee camp that itself is situated in the middle of a drought zone. [...] It may seem strange that someone so short of food can afford a mobile phone but one of the great ironies of modern Africa is that mobile phones are not seen as a luxury, but a necessity. They are often cheap and used far more widely than most would imagine. For traders, they are the primary tool of commerce and for the many millions -- like Mohammed -- who make up the African Diaspora, they are the thread that binds scattered communities together.”⁵⁴

While WFP did subsequently boost rations in the camp, they cited other reasons than the text message for revising their distribution plan. Some suspect the “rations were increased on the basis of WFP staff on the ground re-assessing the situation, rather than technology empowering beneficiaries.”⁵⁵ The real question is what led the ground staff to re-assess the deteriorating situation in the first place? Perhaps because of the initial SMS? Even if the re-assessment was initiated prior to or during the SMS, this doesn’t take away from the fact that a refugee in a remote camp on the Northern Kenyan border sent an SMS to a WFP spokesperson sitting in London who obviously received it and which led to a press release. The refugee took the initiative without their being a protocol to do so. If more refugees had mobile phones and a contact number to provide feedback, would this not assist the WFP staff on the ground?

⁵² Personal conversation with Microsoft’s Ted Okada, Washington DC, September 24, 2007.

⁵³ The Economist 2007, available online line at:

http://www.economist.com/world/international/displaystory.cfm?story_id=9546242

⁵⁴ WFP 2007, available online at: <http://www.wfp.org/english/?ModuleID=137&Key=2146>

⁵⁵ Blog entry available online at: <http://www.humanitarian.info/2007/07/28/flood-famine-and-mobile-phones-in-the-economist/>

Although only a handful of anecdotes do make it on the Internet or on the pages of local newspapers, they nevertheless serve as proof of what is feasible; that the last mile can make all the difference in the world. Of course, this now leaves us with more questions than answers. Can a people-centered approach to disaster early warning be employed in conflict environments? How would such systems work? What of their underlying methodologies? Can the same ICTs used in disaster contexts empower local communities facing politically volatile and violent situations? Is a tactical approach to early warning more effective at anticipating violence than the academic models described above?

The next section addresses these questions by drawing on another field of practice rarely connected with conflict early warning and conflict prevention; namely nonviolent action and associated survival techniques.

3.0 - Getting Tactical: Nonviolent Action and Staying Alive

Conflict early warning works. Indeed, current and historical cases of nonviolent action may be the closest systematic examples or tactical parallels we have to people-centered disaster early warning systems. Planning, preparedness and tactical evasion, in particular, are central components of strategic nonviolence: people must be capable of concealment and dispersion. Getting out of harm's way and preparing people for the worst effects of violence requires sound intelligence and timely strategic estimates, or situation awareness. In short, reliable people-centered early warning is vital when conducting maneuvers of defensive dispersion within the context of strategic nonviolence. To be sure, a realistic appreciation of impending violence makes it possible to motivate civilian groups to respond early in conceiving plans for evasive action and self-protection. The literature on nonviolent action and civil resistance is rich with case studies on successful instances of early warning tactics for community empowerment.⁵⁶

3.1 – Organizing for Nonviolence

What are the characteristics of successful early warning case studies in the field of nonviolent action? Nonviolent early response uses local social *networks* as the organizational template of choice, in a mode different from our conventional and institutional approach to early warning. Networks have demonstrated a better ability to innovate tactically and learn from past mistakes. The incentives for members of local networks to respond early and get out of harm's way are also incalculably higher than those at the institutional or international level since failure to do so in the former instance often means death. This explains why nonviolent movements are continually engaged in monitoring for early warning purposes. As argued earlier, “it is extremely difficult to forecast, especially the future, but if you [must] forecast, forecast often.”⁵⁷

⁵⁶ Popovic 2006; Sharp 2005; Helvey 2004; Martin 2001; Ackerman and DuVall 2000.

⁵⁷ Schmeidl 1998.

Nonviolent action is non-institutional and operates outside the bounds of bureaucratic and institutionalized political channels. Nonviolent movements are locally led and managed. They draw on local meaning, culture, symbolism and history. They integrate local knowledge and the intimate familiarity with the geography and surrounding environment. They are qualitative and tactical, not quantitative and policy-oriented. Not surprisingly, successful cases of nonviolent action clearly reveal the pivotal importance of contingency planning and preparedness, actions that are particularly successful when embedded in local circumstances and local experience.

