DISASTER RELIEF 2.0

THE FUTURE OF INFORMATION SHARING IN HUMANITARIAN EMERGENCIES

UNITED NATIONS FOUNDATION

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OCHA

HARVARD HUMANITARIAN INITIATIVE

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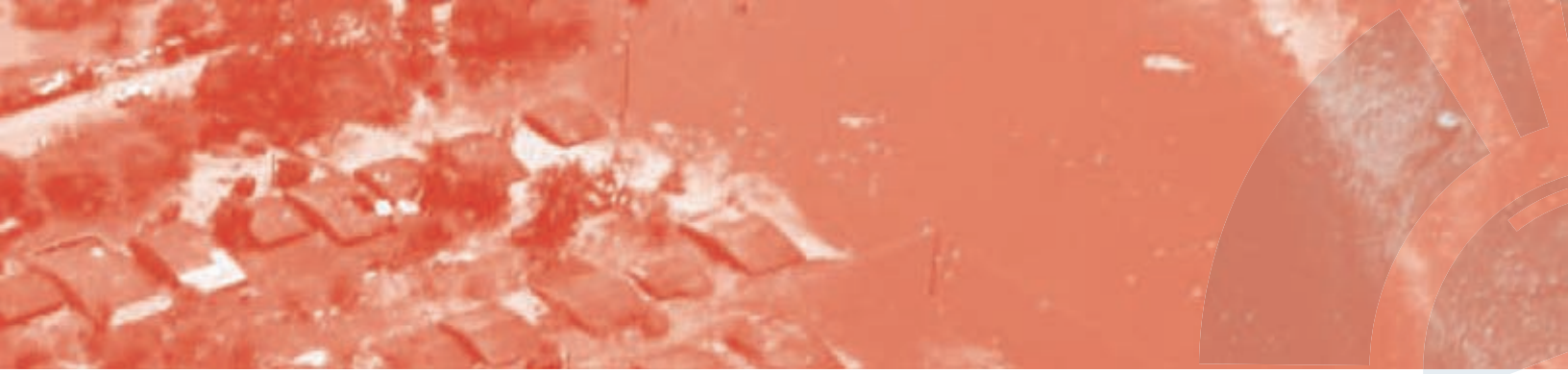

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TABLE OF CONTENTS

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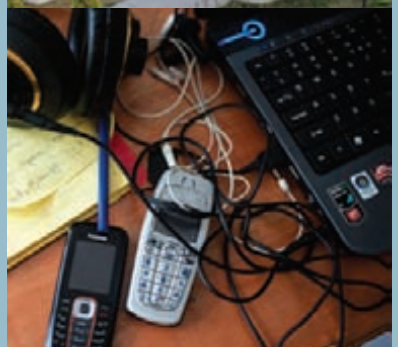
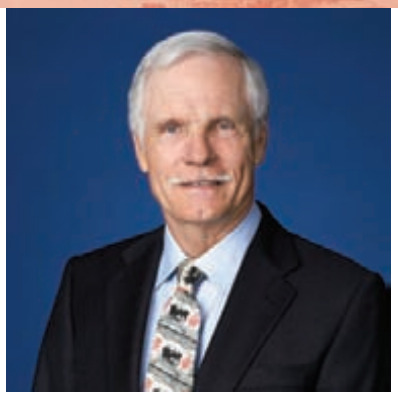




FOREWORD BY TED TURNER

Individuals everywhere are interconnected by technology as never before. In 2011 more than 5 billion mobile phone subscriptions are in use worldwide, creating connectivity in many parts of the globe where previously we talked only of a digital divide.

Mobile uptake, including access to the mobile Internet, is creating new market forces and reshaping businesses around the world, including the business of humanitarian aid.

The global response to the January 2010 7.0 magnitude earthquake in Haiti showed how connected individuals are becoming increasingly central to humanitarian emergency response and recovery. Haitians trapped under rubble used text messaging to send pleas for help. Concerned citizens worldwide engaged in a variety of ways, from sending in donations via SMS, to using shared networks to translate and map requests for assistance.

Powered by cloud-, crowd-, and SMS-based technologies, individuals can now engage in disaster response at an unprecedented level. Traditional relief organizations, volunteers, and affected communities alike can, when working together, provide, aggregate and analyze information that speeds, targets and improves humanitarian relief. This trend toward communications driven by and centered on people is challenging and changing the nature of humanitarian aid in emergencies.

Since 2005, the United Nations Foundation and Vodafone Foundation Technology Partnership has leveraged the power of mobile technologies to support and strengthen UN humanitarian work in the fields of global health and disaster response. We commissioned this report—the sixth in the United Nations Foundation and Vodafone Foundation Technology Partnership's Access to Communications publication series—to examine the challenges and opportunities an increasingly networked world presents for delivering disaster relief in the immediate aftermath of large-scale humanitarian emergencies.

Our hope is that this report will spur dialogue and action to harness the potential of evolving communications technologies to transform how the world responds to disasters. This work is part of an ongoing conversation and we welcome your comments at: **www.unfoundation.org/disaster-report**.

Ted Turner, ***Chairman***
United Nations Foundation

Credit: FAO/Truls Brekke, UN Photo, Internews/Eckert

01 EXEC

EXECUTIVE SUMMARY

Each major humanitarian disaster rips open a gap between the past and present, between what once was and what is now.

The 7.0 magnitude earthquake that struck less than a mile off the coast of Haiti's capital city of Port-au-Prince in January 2010 is one of the largest sudden onset emergencies the Western hemisphere has ever seen, and it struck its poorest country. Damage from the quake collapsed poorly constructed housing and iconic government buildings alike, frequently crushing those within. It also created a chasm between what the international humanitarian community knew about Haiti prior to the quake and the reality that faced them in the quake's aftermath.

The race to fill this information gap—to assess the damage and plan a response—is a dynamic familiar to seasoned responders to major sudden onset emergencies. After a large-scale disaster, there is always a massive effort to collect and analyze large volumes of data and distill from the chaos the critical information needed to target humanitarian aid most efficiently. But the response to the 2010 earthquake in Haiti was different.

For the first time, members of the community affected by the disaster issued pleas for help using social media and widely available mobile technologies. Around the world, thousands of ordinary citizens mobilized to aggregate, translate, and plot these pleas on maps and to organize technical efforts to support the disaster response. In one case, hundreds of geospatial information systems experts used fresh satellite imagery to rebuild missing maps of Haiti and plot a picture of the changed reality on the ground. This work—done through OpenStreetMap—became an essential element of the response, providing much of the street-level mapping data that was used for logistics and camp management.

Credit: Government of Colombia, OCHA/David Del Conte, Internews/Jacobo Quintanilla

UTIVE SUMMARY

The international humanitarian system was not tooled to handle these two new information fire hoses—one from the disaster-affected community and one from a mobilized swarm of global volunteers. This report seeks to understand and make recommendations for how to adapt to this new reality where collective action can lead to collective intelligence.

This work will require partnership and dialogue. Humanitarian organizations have amassed deep wisdom and experience from decades of work in the field. Yet new voices are opening the possibility of closer interactions with communities affected by disasters. And new partners are offering faster, more effective means of analyzing an ever-increasing volume and velocity of data. The challenge ahead is how to create an effective interface between these resources, and create an ecosystem where each actor understands its role.

It will not be easy. Volunteer and technical communities (V&TCs) like OpenStreetMap, Sahana, and CrisisMappers approach problems in ways that challenge the *status quo*. As organizations, some V&TCs are struggling to attain financial sustainability, especially when asked to respond to successions of major disasters.

This report recommends a five-part framework for addressing these challenges:

1. A neutral forum to surface areas of agreement and conflict between the international humanitarian system and the V&TCs.

2. An innovation space where new tools and practices can be explored as experiments, allowing for the failures that are a necessary component of learning new ways of working.

3. A deployable field team with a mandate to deploy the best available tools and practices from the V&TCs to the field.

4. A research and training consortium to evaluate the work in the field and to train humanitarians and V&TCs alike in the best practices for information management in a humanitarian context.

5. A clear operational interface that outlines ways of collaborating before and during emergencies, with agreed procedures for communication, shared standards for data exchange and an understanding of roles, priorities and capabilities.

This report is a snapshot of an ongoing discussion—a dialogue that the partners to this report wish to extend and continue.

Credit: UN Foundation Photo/D. Evans

02 INTRO

INTRODUCTION

After each major disaster of the modern era, humanitarian organizations have reaffirmed a critical lesson: good communication is essential to effective coordination. As a result, many institutions made significant investments in information and communication technologies (ICTs). Field workers now rely on tools like portable satellite antennae that enable them to have Internet communications from many places on the globe. Being 'disconnected' is still a real problem, but fewer humanitarians work without frequent interactions with their managers at headquarters in New York, Geneva, or other major cities. Rather, the problem is now shifting from basic connectivity to information management.

> "Without information sharing there can be no coordination. If we are not talking to each other and sharing information then we go back 30 years." *–Ramiro Galvez, UNDAC*

Although the networks that connect humanitarians have expanded quickly in recent years, the volume of data flowing through these pathways, and the number of information sources, have increased at an even faster rate. Responders are increasingly struggling to handle a growing amount of data, arriving more quickly than ever before. This is a problem from the non-emergency world that is amplified at times of crisis. Due to poorly adapted tools, training and strategies, responders are increasingly ill-prepared to produce useful knowledge from the flow of information and data.

For all the new capability in ICTs, the information revolution has not led to a fundamental rethinking of the methods of coordination and working during humanitarian operations. Thirty years ago, humanitarian operations were managed with push-to-talk radios, paper forms on clipboards, and push pins on paper maps. Since that time, the field has undergone a revolution. Today, many responders read email on their smart phones while at meetings and while sending SMS/text messages to colleagues. A few perform geospatial analysis of incoming data on laptops that not long ago would have qualified for supercomputer status. Digital

Credit: WHO/Syed Haider, MapAction, Ushahidi/Jonathan Shuler

ODUCTION

maps get updated frequently, building thematic layers for particular purposes.

And yet, digital maps are printed and posted on walls, where they are annotated by hand. Documents have migrated from paper to digital files, and are still the primary method by which key metrics and supporting data gets collected, analyzed, distributed, and briefed to decision makers. Paper itself is not the problem: it is a durable, cheap, lightweight, and high-resolution method that requires no power to use and allows for annotations by multiple individuals. The problem is the method of creating the content that goes onto paper.

Today's predominant method of work relies on a human reading each document and distilling the important bits for others in their organization or network. It is a venerable method, but slow and not easily scalable to handling massive increases in data flows without also increasing the number of humans reading documents. During the response to the 2010 earthquake in Haiti, the volume and velocity of data began to overwhelm this approach, helped by a new dynamic: the ubiquity of cell phones enabled new processes for crowdsourcing and microtasking.

In the developing world, cell phone use has become almost ubiquitous. Even some of the world's most impoverished communities now have access to voice and data services. After the January 2010 quake, the Haiti community used cellular technology to tell the international community what they needed. Haitians sent hundreds of thousands of text messages in through social media sites. At the same time, the scale and scope of the tragedy created an unprecedented volume of information flowing between humanitarian personnel. Humanitarian field staff had neither the tools nor capacity to listen to the new flow of requests arriving directly from Haitian citizens.

This gap did not go unnoticed. Working in communities, thousands of volunteers from around the world aggregated, analyzed, and mapped the flow of messages coming from Haiti. Using Internet collaboration tools and modern practices, they wrote software, processed satellite imagery, built maps, and translated reports between the three languages of the operation: Creole, French, and English. They provided their data to each other through interlinked services, so that outputs from one effort became inputs to another.

> "The absorptive capacity of responders is pretty low. It's not because they do not have an affinity to technology. It's because they are really, really busy 98% of the time, and they are sleeping the other 2%." *–Robert Kirkpatrick, UN Global Pulse*

On the timeline of the Internet's evolution, **the 2010 Haiti earthquake response will be remembered as the moment when the level of access to mobile and online communication enabled a kind of collective intelligence to emerge**—when thousands of citizens around the world collaborated in volunteer and technical communities (V&TCs) to help make sense of a large-scale calamity and give voice to an affected population.

That said, the humanitarian system had no formal protocols for communicating with these volunteer and technical communities (V&TCs). Despite the good will of field staff, their institutions' policies and procedures were never designed to incorporate data from outside their networks. Some view this as a lost opportunity; others worry about what this change might mean for humanitarians who need to protect data about vulnerable populations.

Regardless of one's viewpoint on the contributions of V&TCs, the response to the 2010 Haiti quake made it clear that the rate of investment in humanitarian information management over a complex global network is failing to keep pace with new technological realities. The humanitarian system could use this revolution in connectivity and the evolution of systems for widely

sharing data during the response to a disaster to make faster, better decisions in emergencies.

> If you look at the expectations 10 years ago in Afghanistan and what a typical humanitarian responder now is expecting in terms of services, it has dramatically increased, both in terms of the number of systems but also the types and quality of information and the bandwidth expectations. *–Alfred Gilman, WFP*

This report sounds an alarm bell. If decision makers wish to have access to (near) real-time assessments of complex emergencies, they will need to figure out how to process information flows from many more thousands of individuals than current system can handle.

2010 HAITI QUAKE STUDIES AND AFTER-ACTION REVIEWS

There have been a number of recent reviews that discuss the role and impact of the volunteer and technical community in the 2010 Haiti earthquake response. They include:

Media, Information Systems, and Communities: Lessons from Haiti. (Communicating with Disaster Affected Communities, Internews, and John S. and James L. Knight Foundation, January 2011).

http://j.mp/eXsDli

Haiti and beyond: Getting it right in Crisis Information Management. (ICT for Peace Foundation, April 2010).

http://j.mp/ceYA7v

Peacebuilding in the Information Age: Sifting Hype from Reality. (ICT for Peace Foundation, 10 January 2011).

http://j.mp/h9POor

Haiti Earthquake Relief: One-Year Progress Report. (American Red Cross, January 2011).

http://rdcrss.org/g32M7Y

Independent Evaluation of the Ushahidi Haiti Project (UHP Independent Evaluation Team, January 2011).

http://j.mp/dVnG0J

Crowdsourcing Crisis Information in Disaster- Affected Haiti. (U.S. Institute of Peace, September 2010).

http://j.mp/9IMBYo

We need to fundamentally rethink how the humanitarian system manages information in light of the increasingly complex system of networks and dataflows.

THE POWER OF NETWORKS

These insights are not novel. In the late 1990s, the inventor of the World Wide Web, Sir Tim Berners-Lee, saw that the migration of more and more devices and people connected into a shared network would require knowledge to be structured and flow in new ways. He called it the Semantic Web.

> Today, the Web is quite effective at helping us to publish and discover documents, but the individual information elements within those documents (whether it be the date of any event, the price of a item on a catalog page, or a mathematical formula) cannot be handled directly as data. Today you can see the data with your browser, but can't get other computer programs to manipulate or analyze it without going through a lot of manual effort yourself. As this problem is solved, we can expect that Web as a whole to look more like a large database or spreadsheet, rather than just a set of linked documents…Locked within all of this data is the key to knowledge about how to cure diseases, create business value, and govern our world more effectively. The good news is that a number of technical innovations…along with more openness in information sharing practices are moving the World Wide Web toward what we call the Semantic Web. Progress toward better data integration will happen through use of the key piece of technology that made the World Wide Web so successful: the link. The power of the Web today, including the ability to find the pages we're looking for, derives from the fact that documents are put on the Web in standard form, and then linked together. The Semantic Web will enable better data integration by allowing everyone who puts individual items of data on the Web to link them with other pieces of data using standard formats. [1]

Technologies are widely available that, in the words of Berners-Lee, "will enable better data integration by allowing everyone who puts individual items of data on the Web to link them with other pieces of data using standard formats."[2] Yet the humanitarian community is not collecting or analyzing data in this way yet; in fact, they are mired in methods that rely on documents—methods more suited to the Middle Ages than the Internet age.

Many V&TCs, on the other hand, were born within the ideals of the Semantic Web. These groups create

open interfaces between their applications where data, organized by open standards, can be freely exchanged or "mashed up". This enables users in different domains to collaborate; for example, a community that aggregates SMS messages can link with another that translates them and a third that uses GPS coordinates associated with the SMS messages to plot the messages on a map.

"The reality is that in a disaster cycle, everyone has a piece of information, everyone has a piece of that picture. The more that people are able to share information data across ecosystems, and the more information that people have to utilize, then we'll really see disaster response really be able to be more effective." *–Kate Chapman, Humanitarian OpenStreetMap Team*

That said, V&TCs also need to adapt to a reality where they are providing valuable services to an international system of crisis response and affected populations, and therefore must be reliable, consistent, and sustainable. Many of these technology collectives are young: some were forged in the heat of the Haiti response; others were founded after the 2004 Indian Ocean tsunami. Nearly all of these groups created ad hoc processes for sharing information in response to specific emergencies and are only beginning to think about how to replicate those processes for use in other emergencies, make them consistent, and bring them to scale. This community must identify how to apply the lessons they learned in Haiti to future disasters, and how to become reliable, consistent partners around the niche that they perform best. The volunteer and technical community can help the international humanitarian system adapt to a new reality while also directly supporting and empowering local communities. The question is, how? And how quickly?

Organizations within the humanitarian system need to examine the same questions and consider what impact an ever-increasingly networked society will have on them. For example, they are just beginning to understand what it means to have two-way conversations with affected populations.

"Beneficiaries now have a voice, and affected populations have a voice. They're not just recipients, […] they have the ability to talk back. That [two-way communication] creates a different dynamic around accountability and responsiveness. It also creates a new set of ethical responsibilities, especially around expectations and whether they can be met. […] [Humanitarian] organizations have always prided themselves with being responsive to beneficiaries' needs, and being accountable to them. But there is a now different set of tools to make that happen and it is taking some organizations by surprise." *–Katrin Verclas, MobileActive*

The path forward will be challenging—both for the formal and structured international humanitarian system (which is led by the Inter-Agency Standing Committee), and for the loosely-structured volunteer and technical communities, which thrive on innovation and spontaneity. As this report will explore, each community faces its own internal organizational challenges figuring out how to manage data flows and each brings its own values to meeting those challenges.

Most importantly, however, there has not been a mechanism for coordinating the collaboration between these two groups and no formal channel for these groups to engage in dialogue about the underlying problems of information management.* The humanitarian system has few protocols, procedures, or policies governing the use of information generated by citizens through social media, and the V&TCs are still learning how best to support to the work of information managers in the humanitarian system.

"We have these two worlds, but we are saying the same thing effectively: We want to help people who have been affected in a crisis. That is our prime objective. We are coming at it from two very different directions. What we saw in Haiti was actually the beginnings of trying to identify an interface between the two communities." *–Andrew Alspach, OCHA*

* This report was written prior to the creation of the Libya Crisis Map, an informal collaboration of the Standby Task Force and UN OCHA.

Credit: UN Foundation Photo/D. Evans

ABOUT THIS REPORT

The purpose of this report is to review what happened in Haiti—what worked, what didn't, and what we can extract from that to inform better collaboration between the humanitarian system and volunteer and technical communities.

It explores how the international humanitarian system and volunteer and technical communities approached information management during the response (Chapter 3) and how these approaches differed and came into tension (Chapter 4). Based on this, the report offers guidelines for what an interface between the two communities might look like (Chapter 5), and, to stimulate further dialogue, presents one prototype model for this missing interface (Chapter 6).

What follows is an analysis based on known inputs. It is not an academic study of formal history; it is a practical framework for addressing the problems seen in the field. **It is the beginning of a conversation.**

The famous mathematician and statistician, George E. P. Box once said: "All models are wrong; some, however, are useful." Reducing the complexity of the information management dynamics during the response to the Haitian earthquake to a simplified model meant omitting key details and simplifying the nuanced contributions of many stakeholders. With limited time available to perform interviews and analysis, the authors expect criticism. But this report is not intended to be prescriptive. Instead, the framework outlined in Chapters 4 and 5 envisions an ongoing dialogue and makes that a priority.

The report is a springboard for conversation and a framework for action. By exploring the underlying dynamics and tensions between the formal and informal systems of information management during the Haiti operation, the report identifies key challenges and recommends an organizational design for addressing some of those.

Approach

Traditionally, evaluations focus on lessons learned but rarely translate these into actions; instead, they leave the lessons identified with no resulting plan to turn those insights into revised tools, practices, and policies. This report focuses on identifying solvable problems and recommending a framework for addressing them—a practical *plan* for dialogue around the interdependent operations of several entities involved in information management. That said, what follows is not a set of definitive recommendations. Instead, it is an approach consistent with methods familiar to the humanitarian community as well as with the ethos of rough consensus and running code that is at the core of the V&TCs.

