STRONG ANGEL III

INTEGRATED DISASTER RESPONSE DEMONSTRATION

Anticipating Complexity | Exploring Responses | Cultivating Resilience

STRONG ANGEL III FINAL REPORT

Strong Angel III was an international disaster response demonstration held in San Diego, California from 21-26 August 2006. During the demonstration week there were roughly 800 participants from more than 200 organizations working in an abandoned building on a set of Objectives within a simple Scenario. This report explains the design of the event, our shared perceptions of the results, and our view of the way ahead.

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A Special Thank You

We wish first to recognize and applaud the superb efforts of Anna Abraham at the University of South Florida, and Janice Robertson at The Institute for Interventional Informatics (I^3), for managing the funding complexities within this demonstration. It is not an exaggeration to state that, without Ms. Abraham, the event would simply not have taken place. And if we had not had Ms. Robertson, many of the most distant and valuable participants would not have been able to attend and so many of our most interesting lessons would not have been identified.

Our deep and sincere thanks to both of them.

The Strong Angel Team

01 October 2006

This report was compiled and edited by Suzanne Mikawa, Strong Angel Informatics Coordinator, with close assistance from the other Executive Committee members:

Milton Chen	Robert Kirkpatrick
John Crowley	Gay Mathews
Eric Frost	Eric Rasmussen
Peter Griffiths	Nigel Snoad
Doug Hanchard	Brian Steckler

Strong Angel III Core Report:

The Demonstration – A Working Laboratory

For 5 days in August 2006, more than 800 participants, observers, and local volunteers came together at Strong Angel III (SA-III), an international humanitarian response demonstration held in San Diego, California. The purpose of the demonstration was the development of a laboratory for experimenting with cutting-edge techniques and technologies to facilitate improved cooperation and information flow across the civil-military boundary in post-disaster and post-conflict field environments.

Over the course of 5 days, on the grounds of the San Diego Fire Training Academy, Eric Rasmussen, MD, MDM, FACP, and the Strong Angel team—a group of medical, military, humanitarian, and technology experts—encouraged participants to explore the development of technical and social tools. Those tools were designed specifically to address roughly 50 real-world challenges that support the principles of community resilience and effective cooperation in response to a complex emergency. The Strong Angel team chose the scenario of a lethal pandemic coupled with a cyber-terrorist attack to provide an adverse context designed to stimulate learning, sharing and experimentation. Teams from the public and private sectors, including engineers, UN staff, humanitarian NGO workers, academic researchers, journalists, active-duty military officers, policy makers and others, formed a working laboratory for disaster response innovation.

The Strong Angel Executive Committee, a team of 11 people, spent 6 months prior to the event working on experimental architecture, website design, and event management, bringing in external participants to join SA-III, the third in the Strong Angel demonstration series. Like the two previous demonstrations, Strong Angel III stressed the principles of inclusion, cooperative response integration, effective resource management, civil-military collaboration, and creative synthesis. A combination of public and private sector organizations provided funding for SA-III. Major contributors included Microsoft, Bell Canada, the Office of the Secretary of Defense, Cisco Systems, CommsFirst, Save the Children, Google, Sprint-Nextel, the Naval Postgraduate School, NextNet Consulting, and Blueturn Media. While SA-III received funding from these sources totaling about US$180,000, it was

basically a very low-budget and largely volunteer effort, with most of the funding used for participant travel and site preparation. Led by Eric Rasmussen, the Strong Angel team designed and implemented the demonstration using nights and weekends, completely independent and beholden to no official tasking authority.

As the event scaled-up from the intended 100 to more than 800 attendees, the event design, planning, and management capabilities of the organizers were stretched to the limit. Participants paid no fees to attend the event but were required to provide almost everything they needed to experiment within a simulated disaster environment. As a result, more than US$35 million in equipment and resources was assembled in San Diego for the experiments.

As we noted repeatedly, Strong Angel III was designed as an international demonstration, not a domestic exercise. The purpose of the demonstration was to evaluate proposals aiming to achieve specific objectives, rather than a usual exercise where the effort is put towards "training to requirements." Because of the stresses within the site and system design, SA-III mirrored real world conditions far more than would a pre-planned exercise.

Exposure to such conditions led many participants to change their way of thinking about this kind of event. Many participants came to the San Diego site prepared to test their set of pre-defined experiments, and they very quickly discovered that the best way to help themselves meet objectives was to effectively meet the needs of the group—to listen to each other and collaborate. Naturally, such spontaneous information sharing, among the best and the brightest, in a condensed amount of time and space, and for a worthwhile goal, led to impressive innovation.

As participants began to learn who their natural social networks were, they formed overlapping groups working towards a common goal that broke traditional boundaries between public and private agencies, between civil and military sectors, between corporate competitors, and between both domestic and international emergency responders.

Experiment Architecture

Participants designed their own experiments to conduct during the event, with the Executive Committee providing a scenario, a set of objectives, a realistic and somewhat austere disaster environment, and inputs and challenges to keep it interesting during the week. The Demonstration Objectives can be found in Annex 5 and on the SA-III website: http://www.strongangel3.net. The Objectives there, and the corresponding solutions, addressed six main categories of disaster relief domain sets and potential solutions. In ascending order, they were:

- Infrastructure & Operational Support,
- Communications,
- Integration & Mesh,
- Tools & Services,
- Community & Social Network, and
- Policy & Practice.

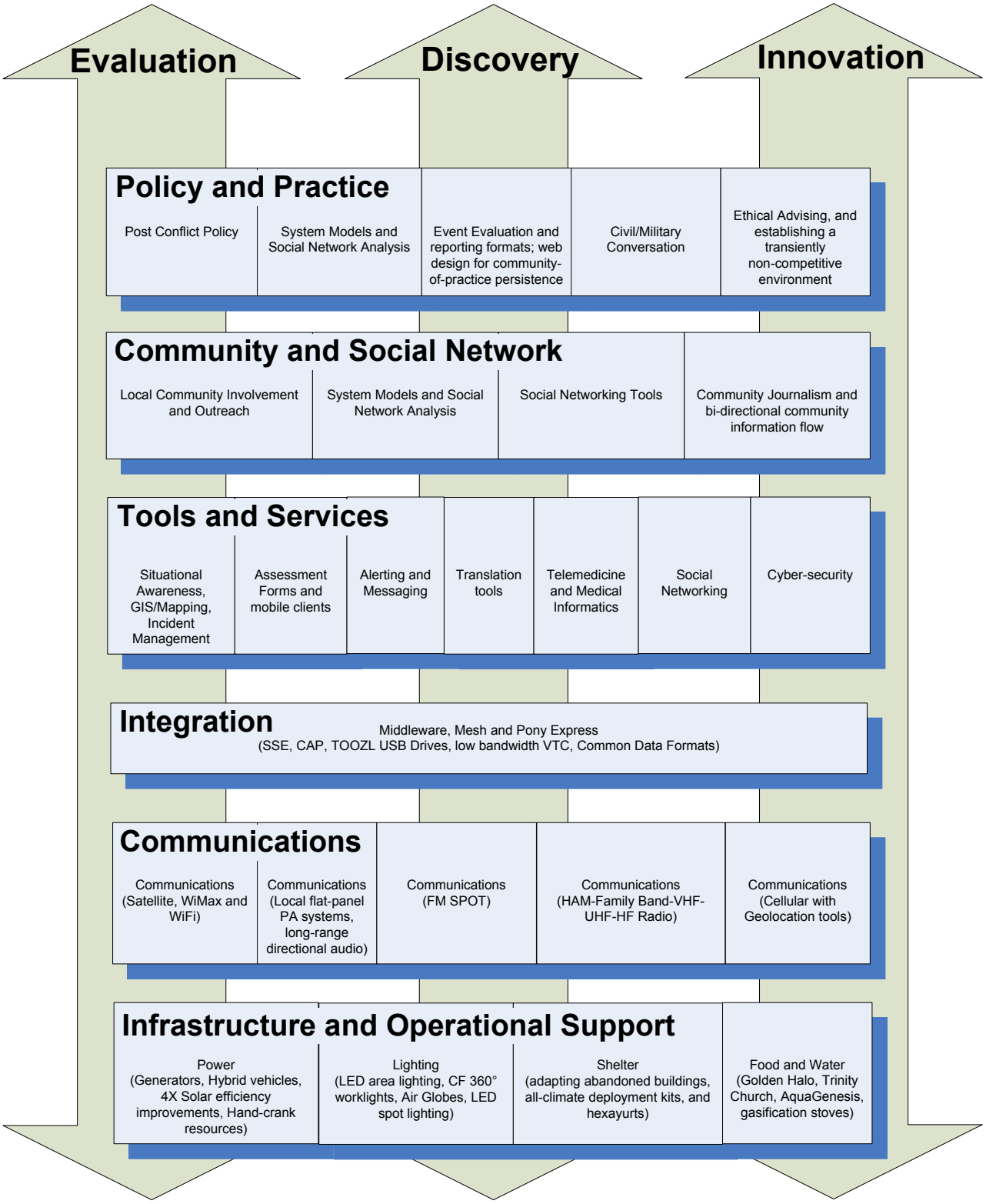
Within these domain layers, the participants' experiments were cross-cutting and had three exploratory methods:

Evaluation—participants evaluated an existing solution or approach,
Discovery—participants discovered new requirements and new opportunities, and
Innovation—participants created new solutions and new approaches on the fly.

The Strong Angel team planned the week's daily schedule according to these naturally progressive domain layers, highlighting a daily theme that corresponded to each domain layer, with an overall emphasis on establishing a model of community resilience and effective cooperation in the face of adversity.

(See the diagram on the next page – also reproduced in Annex 6)

Strong Angel III Experiment Architecture



Examples of Experiment Results

Monday

"Establish operations, communications and links to the community"

Infrastructure & Operational Support

Evaluation

- **Small scale power** provided by commercial personal generators and **GM Hybrid Powertrain trucks,** which had built-in 2.4 kW generators and four auxiliary electric power outlets (120 volt, 20 amp) to provide power to construction tools, BGAN satellite units, efficient lighting units, public address systems, HAM radios, and laptops.
- **Larger scale power**—GE Energy's 100 KW and 50 KW generators, local and solar power (including a new report describing the development of a four-fold increase in solar efficiency, coming to us now and sparked by reporting on SA-III.)
- **Lighting** within the site was designed to be both rugged and highly efficient. We found value in area LED lighting from Carmanah in Canada, TekTorch handheld LEDs, and compact fluorescent lighting within rugged metal cylinders from Husky.

Discovery

- **Desalinated water** by Aqua Genesis was delivered through a new process using waste heat and seawater, with purity levels several orders of magnitude better than conventional requirements. That invention was described during SA-III, and there are now investors involved in further development.

Innovation

- **Low-cost family shelter and cooking solutions** were made available through the Hexayurt shelter, wood gasification stoves, composting toilet, and other technologies appropriate for supporting a displaced family. The **Hexayurt refugee family shelter**, a structure built from four-by-eight sheets of hexacomb insulation and duct tape for under US$300, was used to provide accommodation at SA-III. The shelters were then further adapted as meeting spaces, communications centers, and visitor reception areas.

Communications

Evaluation

- DRASTIC and GATR demonstrated an **inflatable VSAT communications antenna**, made of ultra-light racing sail cloth and transportable by backpack. It inflated on the SA-III site to a roughly 12 ft diameter VSAT satellite dish and worked reliably all week**.** At least one international NGO CIO thought it was the most interesting new technology on the site.

- **Amateur radio** (HAM) had multiple successes, including robust email messaging capabilities in the San Diego area and around the globe (e.g. Spain and Russia) over HF radio. An abbreviated report on HAM radio results can be found in Annex 3.
- **Video teleconferencing** from VSee and Tandberg to SA-III field sorties with Border Patrol vehicles, San Diego police stations, Harbor patrol boats, SeaBotix underwater robot, and MedWeb's mobile communications van. VSee also established **live video links with international remote locations** in Afghanistan and Indonesia.
- **A highly efficient, very small public address system** from the Lorimar Group was found to be effective in several locations for crowd management and information dissemination**.** Such a capability is critical in emergency circumstances. A **long-range directional audio system** was also evaluated and found to perform as described (spoken voice audible at ½ mile range) but was not used on the site since it was not needed.
- **FM radio broadcasts** were used to deliver messages to five separate classes of participants (security, network, medical, EXCOM, and NGO) through the Microsoft SPOT watches. Those proved effective for subtle notification of conditions on the SA-III site.

Discovery

- **Hastily Formed Networks** turned into "Inadequately Formed Networks" at SA-III**.** Internet communications and on-site communications networks failed for the first 2 days and were unreliable thereafter. This occurred despite the presence of a huge amount of satellite bandwidth on-site. The wireless mesh was regularly unreliable, and personal WiFi networks continually disrupted well-planned professional networks. Key learning—those responsible for networks identified the importance of establishing a multi-vendor working group (led on the Strong Angel site by Bell Canada and Cisco Systems) to develop **flexible but standardized operating procedures** for ad hoc disaster communications in the field.
- **SeaBotix** Little Benthic Vehicle robot was linked up via Simple Sharing Extensions (SSE) to provide live video feeds on VSee from underwater remote sites back to EOC over EVDO and WiFi networks. One result was the altering of security procedures at San Diego International Airport with the full cooperation of the Strong Angel team working with the airport staff.

Innovation

- **A unified notification gateway** was developed under the **Codespear** platform that allowed for multi-cast **group messaging** and alert notification to SMS, voicemail, cell-phone, email, SPOT watches, and police-EMS-fire radio and family band radio.
- **Boost cell phones** were modified for persistent and **multi-modal geo-location** through software developed by Autonomechs. Those locations were broadcast to maps every 5 minutes through an extremely efficient data transfer. That system was developed for Strong Angel and was used throughout the demonstration for near-real-time localization of participants.

Tuesday

"Assess and evaluate the community situation, needs and priorities."

Integration & Mesh

Evaluation

- Remote medical reach-back via **VSee's low-bandwidth, encrypted videoconferencing software**. Using VSee's MRI and X-ray sharing capability, SA-III participants connected video reach-back to Stanford University and shared 3 types of data sets: microscope images, MRI data sets provided by the Naval Postgraduate School, and X-ray images.
- **Deployment of mobile data centers** on the Op-V Platform self-powered humvees from OSI Network, Blueforce Development Corp, Adesso Systems, and XCeedium to enable data collection at the edge of the network.

Discovery

- **Development and synchronization of data collection forms** on small mobile platforms (like PDAs and Smartphones) from Blueforce Development Corp/Adesso via SSE for tracking, reporting, sensor networks, and mobile telecommunications.

Innovation

- **SSE (Simple Sharing Extensions)**: A new capability for bi-directional synchronization. In SA-III, SSE was used to define interoperable GIS solutions and so enable common operational viewpoints of real time field location and assessment data on multiple solutions and systems.

Wednesday

"Extend the strength and reach of the response by collaborating with other groups and the community"

Tools & Services

Evaluation

- **Free and open source disaster management system** called **Sahana**, a web-based collaboration tool that addresses common coordination problems encountered during disasters. Modules now developed include managing incoming aid, managing disaster site requirements, managing volunteers, tracking logistics effectively (between government groups, civil society, and the victims themselves), and finding missing persons in disaster areas using integrated and standardized GIS tools.