3.2 – Tactical Early Warning and Response

The trouble with CEWARN and similar systems such as FAST is that they are designed to trigger a response from the outside in contrast to people-centered early warning systems, which are wired horizontally.⁵⁸ “When this [warning] is targeted internally – that is from the informants to their headquarters – there must be an onus upon the headquarters to act. There is little point in investing in warning systems if one then ignores the warnings!”⁵⁹ To be clear, “early warning should not be an end in itself; it is only a tool for *preparedness*, *prevention* and mitigation with regard to *disasters*, emergencies and *conflict situations*, whether short or long term ones. From a managerial point of view such a system will necessarily depend on the efficiency and effectiveness of the organizational work [...]. The real issue is not detecting the developing situation, but reacting to it.”⁶⁰

There have been plenty of violent conflicts and mass atrocities to react to over the centuries. Recent research into “the response strategies of internally displaced people found that their information-gathering systems were often highly developed and far superior to those of the humanitarian community.”⁶¹ So the task at hand is not to develop new tactics for survival but rather to learn from those who have survived and perished in conflict. As a seasoned practitioner with *Medecins sans Frontieres* stated, “people will continue to survive as best they can, relying more on their own communities and traditional networks than on [us] ... it is not the fault of the displaced persons and refugees, but our system for providing protection and assistance that does not work. They have, after all, had to learn the hard way what it takes to survive.”⁶²

Sadako Ogata and Amartya Sen echo this sentiment when they write, “the empowerment of internally displaced persons has not received enough attention, despite the crucial role [they] play in meeting their own needs and influencing the course of *conflict*. In many situations internally displaced persons develop survival and coping strategies. In some, they and host communities develop self-defense units to ensure that people have time to flee...”⁶³ To this

⁵⁸ Barrs 2006; Talentino 2003.

⁵⁹ Walker 1992.

⁶⁰ Kuroda 1992.

⁶¹ OCHA 2003.

⁶² Cited in Barrs 2006. Casey Barrs at the Cuny Center has over the course of many years developed a complete manual for Locally Led Mobile Aid (LLAMA). The manual includes over 1,600 citations from diverse studies on humanitarian aid, civilian protection, people-centered early warning and nonviolent action. For more information, please email Casey at: cbarrs@mt.gov

⁶³ *Human Security Now*, May 2003.

end, studying and disseminating testimonies of those who survive violence can provide important insights into the numerous tried and true survival tactics. Luck may at times play a role in survival stories. But to quote the French scientist Louis Pasteur, “in the field of observation, chance favors only the prepared mind.” In any event, luck can be turned into knowledge, and knowledge into future tactics.

From survival testimonies, other communities in crises can “learn what dispersed and hidden livelihoods look like. They can be shown how they might dismantle their village homes and build temporary huts near their fields as the Vietnamese sometimes did in the face of American airpower. Or use crop colors and canopies that are less noticeable from the air, as Salvadoran peasants sometimes planted.”⁶⁴ Understandably, “no sophisticated warning systems were available, so people had to develop their own skills in detecting and identifying aircraft.”⁶⁵

The following short testimonies are taken from the extensive research on civilian protection and humanitarian tactical training carried out by Casey Barrs.

East Timor, 1990s: “When we hid, we always hid in the forest. There were no more villages; the Indonesian Army had burned them all down. Each family hid by itself. We were more secure if we separated into many places in a given area, rather than all camping in one restricted area. There were a few hundred people with us altogether.”

Belorussia, 1940s: “Our camp was spread out in sections over an area of ten kilometers; special scouts would ride over the area to maintain contact between the difficult subunits ... we remembered the Biblical phrase ‘should one part of the camp be attacked and overcome, the other part will remain.’ This strategy was used by our forefathers.”

Burma 1990s: “The armed opposition in Burma built early warning systems for civilians to monitor the risks of government attack. Monitoring systems can be as simple as a rotating networks of villagers taking up strategic outlook positions and sending runners to inform neighbors if troops are approaching. However, more advanced early warning systems utilize the radio transmitters of the armed opposition forces to prepare villagers for evacuation.”

El Salvador 1970s: “Salvadorans sometimes did their own preemptive migrations in order to outflank military sweeps. These defensive movements were called *guindas*. In groups ranging from a few dozen to as many as two or three hundred” the people hid during the day and moved at night, sometimes repeating this for a few weeks.

⁶⁴ Barrs 2006.

⁶⁵ Meyer 1994.

Civilians would also set off firecrackers to warn others when they saw spotter planes. Said one observer, ‘they’re human radar, practical and self-taught; who knows how to do it, but they know that there’s going to be a military operation.’”

Uganda 1990s:

“The residents of some threatened villages in Northern Uganda climb the mountainsides each night and sleep under animal hides tanned to look like rocks. Dig underground rooms for supplies and services adjunct to the encampment.”