Methods

The research team applied a mixed methods approach to untangling the complex dynamics between the international humanitarian community and the V&TCs during the Haiti operation. Based on requests from OCHA, the team interviewed key stakeholders in each community using a standard set of research questions. The research team and informal advisory group selected interviewees according to three initial groups:

- **Decision Makers:** Individuals whose influence and experience in emergency operations require direct interaction with information and communications technology.
- **Key Voices:** Individuals whose work is an important component of any framework and whose experience would aid in the mapping of opportunities and roadblocks to making desired changes.
- **Augmenting Voices:** Individuals whose voices address community level engagement and will inform future dissemination of the framework to non-governmental stakeholders in due time.

Credit: UN Foundation Photo/D. Evans

Additionally, the research team asked interviewees about other key individuals to interview. The team reviewed the interviews regularly to identify untapped issues and groups. In total, 41 individuals were interviewed.

One-on-one and group interviews were performed to create opportunities to capture each person's experiences in the field and their beliefs about their work. Fifteen semi-structured questions guided each interview toward:

- personal experiences during the aftermath of the Haiti earthquake or experiences during other recent humanitarian crises,
- interactions with technology at operational, organizational, and cultural levels,
- perspectives on new and existing information flows, validation, and effects on field operations, and
- attitudes about the synthesis of new V&TCs into the changing humanitarian landscape—through the lens of humanitarian principles, ethics, and policy.

Interviewers met with members in person, via Skype, or by phone for approximately 1–1.5 hours. The research team recorded transcripts and interview notes, which they collated, reviewed and coded. The team met frequently to analyze interview content.

The team that conducted research for this report was composed of members of the humanitarian assistance, research, and volunteer and technical communities. Their backgrounds include expertise in field operations, medical operations, humanitarian technologies, and translational research and evaluation. Each brings experience with UN agencies and NGOs; some actively work with V&TCs, some with military disaster response units. Some members have many years of experience while others are more recent members to these communities. Through their work with the broader community, the team developed a composite history of information management in Haiti—the subject of the next chapter.

Credit: UN Foundation Photo/D. Evans

03 INFOR

INFORMATION LANDSCAPE

When responders arrived in Port-au-Prince, they faced an unprecedented information gap. The foundation on which international organizations usually build their operational plans—the baseline datasets that described a nation's systems for public health, finance, and other critical services—were hard to find. Many were on hard drives, buried under the rubble. Backups were unavailable. And tragically, the curators of these data, including staff from the UN peacekeeping mission in Haiti, MINUSTAH, were too often missing or dead.

Humanitarian field staff arriving in Haiti to begin the relief effort thought that, after decades of UN involvement in Haiti, they would find volumes of data about existing operations and be able to use this to identify primary tasks for the disaster response effort. They expected to be able to access information such as the locations of health facilities, demographics by regional department, road and routing information, and the locations and types of development programs and projects underway. The responders also assumed they could consult with peers who could explain underlying assumptions they used when they collected the information and the trends that had emerged over time. Instead, in most cases the responders found both these data and their curators tragically absent, or simply impossible to reach (notably, a few who remained put in incredible effort). In the face of one of the largest humanitarian catastrophes on record, relief workers struggled to access even the most basic data sets; they would have to start virtually from scratch.

Thus began an information race to close the gap between Haiti's past and present. In harsh conditions, and near the noise of taxiing aircraft, arriving staff began to rebuild the shared operational datasets that they needed to plan and implement a response. At the same time, they had to track and coordinate an unfolding operation that involved hundreds of regis-

Credit: FAO/Truls Brekke, UN Foundation Photo/D. Evans, UN Foundation Photo/D. Evans

tered NGOs, several militaries, and a Haitian government that had lost key decision makers. And they had to do so without much input from either the host nation, which usually points to available data or information systems, or local UN agencies, whose operations had been crippled by the collapse of buildings and the significant loss of personnel. As one information manager put it,

> "…the expectation was that we could do more than normal. But, because of the […] lack of access to those facilities, we were actually able to do the same as if we were in a tent in the middle of nowhere. It was one of the most incredibly frustrating things I've been through." *–Nigel Snoad, UNDAC*

The managers in home offices, who did not understand why immediate and detailed answers to questions about baseline and operational metrics were unavailable, put even greater pressure on the humanitarian field workers. In twice-daily teleconferences, senior UN and NGO staff requested granular bits of data around flight prioritization, food delivery, and health facilities. The overburdened staff simply did not have the answers to many of the questions and were overwhelmed by repeated requests to obtain "situational awareness."

> "During the first 12–24 hours, there is a fog of information. The situation is changing rapidly and the numbers are changing rapidly. You might as well watch CNN for the changing situation, because any product that we did was quickly out of date and overtaken by events." *–Dennis King, U.S. Department of State Humanitarian Information Unit*

DRINKING FROM A FIRE HOSE

Against this backdrop of missing data and a shattered landscape, arriving humanitarian field staff interviewed consistently reported that as they rushed to reassemble data sets and coordinate the relief effort, they felt as though they were trying to drink from a fire hose of information. Yet these same respondents described not being able to collate, analyze and transform this into the knowledge they needed to make decisions and to brief their bosses.

> "The challenge in the beginning was that there was almost nobody to do the work and then all of a sudden [Haiti] was filled with new actors. There was a lack of baseline data. The Ministry of Education collapsed and they lost a lot of staff and all [mostly paper data] systems. No list of schools survived. We were trying to plan rapid needs assessments with almost nothing to go on." *–Charlotte Lattimer, Save the Children*

When they started, relief groups lacked verified information such as basic street-level maps for dispatching search and rescue teams, up-to-date hospital throughput rates for planning the shipment of medical supplies, road closures and routing for moving aid, and the current point of contact for any given NGO working in Haiti. Like many emergencies the treacherous race to fill this data gap while simultaneously running a massive relief effort defined the early phase of the Haiti response operation.

Existing Demands of the Humanitarian System

Amidst the time pressures of their jobs, which for most meant 20-plus-hour days, relief workers were expected to process a rapid flow of data and extract the elements necessary to make sense of the rapidly developing crisis. This included the typical emergency tasks of: reading numerous emails and coordinating documents within their own organizations; having frequent conversations with headquarters and related Skype and chat conversations; keeping pace with the flow of rapid assessment data, personal queries from outside visitors and partners, situation reports, briefing documents and maps from multiple organizations; and attending regular interagency coordination meetings. All this was ongoing without any significant engagement with non-traditional actors, or new sources of information and analytic support.

> […]by the time that we were two weeks in, there was 1 email per minute coming into our team's email box, 24/7. We needed to classify those emails, turn them into information, and then group them accordingly so they could be addressed by the different [teams] that had expertise in shelter or health and so on.
> *–Andrew Alspach, OCHA*

Yet even in spite of these challenges, according to interviews with experienced field staff, information management in Haiti did perform well, both in terms of the quality and the productivity of their work. Various experienced emergency responders noted that information management tools and processes had improved over the past few years, leading to both increased capability and increased expectations.

> It got to the stage where, at the end of the first ten days, I had to […] give a talk to everyone in the general meeting, where I said, 'look, […] it is right that the senior management in the room is demanding more product and information. That's their role, that's their right, and they should. […] But everybody should realize, that we've[…] done very well by comparison to where [information management] was in the [2005] Pakistan earthquake, or during the [2004] tsunami, both in terms of the types of products that were outputted, and the types of coordination we managed.' I just wanted everybody to realize that, even though the expectations were higher than ever. *–Nigel Snoad, UNDAC*

The challenge was that the sheer volume of information input and number of sources had increased even more quickly than expectations had grown, leading to a struggle for situational awareness within the humanitarian community and in the general public.

Although the information management challenges in the early phase of the Haiti relief effort had unique aspects, such challenges in sudden-onset disasters are not new. As Paul Currion noted in February 2001:

> …rapid advances in information and communications technology have led to a proliferation in the quantity of information available to humanitarian workers at all levels—but not necessarily any corresponding improvements in their abilities to usefully handle that information.[3]

Over the past decade, the challenge has only increased. Information is flowing at a rate that is increasing exponentially. But investments in methods and personnel to handle these increased flows are lagging behind. The information gap is now more pronounced than ever, not because of a lack of human effort, but because **communications are growing more complex at a faster rate than current tools and practices can handle**. And according to interviewees across the spectrum, the situation is only going to get worse.

Credit: Mark Turner

New Data from the Volunteer & Technical Communities

Against this backdrop, volunteer and technology communities rushed to fill the perceived sense making and information gap, leveraging social networking and mobile phone-based tools to aggregate, analyze and plot data about urgent humanitarian needs. Yet without a formal interface for information exchange with the humanitarian system, or appropriate data standards, this new data-added to the raging river of information that aid workers faced as they struggled to build the relief effort from the ground up. As the volunteer and technical communities continue to engage with humanitarian crises they will increasingly add to the information overload problem. Unless they can become a part of the solution.

OVER-FILLING THE GAP

How did the humanitarian system that came into Haiti facing a yawning information gap end up overloaded with too much data? Our research points to four major causes that will likely continue in future emergencies:

1. **The cluster system was neither structured nor given the resources and tools to deal with the complex information dynamics it faced in Haiti.** The method by which field staff manage information has not kept pace with the increased velocity and volume of information flows. Most data handled by field workers require their dedicated attention—a scarce resource—at every step: data entry, aggregation, analysis, presentation and briefing. Humans —and busy field workers at that—had to take each of these information management steps, so it is easy to see how the cluster system in Haiti became overwhelmed as the volume, tempo, and heterogeneity of the information flowing in increased.

2. **A growing number of volunteer and technical communities (V&TCs) mobilized valuable tools for collecting, analyzing, and visualizing data.** They attempted to share that data with responders, and advocated the use of methods that automate or outsource parts of the information management workflows. However, with the notable exception of geospatial data, there existed only ad hoc means to make these new information flows useful to the harried field staff from NGOs and UN agencies. As a result, both the information that V&TCs submitted and the faster methods for information management that V&TCs used and shared only exacerbated the field staff's sense of information overload.

3. **The affected population became mobile-enabled.** At the time of the earthquake, the state of cellular connectivity in Haiti was such that tens of thousands of citizens could, and did, directly communicate their needs to a domestic and international audience, and those citizens expected that a few thousand international responders would be able to monitor their hundreds of thousands of requests for aid and at least deal with aggregate trends, if not individual requests. Some of these increased expectations were created by the V&TCs, who were responding to messages sent over SMS and tracking messages in the hundreds of social media feeds.

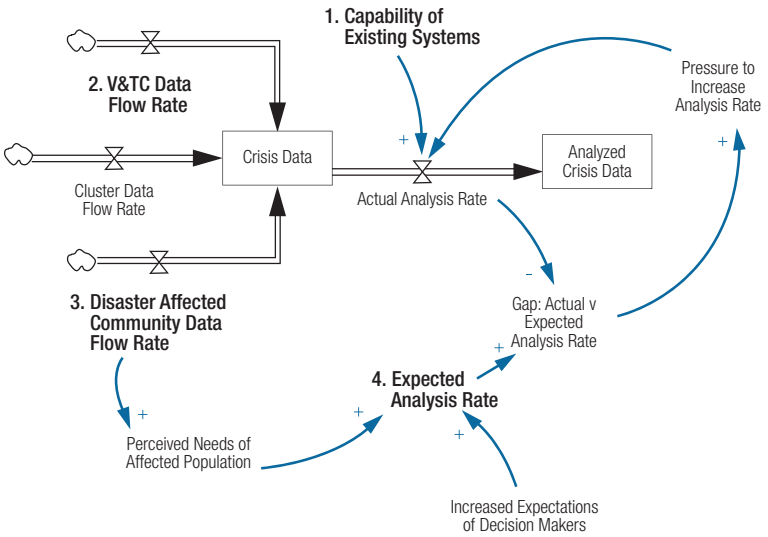
4. **Expectations of what should be known in response operations have dramatically increased.** Everyone from senior managers at the UN to donors and beneficiaries expected the formal humanitarian system to have far better communications about what it has discovered and what corrective actions it is taking. They demanded a composite picture across all specialties and organizations involved in the response, but that was unrealistic given the humanitarian system's paucity of technical resources and staff, and nor with its document-centric methods of information collection and data exchange.

These causes are interlinked. Under existing UN designs, most data is designed to flow through the humanitarian cluster system—a group of UN agencies and NGOs tasked with adjacent and sometimes overlapping areas of expertise. The cluster processes data, analyzes it, and periodically briefs it to decision makers at meetings and through situational reports.

New Data Inflows

During the Haiti response, two new data inflows were added to the system: one from the V&TCs and one from the affected community of Haitians. These new data had to pass through the same humanitarian staff already overburdened by work to backfill missing data sets. And because these new data feeds were open and widely reported in the press, many decision makers in the humanitarian system thought that more data was available than what they were receiving. This put additional pressure on responders to increase their processing rate, despite not having adequate resources. The following system diagram captures this dynamic.

FLOWS OF DATA TO CRISIS RESPONDERS



This chapter explores each of these four basic causes. The chapter starts with the base system into which V&TCs and the affected population tried to pour new information: the information management component of the IASC-led humanitarian cluster system.

01. CAPABILITIES OF EXISTING INFORMATION MANAGEMENT SYSTEMS

In the initial phase of a response operation, humanitarian groups partner with a host nation government to determine what happened and what needs to be done to restore civil society and address urgent humanitarian needs. In this role, they operate at the edge of knowledge—an activity which entails great risk. Decisions made early in the response will lead to allocations of billions of dollars for future programs. Even small errors can lead to uninformed decisions that could result in great harm to vulnerable populations; the unintended consequences could blight a society's future for years or decades to come. Thus there is a tension between the time needed to fully understand a complex scenario, and the urgent need for immediate humanitarian response. And in large-scale humanitarian emergencies like the Haiti response, the evolving nature of the situation requires continuous updating and analysis. Respondents consistently reported that, **no matter how fast information managers operated, they were behind where they were expected to be**. The question is, why?

Based on interviews, there appear to be three types of issues that changed the speed of information management:

1. **Structural issues:** Aspects of the information management design used by the IASC-led cluster system that restricted information flows within and between clusters.

2. **Lack of Resources:** Overreliance on underfunded and understaffed information management units.

3. **Delays:** Delays in information flows due to translation, collation, and analysis.

Structural Issues: Cluster System Design Challenges

In the humanitarian system, different actors approach problems with varied practices and beliefs about neutrality and solidarity, as well as different views on the role of international aid. The international community has developed "cluster" architecture to align the efforts of organizations with these actors' divergent methods and values and minimize the risk of conflict within the humanitarian system and with the host-nation government. The clusters are the international community's best effort, drawing on years of experience, to develop a structure to negotiate the responsibilities for various sectors. This organizational design assigns a lead agency inside each cluster to be responsible for coordinating the provision of aid in a functional area (e.g., water, shelter, etc.). Each cluster coordinates with the UN Office for the Coordination of Humanitarian Affairs (OCHA). OCHA, in turn, is the UN agency accountable for the overall coordination under the UN Emergency Relief Coordinator.

INFORMATION MANAGEMENT IN HUMANITARIAN EMERGENCIES

Source: OCHA

While the cluster system solved many of problems of earlier systems, it still is evolving. One outstanding issue is the architecture for information management. In theory, this information management system is designed to provide decision support services to leaders working on two levels: those who are working in the area of functional specialization represented by an individual cluster (shelter, health, camp management, etc.), and those who are working to coordinate the overall system across various clusters. Each of the various clusters is responsible for building information management systems that tie its various data flows into the cluster's decision making. Likewise, OCHA is tasked with building tools that coordinate information flows for decision making across the various clusters.

IASC Operational Guidance on Responsibilities of Sector Cluster Leads and OCHA in Information Management

The cluster lead agency is responsible for ensuring information management for an effective and coordinated intra-cluster response. While the design was well intentioned, in practice, this research and previous reviews have shown that the clusters often do not have the resources to perform work beyond their own analysis and to devote time and assets to coordinating with OCHA. The clusters tend to manage information in a way that is best for their own immediate needs but not necessarily for the overall system. In many cases, the clusters' choice of closed proprietary systems locks data in tools and data formats that cannot be easily shared (though many commercial software providers are now building open interfaces to their systems, this work is not universal).

> "There's an agreement between how information is supposed to be managed within the cluster approach, which means that essentially each of the clusters is supposed to manage its own information in the crisis. Some clusters, weeks into the disaster, were lucky to have a focal point, somewhere where your public information officer's looking out for information management and doing their day job. So the clusters themselves didn't have the capacity early on to manage their own information. So what was probably happening was even if there were individual attempts by NGOs and UN agencies to collect information systematically, whether it was an individual assessment of a health facility or a much more systematic standardized assessment, the capacity then to process that and then share it didn't exist."
> *–UN staff member*

This dynamic—where clusters work in their own self-interest with few resources (and low incentives) to invest in overall coordination—appears to have led to one of the core information management challenges in Haiti: **information fragmentation**, the division of data resources and analysis into silos that are difficult to aggregate, fuse, or otherwise reintegrate into composite pictures. Based on interviews with information managers at the cluster level, at OCHA, and the CITO's office, fragmentation occurred through this design on two levels: those of the back end systems and those of the tools used in the field.

Fragmentation in Back-end Systems

As designed, each cluster applied its own back-end systems—usually proprietary and contracted to vendors by individual agencies or organizations—to the crisis. As is widely known inside the UN, this approach has created data silos. These systems had rarely been designed to facilitate data exchange directly with the information systems from other clusters using open (i.e., non-proprietary) data formats. Many systems lacked tools—such as data dictionaries—that enabled staff using one system to determine programmatically how their own data might be related to data in another system.[4] While having agreed inter-agency data standards like the Common Operational Dataset (COD)—for data like baseline population, road data and more—is a step towards solving this problem, field staff familiar with the GIS, systems where this data often ends up being used, indicate that the COD's schema lack specificity about how to characterize individual objects that are important to the response.[5]

Interviews with multiple UN managers and field staff indicate that the politics of opening their internal data to other UN agencies is itself an issue, let alone opening the data to the hundreds of organizations that partnered with the IASC-led cluster system in Haiti. Barriers such as cyber security, humanitarian protection[6], and distrust loom as large as the technical interoperability of proprietary systems.[7]

Fragmentation in Field Systems

In the field, most information sharing occurs in face-to-face meetings at the cluster and sub-cluster levels. For anyone who is working in another cluster (or whose work prevents them from attending any given meeting), the key method of exchanging metrics from assess-

Credit: OCHA/Dan DeLorenzo

ments is bullet points, shared in web sites, slide decks, and emails. This is the primary method of briefing decision makers in the field and back at headquarters.

VIRTUAL ON-SITE OPERATIONS COORDINATION CENTER (OSSOC)

Summary Overview:

- 12 USAR Team (around 440 pax and search dogs): BE, FR (2), LU, IS, PL, UK, NL, ES (4)
- 2 Field Hospitals (90 pax): BE, FR
- 6 Advanced Medical Posts: EU, FR (3), OT, SE
- 38 Medical Teams (252 Pax); FR (30), PT (2), DE, ED (2), HU, GR, UK
- 6 Water sanitation units: EU, BE, DE, FR, ES (2), and water purification tablets: IT, DE, PT, SE
- 1.182 tents for app. 7.600 persons: AT (400 x 6). SE (200 x 5). IT (155 x 8), SI (25 x 10), SK (15 x10), ES (55), PT (65 for 615 pax), BG (67 x 6), PL (200 x 6)
- 1 TAST/Base-camp with a capacity of 300 people: this is a joint-module of SE, DK, NO, EE, and FI
- EU co-financing for transport of assistance requested or approved so far reaches a total amount of EUR 3.2 million.
- EU CP Assessment and Coordination Team on site since 14.01.2010. A second team has arrived in Port-au-Prince on 23.01, to replace the existing team.

However, multiple interviewees described a familiar problem: the documents used to brief leaders were also the method by which staff exchanged information, including key metrics. To learn what was going on, one had to read documents manually, tracking dozens per day. Worse, to get those data back into formats that can be used for analysis and tracking, someone had to manually re-key those data into another document. This was particularly a problem for maps, where the map itself was shared as a static graphic, instead of a format that could be used for GIS purposes.

> "If you want to know where the biggest gap is, it's the extraction of structured data from unstructured inputs. And the unstructured inputs are situation reports, emails that go flying around, etc. And the structured data outputs would be points on a map with a few key values that matter for decision making. And I think there's two reasons we don't do that… one, we just don't think that we can, two, decisions are currently made on the basis of situation reports and verbals, so there's a decision making culture that has to change. That's a chicken and egg problem, because if you have better outputs, you make better decisions."
> *–Nigel Snoad, UNDAC*

> "The other thing that we have is that information management is seen as a panacea to coordination problems. So if you have a meeting and it's run effectively with decision points, that's a very effective information exchange for those who are present, with well-written minutes and captured very short. But if a meeting is run incredibly poorly, disorganized, the notes aren't captured effectively and aren't disseminated effectively, it's a waste of time."
> *–Brendan McDonald, OCHA*

While meetings of this sort do convey information from one human to another, this method of information sharing also assumes incredible memory on the part of stressed readers. Relief workers would need to recall, for example, three previous hospital throughput rates from earlier briefs and furthermore be able to compare those past metrics to emerging data. The capacity of responders to engage in this type of recall is laudable, but the cognitive load placed on overtasked managers could be lessened by improved methods of information sharing. However, because clusters have not implemented open data standards, there exists no way to pull structured data (like key indicators from the SPHERE standards) out of unstructured documents like slides and situational reports. There is also no way to easily map this information to gain a better situational awareness so that managers can communicate needs and prioritize their decisions.