- **Harmonieweb.org** is a disaster assistance web-based tool designed to provide a collaborative information environment that would allow first responders to develop situational awareness, identify team members, and form response teams. While an encouraging start within the military (unprecedented, actually), many people were not able to access Harmonieweb due to lack of Internet connectivity on the site and so demos were difficult. Based on what little was seen by the Strong Angel team, further consultation with the civilian relief community might be beneficial. There were multiple NGOs present at SA-III willing to offer their constructive advice regarding the concept, the design, and the implementation and we think the conversations will likely have been productive.
- **AIMS, the Alabama Incident Management System** is a comprehensive software system developed within the University of South Alabama's Center for Strategic Health Innovation (CSHI) in Mobile. The software, developed under the leadership of Carl Taylor, director of the CSHI and Assistant Dean of the College of Medicine, is a suite of integrated tools originally developed as a small research effort. That research effort rapidly became the backbone of the Alabama response to Hurricane Katrina for the urgent tracking of medical resources within the state in near-real-time. In our opinion AIMS displays an appropriate selection of useful information using a clean, elegant, and intuitive interface on a robust and resilient backbone. On a survey of tools available for medical incident management we selected AIMS as the best of those we saw, and we noted that – despite its impressive capabilities - it's free. We were also pleased to note that the Sahana team (see above) worked closely with the AIMS team, often sitting side-by-side at the same table, to integrate each system into the other. They are complementary and together make an appealing option for disaster medical logistics management.

Discovery

- **Bit9's application control software** protects systems from cyberattack and unwanted software execution in both a networked and disconnected state. As a result of their participation in SA-III, Bit9 discovered new requirements for their cybersecurity software to optimize deployment in low bandwidth environments and for multi-organization teams.

Innovation

- **GIS common data store and mash-up**—five GIS solutions, one common source. As a result of the exercise scenario and demands from "users" at SA-III who relied on GIS solutions, all of the GIS vendors, who are traditional competitors, worked together to establish an interoperable data store for all geo-referenced data. A recurring theme of humanitarian assistance and disaster relief operations has been the importance of geospatial products (e.g. GIS imagery, maps, and 3-dimensional projections of pyroclastic flows). While there are international standards for geo-databases, the practical implementation often lags far behind policy.
- **GPS location tracking** on Sprint Nextel mobile push-to-talk phones, which have a location tracking capability based on cell-tower triangulation. This was linked to the GIS solutions.

GPS location tracking for Groove forms was enabled through a tool provided by Information Patterns.

- **Computer-aided language translation and transcription** from live video feed**.** Virage translated and transcribed in real-time the live speech of an Arabic speaker on the site, a member of the Saudi military attending the US Naval Postgraduate School. The translation was done on the Strong Angel site via WiFi link to a video feed from the speaker in a remote location in a Border Patrol vehicle.
- **The One-Ounce Laptop (Toozl)** was very well-regarded by several evaluators. The Toozl drive is a simple USB drive with a suite of software tools (more than 40) designed to provide all required functionality for an effective disaster response coordination effort anywhere in the world. It was designed on a 4GB USB drive for Strong Angel by a UK Royal Navy physician Surgeon-Captain Peter Buxton, although the full suite will fit on less than a 1GB drive. The Toozl drive can be plugged into any USB port and allows the running of a completely familiar suite of programs, all of which are **free**, all of which are **open-source**, and none of which write to the host computer's memory or registry. We have made Toozl a free download from the web, and it comes with a built-in menu system to reduce training time.

Thursday

"Consolidate: engage in conversations that make the response more relevant and transparent."

Community & Social Network

Evaluation

- **Second Life is a virtual world** that we found useful as a globally accessible development and meeting area. The Second Life world was used to demonstrate a custom-built virtual training and learning environment for the Strong Angel community. Because of the initial network difficulties on-site, it was difficult to access and so was used more effectively from remote locations. A full demonstration was given later in the week showing the remarkable potential of this **rapid 3D modeling toolset** to build a virtual community.

Discovery

- **Spontaneous communications and community journalism** in an emergency response were tested at local homeless shelters and the San Diego Food Bank by Loma Linda University, NIUSR, Internews, and the Center for Citizen Media. This concept was presented by blogs, pod casts, chats, local radio, and other media. Dan Gillmor from the Center for Citizen Media tested methodologies concerning the future of journalism "by the people, for the people" and their effect on preventing social disintegration.

Innovation

- The Center for Citizen Media, YRB, and Internews formed a strategy for **citizen media** using Codespear messaging and mass alerts on SPOT watches, addressing Objective #18 "Inform Everyone of Everything Important."

Friday

"Depart well. Create a sustainable transition with the local community."

Policy & Practice

Evaluation

- **Ethical oversight to ensure a consistent focus**. Dr. John Francis, the United Nations Goodwill Ambassador for the Environment, served as the Ethical Advisor at SA-III. As discovered at earlier Strong Angel demonstrations, the role of an Ethical Advisor is an important one. It provides the individuals within the group a safe and neutral space, within an environment of conscience and reflection, to step out of the intensity of their own Strong Angel role and refocus on the broader goals of their specific tasks. Dr. Francis noted that many of his conversations with people at SA-III concerned conflict resolution between participants and observers, and the discussions encouraged the re-establishing of purpose—the overarching effort to serve a population in need.
- **Further development of state-building framework.** Dr. Ashraf Ghani and barrister Clare Lockhart adapted the Ghani-Lockhart Framework (developed for measuring state effectiveness in post-conflict transitions) to address **state effectiveness in a disaster context**. Lockhart worked with a team of San Diego State University volunteers to build a picture of the local conditions and services, both on a geographic, neighborhood-by-neighborhood basis and on a functional basis (e.g. health, education, power, transport), then mapped the informal communications resources (e.g. community leaders, associations, religious groups) associated with each layer. The result was a multi-dimensional view of the centers of influence in the local community. Their on-site collaborations and observations on systems and social networking enabled them (by their description) to make exceptional strides in their state-building and state accountability framework.

Discovery

- **Civ-Mil Interactions**: Humanitarian relief and development experts from international NGOs and the UN met with active duty military officers from the US military and international militaries in "no attribution," brutally honest discussions about collaboration and information-sharing among civil and military organizations. The civ-mil discussion group made collaborative recommendations pertaining to US Department of Defense Directive 3000.05. Please refer to Annex 4, "Civil-Military Discussion Notes."
- **System Dynamics:** The team of mathematicians from Boeing developed a map of the intersections and dependencies seen in Strong Angel III, and that map has now been presented in several locations (including the International Conference for the Society for

Organizational Learning). The System Dynamics map, available as Annex 9, is an example of effective modeling design.

Innovation

- Dr. Ashraf Ghani and Clare Lockhart J.D. observed how the Ghani-Lockhart Framework can be used not only as a **diagnostic and planning tool for leadership**, but also as a communications and **social networking tool**. In doing so, Ghani and Lockhart were able to partner with the Center for Citizen Media and Internews to form an ad hoc communications working group focused on Objective #18 "Inform Everyone of Everything Important." Their on-site discussions of social networking enabled them to develop general ideas and methods for community involvement and collaboration between various stakeholders during initial relief assessments.

Unexpected Outcomes – Pushing the Boundaries

SA-III provided a setting for the Strong Angel team to assemble a diverse group of people with complementary capabilities whose cooperation is essential to solving some of our world's most challenging problems. Many participants who came to SA-III with the aim of fulfilling a certain task or objective failed to do so, sometimes after repeated attempts. The demonstration was structured in such a way that failures were often as instructive as the successes.

Based on opinions within more than 40 pages of post-event interviews, the participants at SA-III were pleasantly surprised by the effectiveness of the event in generating both new learning and unexpected outcomes. SA-III was initially a struggle for many taking part because the design forced participants to embrace new responsibilities through constructively interacting with others. The collaborative process of jointly defining and solving problems took many well outside of their comfort zone, and the enthusiastic response has proven to the Strong Angel team that it was well worth it. Participants and observers have repeatedly stated that they have learned more at SA-III than in any other planned exercise and have developed a new appreciation for the capabilities and limitations of other actors in a response environment.

Chaos in a Car-park

"SA-III is a demonstration of chaos theory in a car-park," stated one participant, Royal Navy physician Peter Buxton, conveying the idea that unrestricted activity can be very productive when constrained by a common framework. SA-III was designed precisely along those lines. At SA-III, some participants were expecting a more traditional simulation event and wanted more structure, command and control. They were disturbed by the near-anarchy and the absence of "real emergency" driving factors.

The Strong Angel team, however, expected their discomfort. On the opening morning, Eric Rasmussen declared "Emergency!" and participants dispersed to set up their own workstations in a bare building entirely exposed to the open environment—no power, light, air conditioning, security, food or water. If everything had been coordinated, it would have been more like a trade show rather than a reasonably effective simulation of a complex disaster. The Strong Angel team wanted to provide just enough external structure to allow the diverse set of participants to "self-organize."

Too much structure would have stifled innovation and led to a sense of resignation that this was just an exercise with a predictable outcome. On the other hand, too little structure would have left many participants struggling to connect with each other and therefore impede their discovery of their mutually cooperative value. To this end, the Strong Angel team elected to create a seating chart for participating teams in Building 557, with the goal of providing just enough design to facilitate meaningful interaction and collaborative innovation.

Tables for teams with related capabilities and expertise (e.g., GIS, media, relief and development, systems integration, situational awareness, etc.) were placed close together. Individual teams were arranged within clusters in order to maximize collaborative synergy—or creative friction: civilian and military organizations were situated side by side, as were commercial competitors. These larger clusters were then placed adjoining one another according to a scheme that the Strong Angel team believed would lead to the kinds of mash-ups and partnerships required for meeting the demonstration objectives.

The goal was to have apparent chaos designed and implemented, then later reined in as the spontaneous networks formed. In our view, it is often the chaos and failures and frustrations that lead most rapidly to innovation and uninhibited social networking. That again proved to be the case here.

Social networks and trust-building

When delivering aid within a complex disaster, social networking at every level is critical for success. Building both trust and credibility, first among emergency responders and then simultaneously with local authorities and the affected population, are among the most important initial tasks to address in a complex disaster response. Consequently, SA-III focused on simulating those aspects of post-disaster conditions that specifically impact communication, information sharing, and coordination.

Beginning on Day 1, participants were dependent on their own social groups and concentrated heavily on the technology failures. They did not see technology as a tool to establishing cultural and social networking; it was, in fact, an impediment to looking around, since they were focused on solving their individual problems. On Day 2 and 3, however, people began to branch out beyond their safety net to discover alternate ways of communicating and sharing information with each other, despite the technology failures. Teams from Building 557

started forming working groups with Shadowlite teams from Building 480 and vice versa, then spontaneously developing Emergency Operations Center strategies, GIS mash-ups, and ad hoc sorties to the field.

The demonstration set up a prerequisite for trust and laid the framework to build social networks between customers and solution providers. This led to an increased understanding of requirements and *in situ* discovery by vendors, as well as new links among solution providers. Vendor collaboration and the "Do Not Sell" approach mandated by the Strong Angel Executive Committee were critical to building trust and cross-sector engagement, ultimately leading to the success of the demonstration.

On Day 5, SA-III participants expressed that the most important take-away from the week was the "personal relationships." SA-III again created a rich texture of partnerships, alliances, personal relationships, and strategic social networks. In fact, at the request of the participants, the SA-III website is being further developed as a documentation and reference source for continued social networking (see Annex 8, "Intertwingularity for SA-III Web").

Many of the newly linked groups from SA-III might see each other in the field in the near future, reuniting in the trenches during a real disaster response. That future meeting may go better as a consequence of the Strong Angel interactions here, and so some future population in distress may find that the response to their needs is more effective than it might otherwise have been.

Simple and reliable

Many technologists were humbled by their experience at SA-III, struck by how hard it was to implement their technical solutions. Participants discovered that technology is often still just far too difficult. The Strong Angel team considers the following as essential:

> **Simplicity:** Simple technology is needed to support disaster relief operations. As was ruefully discussed by vendors multiple times in the SA-III hotwash, technology should "just work" without so much effort required. Lessons identified multiple times show that effective technological solutions should not be difficult, should not be overly feature-rich, and should not need core changes to the design for effective performance in the field. Useful tools will be basic, clear, flexible, resilient, adaptive, and used routinely in day-to-day operations. In our opinion, there is insufficient

capability and innovation around technical and application support for users in remote and high-pressure environments. Technology ought to be an intrinsic enabler within difficult environments. No new skills should be required for use, and the design of the system should allow optimal use of the responders' professional skill set, without requiring skills that are irrelevant to the professional work of the responders.

Reliability: The extent to which we can have standards for information sharing is important because that provides a framework for interoperability and reliability. At SA-III, the technologists sat with the subject-matter experts from the field and discussed what happens when the technical tools we depend on fail. Very few of the tools in Building 557 failed gracefully. A few tools degraded intelligently to lower levels of function. A few offered suggestions when capabilities were degraded. Fewer still fixed themselves when the reason for the degradation was easily surmised. From the Strong Angel team's perspective, there was too little thought given to the failure cascade.

New thinking about old organizations

To a large extent SA-III altered the way that several organizations traditionally approach and interact with each other. By encouraging collaboration and cooperation among military, civilian humanitarian organizations (government and NGO), and commercial technology vendors to work toward a decent common purpose—serving other humans in distress—perspectives were altered. Leading up to the event, the Strong Angel team received funding support from a surprisingly broad combination of organizations: military, NGO, academic, multinational corporations, and small companies. This proved even before the event started that a wide range of people and organizations were genuinely interested in supporting the SA-III cause and were willing to work together for a worthwhile common purpose. That was excellent news prior to the event.

The Strong Angel team enforced "No sales on site," and this course of action became self-policed to an amusing degree. The no-sales policy won a cheerful response from many participants and was rather liberating to vendors who are normally quite competitive. Many vendors present thought that they had brought the best of all possible products, one that perfectly fit the needs of humanitarian relief operations. They soon figured out that there

was more than one vendor at SA-III who thought the right answer was at their worktable. These vendors twisted and turned and argued and denied and, in every case we witnessed, finally agreed to a common platform, program, or device-agnostic information-sharing framework. As many news journalists noted, the ideas generated at SA-III caused, for instance, competitors such as Google and Microsoft to work closely together **at the same table** and five of the fiercest GIS competitors to share information and work with each other.

Another aspect of the event we heard repeatedly was that the Strong Angel environment helps companies harden systems and improve usability, changing the way they do business. During the final briefing session, a Microsoft senior manager spoke about SSE as an open source technology, saying that he was fully supportive of open standards and promoting this open source software. That, the Strong Angel team noted, was a significant change from the previously understood corporate software position.

Also notable was the NGO table where signs were posted that boldly said: "We don't know you, we don't trust you, ask us how we save lives, tell us why you matter, we want to learn, so do you (we do not have much money…)." That stimulated a lively conversation between the NGO representatives and several military members currently preparing to deploy to Iraq. A few hours later the NGOs organized two no-attribution "gloves-off" meetings with the military to engage in honest discussions about civ-mil collaboration and communication.