The above testaments are only a handful of those documented by Barrs. They emphasize the pivotal role that preparedness and contingency planning can play in early warning and tactical response. In many situations, an entire encampment can evacuate within minutes with people hiding in pre-designated areas of the rain forest or huddling in crude bomb shelters to wait out an attack; this unbreakable discipline makes the difference between life and death.⁶⁶ To this end preparedness and contingency planning are fundamental to the practice of conflict prevention even though this is rarely recognized or operationalized.

Of course, some may charge that preparedness doesn’t prevent the overall *political* conflict. Even if this were true most of the time, preparedness and contingency planning would still save more *lives* in the short run. Taken from the perspective of a local facing certain death, that individual would likely prefer life in the short run and death in the long run than vice versa. In any event, preparedness, tactical evasion and survival techniques can, and often do, change or influence the course of conflict at the political level.

Indeed, the reason that these tactics are effective is because they empower the individual with “A Force More Power”, i.e., nonviolent action within a social movement that can force political change. For example, preparedness and planning was pivotal to the success of Otpor’s nonviolent resistance in 2000, which contributed to the fall of Milosevic. To be sure, this student-led resistance group, “could only be done because of the planning during the fall of 1999.”⁶⁷ In sum, successful nonviolent tactics characteristically seek to effect changes in the balance of power and the capacity of armed groups to inflict physical and psychological violence on local communities.

Nonviolent action is not a question of morals by tactics. Gandhi himself conceived of nonviolent resistance not as a spiritual power but as a kind of science with laws to be applied, yielding power that was predictable.⁶⁸ Unlike conventional early warning systems, nonviolent movements emphasize the importance of distinguishing between intentions and capabilities. Instead of focusing on trying to predict the intentions of authoritarian regimes using complicated math, nonviolent networks directly assess their adversaries’ capacities as well as their own to apply calculated tactics that have predictable outcomes. A fundamental strategy in nonviolent action is to undermine regimes’ pillars of support by unraveling their power base.

⁶⁶ Casey 2007.

⁶⁷ Popovic *et al.* 2006

⁶⁸ Ackerman and DuVall 2000.

A slew of tactics can be used, for example, to convince a regime's police force or military to change sides. A powerful tactic is to provoke the government into responding with excessive or disproportionate force. Obviously, this is no Sunday stroll in the park. But this strategy explains why (1) tactical evasion is critical, and (2) nonviolent groups continually assess the state's capacities along with its pillars of support. These assessments focus on real time evaluation of existing strengths, weaknesses, opportunities and threats. (Note that the first two factors are internal and the later two external. Academics may well be able to model the external factors but will be hard pressed to anticipate the changing dynamics of the internal factors). Groups engaged in civilian resistance clearly need a very sound understanding of capacities in order to plan and prepare appropriate tactics that will have lead to an anticipated response by the regime.

This approach to capacity assessment bridges the division of labor between those who warn and those who respond. Organizational learning is also far more effective in this context.⁶⁹ The key to successful nonviolent movements is therefore to maintain the discipline of a decentralized, activist social network. In sum, a tactical approach to conflict early warning and response is not only a viable approach but also one that is already operational in multiple contexts. Local communities and groups engaged in nonviolent action have clearly learned some difficult albeit important lessons along the way and in so doing have won some important victories that can be capitalized on by other nonviolent movements.

To recap, the "system" in tactical early warning is the "social network" and the "methodology" is planning and preparedness for tactical action. This leaves us with the technology component of tactical nonviolence. Do networked communications and mobile ICTs empower local communities and groups engaged in strategic nonviolence? Or does the information revolution give centralized regimes and non-state armed groups a distinct advantage over social networks?

3.3 – Decentralized ICT for Decentralized Action

Conventional approaches to conflict early warning primarily used computers to analyze conflict indicators and visualize trends over time (and more recently across space as well). In contrast, the disaster early warning and humanitarian response community making wider use of the information revolution—as evidenced by the activities of WFP and Google's new InSTEDD group. Is this also true of citizen activists, local communities in conflict and nonviolent movements under repressive regimes? Clearly, the information revolution has dramatically reduced the costs of networked communications. However, does this enable civil society to more effectively mobilize action, influence centralized regimes and to get out of harm's way when the regimes decide crack down? Or are states becoming increasingly savvy in their ability to control the flow of information?⁷⁰

⁶⁹ Meier 2007.

⁷⁰ This section is based on the author's dissertation research.