> "Dispersed pieces, tidbits of data almost, that can't even be classified as information, were some of the less useful [information we got], because that required an intense amount of resources and coordination to turn that into actionable piece information….and I'm not just talking from the V&TCs, but also from things getting dumped into the emails… if you sort of think about it, we need to put it [all] together for the big clusters—big clusters which are making multi-million and in this case multi-billion dollar decisions."
> *–Andrew Alspach, OCHA*

Credit: Andrej Verity

The fragmenting effect of austere conditions

While the tools that field staff had to process this information had improved markedly from previous disasters, the capacity of personnel to harness those tools was far lower than one might expect. First, the conditions in the early days were in many ways no better those in Banda Aceh after the 2004 Indian Ocean tsunami. Normally reliable equipment failed in the heat and dust. Reliable workhorse printers actually caught fire trying to keep up with the demand for maps. Radio and phone communications were difficult due to aircraft engine noise less than 100m from the tents. And some teams that are accustomed to being within close proximity of one another were separated by more than one mile that had to be covered by foot.

> "The operations center for the USAR teams was located in a different place from the operations center for cluster organizations. They were about 1–1.5 miles apart. The USAR operations were in the middle of airport, with the clusters working from the logistics base (LogBase). To separate the two was good from an operational perspective, but bad in that they were 1.5 miles away. Information was not flowing between those two operations, and communications between the operations centers was extremely limited." *–Gisli Olafsson, Icelandic USAR team*

Credit: Mark Turner

Across the board, questions about the use of web portals received a short and simple response: **web portals failed to work when accessed from the field.**

> "During the first 2 weeks of a major disaster, like Haiti, even though we had connectivity, we [did] not have the luxury of accessing the graphical web, at $6–8/MB for data. And you load a Facebook page, with photos/status page, that is 300–400KB. It quickly adds up." *–Gisli Olafsson, Icelandic USAR Team*

Field staff found the method of exchanging files via web portals to be flawed. They often could not afford to download large files, particularly those which involved datasets, imagery, and new applications. Instead, low bandwidth and unreliable access to the public Internet left staff relying on paper and data formats that could work offline. Portals also tended to provide file dumps instead of a common picture or dashboard, requiring staff to piece together a situational picture by painstakingly reading through lists of documents and blog posts; few had time or adequate network bandwidth for this activity. Many had no means to exchange data with other web sites or services.

> "It used to be that people showed up at the events with their own clipboard. Ten years ago, they showed up with their own laptop, and now they show up with their own web-based program. But it is still the same problem: none of those can communicate with each other." *–David Aylward*

Web services, a method of exchanging feeds of data between machines—had better success; the data tended already to be in structured format, was low bandwidth, and could be handled in the background. However, it was not well used in the field, and had better success among the V&TCs.

02. LACK OF RESOURCES

A second barrier to increasing the flows of information moving through exponentially increasing number of devices and network connections was lack of investment. This occurred at both the level of inter-cluster and intra-cluster coordination. When the dominant method of extracting information from analytical products required human intervention, the failure to provide adequate resources for information management all but guaranteed that coordination across and between clusters would be a struggle.

Inter-cluster Coordination: In the initial days after the earthquake, the Office of Coordination for Humanitarian Affairs (OCHA) and UN Disaster Assessment Coordination (UNDAC) team deployed an information management staff to coordinate information flow between

clusters, along with a team from the NGO MapAction to supply mapping services. These information managers focused on getting the basics completed: registering thousands of individuals arriving at LogBase, building 3W reports (who is doing what where), notifying everyone registered of every cluster meeting, making maps, and coordinating the information flows of the relief effort. They had no time for additional duties. It was all the staff could do to manage the team's inbox (receiving around 1 email per second, which is over 3000 emails per day), build contacts lists, and handle the information flows generated by USAR operations.

> "The classic situation is always information overload. It's just that particularly with better communications, there's more and more email to process. We had one to two people full time doing the inbox of the UNDAC team, and to some extent all we could do with the email was to forward them to the cluster coordinator, which just replicated their problem. And again that's another task that could be done elsewhere, if the process and systems are set up. And we're not talking new tools; we're just talking a different way of using email inboxes." *–Nigel Snoad, UNDAC*

OCHA and UNDAC were so overstretched that MapAction staff increasingly assumed a formalized task of augmenting information management staff. Even together, they could not keep up.

Intra-cluster Coordination: Each functional area—emergency shelter, food, WATSAN (water and sanitation), etc.—was also supposed to have an information management staff assigned to process flows of data into analyses that could support decision making. Most clusters did have small numbers (1–3) of information managers who usually wore multiple hats: public information officers, data jockeys, technicians, and GIS analysts. However, anecdotal evidence points towards a problem of "double-hatting", or multi-tasking by key staff in some clusters: many personnel assigned to handle information management at the cluster or sub-cluster level were also expected to perform their "day jobs" for their organizations.

> "The clusters themselves didn't have the capacity early on to manage their own information. Even if there were individual attempts by NGOs and UN agencies to collect information systematically, whether it was an individual assessment of a health facility or a much more systematic standardized assessment… the capacity to then process that and share it didn't exist."
> *–Brendan McDonald, OCHA*

Credit: WFP/Dane Novarlic

03. DELAYS IN PROCESSING INFORMATION

Several issues increase the likelihood that a given information management process would take longer than desired. These delays included translation, ad hoc data management practices, and fusion of data from multiple sources.

Translation: A Perennial Hidden Issue

Multiple sources cited a lack of translation support as a perennial problem in international operations. Cluster meetings were held in language that shut out many participants and which delayed the communication of decisions to those who needed to know.

> "Go and look at any evaluation from the last ten or fifteen years. 'Recommendation: make effective information available to the government and the population in their own language.' We didn't do it. The maps, English. Now they're much better, but the first month most of the staff didn't speak French and most of the information produced was English… … It is a consistent thing across emergencies: how to best disenfranchise the national authorities is to run your meetings in a different language."
> *–Brendan McDonald, OCHA*

One interviewee told the following story:

> For some reason, UN agencies seem deeply convinced that everyone on the planet speaks French. In meeting, the Haitian government was there. The meeting started with interleaved translation: paragraph, then paragraph. The government left, and the last language that was spoken was French. The cluster lead continued the conversation in French, no translation at all. Twenty minutes went by, with apparently major decisions being made. I stepped up and said, 'There is no translation, and clearly things have happened in last 20 minutes that are major decisions, and it is going to be very difficult to revisit those. If we are going to have a meeting in a single language, wouldn't it be more reasonable to have that language be English, since most of the resources are going to be coming from English-speaking countries?' I got booed and laughed at. [The meeting continued in French]…. The US military representative spoke no French. The USAID representatives in room spoke no French. The relief community is not bilingual. They may all speak English, but they don't all speak French… There were genuine consequences. The military folks didn't return. It caused divergent pathways in that cluster. *–NGO field worker*

Clusters did not have funding to translate cluster meeting notes, and OCHA does not have the resources to provide this service to each cluster. As a result, critical data may have been available to decision makers, but there was neither time nor funding to allow those who speak other languages, including the host government, to find or read it.

Ad Hoc Data Management Practices

Given the tempo of staff rotations, a common complaint is that incoming staff felt lost in a stream of data and experienced a steep learning curve. It was a common practice for staff to use spreadsheets to try to come to terms with data—often reinventing the tools that departing staff had used, substituting their own familiar data structure and thereby making the data from one staff rotation incompatible with the next. This was a result of both lack of commonly accepted tools and standards, and the common chaos caused by staff duty-cycles in a crisis. Although effective for individual staff members, the time invested in this activity—and the time lost in translating one person's spreadsheet into the next—needs to be analyzed.

In aggregate, the information management practices of the cluster system not only experienced problems with information management at both the intra- and inter-clusters levels but also were ill-prepared to accept information flows from new sources. The information managers in Haiti had to confront two such fire hoses: one from an emerging V&TC and one from the affected population. These are the subjects of the next two sections.

V&TCS: UNINTENTIONALLY OVERLOADING THE GAP

V&TCs are not a new phenomenon in humanitarian operations. MapAction is an NGO that has provided mapping services to OCHA since the 2003 Bam earthquake in Iran. And the NGO Télécoms Sans Frontières, which provides satellite-powered voice and data communications in emergencies, has had a formal relationship with the UN emergency telecommunications cluster since 2006. In Haiti, both MapAction and Télécoms Sans Frontières deployed under OCHA in support of UNDAC. Another volunteer community, Sahana, is a 501(c)3 organization that developed an open-source disaster response management system to track people and supplies in Sri Lanka after the 2004 Indian Ocean tsunami. During the Haiti operation, Sahana deployed a public instance of its software to coordinate data flows between V&TCs and many members of the international humanitarian system; it also deployed a private instance of its software in support of WFP.

Credit: UN/Nancy Palus

Yet in the Haiti response, many new V&TCs were established, contributing capabilities that had not heretofore been available to the cluster-led humanitarian system. Some existing groups refocused their activities and came to the forefront. Many of these V&TCs had mandates that did not explicitly include deployments to disasters. Some of the newer V&TCs that played a major role in the Haiti earthquake response include:

OpenStreetMap is a community of approximately 150,000 mappers dedicated to building a free and open map of the world. Approximately 640 mappers participated in the efforts to build an open base map of Haiti. MapAction credits OpenStreetMap with providing an essential service and for building a street map of Haiti from scratch in about two weeks, a project that should have taken about a year.

CrisisMappers is an informal network of humanitarian practitioners, technology groups and academics interested in crisis mapping, which is loosely defined as the application of geospatial and crowdsourcing tools to the analysis of humanitarian emergencies. It was founded in November 2009 with approximately 100 members; more than 550 participated in the Haiti efforts. The CrisisMappers community, via an email listserve, became the central mechanism for coordinating imagery and mapping activities in Haiti. Its members included representatives from UNOSAT, Google, GeoEye, Digital Globe, OpenStreetMap, and the San Diego State University Visualization Lab, which hosted haiticrisismap.org and its associated web services.

CrisisCamps/CrisisCommons started in 2009 as a venue through which crisis response professionals could explore ways to share best practices. It transformed into a structure for mobilizing almost 2000 laypeople (mostly technologists) in 25 cities around the world to swarm around information needs generated by the Haiti operation.

Mission 4636 is a partnership between Samasource, 1000 Jobs Haiti, FATEM, Union Haiti, Stanford, Energy for Opportunity, CrowdFlower, The Crisis Mappers Network, Ushahidi, FrontlineSMS, SEIU, Thompson-Reuters Foundation, InSTEDD, The US State Department, Microsoft Research, Sahana, Digicel, Voila, and a dozen more Haitian NGOs. It was affiliated with Internews and the Communicating with Disaster Affected Communities initiative.

Ushahidi is a 501(c)3 organization that develops free and open source mapping tools for live collaborative mapping, mostly in the area of election monitoring and international development. Ushahidi's Director of Crisis Mapping mobilized approximately 200 students at Tufts University Fletcher School of Diplomacy to monitor and geolocate reports from over 300 sources including Twitter, Facebook, new sources, official UN/humanitarian reports and Mission 4636.

The History of the Volunteer and Technical Communities in Haiti

Despite the damage to structures, many of Haiti's cell towers remained operational, and thousands of Haitians sent SMS/text messages from makeshift camps, telling the world of their plight. Importantly, Haitians were able to send these messages not only to other family members but also to public social media channels such as Twitter and Facebook. Both of these services can interact with SMS so that users can post messages directly to their profiles from a cellular phone. As a result, via the highly connected networks of the Haitian Diaspora, requests for extraction from the rubble reached far beyond what might be expected—that is, messaging among small 'family and friends' networks—and expanded into the common view of a global social network.

These messages were heartbreaking to read and elicited strong emotions worldwide. Many survivors complained of broken bones and lack of food and water; they often left clues about an address or location of people in need. Others messages probed for information about missing loved ones. During past crises, various online communities had supported the affected by waging online campaigns, from wikis during Hurricane Katrina to Twitter during the Iran elections. During the Haiti quake, a new dynamic emerged: V&TCs began to aggregate, geolocate, and prioritize incoming messages from various social media, and providing geolocated reports of trapped individuals to urban search and rescue (USAR) teams on the ground. Much of this work was possible because the V&TCs had established relationships with responders ahead of the disaster. Among these groups was Ushahidi, a Kenyan NGO that originally built SMS-based tools to monitor elections in its home country.

> One message arrived from a location listed only as "Un Bon Privee." The hunt for where this business—it turned out to be a bookstore—was located took hours, and involved research that included finding the resume of a former employee on the Web and calling him in NYC at 2AM local time to ask where the bookstore was in Port-au-Prince.

Ushahidi

Within two hours of the quake, the Ushahidi team launched an instance of the software customized for

Haiti and opened an operation center in a small apartment near the Tufts University Fletcher School of Diplomacy, where Ushahidi's Director of Crisis Mapping, Patrick Meier, was a Ph.D. candidate. Based on new code written by Brian Herbert after the quake, the modified Ushahidi platform provided a mechanism for Patrick's classmates to begin collating social media posts and plotting each message on a map.

The messages were initially collated by about two dozen Fletcher students from Twitter, Facebook, and contacts within the Haitian diaspora. The team developed a quick-and-dirty system for classifying, prioritizing, and geolocating the tweets using a mix of Google Spreadsheets, Microsoft Excel, and Google Maps, the same time worked with the Ushahidi development team to integrate this type of capability into the software. However, this system strained under the volume of messages. There were two reasons:

1. **Geolocation.** Pinpointing the location of a plea for help took lots of time and had to be right. However, messages often arrived from locations listed by nicknames or partial addresses. That said, the team was under pressure to ensure that each location was verified, especially if it required sending a USAR team into an area with questionable security or required a helicopter to ferry a patient to a hospital.

2. **Resources**. Volunteers came together with no budget for even pizza and coffee. They brought their own (aging) laptops, which often did not have access to GIS tools. And they had no relationships with vendors to get them free licenses. For nearly two weeks, nearly 20 people on the Ushahidi team at Fletcher worked from a small 1.5 bedroom apartment, with their feet overlapping on a coffee table surrounded by three sofas. When the laptop of the person in charge of geolocations failed, she did not have a spare computer; it took several hours to find a donor for a new computer (which increased speed of lookups by over 100%); meanwhile the geolocation team tried to proceed on a borrowed laptop.

The team received help from a coalition of organizations that came together around the use of SMS to reach disaster-affected communities using the 4636 shortcode.

The Race Against Time and the 4636 Shortcode

Working separately from Ushahidi Haiti, several NGOs partnered with the U.S. State Department to launch a single SMS number for aid requests in Haiti. Several NGOs partnered with the U.S. State Department and Haitian carriers to launch a single SMS number for aid requests in Haiti. These partners, who included Rob Munro of Stanford University, FrontlineSMS, InSTEDD, Energy for Opportunity, the Thompson Reuters Foundation, amongst others, worked with cell phone carriers in Haiti to set up a resource called an SMS shortcode along with the infrastructure to support the flow of SMS messages sent via a 4636 shortcode. Brian Herbert wrote code to integrate the 4636 flows with Ushahidi Haiti overnight. Like 311 or 411, a shortcode is an alias for a longer number that is more memorable and easier to communicate to a large audience. The core 4636 service was launched for Mission 4636 by Digicel and their local partners DigiPoint after discussions lead by Josh Nesbit of FrontlineSMS. It was launched in minutes, with the messages read into a translation and mapping microtasking platform quickly put together by the V&TC community. The Thompson Reuters Foundation and their technical partners InSTEDD helped deployed to Haiti in the first 72 hours, where they publicized the number within Haiti and later worked with engineers from ActiveXperts, Energy for Opportunity, CrowdFlower, Digitel, Noula, Samasource, Stanford, Ushahidi, Voila and Votident to support the crucial task of passing the messages from the telcos to Mission 4636.

The period during which responders can rescue someone who is trapped under the rubble is short: under most circumstances, trapped survivors only have a few days before they will die from dehydration, exposure, or untreated injuries. To identify where these desperate

Credit: Ushahidi

victims might be, the partners advertised the short code over Haiti's radio stations, which largely remained operational or were quickly brought back online through the efforts of Internews, which builds citizen journalists worldwide.

Messages began to flow into 4636 almost immediately. To deal with the flow of information, the partners had to build a means for translating these messages from Creole to English. Working with Haitian community groups, Rob Munro of Stanford, mobilized more than 1,200 Creole and French speaking volunteers from the Haitian Diaspora in 49 countries. These volunteers translated messages in near real-time via micro-tasking platforms, collaborating on open chat rooms and using their geographic knowledge to map thousands of messages from satellite imagery in the crucial days before the Open Street Map initiative started publishing new maps. To ensure greater quality control, Rob soon migrated the microtasking platform to CrowdFlower, a for-profit that specializes in ensuring quality controls over microtasks. Through Crowdflower, Rob worked with Samasource, an NGO that had just established a microtasking center outside Port-au-Prince to create digital employment opportunities. By day six of the response, Ushahidi was fully linked into this new flow of messages coming in from 4636. Soon thereafter, the Sahana Disaster Response Management System integrated the data coming in through 4636 into its system.

> "The questions the Marine Corps was trying to answer were who are the NGOs, where are they, what are their needs and how do we connect with them to empower them? Simply locating the NGOs was a huge piece of the puzzle. UN had a map of NGOs across Haiti on January 12, but it was quickly outdated. We relied heavily on Ushahidi to locate NGOs." *–Craig Clarke, US Marine Corps Civilian Analyst*

Crowdsourcing's Enabling Technologies

Connecting SMS information with situational maps of needs requires enabling technologies. For instance, volunteers could not have geolocated most of the pleas for help without maps with street names and building outlines. The success of 4636 was in large part due to the coupling of SMS with five technologies: 1) tools for collecting, processing, and viewing publicly available high-resolution satellite and aerial imagery; 2) Geospatial wiki platform where many people can build a common map of the area of interest (AOI); 3) wikis were volunteers can collaboratively build up a narrative and link to resources; and 4) collaborative platforms like Google Docs that had open interfaces to mashup data stored in the platform with web services; and 5) the wide use of Skype text and voice chats for use across-platforms and low-bandwidth connections. The most common use of this fourth resource was to link a web-bases spreadsheet to services that could automatically plot rows of data on a map.

The first two tools—open aerial mapping and open street mapping—were relatively new to the field of humanitarian response. While their underlying technologies existed at the time of prior disasters, the tools had not been applied to humanitarian operations on a massive scale until Haiti. Therefore, each requires a short explanation before getting to how they were applied to mapping Haiti's health facilities.

Collaborative documents like wikis have a relatively long and important history in citizen contributions to humanitarian response. The Hurricane Katrina Wiki was a collaboratively created portal based on the Wikipedia platform (MediaWiki) that provided both situation updates and resources and advice for those affected by the disaster. It grew out of the initial efforts of the Tsunami Wiki, and was followed by locally led and developed wikis for the 2006 Yogyakarta earthquake and several other emergencies. For Haiti the ICT4Peace foundation developed and maintained a wiki that provided a collated and curated set of links and resources. In a similar vein the NGO InSTEDD regularly provided a V&TC oriented "situation report" that gave a snapshot of many key activities by new players in the volunteer

Credit: UN Photo/Logan Abassi

HEALTH FACILITY MAPPING WITH SAHANA, OPENSTREETMAP, AND CRISIS MAPPERS

One of more difficult problems during the Haiti operation was determining where the health facilities were. The lists prior to the disaster were already out of date. Once the quake destroyed hospitals and clinics, the list became a critical must-have for OCHA.

The task was daunting. No agency had the definitive list; each had what is assumed was a fragment with some unknown number of facilities overlapping with other lists. Some lists listed the same place in three different lines of spreadsheet: one for French, Creole, and English. Some facilities appeared multiple times for other reasons, like doctors' offices that were inside a hospital.

Faced with a task that required speed and human labor, OCHA and MapAction asked the Crisis Mappers community if it could crowdsource the effort to geo-locate 105 health facilities that had no location data. WFP made a similar request, as did the U.S. Embassy in Haiti. Planning for this effort began on the evening of 20 January. Coordinated through Sahana and OpenStreetMap, this effort planned to use satellite imagery, OpenStreetMap data, and outside sources to locate almost all these facilities, using crowdsourcing to fill in the data by distributing the effort among dozens of people. The request to the crowd went out at 2:40AM on 22 January. Approximately 35 hours later, the team working on the problem had located the de facto list of 102 of the 105 missing hospitals used on the ground, inputting all the data into the Sahana disaster management system. They had verified each facility by having an OpenStreetMap member locate the hospital or clinic on high-resolution satellite imagery (15cm resolution) and verify that health facility was located at the submitted coordinates.