It is worth noting that, despite having no policy legitimacy or tasking authority, Strong Angel demonstration results have been used all over the world to guide thinking and shape planning conversations related to humanitarian assistance, disaster relief management, and post-conflict stability and reconstruction efforts. Strong Angel I and II may have led, to a small degree, to the conversations that eventually produced the US Department of Defense Directive 3000.05, issued in November 2005. This time, the civ-mil interactions at SA-III appeared to initiate a dialogue between the military and NGOs that could lead to frameworks that will help save lives through greater information sharing in post-disaster and long term post-conflict reconstruction operations.

Recommendations – The Way Ahead

"Moving SA-III towards a Strong Angel community"

1. StrongAngel.org: In our view, **Affiliation** is the oft-forgotten tier in Maslow's Hierarchy of Needs, but that step on the ladder may actually be the most crucial for restoring a sense of community after a disaster. It is also, arguably, the most valuable attribute for the responding community to share as they arrive to help from diverse areas and agencies. Any solutions proposed for response and reconstruction that disrupt a sense of affiliation, in those affected or in those responding, will impede the restoration of a community. From our perspective, the best ideas from Strong Angel III were those that allowed a damaged community to embrace self-reliance and reconstruction on their own terms rather than those terms imposed by an external agency. A willingness to engage in a conversation with the local population, then, ensured a sense of integration and trust with those charged with helping.

The same is true for Strong Angel as an event. The affiliations we form in these demonstrations are close, long-lived and powerful. The results from those affiliations include lessons you'll see below that are significant and can alter how agencies and institutions—including nations—choose to interact with one another.

Such events should not be infrequent and episodic, and the Strong Angel team heard that repeatedly. They should be a recurring dialogue, exploring relationships and capabilities with the same degree of freedom and support found in these 5 days and the two events prior to this. Having a permanent place to develop such affiliations and to test new ideas in technology and social structure seems long overdue.

> ***Recommendation:*** **The Strong Angel concept should be established as a long-term capability. It should have a flexible and adaptive charter, a small, diverse, and dedicated staff, adequate and reliable funding for assessment, evaluation, and deployment around the globe (remember that some of the best ideas came from Scotland and Sri Lanka, and both were NGOs), and Diplomatic support for travel to wherever the need seems greatest.**

2. Strong Angel design: This year's experimentation model was a good one and produced useful results. However, the Strong Angel team received a wide range of suggestions for improvements in the design of future demonstrations. The core experimentation diagram will not change—we found it very close to optimal (though Planning is missing as a structural effort and will be added). But, pragmatically, the next iteration should have fewer people and take place in a remote location. It should have funding in the bank, a clean and neat method for using that funding, and a dedicated staff able to pay full attention to the possibilities within the potential attendees. The Strong Angel team should consider two separate events: One would be a pre-event clearing house for pre-integration as a condition for participation, the other would be the event itself, which should involve helping real humans in distress somewhere. The Executive Committee should seriously consider excluding any solutions proposed for those events that are not based on open standards, and the participants should be able to leave behind any solutions that those whom they are assisting find valuable.

***Further recommendations*:**

1) Any technology the Strong Angel team considers for field use should address legacy operating systems. People show up with what they have and many people have Macs. Mac and Linux are competent operating systems and are preferred in some areas. These operating systems are also becoming somewhat more common and should be a part of humanitarian response planning.
2) Strong Angel should use SSE, or the best current technology, for the development of a common address book for all participants and useful contacts. That directory should be a critical feature within the Strong Angel organization and should be cultivated every day of the year.
3) The Strong Angel team should consider denying WiFi on the core site. WiFi is a useful but immature technology, and the consequences of its management failure in SA-III were severe. It may also be useful to limit the use of bandwidth-heavy applications (and make sure that the Strong Angel team chooses applications that have that option). Regardless of the presence of WiFi or the limiting of applications, it is necessary to have a "Communications Emperor" who has absolute authority to intervene when

necessary in the management of the communication pathways established in the demonstration.

4) Web-based tools and services are limited by the availability of connectivity in a post-disaster environment. Many participants who came to SA-III expecting broadband availability were sorely disappointed, which mirrored real-life disaster responses. Internet-based applications and services—such as Sahana, Harmonie Web, and Second Life—should be deployed only when connectivity is readily available.

5) Large-format, brightly colored GIS maps covered the walls at SA-III, but these glitzy printouts are utterly useless in the field. Disaster response teams should provide 8.5 x 11 black and white sheets of paper, with patterns instead of colors that can be quickly and easily photocopied for mass distribution. The dominant use is for maps but also valuable for schedules, contacts, and articles. Easy printing. Reliable distribution.

6) Video should not be the dominant off-site interaction tool. Its requirements are too severe and the yield is not yet worth the costs.

7) Within all the technology we consider, adaptability should be more important than brilliance.

8) The Strong Angel team should work harder to ensure participation on site from those persons who represent agencies that actually respond to international disasters, particularly the professional NGOs and the UN relief agencies. These field practitioners, who represent doctrine, guidance, and experience, should be a part of the planning from the earliest stages (physically present during Strong Angel meetings), so that the experimentation design incorporates their existing methods for both the development of the planning and the execution of the response.

3. Interoperability and open data formats are critical for collaboration solutions, particularly in humanitarian environments. Users have a range of existing platforms, tools and approaches that need to be accommodated in many collaborative humanitarian solutions. Interoperability and open data formats are necessary for the **technical level** of data formats

and transport, but both are also required on the **social level.** Any proposed solution requires an element of trust before acceptance, and such transparency is therefore critical to mutual success.

> ***Recommendation:*** Interoperability requires that we agree on standards. Promote agreements on data standards and neutral repositories for geographical information.

4. "Communications first" principle—Networks are key, and communications are a fundamental requirement for all other coordination and response activities. Easy access to satellite WAN and wireless LAN solutions has enabled ad hoc communications, but access brings its own coordination and interference challenges. The difficulties in ensuring Internet connectivity resulted in a number of new requirements. As a result, several vendors have agreed to establish a working group, potentially led by Bell Canada and Cisco Systems, to develop flexible standard operating procedures (SOPs) for *ad hoc* disaster communications.

> ***Recommendation:*** The communications working group plans to address
>
> 1) Standard Operating Procedures for deploying *ad hoc* networks in disasters, and
>
> 2) Bandwidth and frequency-sharing strategies within easily deployable load balancing systems.

5. Collaboration tools: Based on a number of field deployments, we have come to the conclusion that we are unlikely to witness—at least in the near future—any response to a catastrophic event in which there is a "main" collaboration tool used by the majority of responders. This is particularly true in international settings, where no single organization has sufficient authority to mandate uniform use of a single technology across the many organizations participating in a response. Every agency—whether civilian or military—arrives with the best people that they have to offer and the best tools they have available to coordinate their activities with others. Almost invariably they discover that, while their tools work quite well within the walls of their own organizations, they are often not used by others with whom effective collaboration has suddenly become a priority.

The need for inclusion of the right people into the response process always trumps the capabilities provided by any specific tool, so users confronted by incompatible collaboration tools typically revert to the lowest common denominator: email. Email, unfortunately, while a reasonably effective communication tool, does not support fully threaded, richly interactive, contextualized work, and these shortcomings are exacerbated by the operational complexity and information overload that so frequently confounds responders.
Strong Angel III explored ways to integrate several collaboration tools so that each organization could continue to use whatever tools made them most effective, internally and externally. One specific objective at SA-III was "'**embracing technical diversity,**" recognizing that responses will always involve a heterogeneous mix of technologies. The Strong Angel team found several overarching ideas, like SSE and Second Life, which contributed to the solution and allowed for individualized systems that still shared information effectively among agencies.

> ***Recommendation:*** Future Strong Angel demonstrations should continue to promote technical diversity through developing methods of software-agnostic cross-agency collaboration.

6. Relationship mapping: One capability missing at SA-III was a method for ***visually mapping relationships***. In the opinion of Sanjana Hattotuwa, we have long since reached the limits of pure textual representations of complex, dynamic and changing (social) relationships.

> ***Recommendation:*** Visual mapping methods such as the Visual Thesaurus, the Semantic Navigator for Groove, or the library at the Dropping Knowledge Initiative are worthy of further exploration as visualization techniques for complex relational databases. The development and adaptation of visualization systems to fit the needs of humanitarian and peace-building contexts remains an unanswered need.

7. Drupal Strong Angel III website: If we are going to build a community, the members of that place will gather for a reason. The members must find inspiration with us—they'll arrive with an itch to scratch, a wish to connect with others like them, or want to seek help with a problem. Perhaps they have a desire to continue a collaboration or relationship begun at SA-III. For whatever reason they come seeking us, the structure of the site must incorporate the intent of individuals to connect. It must make it easy to express a problem, find a like-

minded colleague, reach across the civ-mil divide, or work on a mash-up with a person who may or may not be in geographic proximity. The functionality of the site must incorporate tools that lower the search costs for finding a solution to a problem, finding a person, finding an asset or resource, or finding out about an event or meeting. It must have tools to store multiple versions of an attempt to solve a problem. It must contain an archive of proposed answers. It must provide maps of problem domains as well as places, and it must make visual and intuitive the ontology of our social network.

As a bit of background, remember that, at SA-III, we experienced the challenges that all web architectures impose on communications architectures: in order to be useful, web servers require connections to the outside world. As we discovered in San Diego, servers hosted on the outside required our local web technologists to administer content through unreliable and slow Internet connections. Photos were time consuming to upload, and additional software development was difficult to perform and troubleshoot. Our web was only as useful as our connections to the outside server.

The SA-III web developer felt the absence of a dedicated system administrator. Without that someone to care for the underlying server itself, the SA-III web developer and information architect was forced to work outside his expertise on non-creative, non-content, time-consuming tasks on an unfamiliar platform. He should have been able to devote more time to making information posted on the site useful to responders instead of pursuing system administrative tasks.

That said, the Drupal content management system (CMS) performed well under load. Its robust systems of taxonomies and customized node-types enabled us to intertwingle information in ways that no other CMS could do. Drupal itself requires additional maturation. The SA-III web developer was forced to extend the core architecture of Drupal itself as well as the various modules and themes that the open source community has built. Drupal is time-consuming when actual new code is required and is not yet the ideal platform when administering a remote server under austere network conditions.

> ***Recommendation:*** Strong Angel should collaborate with companies like Akamai and Google to build a robust, layered web architecture that is available both during disasters and periodic training exercises. The Strong Angel team should deploy to

disasters with pre-packaged web servers for use at the disaster response sites, which would (through tested and reliable software like SSE) synchronize all local databases and files to servers hosted on a global network of servers. The Strong Angel team should also build a web team that includes a system administrator to handle the security and optimization of the web server, a web developer to build mash-ups and new software tools, and an information architect to organize the incoming streams of information into useful and findable structures. For now the SA-III web team will continue to build the Strong Angel III website in Drupal, forming a mesh of associations and relationships between nodes of various types (objectives, experiments, organizations, people, objects, and events).

Of note, the Strong Angel team intends to maintain a current and comprehensive Strong Angel page on Wikipedia, and we suggest creating a StrongAngel.org site for future development.

8. Civil-Military discussions produced several recommendations for future dialogue and trust-building activities across civ-mil boundaries, in particular pertaining to Department of Defense Directive 3000.05.

Recommendation: See the 'Recommendations' section in Annex 4 "Civil-Military Discussion Notes."

9. Coping with **effects of scale** proved to be a key challenge. Initial planning was for a 100-person event; however with more than 800 eventually attended. With many arriving at the last minute, the Strong Angel team could not really scale to effectively accommodate the masses. Furthermore, several organizations who did not participate were somewhat unhappy not to be directly invited.

Recommendation: Future Strong Angel events should be smaller in size and should be either more selective when offering invitations or broadly advertised to reach all who may be interested. The implications, of course, are that there would be staff and funding to accommodate such invitations, and that is not yet established.

10. The SA-III management and leadership approach for the demonstration was itself an experimental concept and, while ultimately successful, proved to be inadequate in many ways and was again reflective of the Strong Friends nature of the demonstration and the need for full-time staff. Basic event management procedures weren't able to be applied, and the on-site media was distracting and probably reduced the overall effectiveness of the Strong Angel leadership team. The Strong Angel Executive Committee struggled with the balance between

1) Simulating a real emergency

2) Initiating and sustaining activities that forced collaboration and innovation, and

3) The sheer mechanics of running an event for 800+ attendees.

There were only eleven people on the SA-III staff, and not even one was available full-time for the duration of the planning cycle. Most were working at day jobs until the moment they got on a plane for San Diego. The demonstration succeeded far beyond expectations in great part due to the improvisational and adaptive response capabilities of the Executive Committee and through the robust and good-natured participation of the SA-III attendees. The Executive Committee is documenting many lessons on the running of such an event, particularly around basic event management practices.

> ***Recommendation*:** The Strong Angel team should establish a 501c3 with adequate and accessible funds in order to more effectively delegate roles and responsibilities for administration, budget and financial expenditures, event management, demonstration design, and other areas routinely expected of committee leadership. They should secure full funding well prior to hosting the actual event.

11. Gender typing: Several attendees noted the gender imbalance in the Strong Angel Executive Committee presentations and in the group of participants, particularly since Eric Rasmussen had made the point on Day One that 80% of all displaced populations are women and children. There were not enough women participating in SA-III, particularly considering the populations that first responders are designed to serve. The involvement of knowledgeable women to address group mindsets and shortfalls, in addition to simply being faces reassuring to those in need, is necessary in international humanitarian response.

> ***Recommendation:*** Encourage more gender mainstreaming in the Strong Angel team:

1) Bring in women technologists and demonstration design experts to join the Strong Angel Executive Committee,

2) Promote a better balance of men and women in Strong Angel team public speaking experiences, and

3) Diversify the Strong Angel group of participants to demonstrate a more gender-balanced representation of humanitarian and disaster response practitioners.

12. **Volunteers at SA-III** were very dedicated but very few. The expected volunteer corps of 15-20 students was not available prior to or during the demonstration to assist with recording and documenting the participants' experiments and outcomes. This shifted most documentation development to after the event.

Recommendation: Strong Angel Executive Committee should identify volunteer corps well in advance of demonstration, define volunteer training strategy, and define roles and responsibilities for volunteers. They should also consider hiring temporary staff from temp agencies to manage event coordination duties and to run errands.

13. **International applicability** of SA-III, to our eyes, was not satisfactory, and a few participants expressed some confusion about the scope of exercise (i.e. "Is the demonstration international or domestic?") despite explanations in several locations. Although the event included participants from Sri Lanka, Honduras, Afghanistan, and Singapore, some participants felt that the **international community and non-English translation** services at SA-III were still in short supply.

Recommendation: Host the next Strong Angel outside of North America to help ensure more global relevance, keeping in mind the influence of donors and parallel governments in the design of the event.

Of interest, during the Highlands Forum, the Academy of Science & Technology in China offered to host Strong Angel IV. In addition, during a prior Strong Angel event, the United Nations University of Peace in Costa Rica offered to host Strong Angel. Other hosting offers have included:

1) Mumbai, India

2) Jalalabad, Afghanistan

3) Yogyakarta, Indonesia

The Strong Angel team proposes that one or more of these distant locations should be considered for any further Strong Angel demonstrations.