The general consensus based the most recent studies that address this question is that coercive states now have the upper hand in using ICT to control and suppress politically sensitive information such as human rights abuses.⁷¹ This was not the case in earlier studies, which suggested with good reason that the information revolution would lead to more open and democratic societies.⁷² Is the pendulum of scholarly debate perhaps swinging back?

Michel Foucault argues that state control by surveillance, e.g., the *Panopticon*, inherently breeds resistance within its power structure.⁷³ This would suggest that as states gain the upper hand, resistance broods beneath the surface. To be sure, while the current literature and empirical evidence tend to place coercive states in the lead, these studies readily acknowledge that state control and censorship of information is far from insurmountable.⁷⁴ This is evidenced by multiple cases of technology-empowered activist networks and/or breaches of government censorship in Afghanistan, Albania, Burma, China, Colombia, Egypt, Iran, Iraq, Kenya, Morocco, Pakistan, Philippines, Sudan, Syria and Tunisia.⁷⁵

Doesn't this then beg the following question: are coercive states really in control? Like Achilles, a single weakness is potentially sufficient to spearhead what Drezner calls an "information cascade" or Smart Mob behavior, which can unravel the coercive control of an authoritarian regime.⁷⁶ In addition, while these regimes can continue to crack down on activist networks that exploit information technology, the political *and* economic opportunity costs of such crackdowns are increasing.⁷⁷

Indeed, a number of authoritarian and semi-authoritarian regimes have shown interest in exploiting the information economy to spur economic growth and development. "However, any state that permits Internet or cellular phone use for commercial possibilities will face difficulties in perfectly censoring undesirable communication or halting all attempts at political coordination."⁷⁸ Furthermore, and as history suggests, where there are weaknesses in state control of information, citizen activists have, and generally will, exploit them; where there are barriers, alternative paths are found.⁷⁹ This is particularly true in cases with antagonistic state-society relations. The pendulum dynamic, then, is perhaps better described as an evolutionary cycle of action, reaction and adaptation.

However, the evolution of the literature on the information revolution and its impact on state-society relations is not robust. Current studies suffer from three important limitations that cast sufficient doubts on the conclusion that coercive states have the upper hand in the information revolution. First, the terms "information revolution" and "Internet" are used interchangeably throughout the literature even though: (i) the majority of studies generally focus on the Internet exclusively, and (ii) the information revolution includes additional

⁷¹ Deibert *et al.* 2008; Drezner 2008.

⁷² Andrew 2000; Clarke 1994.

⁷³ Foucault 1995; Lyon 2006.

⁷⁴ Zittrain and Palfrey 2008; August 2007.

⁷⁵ More details on some of these cases are provided in the following pages.

⁷⁶ Drezner 2008.

⁷⁷ Drezner 2008.

⁷⁸ Drezner 2008.

⁷⁹ Fallows 2008; Rheingold 2003; Scott 1999

means of communication, such as mobile phones.⁸⁰ In other words, the literature focuses almost exclusively on assessing the effect of the Internet instead of evaluating the aggregate impact of the information revolution on antagonistic state-society relations.

Second, the two terms are purposefully not differentiated on the basis that the predominant feature of the information society is the spread of the Internet.⁸¹ While this is true of the most industrialized democratic societies, it is not the case for the majority of developing countries experience conflict and/or repressive regimes. Indeed, mobile phones are the most widely spread ICT in developing countries and also the technology of choice for activist networks in these countries.⁸² However, studies are still biased towards assessing the political and legal ramifications of the information revolution in industrialized societies.

Third, current studies largely ignore the use of network theory as a theoretical framework. While other conceptual frameworks from political science, economics and sociology are typically employed to frame the research methodology and design, the added value of network science is rarely considered—let alone pursued. This is problematic since the evolutionary dynamic of adaptation described above is a dynamic inherent to all networks in complex systems.⁸³

Put differently, the information revolution may very well favor civil society networks given the compatibility of the technology with the latter's decentralized organizational structure.⁸⁴ Network science thus provides a rich and fertile theoretical framework to assess the theoretical impact of the information revolution on repressive regimes (hierarchical & centralized organizations) versus social networks (horizontal & decentralized organizations).

The above arguments are meant to instill doubt on whether the current impact of ICT is really at an evolutionary stage that favors the survival of coercive states. Leaving these academic concerns aside, however, what counter evidence currently exists that might suggest ICTs are more effectively empowering civil society networks? The following seven short country case studies (taken from the author's dissertation research) reflect examples from a wide range of security environments and technologies—including the Internet in general, blogs, GPS units, mobile phones, SMS texts, phones cameras/videos, radios, very high resolution imagery, Google Maps and Google Earth.