What happened next is critical to lessons learned from the response. Sahana made the data available in open data formats via several feed formats, including XML, KML, GeoRSS, and the XML schema designed for tracking hospital data, EDXL-HAVE. This resource became one the best resources for health facility data for the next month. Over 8,000 unique individuals visited the site or pulled from these feeds. Crowdsourcing had taken a responsibility that would have taken OCHA days to complete and reduced it to a little more than a day of work. In the process, a group of V&TCs had built a process for locating health facilities—a process that is now being revised for the next disaster.

and technology sector. Together these activities can be seen as an attempt by the V&TC community to make sense of their own activities, and to start to apply both individual and collective intelligence to the problem of information overload and harmonization of effort.

Crisis Mappers and Open Aerial Mapping

High-resolution imagery—defined here as being able to see to the level of one meter—has not traditionally been available at the field level for operating agencies immediately after a disaster. Imagery can be critical to making operational decisions, especially in regards to logistics. But imagery also is time consuming to process and analyze—a task for which field staff has precious little time. During the response to the 2004 Indian Ocean tsunami, the UN staff in Aceh had asked for detailed imagery of bridge outages so that they could design supply chains around the island. They had also requested nighttime infrared imagery of the island, hoping that heat of campfires and congregations of (warm) people would help the UN identify where the populations of destroyed villages had moved. While they eventually received some imagery, they never received a data set that answered their operational questions.

Haiti was an entirely different case. A GeoEye/Google partnership released high-resolution imagery of the disaster 26 hours after the quake. Digital Globe soon followed. What was remarkable was that these providers released the imagery under an "attribution only" license, instead of the usual restrictive licenses that prevent derived works and redistribution via other online and offline channels.

Working in coordination with Crisis Mappers, the Disaster Risk Management group in at the World Bank commissioned the Rochester Institute of Technology (RIT) and ImageCat to collect 15 cm aerial imagery of Port-au-Prince. From 21–29 January, the teams flew a prop aircraft in box patterns, releasing the imagery into the public domain. This transformed the work of the response.

The Haiti imagery would have been useful under any circumstance, especially for the UN and the NGOs that possessed the requisite geospatial information systems experts to process the raw imagery into the formats that laptop clients and web services could read and write. However, in this case, something unexpected happened.

A community of geospatial experts—loosely coordinated by the Crisis Mappers' mailing list—took it upon themselves to become the stewards and evangelists for the imagery data.

This group had first congregated at the International Conference of Crisis Mapping in October 2009 and included about 100 top subject matter experts from the UN, U.S. State Department, the EU Joint Research Center, and major academic institutions. Their intent before Haiti was to define crisis mapping as a new discipline and to explore means for identifying how the analysis and visualization of data flowing from humanitarian emergencies could improve response operations and recovery.

Crisis Mappers went far beyond what one would expect of an online community. Growing to over 500 members, they downloaded many dozens of terabytes of post-quake imagery from satellite providers, georectifying them against pre-quake data sets. Crisis Mappers set about analyzing the imagery from many angles: creating shape files of the emerging IDP camps, building thematic maps of potential hazards, even modeling potential flooding hazards from a hypothetical tropical storm.

Much of the work was centered at academic centers, with the San Diego State University/Telascience "hypercube" server functioning as the primary platform for aggregating the data. Other academic centers—including the Delta State University in Mississippi—added complex GIS analyses. This location of the work took the load off field staff for processing and analyzing imagery—a service to field staff and other V&TCs alike.

Credit: UN Photo/Logan Abassi

OpenStreetMap

OpenStreetMap (OSM)—a geospatial wiki, akin to a Wikipedia for maps—began to displace traditional GIS within a week of the temblor, especially for routing data and for maps of building footprints in Port-au-Prince. The reason was practical: OSM was able to mobilize over 640 volunteers around the world, who scanned and rectified old atlases and maps and traced roads, bridges, and buildings into the OpenStreetMap geospatial wiki using tools that only required a simple web browser and time. In the process, this community turned a blank spot on the map into one of the most accurately mapped countries in the world—creating a map far better than any available to the UN. By mid-March, OpenStreetMap had become the de facto source for Haiti map data within most UN agencies and the EC Humanitarian Unit.

04. CHANGE IN EXPECTATIONS

The goal of information management is more than ensuring that information flows from an origin to its recipients. When timely and accurate, information enables leaders to make well-informed decisions. However, leaders at UN headquarters were very clear that they did not believe that were receiving detailed information about unfolding operations that would enable them to know what was going on and to coordinate the response. While this expectation for greater visibility into the field is expected and right, what is unclear is if existing structures for information management can supply such fine-grained details so early in the response.

The plumbing is better, so why is information not flowing?

Since the Indian Ocean tsunami, the UN and NGOs have made enormous investments in communications. And it paid off in Haiti: under its mandate, WFP established connectivity and power in 22 locations, providing over 20 megabits of connectivity at LogBase alone (a number which was augmented by significant satellite connectivity brought by individual teams and greater than bandwidth available in many office buildings). This investment provided a dramatic increase in the availability and use of bandwidth over previous major operations (WFP stated that 2 megabits has been the average for recent operations). But even this increase was not enough to keep pace with demand:

1. Demand for support to mobile devices. WFP faced demands to support access to email and the Web over handhelds and Blackberries, with major usage appearing to be individuals who needed to access email (and ask questions of remote staff) during meetings while away from their laptops.

> On Day One, we had people asking when their Blackberries were going to work. Our immediate response was, 'Please come back in a couple of weeks, because the service provider is not there yet.' Two days later, we were providing Blackberry services. It was definitely an eye opener for us. *–Martin Kristensson, WFP*

Credit: WFP

2. Demand for access to backend office systems. Many of the 1,200 staff on the ground asked for access to backend office data systems, along with maps, imagery, and datasets from their respective headquarters and international partners. Many field personnel spoke of an inability to access large files and important web sites, including the OneResponse portal established by the UN for coordination of information sharing across clusters. One field worker was warned against trying to download a 17MB map file for fear of interfering with the downloads of other staff. Others found that downloads that might take days in the field were made in a matter of seconds once they rotated out of theatre and got to a broadband connection in a hotel in Florida.

> All the major humanitarian agencies have a very significant complement of back office applications that are critical to being able to respond...Most people coming to an emergency site have very high expectations for what technology service will be available to them. We don't doubt that in the next emergency, there will be people with iPads demanding access to their critical back office information over those devices. *–Alfred Gilman, WFP*

With all this provisioning of bandwidth and the associated costs, management expected information to be flowing over the new (and expensive) plumbing. Leaders were demanding greater access to what was happening in the field; at the same time, managers were getting involved in tactical decision making with what one person called "the thousand mile screwdriver."

The coordination of data and its translation into decision making—information management—is different from building the communication pathways via which those data are able to flow. The processes that facilitate the flows of data and information over ICT infrastructure have not received the same attention in humanitarian operations as information technology.

Senior managers had high expectations of what should be known about the nature of the response. They wanted to know not only strategic details, but also deep tactical operational details: not only how many tons of food had been delivered, where, and by whom but also why one plane had been prioritized over another.

> The greatest challenges were—we had them in previous emergencies but they came to a head in Haiti—the requests for detailed information about the disaster at all levels at headquarters. *–Brendan McDonald, OCHA*

From the perspective of many interviewees, senior managers in headquarters had unrealistic perceptions of how fast certain data could be known. Field staff were already racing to fill gaps in knowledge, and there are indications that requests for data to support the consolidated appeals process (CAP) placed an additional burden on people working in austere conditions. This pressure was augmented by improved connectivity and bandwidth, which enabled senior managers at headquarters to get involved in tactical decisions on the ground through twice-daily conferences. This dynamic weighed on their morale—so much so, that one information manager felt the need to give a speech, both acknowledging the right of management to expect answers to inquiries but also to

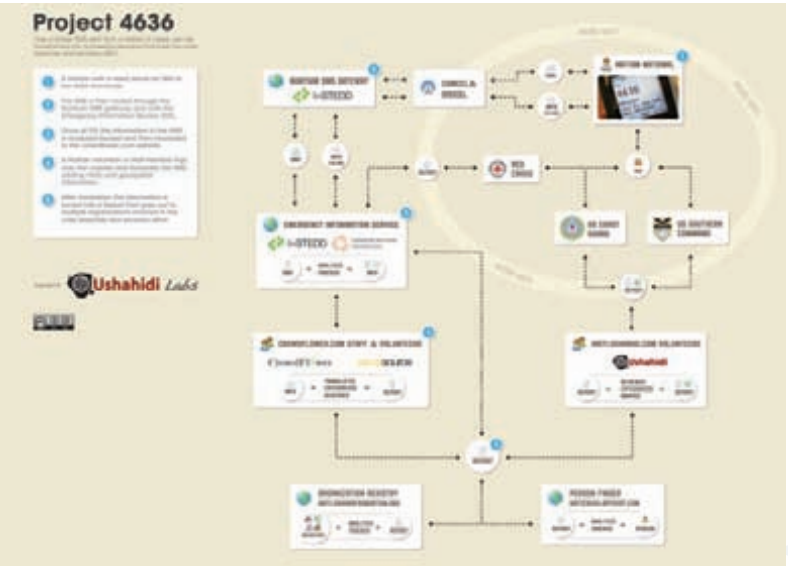
congratulate the staff on how well they were doing in comparison to the work in the Indian Ocean tsunami.

> "In a disaster response information management and ICT either need to be working seamlessly together or to be considered as a package." *–Brendan McDonald, OCHA*

05. MOBILE-ENABLED AFFECTED POPULATION

The Haiti operation was not the first time that a disaster affected population used SMS to communicate their needs: in Banda Aceh, one cellular tower remained operational, and SMS was all it could handle. However, Haiti did represent a tipping point in the use of social media to convey needs to a worldwide audience. According to one report, "approximately 85 percent of Haitian households had access to mobile phones at the time of the earthquake, and although 70 percent of the cell phone towers in Port-au-Prince had been destroyed in the disaster, they were quickly repaired and mostly back online before the 4636 number was operational."[8] Haitians sent hundreds of thousands of messages out via SMS to Twitter, Facebook, Ushahidi, the Thompson Reuters Foundation Emergency Information Service (EIS), and most importantly, to members of the Haitian diaspora.

Thousands of Haitians living in the United States, Canada, and several other countries served an important role in translating messages from a low-density language (Haitian Creole has only 12 million speakers worldwide, 9 million which live in Haiti) and conveying those needs through channels such as the Mission 4636.



Credit: Ushahidi

TRANSLATION THROUGH THE MISSION 4636

One important part of the Mission 4636 was the collaboration that a team at Stanford established with members of the Haitian diaspora to translate thousands of messages from Creole into English. In the first days of the disaster, Rob Munro (a computational linguist at Stanford) began to recruit Creole speakers from Facebook and other public web sites, asking them to begin translating tweets, SMS messages, and Facebook posts coming from Haiti. At its peak, the effort had 1,200 Haitians translating thousands of messages per day, usually within 4.5 minutes of their arrival. By February, Rob began a partnership with CrowdFlower, a company specializing in quality control for microtasking that was working with Samasource, another social venture with partners on the ground who could recruit Haiti citizens to perform translation services from Haiti. The effort transitioned to this professional translation platform soon thereafter.

> "This was probably the most important thing we did: to help the Haitian community help themselves."
> *–Rob Munro, Stanford University and Mission 4636*

To make the situation more difficult, the wide adoption of mobile phones by Haitian society generated a channel by which Haitian citizens could try to communicate their needs to the international response operation. Haitian citizens were sending tens of thousands of short reports via SMS to social media channels to tell the world—and international humanitarian personnel—what they needed. Over 30,000 text messages went through 4636 during the first month, with about 80,000 total. Some messages contained actionable information, like a specific medical emergency at a known road intersection. Responders had to ask: in the absence of a functioning sovereign government, was there a responsibility to respond to each individual request for help, much like a call requesting an ambulance? What happens if these calls go unanswered?

> "Where I see the real potential, is actually investing our energy and efforts into increasing the capacity of local communities to effectively prepare and respond to a disaster through effective utilization of a variety of new tools and practices that are a result of increased access to technology and social networking.

Furthermore, to assist them to effectively produce and communicate actionable emergency data to the teams of international responders—in a format they understand and can act on. This is how the affected community as the very first responder can become a serious, valuable and respectful partner during and after emergencies.
–Jaroslav Varuch, Ushahidi

Credit: Mark Turner

Interface between the formal and informal humanitarian communities

For all the work that the V&TCs performed around Haiti, few made direct connections with the field staff at UN agencies and the NGOs that were working under the cluster system. The reason was simple: although the V&TCs had personal relationships with people on the ground, these individuals were too busy to both perform their jobs and lobby for the use of V&TC tools (which would have required changes to standard procedures) during an emergency operation. Even if these individuals had made requests to integrate the information from V&TCs, and even when V&TCs sent staff to the ground, several barriers emerged:

1. **Lack of Channel.** Field staff had no formal channel to link these new flows of information into existing workflows. Those V&TCs which were more successful in connecting into the UN system either did so through UNOSAT or other back office connections or by deploying staff to the ground.

2. **Verification of Data.** Field staff had neither time nor methods for verifying data from V&TCs, aside from the easy-to-see accuracy of street-level data in OpenStreetMap. Crowdsourced reports were not (and are not) a replacement for formal assessments; they are a complement, signaling where more data might be collected. With UN staff scrambling to build data from scratch, complements were a luxury, especially in cases in which the data's provenances are unknown and methods are untested. Many simply felt they could not use—or did not have time to figure out—the data collected from the V&TCs.

What was needed was a formal interface into the humanitarian coordination system for the V&TCs. The challenges to making this happen are the subject of Chapter 4.

04 BRIDG

BRIDGES AND TENSIONS

One measure of the power of a new idea is whether it is able to displace traditional practice during periods of crisis. At these times, professionals tend to avoid novel approaches that have not yet been tempered by hardship; they instead reach for familiar and trusted ways. This tendency is particularly strong within the international organizations that deploy their personnel to major disasters. Because field staff has learned hard lessons in austere places, they tend to avoid assuming new risks. As a result, humanitarian relief operations often deploy older technologies that—while imperfect—have been adapted to the harsh conditions of the field.

In this light, the emergence of the V&TCs and the extent of their role as part of the Haiti relief effort caught many by surprise. No one predicted that volunteer-run platforms—many running on free-and-open-source software—would not only augment the traditional information systems but also provide data that became essential to the earthquake response.

> "In summary, the work by OpenStreetMap, was phenomenal, I hesitate to understate its importance in our work in the field."
> *–Nigel Woof, MapAction*

> "Haiti has been a revolution. The technology community has engaged for the first time in a very important and permanent manner in a humanitarian operation." *–Jacobo Quintanilla, Internews*

And yet, for all the power of the new information flows and the opportunities presented by the V&TCs to apply web services and collective intelligence to humanitarian emergencies, the international humanitarian system was not yet tooled to process this information. It does not have the resources necessary to adapt to handle the new inflows from V&TCs and disaster-affected communities. The international humanitarian system is still firmly rooted in a paradigm of documents and data-

Credit: Government of Colombia, UN Photo/ Sophia Paris, OCHA/Laura Sala

bases passed through hierarchies. It is not yet ready to exchange knowledge via services, architectures, and communities in a flattened, distributed mesh of partnering organizations. Nor is the system designed to receive individual pleas for assistance from large numbers of an affected population and to act on those requests on an individual level. But this type of information is not going away: even the world's poorest peoples are beginning to get access to wireless communications, and Haiti showed that many will not hesitate to use this technology to reach out to the international community when lives are at stake. What remains to be seen is how the international community will retool to take advantage of the power of crowds.

The questions therefore emerge: which aspects of current information management practices will remain and which must adapt? Why did certain tools used by V&TCs and the disaster affected community in Haiti integrate successfully with the international humanitarian system? Why did others experience the equivalent of antibody reactions?

> "I don't see these two groups as opposing forces. For me it is just a matter of time, capacity and coordination to find a way to really synchronize our efforts in an effective way."
> *–Jaroslav Varuch, Ushahidi*

While the answer to these questions will be debated for years to come, what can be known are important dynamics during the Haiti operation that created bridges and exacerbated tensions between the V&TCs and the international humanitarian system. This report explores the dynamics which interviews exposed, leaving further discovery and discussion of other issues—perhaps those more hidden deeper in values and belief structures—to conversations which will incorporate many more stakeholders. The intent in this chapter is not to criticize but to surface issues that should be approached through the dialogues that Chapters 5 and 6 recommend.

> "And that's why it's really important to have two kinds of people at the table when you're talking about this. You need to have people who know open technology communities, and you also need people who understand crisis management."
> *–Heather Blanchard, Crisis Commons*

This chapter starts from the core issue of integration—awareness—and proceeds to explore several more issues that consistently emerged in discussions across both communities as critical managing the flows of information into and out of the international humanitarian system: reliability, trust and brand, professionalization, open standards, and verifiability.

Awareness

Any analysis of the interactions of the humanitarian system and V&TCs during the early period of the Haiti response operation must begin with the obvious: in the first weeks of the response, most field staff did not even know that new V&TCs were offering to help. Those staff that did was so overloaded that they could not turn their attention away from their immediate responsibilities.

> "I didn't use OpenStreetMap. I didn't know about it. The only rescue team that used it was Fairfax, Virginia on days 8–10."
> *–Gisli Olafsson, Icelandic USAR Team*

(NOTE: MapAction was generating maps based on OpenStreetMap data which may have been used by the USAR teams.)

Some organizations devised their own innovative means to deal with the information gap they faced going into Haiti. A good example comes from the experience of the Icelandic Search and Rescue Team:

MATCHING NEEDS WITH SERVICE-ICE-SAR

"Tell them what it is you want"

At midnight on day 5, the Icelandic Search and Rescue Team (Ice SAR) was tasked to travel to Léogâne by 5am. The team leader reached back to a group of volunteers to help maximize their situational and geographical awareness–what came to be an informal V&TC. Gisli Olafsson, the team leader explained:

"In previous emergencies, we would stay up all night, trying to create a plan of action for the day after. Instead of doing that, we contacted 24/7 home support. We simply told them, 'Find out anything you can from Léogâne, the best maps you can find, identify potential targets, where are there large building, hospitals, shopping, create lists, and GPS coordinates.' At 4AM, in my inbox, was a 2MB PDF document. Maps, pictures, school and municipal office locations, contact information of the chief of police, mayor, and GPS locations – all from GoogleEarth and Google searched information. I printed out a 10-page leaflet, with all of that information to squad leaders, they read it on the way over there. The UK team said, 'Wow, where did you get that!' There are a lot of tasks like this, which can be outsourced to other groups… Also if you think about it from a cost perspective, we were able to sleep which is valuable. At the same time we were saving money. For a volunteer organization this is important."

While the V&TCs were producing innovative data and applications, their ad hoc connections with traditional actors in the field limited the integration of new resources—like reports generated by Haitian citizens and software to process these streams—into core planning at the cluster level and at OCHA. In the midst of a major crisis and increased expectations from their bosses, humanitarian staff relied on tools and processes that they trusted, that were familiar to them, and that tied into existing workflows. As one information management officer at UNDAC said,

"Some individuals had a sense of what that [the V&TC's] capability is, just as a volunteer workforce, not to mention the technical capabilities. But I think most of straight up crew in info management with the traditional ways of doing things did not feel frustration, because they did not even realize what had been missed. It was more about, 'How do we execute on tools and processes that we know about and are quite standard?' It was not about what could have been done quite differently." *–Nigel Snoad, UNDAC*

Even though some field staff members were tangentially aware of the resources that were available, they were too busy to take advantage of the resources or to consider the changes to workflows and methods that these new information resources would entail. It was a key lesson learned for many V&TCs: the introduction of new technologies during an active operation can be disruptive and ineffective. The right time to make field staff aware of new capabilities is between operations.

"Emergencies are not the best time to experiment with untested initiatives. People work around the clock and have hardly any time to try out new systems they are not familiar with." *–Jacobo Quintanilla, Internews*

Reliability

A core tenet of the international humanitarian system is reliability: a demonstrated commitment to responding to any crisis in any place.

"…if you're jumping into one crisis, then when the crisis happens, there is an expectation: the system has to know if it can predict the availability of your services and that is a requirement." *–Nicolas Chavent, Humanitarian OpenStreetMap Team*

This expectation is only partly a litmus test about the belief structures behind a newcomer; it is also a practical concern for planning who will perform what role, so that scare resources can be allocated to tasks which are under-funded.

"[V&TCs] need to be seen as predictable and reliable. In essence, we need to know—whether I'm dealing with Central African Republic in a conflict or I'm dealing with a mega disaster—I'm going to get the same level of support. Because we need to structure; the response system has to be predictable. If you want to play the game you need to be stepping up each and every time as a predictable partner, because people will rely on you." *–Brendan McDonald, OCHA*

Those V&TCs which have successfully integrated with the UN over the past decade—MapAction and IMMAP—have sent dedicated, trained staff to extremely difficult places. In one case, a volunteer MapAction GIS analyst had the courage to continue her deployment after the UN facility in she was sleeping in was bombed.