Furthermore, intermediate gatherings (charrettes) should take place in some far-off and challenged place, looking specifically at how shortcomings witnessed in a real response can be evaluated for a solution in a later Demonstration. Our current suggestion is to alternate years for the holding of charrettes and Demonstrations.

14. Personal data protection in disasters and humanitarian relief. SA-III did not address the issue of **privacy, identity and security** within policy and technology frameworks in any disaster. Microsoft, Sahana, participating NGOs, US Department of Defense representatives, and other participants each voiced the opinion that there was too little discussion of the rights of individuals and groups of individuals in protecting personal data. One expressed opinion was that effective collaboration will not move forward until this particular disaster relief and management issue has been addressed.

Recommendation: Pursue a deeper analysis of the socio-economic, political, cultural and historical factors that determine notions of privacy and identity protection, and try to determine and codify the rights of individuals, and groups of individuals, in the legitimate use of such data in disasters and humanitarian relief.

15. Leave-behinds for the local community. SA-III explicitly planned to add benefit to the local community, primarily through improving services to the local San Diego Search & Rescue (SAR) Task Force and the San Diego Fire Department.

The Strong Angel team planned and managed the following:

- Site-wide LAN and Internet link for the Fire Training Academy and SAR Task Force based on-site. (Cisco and others providing)
- Physical equipment for the Fire Training Academy and the Search and Rescue Task Force (mobile generators, extension cords, ladders, etc.).

- Physical cleanup, locksmith services, and repair of anything on the site that was damaged and uninhabitable when we arrived. It has all now been confirmed by the owners as left in a better condition than we found it.
- An enormous amount of GIS and incident management data for San Diego county and surrounding areas was processed and is now delivered and available for local authorities and the community to use.
- Direct assistance during the SA-III event to lifeguards and the California Urban Search and Rescue Task Force (information management, mapping, location services).
- Exposure to a range of solutions and approaches for disaster response and incident management.
- Interoperability training and social networking for local and federal emergency response personnel including local Fire-EMS-Police, FEMA, Red Cross, medical services, hospitals, and the US Marine Corps.

Near the conclusion of SA-III, Miramar College, one of SA-III's several hosts in San Diego, expressed disappointment about their perception of unfulfilled promises by the Strong Angel team. Fortunately, subsequent developments have shown the promises have been kept (or, at least, the promises are under active construction), and the level of local unhappiness is much improved. Such circumstances are understandable in light of the logistics constraints of the Executive Committee before the event and the inability to have a single coordinating voice on each side determining the capabilities to remain after our departure. The website registration explicitly asked that participants assess the possibilities for leave-behinds, and many did. On the last two days, all vendors were again asked to consider what they could leave behind and provide for the local community and emergency services. Many are now examining what they can contribute as a follow-up to the event.

> ***Recommendation:*** The Strong Angel team should work to better coordinate leave-behinds with local community authorities. We recommend identifying a Strong Angel Executive Committee member for liaison with the local community, leading discussions about the ethics and expectations of local improvements, the timing of such capabilities and deliverables, and the method for transfer at the end of the event.

END CORE REPORT

Annex 1: Mission and Vision

Strong Angel

Mission

Strong Angel demonstrations are neutral laboratories for the development and evaluation of tools designed to assist in global responses to populations in crisis. Each demonstration incorporates principles of inclusion, cooperation, reliability, accessibility, simplicity, and creative synthesis while maintaining a dedicated focus on the population served.

Vision

Strong Angel will become an incubator for ideas that help improve our global responses to man-made and natural disasters. We will nurture ideas and solutions that are flexible, inclusive, impartial, reliable, resilient, and which build trust. We value open standards and the development of tools and technology that can simply and effectively share information and knowledge in difficult circumstances. We are sensitive to the complex needs of populations affected by violence and disaster and seek to develop capabilities that transform antipathy, antagonism, and desperation to cooperation toward goals held in common. We are guided by a Do No Harm ethos and strive to develop solutions that strengthen humanitarian response cooperation, bringing assistance to communities in need through the supporting of resilience, self-reliance and self-determination wherever such independence can be encouraged.

Annex 1: MANIFESTO

Although each are useful in their place, the Strong Angel team values:

Social interactions over processes and tools

Inter-personal trust over policies and procedures

Cooperation over coordination

Agility over planning

Simplicity over complexity

Reliability over capability

Interoperability over features

Inclusive over exclusive

Holistic over insular

Annex 2: Strong Angel III Summary Recommendations

Strong Angel III (SA-III) is described in detail in the Core Report, but included here are brief thoughts and recommendations that summarize the highlights of the demonstration from the Strong Angel team's perspective. These recommendations assume familiarity with Strong Angel and the Objectives within the demonstration (Annex 5).

There were a number of significant successes within Strong Angel III, but there were also failures, non-starters, and squibs with a bright flash and no substance. After filtering, here are a few items we find worthy of further pursuit.

Note: These are NOT listed in any significant order. We consider them to be too wide-ranging to have such a linear arrangement imposed meaningfully.

Should there be interest in further pursuit of any of the topics listed below, information can be found on the website www.strongangel3.net or from Eric Rasmussen at +1-360-621-3592, and RasmussenE@gmail.com.

1. **The Ghani-Lockhart Framework (GLF) for Failed State Reconstruction**
    a. In our opinion, this is a very substantial body of effort toward the orderly reconstruction of failed states. The GLF is now reportedly improved through Ghani and Lockhart's participation at SA-III and exposure to resources and ideas that were helpful in the further development of their pragmatic State-building tools. Our opinion is that this effort by Ashraf Ghani and Clare Lockhart may eventually become Nobel-quality work in the systematic, effective and measurable reconstruction of failed states. The benefit to be derived is almost incalculable and deserves significant support at the policy level.

2. **Solar Energy Efficiency Design**

a. A very interesting new solar-energy system design was described which reportedly provides a 4-fold improvement in the efficiency of solar-derived electricity over conventional solar engineering. That would make solar competitive with grid-power in many locations. The method was described in detail to two senior science faculty members at San Diego State University (under intellectual property constraints) who reported that the technical aspects were feasible and "likely to make a major contribution in that field that will change the world." Research assistance is needed, and probably from multiple institutions, but this seems worth pursuing. Please contact Eric Rasmussen for further information.

3. **Hexayurts**
    a. A surprisingly interesting temporary shelter, a Hexayurt, that costs about US $300 appeared on the site as a part of a comprehensive family support unit that included gasification stoves, uniquely small composting toilets, and other items involving low-impact and sustainable support to displaced populations. The Hexayurts, brainchild of Vinay Gupta of Scotland and featured in the Architecture for Humanity publication *Design Like You Give A Damn*, are created from conventional laminated insulation and built on site with scissors and duct tape. Initially ignored on the SA-III site, participants gradually drifted in to one of them and stayed because it was a bit cooler. Eventually an Afghan NGO built one itself next door on the Strong Angel Plaza and used that as their base of operations, decorating the doorway with photographic examples of where such a shelter could work. Hexayurts weigh very little and can be lifted by a single individual, can be anchored firmly to the ground, and can last for 5 years. Several were built on the site in an afternoon. Florida Emergency Services is evaluating them for disaster response, and that effort should be tracked.

4. **Desalinated Fresh Water**
    a. The AquaGenesis Project has developed a remarkable sea-water desalinator, producing large volumes of very pure fresh water from seawater using waste heat from any source (HVAC, combustion, solar stills, and more). A set of 20 units (in total, roughly the size of a large room or, in this case, a loading dock), when provided with heat and seawater, can produce a half-acre foot of fresh water every 24 hours—about 163,000 gallons. For Strong Angel we had a single unit,

roughly 4 ft x4 ft x10 ft, and it supplied all of the water we required for cooking and drinking for several hundred people a day for all 5 days. Such a capacity is unprecedented in our limited experience, and this may represent a breakthrough in the provisioning of clean water to populations in need.

5. **Toozl**
    a. The One-Ounce Laptop (Toozl): A common requirement in any remote area is the need to take advantage of any communications capability found. Toozl was designed to take advantage of modern capabilities in both hardware and software to ensure the presence of all required response informatics (software applications, references, prior documents, and a place for new work) on a USB drive.
    b. Surgeon-Captain Peter Buxton, a Royal Navy radiologist and the Tri-Service advisor in Telemedicine for the United Kingdom Defence Forces, was a participant within SA-III. He also serves on the NATO Telemedicine Expert Panel. He has experience in many corners of the world and has personally suffered the frustrations associated with remote Internet cafés.
    c. Dr. Buxton designed and constructed a USB drive with a complete suite of free and open-source tools selected for their comprehensive utility in any remote area for a broad range of needs, including disaster response. The applications are installed on a menu system that is itself very easy to use and to modify and is also open-source and free.
    d. Dr. Buxton used Toozl on the Strong Angel site to get work done on a daily basis, and he took the opportunity to make minor changes based on that field experience. He then released the entire Toozl package to the world.
    e. Toozl now contains more than 40 applications, including a comprehensive Office suite that reads and writes files compatible with Microsoft Office standards, email, shared calendars, a web browser, a web server, database management tools, VOIP software, graphics viewers and editors, FTP uploaders, media players, backup software, zip file managers, and websites downloaded and captured intact on the USB drive. All free, all current versions, no licenses.
    f. Toozl is a 170Mb file when zipped for transport and installation, and it unzips to fill about 340Mb. It is available at no charge on several Strong Angel sites and has

remarkable utility. We recommend deploying Toozl on USB drives with anyone who might need to do effective work in limited circumstances. Each member of the Strong Angel team, for example, is now carrying a Toozl stick.

6. **Second Life**
    a. Second Life is a virtual world developed by Linden Labs in California. It falls into the class called Massive Multi-Player Online Persistent Worlds, and that name is an adequate description. It currently contains something over 260,000 members, and basic memberships are free. While there are many persistent worlds of this type (World of Warcraft, Everquest, others…), we selected Second Life because of the richness and flexibility of the development platform and because of the interesting economy developed for the world. We are not alone in our selection: Second Life now has areas devoted to collaborative computer software design, emergency management training for paramedics, Post-Traumatic Stress Disorder therapy for Iraq war veterans, and many other unexpected classes of interest. One opinion from a respected software developer on the Strong Angel site was that Second Life is good enough to show what Web 3.0 should look like.
    b. Within Second Life, we designed an Island (the unit of land ownership in Second Life) to be a meeting space for global conversations on humanitarian issues. The theme of the island we developed was classical Greece, and there are multiple meeting areas that can be recognized as familiar classical buildings (the Parthenon, the Temple of Athena, and so forth). Each holds a variable number of participants (from about 10 to roughly 40) and has a presentation screen built into a wall. Powerpoint presentations, streamed video, and jpgs can all be viewed at the same time by participants from around the world sitting there as avatars.
    c. Additionally, we have a circle around which participants can sit. Within that circle is a large detailed 3D model of the Strong Angel III site in San Diego. The model sits below the participants, so anyone sitting in the circle has an aerial view of the site from an altitude of about 700 feet. It's high enough to see the entire set of buildings and some of the surrounding land. It's an interesting perspective and helps discussions about the event.

d. We have contracted with Second Life to have that island for a year. If, by that time, we've not found an interesting and effective use for the site, we'll let it go, but those who have seen it (and the virtual world it sits within) have been intrigued.

7. **Simple Sharing Extensions (SSE)**
    a. A new method for bi-directional exchange of information, called SSE, expands on RSS as a method of synchronization between disparate systems. It was invented by Ray Ozzie (now Chief Software Architect for Microsoft) and released as open source to the public domain in late 2005. It's a new and undiscovered capability and has extraordinarily broad and deep implications for transboundary data sharing. SSE was implemented on site and proved effective for the purpose designed. We used it in several locations and linked tools that had reportedly never been linked before (including five separate GIS systems). SSE is free and open source software, available as a free download from the web, and invented by the same exceptional intellect that developed Lotus Notes and Groove. The tool is broadly useful for a key and common communications requirement and, in our view, it deserves a very close look and wide implementation if the first impressions prove accurate.

8. **Sahana**
    a. Sahana is a disaster logistics management tool developed by a team of Sri Lankan students during the response to the tsunami in early 2005. In brief, the students recognized both the need for the logistics tracking capability and their collective strengths as programmers and developed a suite of software tools. They later elected to release the software globally as open source and as a project in humanitarian response support. The idea was apparently appealing and the response from around the world gratifying. The software has been developed as a robust, resilient, and comprehensive tool for disaster management using some very good thinking from around the planet. It has become so good that Google selected it as a "Summer of Code" project, and the UN relief agencies are considering it for general deployment as their core tool for disaster response.
    b. We flew the lead for the original team (Chamindra da Silva) in from Sri Lanka to San Diego for SA-III and requested development and programmatic support for

Sahana from the other software engineering teams on site. Our request was that they address the Sahana team's concerns regarding their needs in further development and to offer responsive thoughts on robust, reliable, and functional improvements that could be developed within the week.

c. It went well. Chamindra was quite pleased and, in fact, on the last day of the demonstration, Chamindra received a request that Sahana be brought to Beirut to assist in the coordination of the post-conflict response. He is reportedly in Beirut as I write, and the enhancements to Sahana went with him.

d. Sahana is becoming a standard for global disaster logistics coordination, and we added some tools on-site that make the further use of the system even more likely. Sahana is free, open-source, web-based, and installed in several Strong Angel III locations. We're watching real-world support efforts on it, by invitation, every day, and the system works as designed. We recommend consideration of Sahana as the default tool for those who require disaster support coordination across the civ-mil boundary during a humanitarian response.

9. **Community Journalism**

a. Dan Gillmor (formerly technology editor for the San Jose Mercury News—the newspaper for Silicon Valley) and David Thorpe (formerly of Random House and Disney, now with Young and Rubicam) developed systems and tools designed to increase the information flow between a stricken population and the central authority responsible for their care. It is a carefully bi-directional system, striving to reduce rumor and increase effective response, actively engaging the population in the process of their own disaster relief.

b. Gillmor and Thorpe were also working closely with Ghani and Lockhart to develop methods for re-establishing trust between a population and the authority responsible for them. Gillmor knows the methods for effective "citizen-journalism," and Thorpe knows how to produce ethical, informative, and responsive messages with intended force and impact, from an authoritative source to an audience and back again. In Strong Angel III, Gillmor and Thorpe were intermediaries for information flow, while Ghani and Lockhart were architects of state-building, disaster reconstruction, and effective disaster responsiveness. Each

helped both sides by tapping the needs and impressions of the affected population through disaster reconstruction planning and community engagement. In our view, over the long term this may be one of the most interesting and useful of the experiments that unfolded, and their work should be widely evaluated.

10. **The DRASTIC-GATR Inflatable VSAT Antenna**
    a. The DRASTIC-GATR antenna was an inflatable, oversized beachball, about 12 feet in diameter and weighing about 60 pounds in a backpack. The antenna is protected within the ball's skin, which also is coated to reflect and concentrate the available signal. It was carried in by a single individual, easily inflated with a foot pump, and provided T1 capabilities to the Hexayurt. Remarkably clever technology, it was reliable throughout the week. Several of us are in conversations with the GATR team regarding deployments, and we recommend them for consideration.