China: “The Chinese government has recently tightened controls over the Internet, taking down sites with no political content. This is leading to a backlash, ‘as many people who previously had little interest in politics have become active in resisting the controls.’ In fact, the mounting discontent against China’s Great Firewall has ‘inspired a wave of increasingly determined social resistance of a kind that is uncommon in China.’ This is also

⁸⁰ Drezner 2008.

⁸¹ Drezner 2008.

⁸² UNCTAD 2008; Zuckerman 2007.

⁸³ Brafam and Beckstrom 2006; Buchanan 2003.

⁸⁴ Drezner 2008.

prompting a ‘loose but growing network of software writers who develop code aimed at overcoming the restrictions.’

To be sure, ‘anyone in China who wants to get around the firewall can choose between two well-known and dependable alternatives: the proxy server and the VPN.’ The government could technically shut these down, but ‘every bank, every foreign manufacturing company, every retailer, every software vendor needs VPNs to exist. They would have to shut down the next day if asked to send their commercial information through the regular Chinese Internet and the Great Firewall.’

One Chinese software developer created an anti-Great Firewall evasion group because of his passion for Wikipedia, a site not directly available in China. He opines that the Great Firewall will break down ‘because people’s hearts have changed [and] because China cannot be completely disconnected to the outside world anymore.’ Another developer concurs, ‘the movement ... has proved the power of public opinion as an important limitation of the censors’ power.’

China’s control over the information revolution is also mediated by the bureaucratic, Communist nature of the government, particularly when contrasted with the loose and decentralized network of activists. No fewer than ‘twelve national government bodies share responsibility for the Internet, and all of them have separate political and commercial interests. In some cases, departmental budgets are financed through revenue from online businesses, so it’s often in their interests to loosen restrictions. Furthermore, the Great Firewall is besieged by bureaucratic infighting and incompetence that results in exceptions and loopholes.’”

Burma:

“With less than 1% of the population having Internet access, ‘Myanmar is hardly a technological hub.’ This may explain the following words from a long time Burmese activist: ‘the phone and the radio are very important now. I always take them wherever I go. They are next to me when I sleep. The radio has become a social weapon for me and for our movement. It is how the messages against the military regime are broadcast by us and others against them.’ In addition, the regime does not scramble its military radio communications, enabling activists and local communities to listen in and track the movement of military units. This allows at-risk communities to get out of harm’s way when these units mobilize. A non-profit based in the US is ‘seeking to provide a local resistance network with hundreds of small handheld radios that can be smuggled into Burma for use by local villages.’

Another activist network that operates on the Thai-Burma border, ‘secretly travels into Burma with cameras to document atrocities.’ As one activist aptly states, ‘technology has changed everything.’ Indeed, activists in Burma have ‘become particularly skilled at using technological tricks to bypass ... restrictions—some of them borrowed from [their counterparts] in China.’ The mainstream media is also facilitating the communication and exchange of information. ‘Time Warner Inc.’s CNN, which had its own reporter in Myanmar [in March 2008], has also been airing 65 clips and pictures from tourists and Myanmar residents sent in via its iReport citizen-journalist system.’ Even in closed regimes like Burma, ‘the spread of the

Internet and mobile phones has meant that footage will always continue to get through and the story will be told, one way or another.'

And so, 'in the age of YouTube, cellphone cameras and text messaging, technology is playing a critical role in helping news organizations and international groups follow Myanmar's biggest protests in nearly two decades. Citizen witnesses are using cellphones and the Internet to beam out images of bloodied monks and street fires, subverting the Myanmar government's effort to control media coverage and present a sanitized version of the uprising.'"

High-resolution satellite imagery of human rights abuses committed by the junta is also surfacing thanks to the American Association for the Advancement of Science (AAAS). In Fall 2007, the group's 'Geospatial Technology and Human Rights Program' worked with groups along the Thai-Burma border to collect ground information on human rights abuses. This local data, with the satellite imagery, exposed the regime's violence. AAAS is also working on a project that will 'make it a lot easier for human rights organizations to make use of affordable and timely satellite imagery.'"

Philippines: "In 2001, the Philippines introduced the world to the first 'SMS Revolution.' Hundreds of thousands of citizens in the Philippines used SMS to rapidly coordinate street demonstrations that helped bring down the Estrada regime. The new President Gloria Arroyo would not have been brought to power had smart mobs not been able to use the texting function of their mobile phones to unseat Estrada.

At the same time, 'it is worth remembering that the powers unleashed by the mobile phone can affect all sides of a political situation. [...] When Arroyo found herself embroiled in a corruption scandal [...] a snippet of dialog between Arroyo and Garcillano and rapidly became one of the world's most downloaded ringtones and spawning over a dozen remixed versions.'"