But the newer V&TCs do not yet have the resources to mobilize large numbers of volunteers for extended periods, nor do they have the capacity to send small teams to the field for every disaster. Most do not even have funds to cover travel or communications, let alone deployments of staff on 2–3 week rotations. Some did not have status as a charitable organization until long after the Haiti operation had turned to reconstruction, making it difficult to reach them with grants, contracts, and other formal funding vehicles. Several V&TCs had to instead rely on proxies or individual donations.

> "While we appreciate the fact that we were doing something that people found useful, the pressure that came to that was incredibly difficult to deal with." *–Patrick Meier, CrisisMappers and Ushahidi*

The newer V&TCs have already seen this need to professionalize and create a reliable capability. The Crisis Mappers community is forming a team called the Stand-By Task Force, composed of experts who are willing to train and deploy to emergencies to provide broad support for imagery, mapping, and crowdsourcing. The Standby Volunteer Task Force is a volunteer community of 450+ skilled volunteers from more than 50 countries. The Task Force was launched at the 2010 International Conference on Crisis Mapping. The mission of this online volunteer community is to provide live crisis mapping support to organizations that request help. In March 2011, the head of OCHA's Information Services Section activated the Task Force for live crisis mapping support of Libya. Crisis Commons received a $1.2M USD grant to explore how to create a crisis crowd that can swarm around problems that require both technical skills and information processing capacity. Members of the OpenStreetMap community formed the Humanitarian OpenStreetMap Team (HOT) to train affected communities how to map their own countries. The HOT team was one of the most successful V&TCs at creating a reliable, consistent operation, despite having almost no funding.

Credit: Mark Turner

HUMANITARIAN OPENSTREETMAP TEAM

As a community, OpenStreetMap is dedicated to providing a free and open map of the world, which anyone can edit and improve. However, if one lives in a country with poor existing maps, contributing to OpenStreetMap takes some training. One must learn how to use a handheld GPS unit, how to input the waypoints and tracks from that GPS into an editor, and how to prepare that data for addition to 'the map.' The Humanitarian OpenStreetMap Team (HOT) was formed to build the capacity of local actors in the developing world to perform this role, handing control of the map back to the people who actually live in a place.

Over six missions to the island (which continued into 2011), the HOT team has trained over 500 Haitians in basic mapping and assessment techniques. When they started in March 2010, they held training sessions for 3–5 Haitians and internationals at a time. By the fall, they were working with mappers from Communaute OpenStreetMap Haiti and were training groups of 30–40. These mappers have adapted to the new challenges of the lifecycle of response and recovery. Working with IOM, they have turned over 100 of the IDP camps from empty bounding boxes (with some statistics about numbers of wells and latrines) into fully-mapped entities which display the pathways and location of services. And they posted the maps in kiosks, where the community could learn what was happening in the camp and edit the map. On request from IOM, these Haitian OpenStreetMappers located and mapped 200 schools in Cite Soleil in a matter of a few hours, assessing them for use as cholera treatment centers. Today, on an ongoing basis, these mappers are performing surveys and data collection at local offices.

Few V&TCs have committed to a long-term presence in Haiti, have successfully collaborated with large traditional UN agencies, and have sustainably engaged local communities. Humanitarian Open Street Map's (H.O.T) activities continue to this day.

> "We have transferred most stuff to Haitians… … It's far from disaster response at this point, it's more prevention and making sure that data is available."
> *–Kate Chapman*

These efforts are still nascent. V&TCs are making great strides in creating reliable services, but like their predecessors MapAction and IMMAP, they will need partnerships within the international humanitarian system to succeed.

Trust and Brand

In most communities, newcomers must earn the trust of veterans; it is not automatically granted. This dynamic is amplified in a world where individuals deploy to austere locations where societies have been torn apart by crisis, and field staff needs to rely on each other to get things done. In the humanitarian community, trust comes not only from individual actions but also grows from the consistent, reliable, predictable presence of an organization that abides by humanitarian principles. Trust is part of brand.

> "If there's a brand that has trust and recognition across the humanitarian community, then it has a chance of being worked with…. So I think one of the problems working with the volunteer technical community is identifying, building the trusted focal points and the trusted network. Really it's about building that brand, and some of it is individual to individual, but some of it is being able to say, 'I'm from this group, here's how you confirm that, and, I'm working on this and let's move together.'" *–Nigel Snoad, UNDAC*

Many humanitarian organizations invest a great deal in building their brand and reputation, sometimes sacrificing opportunities for partnerships or rejecting funding to protect the network of associations around their organization. This is particularly the case for organizations that send staff to areas where armed conflicts are ongoing. To protect their staff under a very fragile but critically important aegis of neutrality, these humanitarian organizations tend to reject any affiliation with aligned parties or militaries.

V&TCs are still working out how these humanitarian principles apply to their operations. Many come from communities where core beliefs sprung out of technology initiatives rather than humanitarian missions. OpenStreetMap began because geospatial experts in the UK felt it was unjust that the National Ordinance Survey forced citizens to pay a license fee for access to public GIS data. They set out to build a completely free and open map of the UK, and then of the world. Ushahidi began from Kenyan election violence and the need to 'give testimony'—which is what ushahidi means in Swahili; it emerged from the Kenyan blogging community's efforts to track incidents around the 2007 election violence. It provides a SMS-based platform to facilitate submissions of reports from the field. Crisis Mappers began as a community of practice seeking to understand how to apply new mapping and crowdsourcing technologies to crisis response. None were established as deploying humanitarian organizations seeking to aid communities affected by crises.

Among the new V&TCs, only a few deployed people to the field. Mission 4636 had people on the ground for

HUMANITARIAN PRINCIPLES (FROM OCHA ON MESSAGE: HUMANITARIAN PRINCIPLES PAMPHLET)

Humanitarian principles provide the fundamental foundations for humanitarian action. Humanitarian principles are central to establishing and maintaining access to affected populations whether in the context of a natural disaster, an armed conflict or a complex emergency. Promoting compliance with humanitarian principles in humanitarian response is an essential element of effective humanitarian coordination. It is also central to the role of OCHA.

Humanity
Human suffering must be addressed wherever it is found. The purpose of humanitarian action is to protect life and health and ensure respect for human beings.

Neutrality
Humanitarian actors must not take sides in hostilities or engage in controversies of a political, racial, religious or ideological nature.

Impartiality
Humanitarian action must be carried out on the basis of need alone, giving priority to the most urgent cases of distress and making no distinctions on the basis of nationality, race, gender, religious belief, class or political opinions.

Operational Independence
Humanitarian action must be autonomous from the political, economic, military or other objectives that any actor may hold with regard to areas where humanitarian action is being implemented.

the whole emergency phase of the operation. InSTEDD also sent staff for the first week following the earthquake. Ushahidi and the Humanitarian OpenStreetMap Team sent staff in the following weeks.

In all four cases, personal face-to-face relationships fundamentally changed the organization's access to members of the international humanitarian system and host-nation government. This field presence was critical for building initial trust and dealing with one of the hard realities of complex operations: rapid staff turnover.

"When you have an emergency like Haiti where so many lives are at risk, you have a lot of instability on the personnel side and the overall continuity of the effort. You have so much personnel turnover." *–Jeffrey Villaveces, OCHA*

Just when a V&TC found entry into an organization, the new champion would rotate out of theatre. This dynamic emphasizes the importance of building relationships between trusted V&TCs before any complex operation.

"…that's why the face-to-face on-the-ground is always more trusted than someone randomly off an email. Particularly, there's the levels: 1) there's the people I know—the people I meet face-to-face, and then 2) there's the people I know remotely already, and then 3) there's the people from organizations I know, and then 4) there's just the random people. And the groups that appear to be the random people are the lowest on the totem." *–Nigel Snoad, UNDAC*

"To get any information, you have to be on the ground. You have to walk around and ask people for it." *–Kate Chapman, Humanitarian OpenStreetMap Team*

Even V&TCs see rotations of people in and out of their community, especially when a change in life circumstances limits a person's ability to participate in a voluntary organization or to engage in the all-consuming work that accompanies supporting a megadisaster.

"And that then becomes a problem of institutional memory. You could have the greatest volunteers today who move on, leaving the platform that they supported in limbo. This is a challenge for some platforms—particularly if they are very successful—to sustain themselves over the longer term." *–Sanjana Hattotuwa, ICT4Peace Foundation*

After Haiti, some groups attained trusted status, or at least built sufficient trust within the international humanitarian system to be invited to discuss further collaboration. That said, this trust—which some field staff referred to as a brand—is still new and fragile. When some V&TCs did not have as strong a showing in their support in the 2010 floods in Pakistan many veteran humanitarians were puzzled. They would have liked to have seen greater mobilization of resources for a difficult response operation.

"The challenge that I have seen, and I have been involved in three different emergencies in less than a year's time, is that it was never guaranteed that the organization or the group that set up a website or a tool in the first one was going to be there for the second and the third. And even NGOs that built fancy tools in Haiti and no matter how great they are, they are not showing up with anything in Pakistan. So it is all great that we can have 15 different who did what where systems out there for one emergency, but then for the next one, you know in Kirgizstan, maybe nobody shows up, or maybe OCHA does, and then in Pakistan it is something different. So for me it is not always just who is authoritative, but also who is consistently there and predictable." *–Andrej Verity, OCHA*

There are good reasons why V&TCs had difficulty deploying in support of Pakistan: closed information management systems, lack of imagery, lack of cellular phone adoption in the affected population relative to Haiti, distance, and security of personnel who might be sent to the field. That said, these issues are technical: they relate to the status of V&TCs being on the outside of the international humanitarian system, where they cannot gain access to imagery put under the Disaster Space charter, where they cannot deploy under organizations that can provide security, and where they lack funds necessary for working under far more difficult (and distant) situations than were found in Haiti. With a

Credit: WFP

formal agreement and the funding that would follow, it may be possible to help V&TCs become more reliable partners to all response operations, large and small.

"I think the crisis mapping community is successful in what they do because they are who they are. And the UN system brings to crisis a rigor that the crisis mapping community does not have. And importantly, the UN has been there for far longer and far more crises than the crisis community even is interested in. And so it's a mutual respect for each other's work I think that will be the foundation to move forward. And hopefully this will occur."
–Sanjana Hattotuwa, ICT4Peace Foundation

Professionalization

For members of the international humanitarian system, professionalism is a way of life. It means delivering consistent services when called to perform their role in the cluster system. Some V&TCs have adopted this mentality. MapAction has been a consistent partner in dozens of emergencies and has engaged in monthly training exercises with its volunteers since its inception, certifying the capability of each individual on its team before he or she deploys.

"David (Spackman) was our operation founder. He had been in an infantry officer in the British army, and he had an absolutely rigorous approach. It was almost a joke, we were so military in the way we went about things. We were so structured and so disciplined. It was important to know that we were never a volunteer network. Rather, we were an organization from day one, and people were hired as volunteers to fill specific roles as a team with jobs to do. It was approached in a totally structured way and it was top down. We had a group that got together to discuss ways and means of doing things. But once we decide how we were going to do it, we pretty much dictated to the team: This is how we are going to do it." *–Nigel Woof, MapAction*

Other groups—often those that began in a realm outside crisis response—are just beginning the process of adopting internal procedures that guarantee consistent, reliable operations.

Some newer V&TCs have begun debates between internal factions, often between technologists who wish to provide platforms for general use and crisis responders who wish to support the application of these platforms to specific humanitarian operations. Some have debates between factions who believe one technology or method is being advocated above others. Others worry that the organizations will need to make fundamental changes to their mission and organizational design to chase the resources necessary for transforming a volunteer organization into an institution that performs a critical role during a disaster. These debates are ongoing. There is also a real possibility that competitive dynamics—if taken too far—may start to damage brands which the V&TCs have begun to build within the international humanitarian system.

"Unlike other VTCs which can bend rules because they are oriented toward humanitarian operations, OSM is oriented to building a fully open map of the world, and must therefore ensure that data that get input into the map has clear licensing. This perspective makes OSM more purist than other VTCs." *–Kate Chapman, Humanitarian OpenStreetMap Team*

The conflict over how entry into humanitarian response is changing the nature of V&TCs is one to watch closely. Like Wikipedia, the software in V&TCs is created by a community and the value is often less in the code than in the knowledge that the code enables thousands of users to co-create. As a result, it can be difficult to separate the platform from the people who build knowledge on top of those software tools. Likewise, software itself regulates what a person can and cannot do within the community. When crisis responders ask for (or themselves build) new features, they are also asking the community to change the range of possible behaviors that users perform in the software, which is roughly analogous to asking for a change to law or policy in a real-world town or city. Whose software code gets used—a crisis responder's or a technologist's who wishes to see the software remain focused on its original, far-more-general mission—is sometimes a matter of choosing which policy is the law of the land.[9]

Credit: UN Foundation Photo/D. Evans

Some V&TCs believe in the potential of technology to change slower-moving enterprises. Many have lived through the Internet revolution, having built companies that succeeded at changing the way that the general public perceives of problems in imagery, mapping, GIS, and crowdsourcing. For some, this success fuels a belief that technology is itself a driver of change, rather than one of several enabling factors that leaders can channel to transform organizations. Large enterprises move on slower timescales because their solutions generally need to be rolled out to thousands of employees. These institutions need to account for a huge range of organizational requirements and to implement accountability controls to ensure compliance with international agreements and internal processes and policies.

Many V&TCs have little experience with working on megadisasters. V&TCs are instead accustomed to shaping malleable architectures of software code. While some have deployed to the field, they tend to tackle information management challenges that allow for rapid cycle development of software. Most are accustomed to working with data whose accidental release would not put vulnerable populations at risk (though some do have methods for dealing with these issues, especially those V&TCs that work in human rights). While some of their leaders are experienced hands in international development, the organizations are generally too young to be acquainted with how programmatic choices early in the response lead to reconstruction and development outcomes years in the future. The scale of these decisions is many orders of magnitude beyond what V&TCs generally confront.

Open Standards

The most successful integration of tools and data from V&TCs happened in the areas where the international humanitarian system has adopted the most open standards: geospatial data. Many GIS officers and V&TCs were using applications that supported Open Geospatial Consortium standards like WMS (web mapping service) and WFS (web feature service). As a result, many information systems were able to exchange critical geospatial information using reliable, consistent formats. For instance, an OpenStreetMap GIS analyst could point her application to the output of an IOM analyst's service, integrating traces of the changing outer boundaries of IDP camps (polygons). In turn, a third analyst from WFP could point his tools

to the output of both the IOM and OpenStreetMap and obtain street level data around those IDP camps.

That said, for all the years of hard work that went into making this data exchange possible, this intermeshed network of geospatial applications is still very rough. As mentioned in the previous chapter, there is still no agreement on a data dictionary that specifies how each discrete object in a response—such as a water bladder—should be described within the Common Operational Dataset (capacity, location, etc.). While it is possible to exchange base-level mapping data without a data dictionary, it is not possible to exchange operational data about objects and events—a situation confirmed by the UN CITO office's analysis of applications across the clusters as well as by on-the-ground reports from GIS officers.

The Humanitarian OpenStreetMap Team devised a basic method for making these data available to cluster officials with whom it worked. Dubbed the Humanitarian Data Model, it provides a basic means of mapping concepts across clusters using points of interest in the OpenStreetMap database. It is an initiative worthy of further discussion, especially since the most common GIS analysis tool in the field—ESRI ArcGIS—has begun to support reading and writing to the OpenStreetMap in its new ArcGIS 10 platform, though

Credit: UN/MINUSTAH/Logan Abassi

additional work would be necessary to also support the Humanitarian Data Model in ESRI software.

While it is true that V&TC solutions are able to interoperate because they use open data standards and public interfaces (APIs), open data is itself a technical solution to the problem of transparency. V&TCs tend to believe that by making both data and decision making processes entirely open, better solutions and governance emerges at all levels.

Application Programming Interfaces (APIs). Helping non-technologists to understand this concept of an API usually requires metaphors. To that end, think of APIs as a protocol by which two or more organizations can exchange information. Some organizations only allow certain types of requests to arrive on specified paper forms (like a request for reimbursement of travel costs). Likewise, they only allow certain types of information to leave the organization on specified forms (like a check). APIs perform a similar role for data. Through software that runs on public web sites (called services), APIs handle requests for data. They require these requests to be in specified formats, and then serve data back out in specified formats. Mashups require software that have two attributes: a published data schema that abides by open standards; and an application programming interface (API) by which external organizations can read (and often write) data to/from the service.

> We ought to agree on architecture, standards, and protocols. It should be possible to say to organizations when they arrive, 'you are not playing unless you are playing according to this architecture, standards, and protocols. Use any software you want, as long as it conforms to these standards.' The UN could use its bully pulpit role to enforce that. Otherwise you get the same wonderful people who do the best they can with the electronic equivalent of duct tape. It's absurd to keep doing it over and over.
> *–David Aylward*

Verifiability

Geodata has largely gained the trust of field staff in certain clusters as well as key policy makers and advisors. Geodata tends to be verifiable to the laymen's eyes, because its accuracy can be ascertained by walking to the place and checking the data by eye. While processes around the creation and use of Geodata need to be formalized, it is likely that volunteered geographic information will be used as much as volunteered information on trusted wikis (like Wikipedia). OpenStreetMap will be commonly understood to be the Wikipedia of maps.

> I would trust OpenStreetMap. Period.
> *–Sanjana Hattotuwa, ICT for Peace Foundation*

On the other hand, data submitted by the affected population and processed by crowdsourcing V&TCs is the subject of fierce debate. Among members of organizations involved in traditional survey-based assessments, there is a criticism that the data that some crowdsourcing V&TCs generated from SMS reports were not collected according to tested processes; instead, collection was done from samples which are unlikely to be representative and may have self-selection bias. USAR teams found that a high proportion of SMS reports about entrapments turned out to be false leads. Many were sent by families who wished to recover a body of a person that was known to be dead.

> Overall 70% of the information that came in about people being trapped was unreliable. Many people fully understand that their family members are dead, but want us [USAR teams] to come to bring out the bodies.
> *–Ramiro Galvez, UNDAC*

However, crowdsourcing V&TCs are not claiming that this data is comprehensive or statistically valid; they are pointing to SMS reports as sensors that give testimony—which provide data about where a more traditional survey team might allocate scarce resources for certain types of problems. This tension is unresolved and will require much further dialogue.

The Need for an Interface

To open their information flows into the international humanitarian system, V&TCs will have to build and demonstrate reliable and consistent capabilities. The international humanitarian system will also need to adapt to different methods of work based on open standards and web services, and will need to establish agreements with V&TCs to aggregate and analyze reports from individual voices that emerge from disaster affected communities.

> A lot of these NGOs are being created because we have failed as a community to portray the situation on the ground to the rest of the

world. These new players feel they need to provide the information. There are a lot of gaps in what we are doing and we should get these new NGOs to focus on these gaps instead of duplicating what we are already doing." *–Ramiro Galvez, UNDAC*

Information sharing and integration across clusters will require open data exchanged over open interfaces using open data schema. The system has already stepped in this direction. The question is how to foster further work that integrates new voices and new opportunities into the system.

"I really think that there is no other way than to keep working together in order to improve the way the affected populations share and communicate emergency information. The people will share information no matter if the process will be managed or not. Same as people share information about what they had for lunch, they will share information during crisis. We as a community have a unique opportunity to step in to the process, if not as managers, than definitely as facilitators who can help to translate these conversations into something the responders (no matter if international or local) can understand. I am not saying that we have all the know-how at hand right now, but we started the process, we learned and we have ideas how to make it more solid."
–Jaroslav Varuch, Ushahidi

To this end, it is important to realize that the international humanitarian system and V&TCs have significant differences in culture, mindset, and approach. The two communities also have important overlaps, with key individuals serving as bridges between problems in the field and capabilities in the cloud. Connecting V&TCs into the international humanitarian system will require careful consideration not only of tools and practices but also of underlying beliefs, including how those beliefs align and how they conflict.

Some of problems that need to be solved form the subject of the next chapter.

Credit: Télécom Sans Frontières

05 INTER

INTERFACE REQUIREMENTS

A partnership between the formal humanitarian community and the informal V&TCs requires an interface between the two systems—a set of protocols not only governing flows of data but also different ways of thinking about decision making, problem solving, and conflict resolution. This interface should be designed to work during a humanitarian emergency as well as during the transitions from preparation to response and response to recovery. To aid adoption, the interface must start and remain lightweight, simple, and adaptable.

Interviewees expressed strong support for integration of technical capabilities to create more efficient information flows. An 'API for the UN' was a topic of discussion at the 2010 Crisis Mappers conference in Boston, with the core notion being that the UN should partner with the V&TCs to establish a common set of protocols to connect their people, workflows, and data flows. The ICT4Peace Foundation heard this appeal and integrated the concept into its recommendations for the UN CITO's Crisis Information Management initiative.[10] What remains, however, is to design the interface itself. These next two chapters offer a first formulation of the idea.