11. **Arabic Spoken Translation**
    a. There were several tools brought to Strong Angel that allowed translation from one language to another in near-real time. Each had limitations, but the limitations were less onerous this year than in past years, and the capabilities are now becoming good enough to be of meaningful assistance.
    b. Virage showed two efforts we found interesting and potentially worthwhile:
        i. Television broadcasts from Hizbollah in Lebanon (Al Manar, by satellite to the SA-III site) transliterated from spoken Arabic to Arabic text, then simultaneously translated from the Arabic text to readable English text. While clearly imperfect, it was more successful in deriving the gist of the article than we'd expected, and we found it of genuine use.
        ii. We took the same translation engine and connected it by radio to an Arabic speaker in the field. The Arabic speaker was in a Border Patrol vehicle sitting on the Mexican border roughly 15 miles to our south (Scenario: found crossing illegally—high-interest prisoner—no English—urgent need for translation). It was possible to extract meaning from the radio-based translation, and we were able to make decisions with greater information

than if we'd not had the translation. In our view, this capability is worth further pursuit.

c. There were other translation tools on site, but our assessments are regrettably incomplete due simply to the distribution of time and staff. No slight is intended, and we'll enlarge upon the other tools when we have a chance to learn more.

12. **GM Hybrid Disaster Relief Vehicles**

a. Reliable power is a constant problem. For SA-III, we had new production pickup trucks designed with a hybrid engine (both an electric motor and a highly efficient gasoline engine) with a 2.4 kW generator built in to the body of the truck. There were standard electrical outlets in the bed of the pickup producing clean 120v 60 Hz power, and we used the trucks to power lights, radios, and computers 20 hours a day, running on a low idle. A full tank of gas (perhaps 20 gallons) lasted about two days, producing power 14 hours a day. The noise was minimal and, we found, if the gasoline runs out and you don't hear the idle stop, the batteries will continue to provide power until the entire vehicle is dead. Fortunately, jumper cables late one night worked fine.

13. **HAM Radio**

a. Amateur radio was successful in providing local, regional, and global communications from the first hour of the demonstration. Our opinion is that they are not appreciated enough for their robust and reliable capabilities in a difficult environment. HAM communities do disaster support all over the world and should be more generally incorporated in disaster planning. There is an effort starting to do that, but it needs better structure. See Annex 3 below for greater detail.

14. **VSee Video Teleconferencing**

a. We were successful at using VSee as a low-bandwidth solution for VTC in several locations, including more than 2 hours from the open balcony of Building 557 next to the San Diego airport to the Aerospace Center in Chantilly, Virginia. Cheap, encrypted, low-tech, and reliable. From our perspective, it's a useful technology for the field, and we've found it equally useful from a hotel room.

15. **Microsoft SPOT Watches**
    a. SPOT watches are a wristwatch technology that can receive broadcasts over the FM band. Multiple watch manufacturers have SPOT watches available, and the FM media distribution method already exists in more than 200 US cities. The standard MSN service supports transmission of messages based on subscriptions (e.g. news, weather, etc), as well as from MSN Messenger users. For SA-III, the SPOT team developed an SMS gateway that allowed users with cell phones to send text messages to groups of SPOT users. Although SPOT supports wide-area broadcasts, as well as messages targeted at individual wearers, the group messages were the most useful. We divided the staff into groups of Communications, Medical, NGO, Executive Committee, and Security. We were, for example, able to silently notify all Security staff of events as they happened on-site by vibrating their watches and displaying a message. The capability, which is encrypted in transmission, seems broad and robust, and several participants developed interesting uses to pursue in the field while they were present at Strong Angel. The SPOT team heard those suggestions for other unique application possibilities and the development is expanding.

16. **Codespear**
    a. Codespear is a unified notification gateway developed through Bell Canada that allowed multi-cast group messaging from a laptop to SMS, voicemail, cell-phones, email, SPOT watches, and multiple radio frequency bands. Very successful. It was used all day long and seems worth expansion.

17. **Geolocation through Boost Cell Phone Modifications**
    a. Boost phones (ordinary cell phones, very cheap, non-contract, pay-as-you-go) were modified for geo-locating through software that used several methods for grid determination. Several of us carried the phones and, at any moment in the day or night, could call the tracking lab and ask where we were. The answers from the map were quite reliable. Such a capability is broadly useful, remarkably inexpensive, and easily implemented. With software written by Tim Murphy at Autonomechs, we did it in an afternoon.

18. **Small-Form-Factor Data Collection**
    a. We used work performed by Blueforce Development to design tools for data collection using PDAs and Smartphones. The development time from "concept" to "live submission from the field" was roughly four hours. We had not seen anything comparable before, and this capability has broad utility.

19. **Golden Halo Field Support:**
    a. Golden Halo is a small company that perceived a need for field support for disaster response staff and decided to pursue a solution. They have designed a combination of field kitchen—communications nexus—safe haven—communal gathering place, using custom-designed trailers complete with tents, sleeping bags, 24/7 coffee and snacks, three hot meals a day, and satellite access.
    b. Although beset with sequential impediments when getting to us, they still arrived on site and worked rapidly and effectively with the local community to provide sustenance to the Strong Angel participants.
    c. Such a capability, specifically designed for difficult environments, is uncommon (actually, unknown to us) outside of the military and is frequently needed. The persistence of the company, led by Gary Baker, to deliver on their promises to the best of their ability was also noteworthy, particularly since they provided everything they could at no charge (this time) to the Strong Angel community. We found them admirable and effective and would actively seek their assistance in a real-world event.

20. **Deployment Kits**
    a. There were several contributions toward deployment kits that were thought to be exceptionally suited to almost any circumstances:
        i. Pelican 1650 cases with foam dividers and lid mesh (personal gear)
        ii. BGAN portable satellite terminals
        iii. Arc'Teryx Sidewinder SV cold-weather jackets

iv. Leatherman Charge XTi multi-tool

v. Thuraya sat-cell telephones (outside of North America)

vi. Grundig hand-crank AM-FM-Shortwave radio, with LED flashlight and USB battery charger built in.

vii. Cocoon silk hot-weather sleeping sheath (6 ounces)

viii. REI Bug Hut portable shelter (17 ounces)

ix. Pelican StealthLITE 2410 LED flashlight

x. Blackhawk ALERT rolling duffle bag (team gear)

xi. APC 350W automobile power inverter 12v DC to AC 120v, 60hz

xii. Garmin Rino 530 GPS-enabled GPRS two-way radio

xiii. Powerfilm F15-3600, a 60-watt solar charger: 3.6a, 15.4v, 2.6 pounds

xiv. Kingston 4G USB drives with TOOZL (latest build) installed.

xv. A simple single-line telephone (or headset) for use with a BGAN unit.

xvi. EDGE or EDGE style card

b. We also developed a disaster-support laptop design, with informatics support tools for any field requirements we could devise. That design is available on the Strong Angel website for download.

21. **Boosting immune competence**

a. Many interesting topics not directly addressed within the Strong Angel demonstration appeared during the preparation or aftermath. As an example, one suggestion coming to us for responding to the avian influenza scenario was to increase population-based immune competency as a method for reducing epidemic spread. Several natural and inexpensive substances have demonstrated effectiveness against a wide range of pathologic agents, and this possibility was discussed with Anthony Fauci at Davos last January. The initial possibilities suggested include mushroom extracts from *Fomitopsis officianalis*,(significant anti-viral properties based on studies at the US Army Medical Research Institute of

Infectious Diseases, 2005), L-glutamine+PAK (piridoxal-α-ketoglutarate), standard antioxidants, and other inexpensive supplements that appear to have benefit in peer-reviewed research and are unlikely to cause harm. As far as we can see, there is not much effort expended on research toward making a vulnerable population more resistant to illness. Given the difficulties in mass vaccination and mass care, such investigations seem warranted.

22. **Ethical Oversight**
    a. On the site we had an individual dedicated to assessing the ethical aspects of the objectives and the associated experiments. Dr. John Francis is the United Nations Goodwill Ambassador for the Environment. He spent the days at Strong Angel reminding participants of their focus on affected populations and offering (requested) advice on the Right Action of leaving the idea of competition behind when a part of a coordinated disaster response.
    b. There are, to our knowledge, no other events where an ethics advisor is a core part of the demonstration, ensuring that political, corporate, personal, and religious agendas are put aside in the interest of cooperation and a larger goal. We recommend such advisors be used more frequently and that attention be given to what they say.

23. **System Dynamics**
    a. Boeing Corporation sent two mathematicians in Complex Systems from its Phantom Works division to the Strong Angel site. Their task was the two-dimensional modeling of the Strong Angel Demonstration, both design and implementation. The model is quite comprehensive and appeared to reflect the system we have used with high fidelity. The results have been briefed at the International Symposium on Organized Learning and were well-received. A copy of the flat diagram can be found in Annex 9.
    b. Having such a diagram may help understand where Strong Angel demonstrations are different from other exercises, tradeshows, or related venues. Having such a general technique available for analysis may also help us understand where venues perceived as less effective can be improved.

c. The model is available in several formats (Vensim, jpg, and ppt) on the Strong Angel website.

24. **Corporate Identities**

a. On the list of impressions we received in the hotwash, one recurring theme was the alteration in perspective between inside and outside; with those who live in cubicles learning more about those who must use cubicle-designed tools out in a cold or hot or sandy or muddy place, deep in a messy and unforgiving world where results really matter.

b. At least two large-corporation representatives (and several smaller businesses) mentioned that lessons painfully learned on the Strong Angel site would alter their internal design methods and so improve their tools for all of their users, not just those within austere environments.

c. As a result of such public statements, several non-corporate participants mentioned their surprise at the honesty, willingness to learn, and responsiveness heard throughout the week from corporations with reputations for a…more aggressive…style. In a very real sense, some corporate identities were modified within the influential set of observers present on the site, and we've seen continuing statements on that topic within post-event email.

25. **Social Networks**

a. As we note in some detail below, many of the most valuable aspects of Strong Angel Demonstrations are found in the people who meet each other across boundaries not crossed elsewhere. We know of a dozen or more professional relationships that have started on the Strong Angel III balcony and are continuing as we write. It is particularly gratifying to see the persistence of conversations across the civil-military boundary, a key goal in any Strong Angel Demonstration. We know of introductions of participants into Iraq, into Sweden, into India, and within multiple agencies of the US government. The conversations are often between those who have genuine value to each other but who would not have met in any other venue.

b. And since it is among the most valuable benefits in any Strong Angel, we'll also note that we all met people with whom we will later work in a real-world disaster. Our mutual engagement will be far more effective with the trust and familiarity we've now established. In our collective opinion on the Strong Angel team, that development alone would justify the event.

26. **Competition-free Environment**

a. There are many places in the world where "technology shoot-outs" are the expectation, since decisions must sometimes be made on which widget works better, faster, and cheaper. We recognize the necessity and value in such venues, but…

b. We would like to argue that there is a valuable place for the elimination of competitive efforts and for the maximizing of cooperation once in a while. The number of problems solved in a purely cooperative venue is far greater than when competitive stovepipes are mandated for long-term corporate advantage.

c. A surprisingly large selection of our participants told us that they welcomed the change and got a great deal done. One senior member of a Fortune 100 company stated "This has been great. We did everything with everybody. How do I go back to my day job?"

27. **Simplicity**

a. We each recognize that we can be easily mocked for such trivial comments, but we're going to make them anyway…

b. <u>Applications are too hard.</u> Many people recognized it and stated it out loud so we will, too. That difficulty leads to fragility—to features that don't work and work that doesn't get done. It also leads to long training and deployment cycles, and then to inertia because it's too hard to re-train. The cost is substantial and perhaps unnecessary.

c. <u>Networks are too hard.</u> Strong Angel III was effectively blind to the outside world for two days. Our networks did not work. We had some of the best network managers in North America on site with us, and we had plenty of bandwidth available (and locally, in the satellite trucks, for example, those resources worked

beautifully), but the area WiFi was not effective for at least 56 hours, for reasons directly related to the very design of the technology.

d. Our communications shortfall proved both a feature and a bug, but it was not planned and was deeply frustrating for a number of people. There were complicated reasons for that failure, and the solutions eventually designed by BellCanada were effective, but the systemic issue is a clear one: networks are too hard and correcting that should be a research priority.

28. **Protect the Data—Not the Networks**

a. Again we learned the value of completely open and unclassified networks and the utility of encrypting the data, leaving the networks accessible to anyone who needs them. In our view, in a civ-mil response environment where resources are scarce, place the networks wide open for access but ensure any confidential material on the network is encrypted. Encrypt data, not networks.

b. A separate issue is protection from Denial of Service on an open network. Our opinion is that capabilities exist to protect against that risk, and the value of the transparency and accessibility far outweighs the small risk of a Department of State monitored system failing.

29. **Protect the Data—Not the Vehicle**

a. One of the several valuable tools we used on the Strong Angel site was the new Kingston Technologies 4 gigabyte USB drives. Although only 3 inches long, an inch wide, and weighing only about an ounce, each drive is large enough to carry an operating system, the entire Toozl suite (see above), the entire Strong Angel reference library, and more than 1000 images. It also, like all USB drives, has no moving parts, is extremely rugged, and was designed to work in any USB port on any operating system. It was an excellent tool and far surpassed the previous USB drives we'd had available.

b. Regrettably, the first version sent to us had a significant flaw. The USB drives that arrived just before the start of the Demonstration had an encryption partition installed that only worked on the Windows XP Professional operating system. That partition could not be altered, despite several emails to the company. On the Strong Angel site, naturally, we had a range of operating systems, including other

Windows flavors, Linux, and Mac, and the drive was described by the company as "unable to work with any of them" because of the encryption partition. Those drives were sent back to the company in exchange for drives with no encryption, and Kingston was helpful and very responsive in the swap.

c. That lesson echoed an earlier lesson from the tsunami response: It is more useful to use system-agnostic data-driven encryption rather than encrypting either the network or the hardware. System-based encryption (rather than data-based) excludes you from collaborating with important partners you need to work with in the field and should be avoided.

30. **Imagery from CENTCOM**

a. A common problem in any disaster response is getting maps and imagery of the affected area. We usually ask for imagery taken both before and after the event.

b. It is unfortunate, but very common, to have military assets collecting useful imagery early in the response, but to have that imagery unavailable to the rest of the response community due to either classified methods, classified resolution, or simply not knowing who and how to ask. Each of those impediments was true during the initial weeks of the tsunami response in Banda Aceh.

c. We addressed that problem fairly aggressively in Strong Angel III with a request from Dr. Dave Warner to General Custer, J-2 at CENTCOM, for the design of a method for urgently retrieving imagery from an area we selected (Jalalabad, Afghanistan), and to have that imagery:

   i. delivered directly to us at an academic institution,

   ii. technically usable (e.g. geo-registered in standard format),

   iii. completely unclassified (publishable on the open Internet),

   iv. in a timely manner,

   v. and at no charge.

d. We succeeded in establishing a method. Just before Strong Angel began, roughly 160 Gb of imagery arrived on a Firewire drive from US Central Command in Tampa. The imagery was of Jalalabad and a circle 50 miles in diameter around the city, as

we'd requested. It was unclassified to the point where it could be released to GoogleEarth as a resource for public display.

e. To our knowledge (and that of CENTCOM), that is the first occasion for such a safe and useful release not directed by higher authority. That internal method (not known to us, we just saw the result) should be codified and released in TTPs for Intel and Imagery specialties.