Iran: "This may come as a surprise but the Iranian blogosphere has exploded. 'Farsi is the fourth most widely used language among blogs worldwide.' Persian blogs are increasingly 'taking the place of reformist newspapers that have been censored or shut down.' While government has tried to impose filters on the Internet, these efforts have been sporadic and with limited success. When a prominent Iranian blogger was imprisoned for 'undermining national security through cultural activity, well known Iranian bloggers joined forces with prominent English-language bloggers to 'create an online coalition that attracted media coverage, leading to [the blogger's] release.'

Blogs are not the only ICT having a notable impact in Iran. 'SMS has become a way for young people to circumvent authority, largely through the spread of political jokes on subjects from nuclear energy to petrol bans to government rationing.' To be sure, we over 20 million SMS messages sent every day in Iran, texting has 'ceased to be merely a way of sending a quick alert, and become a method of political and cultural

discourse, filling the gap left by the dearth of free and independent media of the conventional sort. Texting is now a potent way of distributing information, critical remarks and above all jokes about politics. With no censorship and no holds barred, it allows people to break taboos, criticize the authorities, have some fun or chat someone up.”

While the Persian Gulf’s rulers could all technically shut down the SMS function, they would ‘sorely disappoint the region’s profit-engorged cell phone companies, whose stock prices have soared as phone and messaging use has exploded.”

Egypt:

“In 2005, Egyptian organizers used ‘SMS and e-mail to rally against President Hosni Mubarak over a referendum to hold multiparty elections.’ Bloggers and activists have also made use of YouTube to post videos revealing ‘the brutality of Egyptian police, leading to criticism by the US State Department of Egypt’s human rights record.’ While the footage was temporarily taken off YouTube, much of it could also be accessed on a website called The Hub, ‘which is what YouTube would look like if it had been designed by Mohandas Gandhi.’

The Hub was developed by WITNESS to serve as ‘the world’s first participatory media site for human rights. Through the Hub, individuals, organizations, networks and groups around the world are able to bring their human rights stories and campaigns to global attention and to mobilize action to protect and promote human rights.’ The Hub is not just a reporting tool; the site accompanies most of the footage with ways to take action against the abuses depicted.

As more citizens begin to carry cameras (integrated in mobile phones) and document human rights abuses, smart mobs will increasingly ‘have the ability to spread them phone to phone, or by posting them to a website.’ There is certainly tremendous potential for ICT to upgrade people power to People Power 2.0. One Egyptian dissident ‘constantly Twitters his status so that if his feed goes quiet, his supporters will know to immediately re-launch the FreeAlaa.com site.”

Kenya:

“In January 2008, Kenya’s contested elections led to increasingly widespread violence across the country. The National Commission for Human Rights provided a dedicated email address and phone number for Kenyans to email or text in any information of human rights abuses. Independently, a group of software developers developed a web-based map called Ushahidi (meaning ‘witness’ in Swahili) for people to map acts of violence that they have observed. One of the distinct strengths of Ushahidi is the interface’s extreme simplicity and user friendliness. Reports of violent events can also be texted.

The team behind this mapping initiative is now planning to develop a global version of Ushahidi called CrisisNet. Also web-based dynamic, the crisis mapping website will be open to anyone who wishes to submit information into a centralized database on a given crisis in their area. While issues of quality control and data validation have presented Ushahidi with some important challenges, the team is taking steps to improve the

reliability of the posted data. Reports posted to CrisisNet and verification of each incident will be verified after the source is confirmed.”

Sudan: “The Sudanese government regularly shuts down mobile phone network coverage when they are engaged in committing atrocities. This may explain why ‘information on human rights abuses are often communicated to human rights organizations when international staff working in the Sudan leave the country on R&R.’ Amnesty International’s new initiative, “Eyes on Darfur”, takes human rights monitoring to entirely new heights, literally and metaphorically.

“The project leverages the power of high-resolution satellite imagery to provide unimpeachable evidence of the atrocities being committed in Darfur - enabling action by private citizens, policy makers and international courts. Eyes On Darfur also breaks new ground in protecting human rights by allowing people around the world to literally ‘watch over’ and protect twelve intact, but highly vulnerable, villages using commercially available satellite imagery.’