The design is based on a synthesis of previous lessons learned about connecting the V&TCs into formal organizations, including prior work by:

- UN OCHA Columbia
- iHub (Kenya)
- UN Global Pulse
- MapAction
- UNICEF Innovation Unit
- InSTEDD Innovation Lab (Cambodia)
- Strong Angel Disaster Response
- Demostrations
- Crisis Mappers Stand-By Task Force

Credit: FAO/Truls Brekke, MapAction, Nigel Snoad

RFACE REQUIREMENTS

Many of these initiatives share a common practice: they approach the integration of V&TCs with formal humanitarian organizations as a design problem. That is, they build systems that capture in their designs how each type of user approaches different tasks and plans for how those users interact. They also accept as a core truth that systems must adapt to changing circumstances, including changing patterns of use and new external challenges.

This report seeks to take a similar approach. It has its own set of assumptions, which balance several ideas and keep them in creative tension:

1. To be honest to the practical constraints while also ensuring that the initiative will challenge the status quo.

2. To acknowledge that part of the problem is technical but focus the supermajority of effort on adapting practices and policies to a new emerging set of realities and expectations.

3. To reduce the complexity of the problem into manageable bits without diluting the message and losing its connection to ground truth.

The extent to which this first formulation succeeds is due to the patience and openness of our interviewees. What follows is a proposed framework for an interface between V&TCs and the formal humanitarian community put in two parts:

1. **Chapter 5: Interface Requirements.** A formulation of design problems that need to be solved based on the analysis in Chapter 3; and

2. **Chapter 6: Organizational Design.** A proposed organizational design that meets most of these design challenges from Chapter 4.

It is the hope of the partners in this report—OCHA, the UN Foundation and Vodafone Foundation Technology Partnership, and the Harvard Humanitarian Initiative—that this outline will initiate a conversation with a larger group of stakeholders than could be interviewed in the scoping phase of the project.

FORMULATING THE DESIGN CHALLENGES

Designs succeed based on the questions they ask and answer. In this case, the first and most important is: what framework will allow multiple communities—each with its own understanding of humanitarian work—to learn from each other, gradually build trust though collaboration on shared problems, and find ways to act in concert? This type of problem—one where communities engage in learning and coordination over multiple cycles—tends to be best met by systems thinking, which uses feedback loops to map out interactions over time.[11]

> So it's more about having appropriate processes that can harness the capacity of ICT, of making sure human resources have the appropriate competencies, that they're aware of how to use technology, and how it can play an important role. And I think if people keep jumping to the tool or the technology as the solution, we will not move forward. *–Brendan McDonald, OCHA*

Adopting the approach begins by mapping out the key interactions in a system. For the interface between the V&TCs and the formal humanitarian communities, six core tasks are coming into focus:

1. **Identifying common problems**: Key stakeholders in the humanitarian system wish to engage in dialogue to discover areas where values and practices are in alignment and conflict. Participants will need to work though a neutral forum to discuss gaps in the current processes and devise methods to address those gaps, including major rethinking of underlying processes and workflows. This thinking includes ethical

questions about the application of any solution—which will always be a combination of technology, people, and practices—to situations where lives are at risk.

2. **Innovating through field experimentation**: Cross-functional teams composed of experts and technologists from the formal and informal humanitarian community have been collaborating on tangible, simple, practical approaches to close gaps identified by stakeholders and reinvent processes (including work through the relief experiments at Camp Roberts, Strong Angel, and classes at the Parsons School of Design and NYU ITP, like Clay Shirky's Design for UNICEF class and the humanitarian information design class at the Parsons School of Design). Working with UN and NGO field staff and developers from the developing world, innovation teams co-develop the solutions in the field, partnering with the personnel who need to make more informed decisions. This field-testing alternates with development in an iterative cycle akin to Agile software development techniques.

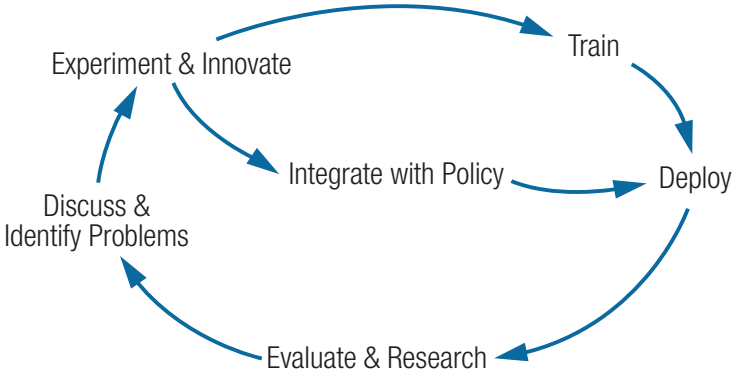
3. **Cross-training personnel in tools and practices from the formal and informal humanitarian systems**: This effort would enlarge a growing consortium of educational institutions that are already training humanitarian personnel. The effort would work with the institutions to offer curricula for 1) V&TCs to learn the practices and history of the formal humanitarian community, and 2) the UN and NGO personnel to learn how to apply new (and newly developed) tools to their work. This work has begun at a crisis mapping program at Tufts University and at the Harvard-Tufts-MIT Humanitarian Studies Initiative.

4. **Deploying a coordination cell**. This activity would pull cross-trained staff from the formal and informal communities into a coordination cell that can deploy to emergencies, providing both field-based support and reach-back support from major centers of activity. The team would focus on synthesizing information from narrative reports, crowdsourcing, and structured data feeds into a composite picture of the emergency for decision makers. They would include translators and (where possible) a coordinator who mobilizes the diaspora community and other civil society organizations from the affected region.

5. **Integrating tools and practices into formal policy**: A policy officer is formally tasked with coordinating the policy aspects of the entire enterprise: forum, field experimentation, coordination cell, training, and evaluation. The officer would work with the experimentation team to identify experts from across the formal and informal humanitarian system with the goals of 1) aligning data standards with the Common Operational Dataset; 2) ensuring that all solutions enable the construction of a common operational picture and facilitate more effective decision making; and 3) ensuring that training is enabling field staff to learn and extend these tools and practices to their own ends. This officer also works to integrate V&TCs into the funding cycles for appeals and build policy to allow for funding vehicles to reach small but high ROI efforts from V&TCs.

6. **Evaluating the results**: A consortium of academics, donors, beneficiaries, and members from the formal and informal humanitarian communities monitors the entire system and reports on areas of success and shortcoming. This consortium establishes a safe forum to discuss failures and the lessons that were learned from the initiative which failed at any stage of its development, from conception to deployment.

These six elements can be placed into a feedback loop, that shows how creating learning opportunities between V&TCs and the formal humanitarian community can lead to a virtuous circle, improving outcomes through all stages of the cycle:



PROBLEMS TO BE SOLVED

Based on research on the information management challenges in Haiti and on the current tensions between the international humanitarian system and the V&TCs, there are several categories of problems that should be tackled:

- Data Standards and Flows
- Workflows to Support Decisions
- Professionalization
- Experimentation
- Education and Training

Data Standards and Flows

Implementation of the Common Operational Dataset (COD).[12] There are three issues emerging from research on the COD: 1) How to ensure integration of information systems that the clusters and V&TCs are using with the various data standards specified in the COD; 2) How to establish which organizations maintain which data sets, including the specification of a set of tools, practices, and policies that allow for interoperable data flows within the cluster system; and 3) How to describe the specific data objects that are referenced within the COD. The third issue was problematic in Haiti.

> "…the common operation data set is something which is very important… but when the operational data set is not encompassing the WATSAN objects, how are you going to describe your water or how are you going to describe your pumps and how are you going to describe each and each of the features that you need to have to describe when you operate in WASH?" *–Former UNDP field worker*

Unstructured Data and Structured Data Feeds. Managing the flow of critical operational data elements by sharing unstructured data such as situation reports, slides, emails, and SMS messages leads to a number of problems, including information overload and difficulties in isolating trends. Critical data elements and indicators of the humanitarian situation can currently only be found if a human reads a document and types an attribute of interest into a database. Work on this problem should focus on characterizing data by location and thereby making them discoverable through maps, spreadsheets, and database reports.

APIs and Open Data Services. If the clusters are going to coordinate activity more effectively, they will all need to use published, open data schema to describe activities and assets in the field and to make the underlying data available within these schema using open application programming interfaces. These interfaces or APIs will enable field staff to subscribe to services that provide them with status information about WASH, Camp Management, Health, and other sectors for any given location, providing the basis for a shared picture of the problems and needs for any given place. Without an API and open data, the system will continue to struggle to pull together a common operational picture, and managers will continue to be frustrated with how little they know early in an operation.

> "As the Secretary-General said at a recent UN Global Pulse event: 'in order to answer problems of global scale, you need solutions that span the globe as well.' With an interconnected world, you'll see an ability to have volunteerism at a scale that didn't exist before. One of the things that Clay Shirky often says is that 'the only thing that scales to the number of people in the world is the number of people in the world.' There is now a chance to really build some strong scaling, open-source solutions." *–Chris Fabian, UNICEF*

Credit: OCHA/ Dan DeLorenzo

Simplified Early Assessments. As part of ongoing work to develop global standards for needs assessments[13], the top 100 indicators might be reduced to an even more lightweight set of simplified metrics for use by V&TCs during the first 72 hours of the response. These simple metrics could be collected by both informal and formal communities through all possible channels, including crowdsourcing. V&TCs might also explore the use of automated statistical methods to determine if the dynamics of the current crisis might match patterns from previous deployments.

Credit: Andrej Verity

Verification and Validation of Citizen-generated Information (Crowdsourcing): Some USAR teams found that the accuracy of information generated from crowdsourcing platforms was often low; sometimes less than a third turned out to be accurate. The tendency of citizens to exaggerate under extreme stress should not be underestimated, nor should the potential service that crowdsourcing will serve in future operations as citizens learn how to use social media. For this reason, humanitarian communities need to develop methods for the application of crowdsourcing, including verifying and validating information that has been generated by citizens within the affected area as well as by volunteers from around the world.

> "It can be used as a communications channel to give some sort of dialogue between three main actors—the humanizing community, the public authorities, and the population." *–Kurt Jean Charles, noula.ht*

Designing the Role of Field Troubleshooter. Five interviewees performed a critical role during the response: they walked tent to tent, asking cluster staff what their problems and gaps were, and then matched those information needs against resources. In some cases, troubleshooters outsourced the problems to networks of experts in Crisis Mappers or OpenStreetMap. In others, they asked reach-back teams from their own organizations to perform the work. In one case, the solution generated created a program which exists at IOM to this day. However, research revealed that the departure of these troubleshooters was very disruptive, sometimes putting a stop to positive dynamics that had only just started. There is a desire to explore how to formalize the role of troubleshooter, so that this function can foster cross-cluster information sharing and enable the gradual construction of a common operational picture.

> "To have a fixer wandering around the grasslands with a number of different vocabularies was incredibly valuable. Someone who could walk into a tent and ask: 'Tell me what it is that you can't do today.' I played this role in Haiti. When I went into the hospital, as a physician, I heard that they needed lactated ringers. So I called the hospital ship and got a pallet of what they needed. Having these informal fixers is cheap and easy. They can calm people down, help them see other points of view, get to the root of the problem, and fix it. There is no one who currently has this as an assigned task." *–Eric Rasmussen, MD MDM, InSTEDD*

Workflows

Fragmentation of Information Flows and Systems. Interviewees expressed strong worries about the fragmentation of crisis information management systems. In the field and headquarters, it was impossible to synthesize data from diverse workflows for each cluster and sub-cluster into a composite picture that facilitated decision making. That said, division of information into functional silos is not itself the root cause of the fragmentation problem. Rather, it is an expression of the dominant analytical methods of the present age, which divides complex problems into ever smaller parts, in the belief that validity of each well-crafted answer to small puzzles creates—like assembled bricks—a composite edifice of understanding of the whole. In crises, however, there is no mechanism to collate all the bricks into one place, and no information masons whose job it is to build a shared structure.[14] As more information flows through humanitarian operations, the success of the cluster system relies on its ability to synthesize the insights of each stakeholder into a composite view of a dynamic situation. It was a common theme that this process will derive from the application of simple, lightweight frameworks (described further below). Fragmentation is a design challenge of deep importance.

> "I'm a firm believer in the ability of the right technologies to enhance our decision making and information sharing abilities. That's sharing internally and also with affected populations about the situation and about priorities and so forth. That only, only ever works if a) they're simple enough, and b) that the processes to make them standardized and repeatable exist." *–Nigel Snoad, UNDAC*

Shared Situational Awareness: The aggregation of information from many stakeholders and information types (geospatial, news feeds, structured data feeds, email) is impossible without open data and APIs. However, once these elements are in place, it will be possible to pull data together into a composite information fusion that can be visualized in multiple ways. This fusion also opens another possibility: the analysis of patterns, trends, and problems based on lessons from previous emergencies. Among UN staff, there was a growing interest in exploring the creation of an information management cluster to perform this role, perhaps with an NGO-analogue to MapAction to perform visualization and analysis.

Credit: Nigel Snoad

> "There is a very good argument for an information management cluster or whatever it gets called. There has been an explosion of actors in that sphere in the last couple of years and I don't think it is realistic to expect a kind of lead dog to emerge from within that sector whom everybody in the sector will agree to be coordinated by. So I think the only way to coordinate is to have a cluster-like approach, for all its probable agonies." *–Nigel Woof, MapAction*

Microtasking with Audit and Task Tracking. This effort would explore the application of microtasking to outsourcing menial tasks that consume massive amounts of field staff time to offsite locations, where crowds could perform the work and send the results back to the field. Microtasking is a type of crowdsourcing that divides a large effort into discrete, small tasks that generally take only a few minutes each to complete. When spread over a large number of people—often dozens or even hundreds—the task can be completed with many microtasks moving in parallel. This process is akin to parallel supercomputing but using humans as processors. It is particularly suited to tasks like transcribing written contacts lists into spreadsheets, geolocating objects in a spreadsheet, and translating short items like SMS messages. The effort requires some degree of auditing to ensure that each task is accurately performed and some degree of tracking to ensure that no task is performed more times than is necessary to ensure accuracy.

> "Microtasking is a great way of addressing large volumes of information on short notice." *–Rob Munro, Mission 4636 and Stanford University*

> "We heard about people in the field who ended up staying up all night doing data entry, because they did not have back office support in their own organization and they did not have an agreement with someone else to do their work for them. It was incredibly frustrating to be at the other end, knowing that we could have helped. Why is someone staying up to 3AM in Port-au-Prince typing contact lists?" *–Mark Prutsalis, Sahana Foundation*

Closing the Decision-Data Cycle: The integration of data flows into UN decision making processes is itself a work in process. This effort would seek to better link the financial appeals cycle with information collection and analysis and would benefit from close cooperation between donors, V&TCs, and agencies with formal mandates under the IASC Needs Assessment Working Group. One type of success would be to connect all stakeholders into a common information flow: from donor to beneficiary and back.

> "It would be great to have some of the feedback loop closed where we could know where to funnel the information of the kinds of information that specific actors on the ground want."
> *–Jen Ziemke, CrisisMappers*

Professionalization

Humanitarian Principles and Code of Conduct: Interviewees expressed deep concern about ensuring that new players in the humanitarian space abide by humanitarian principles, particularly through the protection of information that contains details about specific individuals in the affected population (not to mention personally identifiable information about individual responders). One proposal is the development of a Code of Conduct governing the actions of members of the V&TCs. The formalization of this Code of Conduct is an area in which the UN and Red Cross can provide guidance.

De Tocqueville wrote, "In democratic countries, knowledge of how to combine is the mother of all other forms of knowledge; on its progress depends that of all the others." [15]

Capacity Building: One expectation that the formal humanitarian organizations have of new actors from the V&TCs is that they will conform to existing rules on contracting, accountability, and ethics. New actors must be reliable and consistent. That said, many in the V&TCs admitted that they are still developing their financial and governance structures to enable this reliability. Some are honest about the still uncertain dynamics by which they are able to generate a surge of volunteers. One area of work therefore needs to be building capacity in the V&TCs. It may be prudent to hold a gathering of contracting officers, financial officers, design, monitoring and evaluation (DM&E) staff, and information management officers (IMOs) to work with leaders from the V&TCs. This working group could educate V&TCs about what processes would make it easier to participate in the formal response. It would also help younger V&TCs to find alternative arrangements for funding, such as working underneath another trusted entity. The capacity building can also work in the other direction. Large institutions tend to be unable to adapt quickly to circumstances that are not in their plans and systems. It should be possible to harness the energy and speed of development in the humanitarian free and open source software (HFOSS) communities to create flexible, simple tools for the clusters at relatively low cost. Such work might occur in partnership with existing efforts, including work under UN Global Pulse and the UNICEF Innovation Unit.

"Using incoming social data for real time visualization and situational awareness is a culture shift for organizations like the Red Cross and FEMA. These tools not only allow us to anticipate needs better, they may also increase efficiency. For example, damage assessment is a time-consuming process in every response. We're now looking at ways we might hand over that responsibility to neighbors with digital cameras and SMS capability."
–Wendy Harman, American Red Cross

Service Level Agreements: In the past, establishing reliable, predictable services from V&TCs has taken the form of service level agreements between large institutions and organizations that rely on volunteers. While such agreements are already in place with NGOs, like MapAction, the application of service level agreements to private volunteer organizations needs further exploration.

"Sustaining a volunteer effort is extremely difficult. This was as big and bad a disaster as you could imagine. But beyond 2–3 weeks, most volunteers need to go back to their jobs, their spouses, and their kids. Sustainability was an issue. Partnership agreements that can guarantee support and service can help address this problem." *–Mark Prutsalis, Sahana Foundation*

It might best be used to guarantee reach back support for menial tasks that are best outsourced from fielded staff. It is important that any service level agreements specify some level of project management and tracking around what the V&TCs are doing.

Credit: Andrej Verity

"I think the key will be to make sure that a core group is enabled and empowered to pick up the slack when the emergency hits in terms of guaranteeing the service level response—almost like a service agreement. There would be a certain minimal level of response that the practitioners could draw on. I'm not talking about extensive contract documents here, but that there would be fairly clear understandings on both sides about what you could expect from both sides." *–Paul Currion*

Competition and Collaboration. In the V&TCs, competition has emerged as a disruptive dynamic. Communities that need each other's strengths are being force to compete for money in the donor pool, and some are finding the need to compete in areas of overlap or are being asked to tackle issues where other V&TCs are already working. Some competition is good; but coordination of effort needs to be put in place so that scarce resources are not wasted on work which is already complete or better done by other organizations.

Communicating with Disaster-Affected Communities. The Communicating with Disaster-Affected Communities network brings together leading relief, development, and media development agencies in a collaboration that recognizes information sharing as a key humanitarian deliverable. The network seeks to identify and promote best practice in communicating with disaster-affected populations, with a view to helping to save lives and reduce vulnerability. CDAC member agencies are collectively working to reach out to aid agencies to help them improve the way they communicate with affected populations. Members document examples of best practice, collect data from monitoring and evaluation exercises, and explore how new technology can improve information exchange. In response to select emergencies, CDAC member agencies work together in-country to improve communication with affected populations. In Haiti, CDAC was funded to provide a coordinated service to disseminate life-saving information. It operated as the "Communications Sub-Group" within the UN Cluster System. Its exploration of the value of new technology was limited; more work needs to be done in this field.

Education and Training

Training curriculum. Ensuring a common approach to IM problems in the field will require some method of training (and cross-training) field staff in the various data collection and analysis methods that various clusters and V&TCs use. OCHA already is having difficulty finding and hiring such field staff. Other personnel from organizations that are formally part of the international humanitarian system also should receive training in a common set of IM tasks specific to their work as well as in methods that V&TCs are developing to complement cluster-level IM workflows. Training for the informal community would provide volunteers and technologists with a history of humanitarian operations, including why certain policies about clusters, protection, and humanitarian principles have come into being. It would also ensure technology is in the hands of practitioners before the disaster.

"The humanitarian community has training in logistics, nutrition, water & sanitation, and security procedures. But it has not really developed a curriculum for information management and information & communication technology." *–Dennis King, U.S. Department of State Humanitarian Information Unit*

"These are tools that need to be in the hands of practitioners long before something like this happens. It's very hard when we know coming into something like Haiti that we should not really advocate dropping what you are doing and trying to learn a new tool. But at the same time, seeing that there are tools that can really do the job better, it is hard to know what is appropriate to inject as a new thing to the folks in the field versus how much do you need to stay out of the picture." *–David Bitner, Sahana Foundation*

Credit: Andrej Verity

Simulations and Complex Field Experiments: In music, though a performance is the "event", most of the real work happens in rehearsal; the performance is a process that flows from prior difficult conversations and serious play. Those who expect a practice session to go perfectly are not actually rehearsing; they are just running through a composition and therefore learning only a fraction of what is possible to discover. Musicians who engage in deep inquiry tend to experiment openly and try ideas that they initially dislike. Humanitarian operations lack these types of spaces, where practitioners from different backgrounds and affiliations can practice how information flows between organizations. There are currently few ways to explore how V&TCs can augment the capacities of larger institutions. Simulations can help with this process, but these events tend to incorporate evaluation into their rubrics; it is hard to try new ideas when one is being rated for one's competency. There must be a place to experiment and fail. There is also a need for a space where practitioners can explore new functionality that they have wanted to create but never get time to pursue. These spaces might well take the form of existing field experiments that were pioneered through the Strong Angel series.