31. **Communications First**

a. In a previous Strong Angel demonstration in 2004, Dr. Sheryl Brown, then CIO for the United States Institute of Peace (USIP), echoed the statement from Dr. Gary Strong at the National Science Foundation that disaster responses around the world do certainly need to provide water and food and medical care promptly, but they need to provide communications first. A later initiative from USIP was entitled CommsFirst, and there is now a company by that name as well.

b. The point was made again in Strong Angel III: Without cross-boundary communications as a core competency of any response organization (including agencies of the US government), something important will fall short in that organization's response. In many cases the costs—physical, emotional, financial, internal morale, external reputation—would all be less if the emphasis were first on effective trans-boundary communications across all levels and using multiple modes, including simple person-to-person conversation. This remains a significant shortfall and could be remedied through relatively simple and inexpensive methods. The costs accrued in <u>not</u> doing it far exceed the costs of simply getting it done.

32. **Design of a Mesh Website**

a. The community that is Strong Angel has developed into a resource that mandates the very best communications infrastructure we can devise to continue the conversation. Lives genuinely depend on it. In 2006, there are a few non-standard methods available, including our presence in the virtual world "Second Life," but the most common and expected method is a website.

b. Accordingly, the team (particularly John Crowley, working with Suzanne Mikawa, Nigel Snoad, and Robert Kirkpatrick) have designed a remarkable site that recognizes that no single axis of interest exists in Strong Angel. We see clearly that everyone involved in Strong Angel cares deeply about integration, cooperation, and best practices. Many of us are practical field staff who deploy regularly to disasters and need support, or who already live in stressed areas and require ongoing resources, or are within agencies and corporations that provide resources to be taken to the field and must be used effectively.

c. We will, therefore, try to implement the site we've designed for the Strong Angel community to accommodate those requirements, while still using the other deep resources found in existing sites (like ReliefWeb) where we have close connections and a desire for enhanced integration.

d. As always, there are practical constraints: We need a server, some time for development, and fewer day jobs so that other members can assist in the implementation and content. We have the design, but we've no resources to put to it except those available on nights and weekends. Strong Angel itself tapped those assets to almost nothing. Assistance might be very helpful. We'll also note that nothing like John Crowley's design exists anywhere else in the world. We've checked.

33. **Gender Focus**

a. Gender sensitivities have been a recurrent theme since the first Strong Angel demonstration in 2000. We've noted in each event that, around the world, roughly 80% of all displaced populations are women and children. Yet as of Strong Angel III, we still have not adequately planned for the integration of women's voices, despite having exceptional women in leadership positions throughout the site routinely performing key parts of the demonstration.

b. Therefore, in trying to correct that persistent gap, we recommend that, in any disaster planning, in any civil-military exercise, and in any demonstration related to DoDD 3000.05 (including any future Strong Angel demonstrations), there be an emphasis placed on the needs and voices of women within the event. Regrettably,

that has to be formalized. We are not yet to where equality extends to this area as far as it deserves to and that is correctable, but it needs an active effort.

34. **International Focus**
    a. Our internal opinion from the Strong Angel team is that there was not enough international integration in this demonstration. We did have presence from Sri Lanka, Singapore, Afghanistan, Honduras, China, and the UK, but the effort was a mixed bag and confusing to the participants, who viewed anything in San Diego as having a domestic focus, despite our protestations (and website) to the contrary.
    b. We formally recommend that no further Strong Angel demonstrations take place anywhere within North America. If this existing team is involved again, for example, we'll select an area overseas from the list of volunteer sites that have been offered over the past weeks. Some of them are listed lower in this document, and none are on this continent.

35. **Personal Data Protection**
    a. In any disaster response, collection of personal information is a critical component of the linking of displaced families, necessary medical care, employee benefits determinations, and other helpful resources. Such information collection has been a standard part of relief operations since the International Committee of the Red Cross efforts during the First World War.
    b. However, in this new millennium, even benign information can be used in unsavory ways, and its collection and management needs to be considered carefully. That conversation is just beginning, and we think it is both timely and a worthwhile topic.
    c. Peter Buxton notes it is perfectly possible to have proper protection of personal data during a humanitarian crisis or when undertaking telemedicine but only if it is considered in advance and built into the technical solutions (software) and management methodology that is used. It behooves everyone involved, both software architects and those who formulate policy, to consider the right of

individuals to protection of their personal data. This should be an integral part of pre-planning and not an ad hoc addition to an existing system.

d. The first iteration of a data protection model should consider standard rules already in place. Once those are understood, they can be considered for modification.

e. Examples of data protection principles:

    i. Using the UK standard, data should be

        1. Fairly and lawfully processed
        2. Processed for limited purposes
        3. Adequate, relevant, and not excessive
        4. Accurate
        5. Not kept for longer than necessary
        6. Processed in line with the rights of the subject
        7. Secure: Technical and organizational methods are required.
        8. Not transferred to countries without adequate protection

    ii. Caldicott Principles for Medical Information

        1. Justify the purpose for which the data is collected
        2. Do not use personally identifiable information unless it is absolutely necessary
        3. Use the minimum personally identifiable information possible consistent with the purpose for which it is collected.
        4. Access to personally identifiable information should be on a strict need-to-know basis.
        5. Everyone who handles the data should be aware of their responsibilities.
        6. Understand and comply with the data protection law.

36. **Better Than You Found It**

a. Any time an exercise or demonstration is held, or a disaster response is performed, or a refugee camp is established, or a failed-state reconstruction is initiated, our impression is that the place should eventually be better than we found it, and that should happen directly as a result of our efforts when coupled tightly to the efforts of the population we're serving.

b. In Strong Angel III, for example, we entered into Memoranda of Understanding with several local agencies that needed assistance that we could provide, in exchange for our using their site for our demonstration. That seemed fair and helpful to both sides, and all agreed.

c. That site improvement is underway, and many tools used in Strong Angel have been donated to local disaster, fire, ambulance, lifeguard, and police services for their extended use, carefully registered as on loan from San Diego State University.

d. The items cannot, apparently, be simply donated to those emergency services providers—despite their small budgets and overworked staff—because there is a level of accountability at the Federal level that puts a deeply onerous burden on those who must track such items—despite their use by public servants.

e. We have two recommendations:

    i. Our first recommendation is that federal law be evaluated, looking for better ways to ensure that the exceptional effort and support we've received from local domestic response agencies (police-fire-EMS) can be returned with gratitude through a simple donation of equipment from the event to those who can continue to use it effectively.

    ii. Our second recommendation is that we incorporate into any disaster response planning recognition that we have resources as a nation that far exceeds any other. That when we elect to assist somewhere, we should choose to go in to the response with a sensitivity to those who live there, integrating them into every deterministic conversation, and offer to assist them in their own rebuilding of their society using the most distant and non-obtrusive methods possible. This requires a deeper discussion, but there are recognized tools in reachable places that can help with

reconstruction efforts along culturally responsible, financially reasonable, and ethically sustainable lines.

(END Summary)

Annex 3: HAM Radio Results and Recommendations

Amateur Radio Demonstration in Strong Angel III

Gary W. Strong, AI4IN (*ai4in@arrl.net*)
Murry Gavin, AG4BJ
Ray Bryant, N6RBY
Matt Runyan, KG4MYD
Jeff Strong, KI4QCQ
Art Tolda, W1AJT (Bell Canada Summary)

Operational Objectives

The objective of the use of amateur radio in the Strong Angel III demonstration follows primarily from the task assigned by the Strong Angel director, CDR Eric Rasmussen, USN, during executive planning, that is:

> **"HAM radio integration and management, #26**: Communication systems break down in disaster situations, however ham radios remain a relatively archaic, yet versatile and reliable, technology. They can operate virtually anywhere, anytime, and are often used in conjunction with other cross-communication technologies during emergencies and major relief operations."

Additional objectives were to be augmented by amateur radio where possible. Specific such objectives noted by event planners were: **"Urgently reach out to civil-military network for continuing conversation, #05;" "Hook up the city's key infrastructure with urgent power and communications, #06;" "Establish effective multi-modal trans-boundary communications, #08;" "Inform everyone of everything important, #18;"** and **"Civil-Military radio management by protocol, #23."**

The main objective, #26, was met, particularly in our being first to make a confirmed contact out of the site after a cold start on the morning of the first day and in our use of WinLink 2000 to support email traffic all week long. The other objectives were assisted primarily in our participation as the communications link between the main site and forays outside of the site to regional hospitals and other locations.

Conclusions

Amateur radio again demonstrated its ability to provide useful, and in some instances the only, communications available under field conditions using off-the-shelf equipment, TNC's, and antennas. Comments by a representative from the local Urban Search and Rescue unit at the final debrief says it all. When she listed things that worked, only two items were mentioned and one of them was "ham radio."

Things That Worked Well and Lessons Learned

At the start of the exercise we had three different contingents of operators on the site who had never met before. Not long after the "go signal" was given, the two groups at the core site were able to find each other, (by noting activity erecting a G5RV antenna from the roof of a building) and quickly combined resources to form a consolidated team. Other amateur operators at the demonstration, of which there were many, noted the antennas and

equipment and stopped by to talk, and volunteered to join the team. A third team from Bell Canada chose to set up at San Diego State University to the west of the core site where they established a DX QSO capability on the top of one of the campus buildings. From this site, they made several hundred contacts, many of them international, but they did not participate in the operational activities of the core site that are described here. They did, however, contribute thoughts on the effectiveness of their site and those are inserted here:

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Bell Canada Summary from Art Tolda, broadcasting offsite from San Diego State University:

Practical Recommendations

- *Amateur radio needs to be included in first response.*
- *Communications response vehicles should have a licensed amateur radio operator as part of their unit with amateur radio equipment incorporated into their technical package.*
- *The interoperability Bell demonstrated with our partner Codespear should be incorporated to provide a seamless emergency communications environment.*
- *Military personnel need to have tactical "cookbooks" in order to operate their communications equipment effectively.*
- *Complex communications response units like the one from the Marine Corps need to have some staff consistency. The individuals need practical radio training and cannot be transferred in and out and expect to be effective.*

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Further thoughts from the On-Site Team:

Handy-Talkies

Even before "official" command and control was established, amateur operators were being deployed on some forays out from the core demonstration site. In all cases for forays to remote locations where radios were used, they were handy-talkies (HT's). Simplex mode was

used whenever possible, but local repeaters were also used as a secondary mode of operation. When it became known that amateurs with handhelds could provide non-cell phone contacts back to the foray control center, amateur operators from our team were asked, to the extent they were available, to accompany forays and to report back at 15-minute intervals regarding their status. If this operational use were pre-conceived it would have been better to put higher power mobile units in each foray vehicle with a mag-mount antenna on the top of each vehicle. Since HT's were used in this exercise, it became necessary to find a local 2-meter repeater with no traffic, having the coverage to support foray communication back to the site. One repeater used in the late afternoon had heavy Spanish-language usage from locals and could not be used. Another repeater had heavy interference in the morning by ducting from a repeater near Los Angeles. A third repeater was quite useful in power and coverage, but failed during the operation, only to return to normal an hour or two later, this in spite of acquiring permission in advance from the repeater operator. San Diego's regional repeater coordination plans call for emergency operations to have a reserved channel pair for temporary repeater setup and use. Establishing a dedicated exercise repeater capability could be important for any such future operation.

WinLink 2000

HF-email using WinLink technology proved to be very successful partly because two of the team members brought PACTOR-III modems and there was a local Participating Mail Box Office (PMBO) not more than a mile from the core site. The local station wasn't a requirement, however, since several different WinLink PMBO's in different locations up the Pacific Coast as far as Washington State were accessible by the team at one time or another. During the second day of the Strong Angel III exercise, when wireless capability failed at the site for nearly the entire day due to RF congestion, the ham team was sending and receiving emails at will. This capability was enjoyed throughout the week-long exercise.

Antennas

Several different antennas were used during the week-long operation, including several rooftop mag-mount dual band (2M and 70 cm) whips, a G5RV strung between rooftops, a linearly-loaded dipole configured as a sloper from one rooftop, and a screw-driver antenna mounted on a tripod outside of the plaza area of the core facility. Using a software-defined

radio with a 40 kHz wide spectrum window over each band, we detected on all ham bands both a very high level of ambient noise (at least 20 db above “normal” noise levels) and many inter-modulation products. The plaza area appeared to be a “snake-pit” of RF signals reflected back and forth between the buildings surrounding the plaza. The screw-driver antenna outside the plaza perimeter demonstrated far less ambient noise. Using a Yaesu FT-897 transceiver, there were only random bursts above Signal strength 0 on most bands with the screw-driver antenna outside the perimeter, but with the same transceiver connected to the G5RV inside the perimeter, the ambient noise in all bands became a solid Signal Strength 7 to 9 on the same transceiver in the same bands.

The G5RV was evaluated in dipole and in an inverted vee configuration. On 40 meters, initially there were some issues with getting antenna to properly tune. Coax feed line length was changed and this eliminated the tuning issue on 40 meters.

Power Supplies

A 24-amp switched power supply provided part of the power for one HF rig, but occasional peaks of SSB phone would cause it to go into protective shutdown. Two small 12-volt deep-cycle batteries were connected in parallel to this supply, which made the combination able to provide for peaks of current at 100 watts of SSB phone operation. Two other 20 amp supplies were also used without batteries for HF and VHF/UHF radios and no issues with shut down were noted.

Most of radios, power supplies, TNC’s and other devices were equipped with Anderson Power Pole connectors. This appeared to be very useful in that it provided a compatible power connector for devices from different manufacturers. These connectors are also recommended for use by ARES.

The switched mode power supplies used were only rated to run from 120 VAC 60 Hz. This is fine for use in North America, but it’s recommended that auto ranging supplies operating from 90-260 VAC 50/60 Hz be used. This would accommodate deployment to off shore or other locations were 120 VAC 60 Hz power may not be available.

Handling Message Traffic

Taking advantage of materials on hand, when ham operators were asked to accompany forays, a 3 x 5 card was issued with primary and secondary frequencies, PL tones, repeater offsets, tactical call signs, call in intervals and other information needed. The back of card was also be used for taking notes while on foray. This appeared to be useful, but some pre-printed paper would have been more useful. Just having simple 3 x 5 cards, sticky notes, spiral bound note books, and an assortment of pencils and pens proved valuable at several times during the demonstration.

For passing messages with the core demonstration site, we used an on-the-fly modification of National Traffic System techniques. Since all communications were local and between operators on forays and control operator, usual messaging address information was not needed and not used. Message “begin” and “end” phrases were used along with message content in short sections with “break” between sections. Each section between “break” was verified by the control operator for accuracy. Usual formatting for numeric data was used. Some preprinted forms along with a software version of form are recommended for future use although we did find spiral notebooks and sticky notes worked fine.