The US Holocaust Memorial Museum (USHMM) has also made use of satellite imagery to document the genocide committed by the Sudanese Government. The Museum’s ‘Crisis in Darfur’ project uses Google Earth to disseminate this compelling visual evidence and raise awareness worldwide. The Google Earth layers include geo-referenced information on damaged and destroyed villages, internally displaced persons and refugees, photos and videos as well survivor testimonies. Anyone who downloads Google Earth worldwide automatically downloads the Museum’s layers. At least tens of millions have done so to date.”

The above cases don’t all qualify as direct examples of local early warning and response. They are not meant to. The motivation behind this paper’s research is to bridge divides between conflict early warning, disaster response and nonviolent action by emphasizing the role of ICT. The examples in this section, and those from the previous section, are meant to outline how ICTs used by activists and disaster responders might be used for local, tactical early warning and response to violent conflict. The conceptual bridging of these disciplines may provide some inspiration to operationally connect the dots and shift the field of conflict early warning from regression analysis to tactical response and saving lives.

Of course, the issue of data security is particularly more pronounced in the context of conflict than natural disasters. At the same time, however, numerous examples from nonviolent movements and civilian resistance demonstrate that information technology can be used anonymously with minimal training and preparedness. In China, encrypted e-mail passes through the “Great Firewall without scrutiny, and users of many Web-based mail systems can establish a secure session simply by typing “https:” rather than the usual “http:” in a site’s address—for instance, <https://mail.yahoo.com>.”⁸⁵ Why do government officials not close these loopholes even they know many activists exploit them? Two reasons: first,

⁸⁵ Fallows 2008.

finding technical fixes for loopholes is not a trivial exercise, and second, an economic reason: “to keep China in business.”⁸⁶

Mobile phones can also provide a general degree of anonymity. In fact, “the anonymity of mobile phones is one of the key reasons they’ve been so useful to activists.”⁸⁷ In most developing countries, mobile phones are bought on a pay-as-you-go basis. “Some countries require registration of a phone’s SIM card using a validated ID, but most don’t, either for the SIM or for ‘top-up’ cards. As a result, it’s not difficult for an activist to have a single phone with multiple SIMs, one which is closely correlated with her identity and one which might be used to send messages to organize a protest or promote a cause.”⁸⁸ To this end, even though scanning software is available for monitoring SMS, the messages cannot easily be traced to their authors.

In terms of voice communication, peer-to-peer technology such as Skype uses 256-bit encryption. According to the March 6, 2008 edition of *The Economist*, “only America’s NSA is thought to have the computing power to unscramble Skype packets.” Mobile handsets that use Skype are now available and likely to become more widely distributed. And if activists are ever Skype out of luck, there’s always the age-old technique of code and misinformation.

Instead of a Conclusion: A Working Case Study

The Harvard Humanitarian Initiative (HHI), in collaboration with the US Holocaust Memorial Museum (USHMM), is developing a dynamic humanitarian information system based on the lessons learned in conventional early warning systems, the disaster management community’s approach to ICT, and on the use of tactics by activist and nonviolent movements alike. Called by the working title “Humanitarian Sensor Web” (HSW), the initial inspiration behind the initiative is the sensor-based approach of disaster early warning systems, which provide real-time, fully geo-referenced information around the clock.⁸⁹

Indeed, the “sensor web” model is often used by scientists to monitor everything from a single glacier to hundreds of simultaneous earthquakes worldwide, recording critical information about each event in real time and portraying the data instantly in geographic context. These systems enable users to quickly visualize and better understand complex dynamics of unfolding event systems, and design collaborative community approaches to operational and policy challenges.

Local communities and staff members in the field have valuable, geographically rich information that can inform effective decision-making and self-organized operational response. To enable access to this rich pool of data, new information system designs must lower the costs of data entry; this means decreasing the time, complexity and frustration of

⁸⁶ Cutler 2008.

⁸⁷ Zuckerman 2007.

⁸⁸ Zuckerman 2007.

⁸⁹ Project Leader Michael Graham (USHMM/HHI) and Coordinator Patrick Meier (HHI/Sympact) have been collaborating on the Humanitarian Sensor Web since 2007. Michael Graham can be contacted at: mgraham@ushmm.org. This above description of the Sensor Web was co-written with Mr. Graham. The project is supported by the McArthur Foundation and Humanity United.

sharing information, while simultaneously increasing the returns and rewards of doing so. Indeed, information systems are meant to facilitate and reduce, not add to, the work already being carried out by field staff. To this end, the Sensor Web team has looked to social network software such as Facebook and to Serious Games as design and console models to develop a fully intuitive point-and-click web-based user interface using Google Maps.