> "The threats from these new technologies are what you would find with any new technology or new intervention. The biggest threat is not being open about failure and not being open about what works and what doesn't. A second threat is the siloing of work and the development of parallel systems to perform similar tasks in different verticals. Both of these problems can be addressed through open source technology, open communities and clear and honest communication, but is always a danger of falling into familiar patterns." *–Chris Fabian, UNICEF*

Finding Balance between Science and the Art of Humanitarianism. There is a tension in the humanitarian community on what should drive decision making: compelling narratives or trending numbers. Traditional views of the scientific method are largely predicated on a notion that one can only know what one can measure. As a result, a tendency to rely on hard data is deeply embedded in humanitarian practice, especially evidence-based assessments. That said, there is worry that in the numbers, there is a loss of focus on the people and the parts of humanitarian emergencies which cannot be measured. As Paul Currion put it,

> "I am a big fan of making decisions based on data. And I still am, but the problem is the more that you emphasize evidence as being the primary vector—the primary factor in your thinking—the less it becomes about the people and the more it becomes about the numbers." *–Paul Currion*

With the rise of powerful ways for affected communities to voice their stories, and with the advent of new tools to turn these stories into statistics, the balance between the two sides requires further exploration.

Identifying interface problems at each level of interconnection. While all stakeholders wish to change the realities for affected populations, the traditional humanitarian communities and V&TCs each have different visions for how this work should happen. One will tend to work as an enterprise: slowly towards consensus of many agencies. The other will progress with many experiments, most of which will fail before they reach the field. Efforts toward some synthesis must start by exploring the perspectives of all stakeholders, accounting for the ways that everyone from senior leaders to illiterate farmers will use information flows to make decisions. There may be multiple answers, which need not be reduced to lowest common denominators, but each explored in parallel and held in creative tension.

Credit: IRIN

Experimentation

The exploration of tangible collaborations across clusters. Humanitarians need to explore how integrated information systems could provide decision makers with a composite picture of the unfolding emergency. If information could flow across clusters and V&TCs, it might be possible to understand how to plan for mass movements of refugees as a collaborative endeavor, capturing the links between logistics, water, sanitation, health, and shelters and connecting to leaders in the affected population.

Credit: IRIN

Establishing a framework for performing field experiments. Mimicking the success of the work of InSTEDD's Innovation Labs and the plans for similar sites for UN Global Pulse, a working group would find ways to engage local actors from field offices in the identification of problems and development of solutions *in situ*. This endeavor would take developers out of the office and bring them into the field, where the challenges of austere conditions will drive them to adopt simplified solutions that work in real-world environments.

Simple, Lightweight Processes that Enable Learning in Real Time: Large institutions tend to be unable to adapt their processes in real time to meet the challenges of each unique disaster. Instead, big organizations try to develop comprehensive processes that cover most known contingencies. This approach may be accurate and low risk, but it is slow and sometimes cannot adapt to new dynamics that challenge the underlying assumptions of the processes. Humanitarians should work on developing design protocols that are aligned with systems that V&TCs are using, which tend to be relatively simple to implement, at least compared to most traditional technologies for coordination and electronic data exchange, and have comparatively lightweight requirements around data standards. Simpler is faster and more accurate in the chaos of the disaster; it is also more adaptable. That said, new methods around iterative learning would need to be adapted for larger organizations, which would entail working with significant cultural challenges.

SUMMARY

These design challenges are but a subset of the issues to be confronted by the community. The authors hope that they provide a useful starting point for discussions, and that they spark considerable debate. The organizational design for this ongoing dialogue is the subject of the next chapter.

06 ORGA

ORGANIZATIONAL DESIGN FOR AN INTERFACE

The development of an interface between the V&TCs and formal humanitarian system is a design problem that must be left to the stakeholders. This chapter provides a guide to one possible organization design for an interface that might enable V&TCs to complement and augment the operations of the international humanitarian system. It is simple, practical, and without assumption that large budgets are available (although it is clear that new investments are needed). The design is optimized to enable continuous dialogue about and innovation to yield improved communications and information management between all stakeholders: donors, beneficiaries, V&TCs, NGOs, and UN agencies.

Translating the six-element feedback loop from Chapter 5 into a practical system of V&TCs and humanitarian institutions requires a healthy dose of pragmatism. Interviewees said that an overstretched humanitarian staff wants to integrate new activities into a common workflow. They also indicated that this efficiency would be important for putting limited funding for coordination work to best use. This design of such a common workflow is the subject of this chapter.

The authors assumed that the most practical approach to this design challenge was to build off existing initiatives and to glue them together into a constellation of activities. The organizational design includes new elements only where necessary. It includes four elements:

1. Humanitarian Technology Forum
2. Humanitarian Innovation Lab
3. Humanitarian Information Coordination Cell (HICC)
4. Humanitarian Research and Training Consortium (HRTC)

Credit: Government of Colombia, Nigel Snoad, Andrej Verity

HUMANITARIAN TECHNOLOGY FORUM

The forum would be a neutral venue for surfacing shared problems between the VT&Cs and the international humanitarian communities, including member states whose work in humanitarian operations is expanding. Members would have space to review successes and failures and brainstorm possible solutions. Additionally, they could recommend further work on promising solutions by members of the Lab and the academic community under the Humanitarian Research and Training Consortium. Additionally, the Forum would function as the primary mechanism for dispute resolution between the communities, and would be a place for the discussion of the ethical and procedural issues that must remain in balance to pursue humanitarian ends.

The need for a neutral space

This concept of a 'neutral space' or 'holding environment' is a core design element of many best practices in dialogue and change management.[16] Work that crosses organizations and specializations requires a safe space where those with different belief structures around the work can safely raise issues and explore alternative mindsets. The space should facilitate face-to-face connections across organizational divides, enabling stakeholders to build relationships that are critical during field operations. This space should provide a forum for the discussion of how information management policy and ground truth interact. And it should be open to everyone from donors and beneficiaries to technologists at operational organizations and the agencies that contract with them.

> "It seems to me to be quite perfect that it's that kind of community based approach that could be a good way of getting discussion going. And the discussion is what creates the basis for trust and the trust creates the possibility of working together for practical projects." *–Paul Currion*

The Humanitarian Technology Forum would rely on this best-practice design as a starting point. A professional facilitator should moderate this neutral space. He or she could focus the communities on their common work and help various factions (which may not map neatly onto organizations) to find ways to acknowledge differences and adapt to changing situations. Facilitation should gradually be handed over to the community itself as it develops its own leaders.

The basic structure of this space would be the opposite of that found in most formal institutions: it would work by lightweight, largely informal processes—only as many rules as necessary to ensure focus on the work of bridging the communities and building common tools, practices, and policies. The internet engineering task force might be one model. The bylaws of the forum would contain clauses that enable the members to develop their organizational designs and processes to meet changing requirements, and ensure that the forum remains focused on what is simple and practical.

The Humanitarian Technology Forum should function as one of the primary means to engage in conflict resolution between the international humanitarian community and V&TCs. Through open dialogue, discussions could analyze the root causes of information management challenges, while also making all parties aware of opportunities opened by new tools and practices.

The forum would also explore shared requirements and facilitate agreement on data standards and APIs. Through exploration of common technical problems, the Forum could agree to forward applied research questions to the Humanitarian Innovation Lab.

Meetings

The forum should be hosted at a neutral physical space and facilitated by moderators skilled in dialogue across organizations and cultures. The forum would

hold an open face-to-face meeting once per quarter, focused on bringing together key stakeholders to discuss agenda items that the group sets in its yearly plan. The meetings would also enable members of the forum to add problems to its agenda based on the unfolding process of discovery. It would also hold a larger annual meeting, the goal of which would be to set an agenda for the year and to share lessons learned from responses both large and small.

Membership

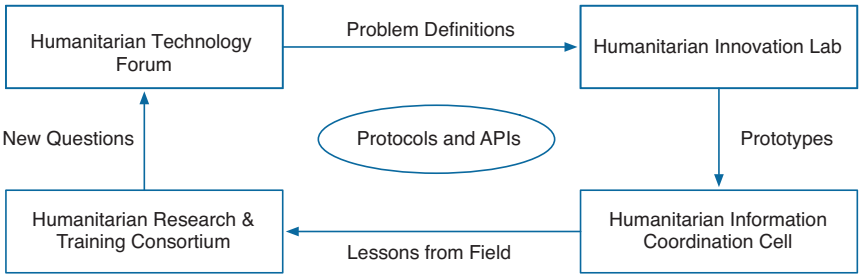
Like the Crisis Mappers Network, the forum would include practitioners and academics in crisis information management, including members of the IASC Information Management Task Force. It would also include donors, senior managers, and members of civil society who have participated in a leadership role in previous and ongoing emergencies. By inviting representatives from member states that received humanitarian assistance, the forum could harness lessons learned and focus on approaches that build the capacity of disaster-affected communities. The forum itself will decide the mechanism for ensuring inclusive membership while also keeping the size of the conversation manageable. The forum might request to elect a member to represent it at the IASC Information Management Task Force meetings as an observer.

To build the capacity for in-house facilitation, the forum should enlist the aid of critical individuals in the social networks of the international humanitarian system and V&TCs—the so-called supernodes identified by many of the interviewed respondents, including Nigel Snoad, Paul Currion, and Patrick Meier. It should also leverage connections to major communities of practice, including Crisis Mappers, OCHA, and Crisis Commons, though it should maintain an existence separate from these institutions, which have a different focus. The Humanitarian Technology Forum is first and foremost a neutral space between V&TCs and the international humanitarian system; it cannot serve that role if it is itself merged with an existing V&TC.

Budget

The forum's budget would include paying facilitators to establish a safe holding environment and to assist the community with any major conflicts. This could be treated as a start-up cost which would eventually disappear. The budget would also include some amount to enable an annual a meeting of 100–150 people and quarterly meetings of 20–30 people, with at least some travel funds for small V&TCs who have little budget for these trips.

DRAFT FRAMEWORK



HUMANITARIAN INNOVATION LAB

Cross-organizational experimentation plays a critical role in the advancement of tools, practices, and policies. Most institutions design new information systems based on internal requirements. As a result, they optimize solutions to their own agendas, leaving little budget or staff time for the larger problem of coordination. As expectations for coordinated action among clusters and V&TCs increases, each organization will need develop methods to open its data to partners. There are very few venues for organizations to explore how to increase their openness to outsiders and make their systems both permeable and interoperable. The Humanitarian Innovation Lab would be way to provide this space.

The lab would find ways to connect data to specific decision making cycles. It would take recommendations from the Humanitarian Technology Forum, Humanitarian Information Coordination Cell, and the Humanitarian Research & Training Consortium, exploring possible solutions to gaps in crisis information management. Its especial focus would be the bridge between the V&TCs and the formal humanitarian systems. To that end, the lab would use open standards and would be biased towards open source software (though the lab would work with the vendor community to foster the use of service-oriented architectures with open APIs so as to integrate proprietary systems currently in use in the field). The lab would explore how to apply the data schema in the Common Operational Dataset to specific objects in the field, for instance, developing specific semantics to describe water bladders, sup-

Credit: IRIN

plies, and other objects that have not already been so characterized, building on existing work by the Logistics, Health, and Camp Management clusters. It would also explore how to integrate information gleaned from crowdsourcing applications into the coordination of response operations. One example would be how to integrate local leaders into on- and off-line discussions during an emergency operation.

Credit:Andrej Verity

Design

Taking advantage of best practices for these innovation labs, the Humanitarian Innovation Lab would exist half-inside and half-outside the UN. After exploring the possibility that the lab might exist as a virtual organization, interviewees strongly recommended that the lab bring together developers into a physical space.

> "You cannot innovate at velocity to create useful humanitarian tools without interpersonal contact—trust building; sitting together; spontaneously drawing things, erasing, and redrawing. Brainstorming over coffee, grumbling over a beer, breaking things together and fixing them together. You need a space for a passionate, dynamic, multi-disciplinary in-house team to gather requirements (by hosting people who come to visit and tell it like it is); to do rapid prototyping; to try things out in the field, fail utterly but instructively, and then try again."
> *–Robert Kirkpatrick, UN Global Pulse*

The lab would require physical space, where an initial staff might draw together UN and NGO staff with independent contractors from V&TCs to work out proper design before evolving the lab into a more formal UN entity. It might also explore partnerships with NGOs that focus on cross-organizational technology issues, such as NetHope. This initial pilot would be sufficient to support 1–2 coordinators to get the lab off the ground. At scale, the lab may model UN Global Pulse, which has about a dozen staff. Its other 'staff' would be personnel who are seconded from other agencies, NGOs, and V&TCs for the purpose of working on problems identified by the Humanitarian Technology Forum and Humanitarian Research & Training Consortium. The staff—who might be called 'fellows' to parallel the academic concept of an individual involved in a time-limited research project—might also include members of the coordination cell who wish to collaborate on improving tools and methods from the field. The team would be consciously built from a small core of professionals from various skill sets: business analysis, information management, database design, and standards building.

To ensure that policy and ethical questions are addressed within the initial designs of the project, OCHA would augment its policy staff and provide an officer whose role is to ensure full respect for and adherence to humanitarian principles and to work them into the design of solutions built in the labs. This would ensure that humanitarian principles are baked into the design of prototypes—embedded in the code itself.

The lab would need a physical office, with meeting spaces to convene developers to discuss hard problems in the humanitarian space. Following the lead of UN Global Pulse and the InSTEDD Innovation Labs, much of the time, staff would also travel to regional and field offices with personnel who are closest to problems in the field.

UN Global Pulse would like to partner with the Humanitarian Innovation Lab. It may well be possible to develop additional partnerships with the World Bank Global Fund for Disaster Risk Reduction Labs and the UNICEF Innovation Unit to share costs and build network effects around the people working on shared problems.

> In any community of practice you have a core group, which does a lot of the work. And I'm talking about this in terms of discussion. I think the key will be to make sure that core group is enabled and empowered to pick up the slack when the emergency hits in terms of guaranteeing the service level response—almost like a service agreement. *–Paul Currion*

Credit: UN Photo/Sophia Paris

Budget

The start-up budget would support 1–2 full-time employees (FTEs) who would build a network of open-source developers around the initiative and piggyback with other innovation labs at the UN, including the Global Pulse and UNICEF teams. This small team would grow to around a dozen FTEs, many of whom may be seconded from their respective organizations. The budget would include travel funds for core developers who volunteer their time and/or are seconded from their own organizations to work from field offices in the developing world. The lab might eventually curate an investment fund to commission software from the developed and developing world, preferably using best-practice models for investing in small-to-medium sized businesses.[17]

Processes

The Lab would craft and advance tools, practices, and policies enable all stakeholders to humanitarian emergencies—beneficiaries, donors, member states, innovators, and operational organizations—to make better decisions on partial data, and to manage the handoff of data from preparatory work to responders and then to steward data from responders to development agencies.

It would provide a safe place for experimentation, where stakeholders from across the V&TCs and international humanitarian community could explore common problems and devise solutions based on the best available solutions. Where necessary, the lab would explore the development of new applications from scratch. The development process would be oriented around inclusive, participatory analysis of problems and collaborative approaches to innovation. The lab would convene thought leaders from various technology projects (public and private) and seek ways to connect their tools together like legos. The lab might also explore open innovation models that incorporate the power of crowds to contribute to collective solutions. The lab would foster an ethos of iterative learning, where experimentation leads to attempts, which may fail but which reveal some new element of insight into the problem.

Creating this safe space for creative failure and creative destruction requires certain protections from the demands of performance metrics that are typical in a large organization. Innovators have to be free to fail. It should be emphasized to management that success in this context is in the quality of the thinking. That is, success is not in the number of fielded ideas generated by a process, but how the learning from problem solving changes the approach to problems themselves. It should be noted that the strength of the relationships created across clusters and V&TCs is another measure of success, as these relationships will be the pathways by which solutions flow during crisis response operations.

As part of this work, the lab would also work closely with the following entities:

- The IASC Standing Task Force on Information Management and cluster system for humanitarian coordination.
- OCHA ISS for data standards, common operational dataset, and field practices.
- Connection into the proposed UN Center of Excellence on Spatial Data Infrastructure (COE on SDI).
- UN CITO efforts on crisis information management (CIM).

- UN Global Pulse for innovation labs and collective intelligence.

- World Bank Global Fund for Disaster Risk Reduction Labs.

HUMANITARIAN INFORMATION COORDINATION CELL (HICC)

Multiple veterans of field operations called for the creation of some organization that would be responsible for building a composite picture of response operations. Many had hopes for a simpler version of the Humanitarian Information Centre (HIC), which deploys to major emergencies to augment information management processes. While some interviewees called for a new NGO, some looked toward extensions of existing volunteer entities, like the deployment of trained V&TC field operators under the Crisis Mappers Standby Task Force (SBTF). What was clear is that some entity would need to provide reliable and consistent services under a service level agreement to troubleshoot issues that clusters and NGOs are experiencing in the field around data collection, visualization, and analysis (as well as other IM challenges).

Design

One suggested entity would be an NGO, whose mission is to deploy under OCHA to support the fusion of information into a common operational picture. It would contract with V&TC organizations like the Crisis Mappers Standby Task Force to deploy coordination cells under the OCHA team and provide services at reach-back locations in countries of convenience to all parties (likely NYC or Geneva).

This new coordination cell would augment the former role of the HIC and focus on creating information management services that stitch fragmented information systems into a composite picture of the operations. It would operate under a mandate from OCHA to deploy to large or complex emergencies (or both) to become problem solvers, helping cluster staff collect, characterize, analyze, and visualize data so that decision makers have a full picture of the operation.

Staff

The team on the coordination cell would draw together specialties in information management, including GIS analysis, needs assessments, database management, data schema, data transformation, SMS-based crowdsourcing, communications, and information design. Members might be drawn from each cluster's area of specialty, especially during complex emergencies. Physicians with experience in informatics would be particularly valuable, as they tend to understand how information impacts critical decisions in public health as well as the overall administration of the response. The staff would likely also be drawn from entities like MapAction, IMMAP, and the Crisis Mappers Standby Task Force.

Budget

The budget would be similar to MapAction: under a memorandum of understanding, donors to UN agencies and private sector groups would be invited to fund deployments of small teams to major crises. The entity would work between crises developing and testing tools with the Humanitarian Labs.

Credit: OCHA/Akiko Harayama

Processes

The staff would play the critical role of fixer: a team of information management experts who can assist clusters in understanding data faster and more accurately than current methods allow. They would evangelize and train field staff and V&TCs on use of the common operational dataset. The entity would deploy under some kind of service level agreements that enable the organization to grow into the hectic tempo of humanitarian emergencies. The team would also field test prototypes and solutions from the lab, determining the maturity of the solution for deployment to the field.

HUMANITARIAN RESEARCH & TRAINING CONSORTIUM (HRTC)

There is a need for neutral, scientific evaluation of tools, practices, measurement of impact and policies in humanitarian information management, as well as for training of current and future humanitarians in best practices in information management. Academia is the natural home for this activity. The Humanitarian Research and Training Consortium would be a network of educational institutions around the world with commitments to various forms of humanitarian education that enter into partnership to offer several types of training and M&E:

- Funded by grants to provide training to V&TCs in humanitarian principles, field practices, cluster system integration.

- Funded by grants to provide retreats to formal and informal humanitarian field staff to reflect on recent operations and integrate lessons learned into practices for information management and decision support.

- Funded by grants to staff from UN agencies and NGOs to learn how to integrate new tools and practices from the V&TCs into humanitarian operations, including training in basic geospatial analysis and crowdsourcing. This would be the equivalent of translational research from medicine, which explores how to bring new drugs from the laboratory bench to the bedside.

Design

A consortium of universities and programs would be linked together across continents to align research and training programs to current problems, not only in information management, but also across the spectrum of issues in humanitarian affairs. This consortium would be coordinated by a council convened under the Humanitarian Forum. As with most academic consortia, it would not seek to create a centralized authority structure; instead, it would use a collegial mechanism for aligning efforts and ensuring common standards. It would be prudent to leave the design of this mechanism to discussions between specific institutions, each of which will bring its own traditions to the dialogue.