Use of Tactical Calls

Tactical call signs were issued for each foray tactical call signs are easier to use and track than ham radio call signs. Although tactical call signs were used to identify forays, radio call signs were periodically used to insure compliance with FCC station identification regulations. One recommendation is that if a mission number is assigned to a foray, then it is recommended that this mission number be included in tactical call sign. This may eliminate one source of error in mapping tactical call sign to mission number as we did in this exercise.

Lessons for Future Demonstrations

Mag mount antenna greatly improve coverage of HT for both simplex and repeater operation and the use of a power adaptor that can be plugged into a car’s auxiliary power socket would extend HT battery life and may increase power output from some HT’s. When running simplex, one also may need to get creative in finding a location that provides coverage. Tops of parking decks work great for gaining coverage since parking decks almost always allow

public access even if by foot. Also look for things like microwave and cell sites and go to these locations. RF engineers have already determined that these sites provide good coverage and one should take advantage of this.

A kit of many types of RF connectors and adaptors, fuses, crimp-on lugs, and power pole connectors was also available on site. This proved value for our ham radio operation, but once word was out, we had others stopping by to borrow items they'd forgotten or overlooked.

It was noted that it was easy to accidentally press a button on radio, especially HT's, that would change the frequency or other operational parameters. Almost all radios have a way to lock buttons to prevent accidental changes like this. It's recommended that users learn how to activate lock feature and use them to best advantage.

We did have soft copies of all radio and other equipment manuals along with installable versions of all software used on a PC. This was very useful, but we had a potential single point of failure. It is recommended that in addition to have this information on PC, that it also be available on CD ROM and/or USB memory chips. USB memory devices are also very handy for exchanging information between PC's without setting up a local network, especially since most PC's no longer have floppy drives installed.

Labeling and kitting of equipment is also recommended so that people who may not be familiar with equipment and interconnecting cables can still successfully get equipment into operation. For example, power cables should have a tag saying make the model of radio they connect to. For things like a TNC that have multiple cables, mating plugs and jacks should be clearly labeled and, if there are optional cables based upon radio type, the radio type must be clearly indicated. Jacks on radios should also have legible labels added to facilitate station set up by those unfamiliar with the equipment.

The location of operation for amateur radio at the core Strong Angel site had a very high level of audible noise from a variety of sources such as:

- Multiple AC power generators
- Located out doors near the end of an active runway
- Several ham and non-ham radios working in close proximity

- Significant foot traffic and conversations all around

With all of these noise sources, if was difficult to copy received traffic using speakers built in to radios. Headphones and high quality commercial communications grade external speakers were tried with both making a significant improvement in ability to copy traffic. Powered PC grade speakers were also used; but they were subject to RF ingress. It's recommended that headphones and/or external speakers be included in any disaster kit.

There was a large contingent of organizations at Strong Angel III with various mapping solutions. One thing that was missing from all these maps was the location of existing amateur repeaters and their coverage areas. Suggestion would be to see if we can get some repeater coverage data from area frequency coordinators to see if this can be overlaid on maps used for response coordination. Frequency coordinators should be using RF coverage modeling software that should be able to provide this information. We did try APRS (Automatic Position Reporting System), but such activity appears to be limited in San Diego area. This technology, if connected via an Internet gateway may be useful to allow others to track assets and operator status in near real-time.

It was requested by Strong Angel coordinators that we try to implement IP connectivity via VHF ham radio, which is certainly possible, but due to time constraints, it was not possible to accomplish. This is an item that should be configured and evaluated for possible use at future events.

Various commercial video devices were also very prevalent at the exercise. To assist in those types of demonstrations, amateur TV may be another item to evaluate for inclusion in ham kits. Both analog and digital versions should be evaluated.

Other Experiments Tried

- Radio control over IP
- Salt water batteries
- Linear loaded dipole

A 2 meter radio was connected to the Cisco® Interoperability and Collaboration System (IPICS) via a Land Mobile Radio (LMR) gateway to demonstrate the control of radio using voice over IP technology. This allowed the radio to be heard and controlled from any location that had IP connectivity including wireless IP connectivity. IPICS also allows access radio access via dialup, PC clients, or IP phone sets. Radio channels can also be interconnected at VoIP level to provide interoperability between incompatible radios. This is well proven technology, that maybe useful in some instances. Caution in configuration is required to insure that amateur radios can only be accessed by properly licensed individuals or under observation of a control operator.

Salt water batteries, about the size of a motorcycle battery appeared to be a promising power source since they were supplied dry, had field replaceable plates, and only required salt (sea) water to activate. Actual performance was disappointing however. Sea water was added to two of the batteries. After a few minutes, one of the batteries was outputting about 6 volts, but the other was bubbling, steaming, and getting hot. Voltage on this battery was only about 300 milli-volts. It appeared that battery had an internal short circuit. Batteries were connected in series to achieve 12 volts to a DC voltage stabilizer. The DC voltage stabilizer had a switch so that 14 or 28 volts could be selected. The switch was not locking so it could easily be bumped and switched from 14 to 28 volts which could cause equipment damage. To be acceptable, a locking switch is recommended. A dual band mobile radio was tested with this supply. The receiver worked fine, but as soon as we tried to transmit, even at lowest power (5 watts) voltage would drop so low that mobile radio would shut down. We then tried to connect to a hand held radio. Again, receive worked fine and the HT could transmit at 1 watt, but even at watt, the measured voltage dropped by about 2 volts. Our conclusion is that salt water batteries will not be suitable for anything other than very low power equipment or to use as a source of power to recharge batteries for HT’s.

The linearly loaded dipole was tried since it promised operation on all ham bands from 10-80 meters, it was only about 2/3 the length of a full size dipole, and it could easily be shipped in a small bag. The antenna was used in a sloper configuration with one end attached to corner of a four story building with the other end attached to a street light pole about 150 feet away at about 10 feet above ground. The feed point of the antenna was about 30 feet above ground. An Icom AH-4 antenna coupler was used at end of the ladder line used to feed the antenna. The AH-4 was connected to an Icom 706 via about 75 feet of RG-8 coax. We were

able to tune antenna on all bands 80-10 meters without an issue. Background noise levels were about same as those seen on G5RV antenna. Received signal strengths from stations again were similar to that using G5RV. The antenna was successfully used for voice contacts as well as for HF email. Due to the high ambient noise levels at this site and generally poor band conditions, it was hard to get a good assessment of antenna performance, however. Our conclusion is that the antenna may be very acceptable for emergency operations if suitable supports are available owing to its multi-band operation.

Amateur Radio Equipment Used

All equipment used in SA-III was commercial off-the-shelf with the great majority of the equipment provided by the participating amateur operators themselves. All software used was “freeware” created by the amateur community and is readily available for download. Since use of this software in most cases results in the transmission of information via amateur radio, software authors may require registration by call sign before downloading or operation to insure that users are properly licensed. Registration is usually “free” and can almost always be done online.

(END Summary)

Annex 4: Civil-Military Discussion Notes

I. Civil-Military Discussions at Strong Angel III

At Strong Angel III, humanitarian relief and development experts from international nongovernmental organizations (INGOs) and the United Nations met with active-duty military officers and government contractors from the U.S. military and international militaries, including representatives from the Office of the U.S. Secretary of Defense and ACT-NATO. Participants held two "gloves-off" civil-military meetings over the course of the week. These meetings were unplanned by the Strong Angel Executive Committee, and were extremely successful in opening dialogue across civ-mil boundaries.

Representatives from the following list of organizations participated in the civ-mil discussions:

- Mercy Corps
- Save the Children
- CARE International
- International Rescue Committee
- ICT4Peace Foundation
- InfoShare
- International Medical Corps
- ACT-NATO (Concept Development and Experimentation, Operational Experimentation Branch)
- Sahana, Lanka Software Foundation
- UNDP (United Nations Development Program)
- UNJLC (United Nations Joint Logistics Center)
- UNOCHA (United Nations Office for the Coordination of Humanitarian Affairs)
- Internews Network
- Microsoft Humanitarian Systems
- SRA International, Department of Homeland Security
- PACTEC (Partners in Technology International)

- Office of the U.S. Secretary of Defense
- United States Marine Corps
- United States Navy
- United States Army
- Naval Postgraduate School
- Naval Health Research Center
- Marine Corps Installations West (MCIWEST), Camp Pendleton
- Asia-Pacific Center for Security Studies
- USJFCOM (United States Joint Forces Command)
- USJFCOM SJFHQ (Standing Joint Force Headquarters)
- USPACOM (United States Pacific Command)
- Royal Navy
- Swedish Defense Research Agency

II. Day 1 Meeting—Perceptions

On Day 1, more than 30 participants from the NGO and military communities sat together in a closed room to engage in "no attribution," honest discussions about communication and information sharing among civ-mil organizations. The group discussed positive and negative perceptions of "the other side," field experiences in Afghanistan, Iraq, Sudan, Sri Lanka, and other post-conflict reconstruction countries, cross-boundary security and stability issues, gender mainstreaming and gender sensitivity in post-conflict and post-disaster reconstruction operations, civ-mil organizational and cultural differences, and the U.S. Department of Defense Directive 3000.05 which states that military support to Stability, Security, Transition and Reconstruction (SSTR) operations **should be given priority comparable to combat operations**[1].

[1] Department of Defense Directive, Number 3000.05, November 28, 2005: http://www.strongangel3.net/files/dod/DoDD300.05.pdf

1. What are your perceptions of NGOs / UN / US Military / other militaries?

NGOs and UN perceptions of US Military and other militaries:

Needs Improvement

Military hears, but does not listen.

Lack of humility.

Inadequate understanding of long-term peace-building.

Lack of gender sensitivity in the military's current approach to civilian interactions.

Overwhelming arrogance. Military often assumes that they know best.

Lack of officer accountability for irresponsible actions by enlisted.

A lack of doctrine and training in the military for cultural education.

Too many acronyms, don't speak the same language as everyone else.

Does Well

Military has a very necessary security function. They protect governments, international NGOs, and the local population.

By and large, the state military is well-trained and responsible.

Military has capacities to augment logistics (power & lift).

Military has communications capacities.

Military is good at logistics.

Military can be extremely sensitive to local issues on the ground.

Force protection for cordon sanitaire.

US Military and other militaries' perceptions of NGOs and UN:

Needs Improvement

NGOs are like a patchwork quilt; no one is the same. Very messy to work with.

Lack of appreciation for military's help and protection.

UN Bureaucracy.

Lack of coordination and communication among NGOs and the UN. Very disorderly.

NGOs are arrogant. They always think that they know better.

Does Well

NGOs have a lot of local knowledge about the region and culture.

Big networks and positive relations with the local population.

Good experience with staff rotation and lessons learned in the field.

There are no "absolutes."

2. What do you want the NGO/Mil to do (or not do)?

Thoughts from NGOs and UN to the Military:

i) Military—Listen. It is powerful to listen and act in response to local needs. The military should try to understand the local culture and not act above the law.

ii) Keep in mind that certain photos and images of the military can be very offensive to NGOs and to the local population. The military should not "market" SSTR operations in one way to the armed forces, and then present another "softer" image to NGOs. Maintain a consistent message to everybody.

iii) Establish a more formalized Joint Civil Affairs Officers program in the US Military under DoD Directive 3000.05 to liaise with NGOs and the UN. There is a time lapse between policy change and output via training. Deploy more civil affairs officers to accompany SSTR missions and MEUs.

iv) Engage with NGO and UN inter-agency working groups, such as:

(1) InterAction.org, http://www.interaction.org/
(2) Inter-Agency Standing Committee, http://www.humanitarianinfo.org/iasc/
(3) See also ISDR: http://www.unisdr.org/eng/task%20force/tf-meeting-10th-eng.htm

v) Military should look into developing a scheme to manage unstructured security forces (e.g. contractors, private security companies). We need very clear labels.

Thoughts from the Military to the NGOs and UN:

i) NGOs – Better collaboration internally, from a cacophony of voices to greater harmonization.

ii) Share the methodologies and best practices from NGO field staff training with the military so that we can learn from you.

iii) NGOs should not ever be perceived as one entity—the same applies to the military. There are many different entities and service branches within the U.S. military, and across national militaries.

III. Day 4 Meeting—The Way Forward

Department of Defense Directive 3000.05

On Day 4, a smaller group of NGO and military representatives met in focus groups to continue discussions started earlier in the week and to discuss implications surrounding the implementation of DoD Directive 3000.05. Participants agreed that finding neutral ground for honest discussions, like Strong Angel III, is a good environment in which to bring together tiered working groups for future discussions (e.g. USAID, U.S. State Department, European Union, United Nations, NATO, NGOs, Militaries, JFCOM), and that apart from a confined dialogue with those present at Strong Angel III, it would be useful to share developments in and within both sectors on a wider scale that impact on each others' work on a regular basis. Everyone agreed that it was extremely worthwhile to mutually continue to explore technology, like those tools at SA-III that could lead to greater civ-mil collaboration and communication. Also useful, and very important in the long term, would be to see how the germination of ideas for collaboration at Strong Angel III could feed into policy dialogues at higher levels.

NGO concerns

The NGOs raised some notable concerns regarding the current status and implementation of DoD Directive 3000.05. For example, how does the U.S. military intend to identify and

approach appropriate entry points in the NGO community and to establish a working relationship with each NGO? Regarding the rapprochement process, some NGOs are concerned that the military may want full disclosure from NGOs about where and when they are operational, which could not only compromise an NGO's relations with the local population but, very often, this information could be used to impose sanctions against NGOs working in certain "off-limits" areas or with certain actors, even though these interactions are absolutely crucial in the specific geo-political context in order to maintain access to humanitarian aid[2]. Furthermore, NGOs are concerned about being perceived as participating in military reconnaissance, as this could wholly compromise their charter and humanitarian aid channels.

One important aspect to consider about closer cooperation between NGOs and the military is managing the perception that both are one and the same – for instance, the perception that in Iraq, UNAMI and the American military are both under the same operational mandate and follow the same operational procedures. This conflation is arguably more detrimental to NGOs. However, certain initiatives of NGOs with sections of the community can be problematic for the military (say for instance, communities affected by the disaster who are armed). In both instances, effective, culturally appropriate communications strategies need to be developed so as to strengthen the ability of the military to do what it does best (power, lift capacities) and to strengthen NGOs to utilize these resources to do what they do best – long term reconstruction.

There is also a strong concern among NGOs regarding the 1) lack of gender sensitivity and 2) lack of understanding about long-term peace-building within the U.S. military in working with the local population. How does the military plan to build trust with the local population through SSTR operations? And likewise, if the military cannot effectively build trust with the local population, then how will it build trust with NGOs whose primary beneficiary is the local man, woman, and child? In his morning briefing on Day 1, Eric Rasmussen reminded all SA-III participants to keep in mind that 80% of a population affected by a complex disaster is women and children. As a statement by Ms. Carolyn McAskie, Acting Head of the Office for the Coordination of Humanitarian Affairs recognizes, humanitarian assistance can only be effective if it is gender-sensitive:

[2] ICT4Peacebuilding "Strong Angel III – Final Observations", August 30, 2006: http://ict4peace.wordpress.com/2006/08/30/strong-angel-iii-final-observations/

While both men and women are affected by conflict, crisis situations have a differentiated impact on them. Conflict and war are not gender neutral. Thus, eighty percent of the internally displaced persons and refugees around the world are women and children. Women are in flight, adapting to life in camps, or are directly caught up in the midst of conflict. In many cases, women and teenage girls in conflict zones are the sole providers and protectors for their families, since most men have either been killed or are away on combat duty. This situation leads to a shift in gender roles with a dramatic increase in the number of women heads of households.[3]

For a more detailed list of NGO concerns, see Section II Question 1: "NGO and UN perceptions of US Military and other militaries."