This approach means that using the Sensor Web requires little to no prior training. It is worth emphasizing that this is a key lesson learned. Many other systems remain cumbersome to work with and often require extensive training and re-training. In addition, unlike the majority of humanitarian systems, the Sensor Web takes a minimum essential indicators approach to monitoring. In other words, instead of monitoring hundreds of indicators (which increases all the costs associated with data entry), the team has identified the minimum required indicators to improve situational awareness and early responses to conflict and disasters.

These indicators are divided into two categories, places and events. The former include the most essential critical assets, or infrastructure, necessary for real-time, geo-spatial situational awareness and coordinated response. These range from transportation infrastructure and refugee camps to project sites and existing settlements. The event-data ranges from security and conflict incidents to health and displacement-related places. Each asset and event is associated with a custom-made intuitive icon that can be dragged and dropped within the Sensor Web's map console (based on Google Maps). The maps can be printed in various formats and also exported as a layer on Google Earth.

The interface includes a location search function that enables users to identify the GPS coordinates associated with the assets and/or events they seek to map. Because the Sensor Web is first and foremost a field-based tool, users can also work with a text-based only interface of the Sensor Web when bandwidth is minimal. Naturally, the system will also include an off line capability for fieldworkers to use when in remote locations. The data will then seamlessly synchronized when connected to the Internet. In addition, users can interface with the Sensor Web via SMS. Texts can then be sent to the Sensor Web's dedicated number and be visualized in real time as an icon on the Sensor Web's Google Map. When the Sensor Web is completed, users will be able to click on the icon and instantaneously forward the SMS message to other registered mobile phones in the general area—a functionality referred to as SMS broadcasting.

Together with Microsoft's Humanitarian Systems Group, the Sensor Web team recognizes that a significant amount of directly relevant information isn't collected and shared because beneficiaries and local communities are not involved, or have no way to participate in the process of data collection, analysis and response. This is another reason why the Sensor Web allows for SMS interface. The mobile phone is the most widely spread ICT in developing countries and Africa is the fastest growing region vis-à-vis subscribers and network coverage. In fact, there are now more mobile phone subscribers in the developing world than in developed countries.⁹⁰

⁹⁰ UNCTAD 2008.

Local communities will therefore be able to both share *and* receive information that improves situational awareness in real time. This horizontal approach allows for local communities to warn each other and service providers such as WFP and other field-based organizations. In turn, these organizations can better interface with local beneficiaries to assess needs in real time. As a basic decision-support tool, the Sensor Web is expected to empower local communities and field staff by enabling them to base their decisions on relevant, real-time, geospatial information.

Like any information collection initiative, data quality and validation are important challenges and pivotal to the success of information systems. The Sensor Web team has therefore looked to self-organized trust-based networks to gain insights on how to most efficiently ensure the reliability of the information collected. The simple strategy developed by the Sensor Web team is based on these insights. First, every user will be registered. Second, every asset and event mapped or edited will be logged with associated user's ID. All changes to the data will therefore be automatically tracked. Third, the initial users will be carefully selected and the user base will be expanded using social network dynamics based on trusted relationships.

This strategy effectively allows the Sensor Web team to revoke the registration of any user who knowingly submits false or misleading information. The team expects this to provide the deterrence necessary to ensure a high quality of reliable data. Equally importantly, the team will initially conduct small pilot projects with trusted colleagues in the field who are known proponents of using ICT in humanitarian contexts. The concept of the Sensor Web has been developed in very close collaboration with members of UN field-based agencies and NGOs who will become the initial user base of the project's pilot activities.

These initial users will provide HHI with the important feedback to further improve the Sensor Web's functionalities and user experience. When the beta version of the Sensor Web is developed, the initial users will each be provided with the option of inviting 5 additional users to the Sensor Web—an approach similar to one initially used by Gmail. This ensures that the scaling up of the system is a smooth process and that user trust continues to drive the Sensor Web's value. The team is also developing a business model around the Sensor Web initiative to render the project viable and sustainable over the long run.

The focus of this paper is not the Sensor Web, but rather the methodologies and technologies that underlie the initiative. These have been individually effective in different contexts. The question that remains is whether they can be bridged to an operational framework that fosters effective, tactical responses at the local level.

This paper has tied together the lessons learned and best practices in conflict early warning, disaster response and nonviolent action. Convention early warning is overly focused on prediction and quantitative methods. Their uses of ICTs reflect their centralized focus on warning rather than response. Disaster response has learned that centralized approaches are increasingly constraining and have therefore shifted focus to people-centered early warning/response. The field's emphasis on preparedness and use of ICTs reflects this decentralized and mobile approach. Lessons learned from survival testimonies and nonviolent action show that a networked form of organization is most effective. They also show that training in simple tactics can empower local communities to survive conflict.