Credit: UNICEF/Marco Dormino

Staff

Partners at educational institutions would manage the consortium on behalf of OCHA, liaising with staff at the Humanitarian Labs and the coordination cell. In the initial stages, the Humanitarian Studies Initiative (HSI) might convene the core partnership, tying together Tufts University, Harvard University, and MIT with other partners in Europe, Africa, Asia, and the Americas. HSI

has already been performing research and training in humanitarian operations for several years, primarily centered on public health. It would need to work with partners to expand to a global scale and to ensure transition to a larger consortium of equals. A core focus should be on recruiting institutions from the developing world to take leadership roles in the consortium, harnessing the thematic and regional expertise that they bring to the dialogue.

Processes

The Consortium would engage in several areas of activity:

1. **Research:** exploration of problems in information management, crisis pattern identification, impact assessment, verification and validation of citizen-generated data, organizational designs of crisis operations, and other issues as determined by innovative minds and discussions in the Humanitarian Forum.

2. **Training:** training and certification to V&TCs in the methods of the formal humanitarian community, in technology and information management, and in the innovative methods for supporting decision making to all-comers.

3. **Monitoring and Evaluation:** reporting on the lessons learned from the application of new techniques in information management. One key area of focus would be on ideas generated by the Humanitarian Forum, developed by the Humanitarian Innovation Lab, and deployed by the Humanitarian Information Coordination Cell.

4. **Convening Humanitarian Technology Forum.** The consortium would provide the convening space for a neutral forum with alternative sites around the world to foster inclusion of humanitarians from across the globe.

Credit: UNICEF/Marco Dormino

07 DIALO

DIALOGUE

The purpose of this document is not to set forth the final word on how to connect new information flows into the international humanitarian system; but to initiate a conversation about the design challenges involved with this endeavor. Getting beyond the fog of information will take political commitment, time, and diligent effort. Technologists will need to connect information flows from their organizations into the Semantic Web. Policy makers will need to determine what information is safe to release to the global public and under what conditions. And V&TCs will need to discover how to best integrate new thinking into existing international systems.

There are many open questions that emerge in a world where V&TCs and affected populations are active stakeholders in the cluster system. What tools and practices will be needed when clusters can exchange data on their operations, and coordinate their field activities with hundreds of organizations in other clusters? What happens when all data collected from surveys can be linked with other data in the operation, enabling everyone to see the relationships between an indicator for cholera and the status of medical supplies to treat this disease?

In this future, there might be more time for field staff to focus on comparing past and present—to find patterns from previous operations repeating themselves, and to catch the dynamic sufficiently early to take proactive steps to mitigate disease outbreaks, medical supply stock outs, and predictive logistics around where IDPs are just starting to congregate. Working with patterns and trends will raise new technical and organizational challenges. What evidence constitutes a pattern, and when does one know when a pattern is occurring the chaos of a sudden onset emergency? When does this pattern trigger administrative actions, including requests for funding? It is our hope that these questions will be solved in the near future.

Credit: FAO/Truls Brekke, MapAction, Ushahidi/Jonathan Shuler

OGUE

If this dynamic is going to work, it will happen when stakeholders come together and perform a critical task: engaging in active listening. Interviews for this report revealed that the longer a person tends to be in humanitarian operations, the greater an awareness of the complexity of the problem. Often, the awareness generates a practical sense of humility about what any individual can do or know, as well as comfort in leaning into discomfort that divergent views may expose. This wisdom, humility, and willingness to listen and engage in difficult conversations will be the keys to success in the dialogues that follow.

Credit: OCHA/Akiko Harayama

ANNEX 1: GLOSSARY OF TERMS

BACK END SYSTEM	The information systems that are used to manage core processes in an enterprise, including logistics, finances, human resources, procurement, and other data sets that are critical to operations.
BROADBAND GLOBAL AREA NETWORK (BGAN)	Mobile communications service that provides both voice and broadband data simultaneously through a single, compact device on a global basis.
CLOUD	Cloud computing describes computation, software, data access, and storage services that do not require end-user knowledge of the physical location and configuration of the system that delivers the services.
DISASTER SPACE CHARTER	A unified system of space data acquisition and delivery to those affected by natural or man-made disasters.
DE JURE	An expression that means “concerning law,” as contrasted with de facto, which means “concerning fact.” The terms de jure and de facto are used instead of “in principle” and “in practice,” respectively, when one is describing political or legal situations.
GEOLOCATE	A verb meaning to position a point at a specific latitude and longitude.
HUMANITARIAN DATA MODEL (HDM)	Model that seeks to reconcile schemas from humanitarian response agencies. When possible, it matches humanitarian attributes to existing map features in OpenStreetMap.
HUMANITARIAN STUDIES INITIATIVE (HSI)	The umbrella educational program led by Harvard Humanitarian Initiative, including the Humanitarian Studies Course (HSC) and Humanitarian Studies in the Field. Educational content includes seminar series in essential crisis management and field simulation exercises.
HUMANITARIAN PRINCIPLES	The core set of beliefs of the humanitarian community that govern the way humanitarian operations are carried out including humanity, impartiality, operational independence, and neutrality. OCHA On Message: Humanitairan Principles states: “Humanitarian principles provide the fundamental foundations for humanitarian action. Humanitarian principles are central to establishing and maintaining access to affected populations whether in the context of a natural disaster, an armed conflict or a complex emergency. Promoting compliance with humanitarian principles in humanitarian response is an essential element of effective humanitarian coordination.” (ochaonline.un.org/OchaLinkClick.aspx?link=ocha&docId=1164797)

Key documents that establish humanitarian principles are the Code of Conduct for the International Red Cross and Red Crescent Movement and NGOs in Disaster Relief (http://www.icrc.org/eng/resources/documents/misc/code-of-conduct-290296.htm) and the United Nations General Assembly Resolution 46/182. (http://www.un.org/documents/ga/res/47/a47r168.htm)	
Open source projects allow anyone to download and install a copy of their software and to run it on compatible computers or servers. Each copy running on the Web is called an instance.	INSTANCE (SOFTWARE)
A web page or application that uses and combines data, presentation or functionality from two or more sources to create new services.	MASHUP
An online microtasking/crowdsourcing marketplace. See: http://en.wikipedia.org/wiki/Amazon_Mechanical_Turk	MECHANICAL TURK
Microtasking is a strategy for ensuring quality control and high throughputs for large amounts of data that is most commonly used for quick, scalable processing of unstructured data. Workers or volunteers undertake tasks that are broken down into small assignments called microtasks that are given to multiple workers in parallel. Most microtasking platforms are primarily statistical systems, using a variety of analytics to track inter-worker-reliability and the appropriately distribution of tasks to multiple workers to ensure quality outputs and timely throughput.	MICRO-TASKING
Mission 4636 is a partnership between Samasource, 1000 Jobs Haiti, FATEM, Union Haiti, Stanford, Energy for Opportunity, CrowdFlower, SEIU, The Crisis Mappers Network, Ushahidi, FrontlineSMS, Thompson-Reuters Foundation, InSTEDD, The US State Department, Microsoft Research, Digicel, Voila, and a dozen more Haitian NGOs. It was affiliated with Internews and the Communicating with Disaster Affected Communities initiative.	MISSION 4636
Collaborative inter-agency website designed to enhance humanitarian coordination within the cluster approach, and support the predictable exchange of information in emergencies at the country level.	ONERESPONSE
A norm for technical systems derived by an open process and published in an open format, usually royalty free. The World Wide Web consortium includes a set of principles which may resonate with the humanitarian community (from Wikipedia):	OPEN STANDARDS

- transparency (due process is public, and all technical discussions, meeting minutes, are archived and can be referenced in decision making)
- relevance (new standardization is started upon due analysis of the market needs, including requirements phase, e.g. accessibility, multilinguism)
- openness (anybody can participate, and everybody does: industry, individual, public, government bodies, academia, on a worldwide scale)

- impartiality and consensus (guaranteed fairness by the process and the neutral hosting of the W3C organization, with equal weight for each participant)
- availability (free access to the standard text, both during development and at final stage, translations, and clear IPR rules for implementation, allowing open source development in the case of Internet/Web technologies)
- maintenance (ongoing process for testing, errata, revision, permanent access) See http://en.wikipedia.org/wiki/Open_standard.

A military term referring to the placement of resources, capabilities, and expertise at a physical distance from an area of interest, supporting the people who are there performing their tasks.	REACH BACK
Special telephone numbers, significantly shorter than full telephone numbers, which can be used to address SMS and MMS messages from mobile phones or fixed phones. There are two types of short codes: dialing and messaging.	SHORTCODE
The text communication service component of phone, web or mobile communication systems, using standardized communications protocols that allow the exchange of short text messages between fixed line or mobile phone devices.	SHORT MESSAGE SERVICE (SMS)
A series of civil-military demonstrations that show methods for civilian and military agencies around the world to work effectively together within a disaster response.	STRONG ANGEL
Individuals who are highly connected in the small world of humanitarian operations. They are hubs who play a crucial role routing information, bridging organizational boundaries, and healing broken connections when staff rotate from one role to the next.	SUPERNODES
An effort to convene the many stakeholders to crisis response operations and to "harmonize the use of tools and systems to produce, disseminate and archive information in a manner that can be scaled up or rapidly focused to deal with any type of crisis." See http://ict4peace.org/what-wedo/the-crisis-information-management-strategy.	UN CRISIS INFORMATION MANAGEMENT STRATEGY (UN CIM)
Eleven groups of UN agencies, NGOs and other international organizations arranged based on a sector or service they provide during a humanitarian crisis: Protection, Camp Coordination and Management, Water Sanitation and Hygiene, Health, Emergency Shelter, Nutrition, Emergency Telecommunications, Logistics, Early Recovery, Education	UN CLUSTER SYSTEM

and Agriculture. Each cluster is led by a designated agency. The system was established by the UN IASC in 2005.	
Combining outsourcing with upgrading	UPSOURCING
An internet site that collects information from diverse sources, then displays it in a unified way. Also known as a links page.	WEB PORTAL
A software system designed to support interoperable machine-to-machine interaction over a network.	WEB SERVICES
A website that allows the creation and editing of any number of interlinked web pages via a web browser using a simplified markup language or text editor.	WIKI

ANNEX 2: ACRONYMS

Mobile communications service that provides both voice and broadband data simultaneously through a single, compact device on a global basis.	BROADBAND GLOBAL AREA NETWORK (BGAN)
A coordination mechanism facilitated by UN OCHA to plan, implement and monitor humanitarian activities. Includes preparation of coordinated appeals for funding from the international community and donors when a humanitarian crisis response requires international response from more than one organization.	CONSOLIDATED APPEALS PROCESS (CAP)
Crisis Information Management	CIM
A predictable, core sets of data needed to support operations and decision making for all actors in a humanitarian response.	COMMON OPERATIONAL DATASET (COD)
A system adopted by the UN to simplify the means by which countries are reimbursed for providing equipment, personnel and self-sustainment support services to formed military or police contingents in peacekeeping missions.	CONTINGENT OWNED EQUIPMENT (COE)
Design, Monitoring and Evaluation	DM&E
Delta State University in Mississippi	DSUM
Thomson-Reuters Foundation Emergency Information Service – deploys expert Action-Units of journalists to scenes of major catastrophe where they seek out, collate and disseminate information to disaster-struck populations.	EMERGENCY INFORMATION SERVICE (EIS)
A high level position in the United Nations that heads the Office for the Coordination of Humanitarian Affairs. The ERC serves as the UN Under Secretary-General for Humanitarian Affairs.	EMERGENCY RELIEF COORDINATOR (ERC)
European Union	EU
First assessment system toolset for the first 72 hours.	FAST72

Full time equivalent	FTE
A partnership of 36 countries and 6 international organizations committed to helping developing countries reduce their vulnerability to natural hazards and adapt to climate change.	GLOBAL FACILITY FOR DISASTER REDUCTION AND RECOVERY (GFDRR)
Geographic information system	GIS
Global positioning system	GPS
Model that seeks to reconcile schemas from humanitarian response agencies. When possible, it matches humanitarian attributes to existing map features in OpenStreetMap	HUMANITARIAN DATA MODEL (HDM)
Humanitarian Free Open Source Software: a collaborative, community-building project started by computing faculty and open source proponents at Trinity College, Wesleyan University, and Connecticut College.	HFOSS
Harvard Humanitarian Initiative – interdisciplinary academic and research center that works to relieve human suffering in war and disaster by advancing the science and practice of humanitarian response.	HHI
Humanitarian Information Coordination Cell	HICC
Humanitarian Studies Initiative – the umbrella educational program led by Harvard Humanitarian Initiative, including the Humanitarian Studies Course (HSC) and Humanitarian Studies in the Field. Educational content includes seminar series in essential crisis management and field simulation exercises.	HIS
Humanitarian Research & Training Consortium	HRTC
Committee that aims to improve coordination of humanitarian assistance through its membership, which includes both UN and non-UN humanitarian partners.	INTER-AGENCY STANDING COMMITTEE (IASC)
Information Communication Technology	ICT
A foundation that aims to enhance the performance of the international community in crisis management through the use of ICTs.	INFORMATION COMMUNICATION TECHNOLOGY FOR PEACE (ICT4PEACE)
Internally displaced person	IDP
International humanitarian systems	IHS
Nairobi's Innovation Hub for the technology community is an open space for the technologists, investors, tech companies and hackers in the area. This space is a tech community facility with a focus on young entrepreneurs, web and mobile phone programmers, designers and researchers. It is part open community workspace, part vector for investors and VCs and part incubator.	INNOVATION HUB (IHUB)

Information management	IM
Humanitarian organization that for more than a decade has worked on the effective use of information management practices and principles in service to the world's most vulnerable populations.	INFORMATION MANAGEMENT & MINE ACTION PROGRAMS (IMMAP)
Information management officer	IMO
A non-profit organization focused on bottom up design and development of tools and services for social good.	INNOVATIVE SUPPORT TO EMERGENCIES DISEASES AND DISASTERS (INSTEDD)
Monitoring & evaluation	M&E
United Nations Stabilization Mission in Haiti	MINUSTAH
Memorandum of Understanding	MOU
A legally constituted group that operates independently from any government. They generally pursue social goals, but are not overtly political. They are sometimes referred to as civil society organizations.	NON-GOVERNMENTAL ORGANIZATION (NGO)
New York University Tisch School of the Arts Interactive Telecommunications Program	NYU ITP
OCHA is the arm of the UN Secretariat that is responsible for bringing together humanitarian actors to ensure coherent response to emergencies. OCHA's mission is to mobilize and coordinate effective and principled humanitarian action in partnership with national and international actors in order to alleviate human suffering in disasters and emergencies; advocate for the rights of people in need; promote preparedness and prevention; and facilitate sustainable solutions.	UNITED NATIONS OFFICE FOR THE COORDINATION OF HUMANITARIAN AFFAIRS (OCHA)
OCHA Information Services Section	OCHA ISS
Community of hundreds of thousands of mappers dedicated to building a free and open map of the world.	OPENSTREETMAP (OSM)
Rochester Institute of Technology	RIT
Return on investment	ROI
An online volunteer-based community that turns ad hoc groups of tech-savvy mapping volunteers that emerge around crises into a flexible, trained and prepared network ready to deploy. Represents the first wave in Online Community Emergency Response Teams, first launched at the 2010 International Conference on Crisis Mapping (ICCM 2010) to streamline online volunteer support for crisis mapping following lessons learned in Haiti, Chile and Pakistan.	STANDBY TASK FORCE (SBTF)
Spatial data infrastructure	SDI

San Diego State University	SDSU
A labor union in the United States, focused on organizing workers in health care, public services, and property services.	SERVICE EMPLOYEES INTERNATIONAL UNION (SEIU)
Service level agreement	SLA
Small and medium enterprise	SME
The text communication service component of phone, web or mobile communication systems, using standardized communications protocols that allow the exchange of short text messages between fixed line or mobile phone devices.	SHORT MESSAGE SERVICE (SMS)
United Nations Chief Information Technology Officer	UN CITO
A stand-by team of disaster management professionals who are nominated and funded by member governments, OCHA, United Nations Development Program and operational humanitarian United Nations Agencies such as WFP, UNICEF and WHO.	UNITED NATIONS DISASTER ASSESSMENT AND COORDINATION TEAM (UNDAC)
Organization that links the UN's work with others around the world, mobilizing the energy and expertise of business and non-governmental organizations to help the UN tackle issues including climate change, children's health, peace and security, and poverty eradication.	UNITED NATIONS FOUNDATION (UNF)
UN High Commission for Refugees	UNHCR
The United Nations Children's Fund	UNICEF
An autonomous body within the UN system with the purpose of enhancing the effectiveness of the UN through appropriate training and research.	UNITED NATIONS INSTITUTE FOR TRAINING AND RESEARCH (UNITAR)
A UN technology-intensive program that delivers imagery analysis and satellite solutions to relief and development organizations within and outside the UN system to help make a difference in humanitarian relief, human security, strategic territorial and development planning.	UNITED NATIONS OPERATIONAL SATELLITE APPLICATIONS PROGRAM (UNOSAT)
Urban search and rescue	USAR
Volunteer and Technical Communities	V&TC
OCHA supported website that facilitates decision making for international response to major disasters though real-time information exchange by all actors of the international disaster response community.	VIRTUAL ON-SITE OPERATIONS COORDINATION CENTRE (VIRTUAL OSOCC)
Water, sanitation, and hygiene	WASH
The UN's frontline hunger relief agency, WFP aims to bring food assistance to more than 90 million people in 73 countries in 2011.	WORLD FOOD PROGRAM (WFP)

FOOTNOTES

[1] Tim Berners-Lee, Testimony of Sir Timothy Berners-Lee, CSAIL Decentralized Information Group Massachusetts Institute of Technology, Before the United States House of Representatives Committee on Energy and Commerce Subcommittee on Telecommunications and the Internet Hearing on the "Digital Future of the United States: Part I – The Future of the World Wide Web", http://dig.csail.mit.edu/2007/03/01-ushouse-future-of-the-web.html.

[2] Ibid.

[3] Paul Currion, "New Lamps for Old: The Role of Information Management in Humanitarian Assistance," The Newletter of the International Council of Voluntary Agencies 3–1 (28 February 2001): http://www.icva.ch/doc00000267.html#opinion.

[4] Data dictionaries act like thesaurus around one concept. For instance, if WHO is referring to a particular region of a river in a cholera report, it is not possible for WFP and the water/sanitation cluster to automatically relate their own data to that region. Any analysis would be the responsibility of a human to collect, analyze, and report on any possible interlinkages manually. Automated discovery or early prediction of action (such as a cholera outbreak automatically triggering an analysis of medical supply chains and water purifiers to the affected region) would be highly unlikely. Such data would need to be pulled by a coordinator who understands the complex interdependencies of a cholera response operation.

[5] For example, the schema in the WASH cluster lack a means to specify a water bladder of x type has been placed in an IDP camp with y P-Code with at a specific latitude/longitude with z capacity. Without this level of specificity—including location-aware attributes for integration into GIS applications—the common operational dataset will be hard to implement in way that facilitates breakdown of data silos.

[6] Under UN humanitarian principles, datasets with personally identifiable information about refugees and internally displaced persons require special protections so that no harm comes to the people about whom the UN has data.

[7] Political sensitivities are sufficiently high that the authors of this document chose to leave out quotes from these interviews.

[8] Crowdsourcing Crisis Information in Disaster-Affected Haiti, Jessica Heinzelman and Carol Waters, US Institute of Peace, Sept 2010.

[9] For more on software code as a form of modern law, see Code by Lawrence Lessig.

[10] ICT4Peace Foundation document from Palisades meeting and Crisis Mappers document.

[11] See Peter Senge, The Fifth Discipline; Ronald Heifetz et al, The Art and Practice of Adaptive Leadership; Otto Scharmer, Theory U; John Sterman, Business Dynamics (which takes a quantitative approach to systems thinking as applied to business processes).

[12] The Common Operational Datasets (COD's) are predictable, core sets of data needed to support operations and decision-making for all actors in a humanitarian response. The COD's are defined in the IASC Guidelines Common Operational Datasets (CODs) in Disaster Preparedness and Response, Endorsed Nov 2010 http://bit.ly/eigMGI.

[13] IASC Needs Assessment Task Force (draft) IASC Operational Guidance for Coordinated Assessments in Humanitarian Crises, and Key Sectoral Indicators http://oneresponse.info/resources/NeedsAssessment/Pages/Indicators%20and%20Guidance.aspx

[14] See P. Senge, The Fifth Discipline, opening of Chapter 1.

[15] A. De Tocqueville, Democracy in America, Volume II, Book Two, Chapter V.

[16] Cf. The Practice of Adaptive Leadership from Ronald Heifetz taught at Harvard for 25 years and The U Process from Otto Scharmer and applied by Peter Senge, which has been in use for nearly as long.

[17] Although on another order of magnitude, the 'KfW' framework used by Germany to manage Marshall Plan funds over the past six decades and reinvest those funds in small-to-medium-sized businesses might be a good thought exercise to ensure feedback loops will lead to continual reinvestment.


222
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