Relationships are the key

As one participant submitted during the civ-mil meeting, "How can we improve operational communication in the field? Relationships are the key."

Imagine the average 28-year old NGO field worker and think about why she/he left home to live in Country X. Now imagine the average 28-year old enlisted military soldier and think about why she/he left home to live in Country X. Very different reasons, very different outlooks, very different living environments, very different purposes. There is much mutual learning possible, but the obduracy on both sides oftentimes prevents this dialogue. How can we improve cooperation and communication between these two persons? Perception is reality.

Recommendations

Overall, it was recommended that the U.S. military focus on cultural education and gender sensitivity training as part of DoD Directive 3000.05 to improve its trust-building and peace-building capabilities.

The civ-mil group also discussed the question of what is the right entry point within the U.S. military to implement DoD Directive 3000.05. It is recommended to train a special group in the military to carry out the directive, for example Special Forces Officers, JAG Officers,

[3] ICT4Peacebuilding "Strong Angel III – 18th August 2006", August 20, 2006: http://ict4peace.wordpress.com/2006/08/20/strong-angel-iii-18th-august-2006/

and/or Civil Affairs officers. These groups could then be deployed as SSTR teams to liaise with NGOs and the UN in country because they have been specially trained in the areas of Stability, Security, Transition and Reconstruction.

In addition to the counsel of deploying specialized groups to implement SSTR activities, it was also collectively recommended that the military and NGOs should work together on a case-by-case basis to identify neutral places in country to host civ-mil meetings, as it was noted that it is oftentimes very difficult for NGOs to gain access onto military bases to meet with military counter-parts and, likewise, it is equally challenging for military personnel to request permission to leave base and enter NGOs grounds without carrying arms.

It was also recommended that the U.S. military should clearly define what constitutes "SSTR activities" in a certain region before meeting with NGOs in order to establish expectations about how those specific activities align with NGO program goals. In other words, define region by region, what are the resources and services that the U.S. military can provide under DoD Directive 3000.05, and likewise what the military's limitations are in a certain region. Remember that conflict zones in a country change the dynamics of cooperation and communication among NGOs and militaries, and that the roles and responsibilities within each organization may change as well.

(END Executive Committee Summary)

Civil-Military Relationships from a single perspective

A further summary below from Sanjana Hattotuwa, head of ICT4 Peacebuilding and InfoShare NGO in Sri Lanka[4]:

In a collaboratively drawn up set of guidelines, NGO's at Strong Angel III presented a set of 8 design considerations and recommendations for humanitarian aid systems that resonate with the core messages in this report—that solutions need to be:

1. **durable,**
2. **adaptive,**
3. **locally owned,**
4. **culturally sensitive,**
5. **open standards based,**
6. **participatory,**
7. **inclusive, and**
8. **foster trust and collaboration at all levels and all stages of peacebuilding and humanitarian aid.**

Four Principles, proven true in a variety of settings and industries, form the basis of this report. If these principles are embraced, they have the potential to improve operations in conflict-prone settings. They are:

I. Connectivity Increases Effectiveness

Connectivity is the capacity for individuals and organizations to interface. Connectivity allows for, but does not guarantee, frequent and meaningful interactions, which can help diverse actors develop a common operating language, plan and conduct joint exercises, and integrate operations during crises.

II. Free Revealing Makes Sense

Openly sharing new ideas, innovations, and information is better suited to fast-paced, chaotic environments than is the traditional practice of closely managing information flows through established hierarchies.

[4] Pasted from <http://ict4peace.wordpress.com/> with permission.

III. Community Generates Content

Relying on the community to generate, share, and interpret content makes the best use of resources and minimizes constraints in conflict settings. These settings demand flexibility and adaptability on many levels. User-driven content, in which all individuals contribute information, share concepts, and evaluate resources, is the practical choice for environments with conflicting and unreliable data.

IV. Lead Users Drive the Market

By identifying and promoting the practices of lead users (those at the top end of the bell-curve), the effectiveness of the entire international community can be enhanced.

Three Strategic Guidelines stem from these Principles and provide a framework for enhancing connectivity in conflict-prone settings across the globe. These guidelines are not tied to any one tool or feature, but recommend ways for institutions to adjust and update policies, invest in appropriate communications infrastructure, and encourage cultural shifts.

1. Design Architecture of Participation

- Expertise is not tied to individuals.
- Contribution should be based on knowledge, not status or rank.
- The participatory structure of networks is necessary to succeed in conflict-prone settings.

2. Strengthen Social and Knowledge Networks

- Communication is largely a social, not a technical, problem.
- Incentives will encourage individuals to join communities.
- Contributions will increase when individuals identify with the larger mission goals.

3. Use All Available Means of Communication

- Basic, commercially available means of communication are the most widely used.
- Advanced technologies need to interface with common, low-tech tools.
- Flexible tools that span no-tech to future-tech have the most value.

The Center for Strategic and International Studies (CSIS) recommends four implementation steps to make the above guidelines operational. These implementation points are low cost, easy to apply, and catalytic for the longer process of transformation.

1. Create a consortium of implementing partners, universities, donors, and businesses to develop, promote, and implement the Principles and Strategic Guidelines.

2. Sponsor pilot projects to test the effectiveness and operations of technology in the field. Open call centers with information, directory, and security hotlines. Distribute hand held, durable, and cost-efficient communication tools to peacekeepers and local peacebuilders.

3. Build on successful websites and incorporate additional features. Market the websites across a range of communities.

4. Conduct extensive outreach to promote the Principles and raise awareness of the tools. Target entry points to the four main communities; publicize and promote communities of practice.

Annex 5: List of Strong Angel III Demonstration Objectives

Strong Angel III Demonstration Objectives

Introduction

The following 49 Strong Angel III (SA-III) demonstration objectives address a range of humanitarian relief problems that impede the effective provision of assistance. These problems were repeatedly identified by a number of evaluations and reviews during and after Hurricane Katrina, the 2004 Indian Ocean Tsunami, the 2005 Pakistan earthquake, relief operations in Darfur, Sudan, prior Strong Angel demonstrations, and many other humanitarian responses, and they are mentioned as "pain points" by many of the participants in SA-III. In one form or another, these challenges are present in most current and recent humanitarian operations including the provision of assistance to people affected by armed conflict. The SA-III Objectives also identify proven solutions to help military forces better support humanitarian relief efforts and conduct stability operations in following the US Department of Defense Directive 3000.05. Relief agencies and communities are actively learning from past experience and improving the ability to cope with many of these problems however many challenges still remain. The spirit of Strong Angel III is one of humanitarian service to those in need, and a willingness to reach across boundaries to provide a better response and to generate greater levels of trust among the people being served.

The following list of objectives are grouped by categories of problems being addressed. It is important to recognize that the list of objectives below was simply a preliminary set of challenges. Under each category listing are descriptions of each of the individual 49 SA-III Demonstration Objectives with a Demonstration number, which correlate to the demonstration numbers listed on the Strong Angel III web site.

Establish operations, communications and links to the community

Mapping and developing necessary relationships (#1)

Problem statement: A frequent shortcoming in any disaster is the failure to develop in advance an adequate understanding of many relationships and inter-dependencies within a community before a disaster occurs. Too often a disregard for local capacities and knowledge leads to ineffective response, and alienated communities. There needs to be an inventory of representative people and sites, pre-established relationships, and a vision for what that inventory looks like when successful.
In the scenario: A robust system of local contacts and social links is essential to building trust, implementing harmonized response and making appropriate decisions in a humanitarian response.
Goals: Identify and build links with the key nodes of effective community management during a time of self-reliance including: determine the power and communications support requirements at key local sites for a period of disrupted infrastructure and document the process of developing of a social-network and contact list of key members and organizations within a typical community.

Deployment kits customized for individual and group responsibilities (#2)

Problem statement: Short-notice deployment is the norm for several members of the Strong Angel Team. In light of new technologies and recent mission experience, we can re-examine and revise the contents of the ideal personal and team deployment kit bag, comprising communications and productivity equipment and gear for personal survival and comfort.
In the scenario: while there is some core equipment that should always be present, a pandemic and cyber attack pose some particular threats that personal and team equipment should prepare for.
Goals: Provision the SA-III core participants with all tools required for effective work in their areas of responsibility, intending them to be self-contained and useful for five days, including determining additional cube and weight for food and water requirements. Share experiences and ideas to establish

Resurrection (#3)

Problem statement: Waveland Mississippi after Hurricane Katrina, like virtually all disaster sites, had no light, power, communication or coordination. Yet we had to do effective work there immediately or risk civil unrest and lives lost.
Goals: On D-day, begin with a completely dark building. Immediately reach out and make contact with outside help, and within four hours use portable capabilities to provide power, light, and comprehensive communications. Linking first to a large remote site serving as the primary downstream care location, to three neighborhood community centers likely to be used as emergency medical support in an epidemic (shelter-care), link to the local, regional, and national government, the San Diego Chamber of Commerce, two branches of the US military, two academic centers within the San Diego metro area, two academic institutions outside of the Southeast region, one energy supplier outside of the region, and two UN relief agencies outside of the United States. As the demonstration progresses, all confirmed communication links will be posted publicly. These arrangements must be further developed to provide sustainable living and working support.

Establish operations center from vacant, unprepared space (#4)

Problem statement: Establishing and managing effective relief operations requires an effective operations center where teams can plan and coordinate operations. Arriving in a disaster area with no power, lighting, communications, or adequate staff available can be challenging. Those were the circumstances faced by Strong Angel members in Sarajevo, Baghdad, Banda Aceh, Pakistan, New Orleans, Waveland, Yogyakarta, Darfur, and elsewhere. A clear process for establishing an effective site and integrating with local colleagues needs to exist.
In the scenario: as noted, a pandemic will significantly affect who is available as partners and resources for operational planning and response.
Goals: On the SA-III site establish an effective operations center building on the infrastructure provided by objective #3. Within the first two hours ensure every member can identify responsibilities and talk with every other member both in person and online. Within the first four hours of arrival establish a briefing plan for daily briefings and their content, media briefings and their format, and survey methods for determining the condition of the population in the affected area.

Establish full communications with the civilian and military networks to maintain continuing conversations (#5)

Problem statement: In each crisis, response agencies and communities fail to link among each other effectively. In some cases, failure of effective incorporation at a key decision point has led to alienation, and opportunities for effective response have been lost. Furthermore, civil-military coordination can be very challenging since they usually operate on different networks, with different t operational cultures.
In the scenario: a pandemic and cyber-attack will make key individuals absent, making essential services even more fragile. Normal networks of information flow and trust are broken by disease and hardship. Under a terrorist threat security precautions need to be carefully balanced against the ability to respond – something that requires cross-boundary negotiation.
Goals: Develop an effective Contact List before the event. Once called to respond, establish, within hours, links to FEMA, NORTHCOM, Joint Forces Command, CDC, the Armed Forces Medical Intelligence Center, the Armed Forces Institute of Pathology, the Department of State CRS, OSD-IIS, the Carlisle Barracks Peacekeeping Center, the American Red Cross (San Diego Disaster Services and the DC Emergency Coordination Center), International Medical Corps, WorldVision, Save the Children, and the Crisis Leadership Group within the Kennedy School at Harvard.

Enable sustainable communications with the community by providing urgent power and communications (#6)

Problem statement: In emergencies, despite knowing who to contact, communications with local authorities and key partners often break down: due to the direct impact of a disaster or humanitarian crisis, because of lost power and damaged infrastructure (including dead batteries) or a long standing lack of training or equipment.

In this scenario: The effects of a cyber-attack combined with absenteeism will mean that coordination will be impossible without providing help to key communications and other infrastructure.
Goals: Within the first eight hours locate and link each sector within SA-III to the sites described in Task 1. Provide any communications support required based on site assessments that day. Be prepared to leave and teach any communications mode and power source that ensures five days of uninterrupted communication between SA-III and that site.
harmonize and strengthen the responses of different groups, particularly across the civil/military, community/outsider, corporate/government/non-profit and different government divides

Sustainable and independent power (#19)

Problem Statement: In Hurricane Katrina, approximately 3 million people were without electricity. If grid power fails, residents need power. In addition, naturally, with no power there are no electrons flowing and so no data stream either, so power is the most critical single resource requested at national conferences.
Goals: Provide all required energy from sources completely contained within a 100-yard range of the SA-III site.

Sustainable and efficient lighting (#21)

Problem statement: Core operations needs adequate lighting for efficient 24x7 relief operations.
Goals: Provide both interior and exterior lighting from highly efficient sources powered on the site, with lumens that meet security and productivity standards.

Broad area WiFi cloud development (#10)

Problem statement: In each disaster in which Strong Angel team members have participated, communications have been difficult. Historically shortwave radio has been the lowest common denominator for long-haul communications, with VHF and UHF radios used for short range. Now IP traffic is becoming the standard for emergency communications and the deployment of an effective wireless cloud, with at least one link to the Internet, is becoming more common. The constraints and limits to widespread and intense use of Wifi and Wi-Max in emergency situations are not yet well-understood.
Goals: Provide wide-area communications by wireless for all interested participants within a 2.5 mile hemisphere of the SA-III Core Site in Fire Academy Building 557 and similarly, as allowed, on other SA-III sites. Examine network performance (see task below) under different load and interference conditions.

Protect against cyber threats from day zero (#17)

Problem statement: Without rapidly building a defense against day-zero cyber attacks from unwanted viruses, worms, spyware, and unsanctioned software, the foundation of data communications and collaboration in disaster relief efforts is seriously jeopardized.

Goals: Provide cyber-threat mitigation from day-zero by implementing network security solutions that protect systems from unwanted software execution in both a networked and disconnected state. Monitor network security and communications across security boundaries.

Provide network security with minimal compromise (#32)

Problem statement: When workgroups and communication methods are ad-hoc and fluid, it is extremely difficult to balance network security policies and the need to share and incorporate new people. How do you keep the network secure and accessible to the greatest number of people, and yet protect the information in it without encrypting or eliminating the information from viewing by people who are not yet known to you but who may need access to the information?
Goals: Establish a mechanism for rapid identification and response to network security breaches. Arrange for local and carefully controlled disruptions of various kinds, randomly, at least twice in three days. Find the source of the disruption and neutralize it without loss of service to outside partners or missed situation reports and assessments.
This is vital, particularly across the civil/military, community/outsider, corporate/government/non-profit and different government divides where miscommunication and mistrust can lead to waste and missed opportunities as well as make sustainable recovery more difficult.

Assess and evaluate the community situation, needs and priorities

Assessing the situation and needs is critical to providing an appropriate response to people's needs. This becomes particularly difficult when faced with security, environmental and health hazards, and degraded communications infrastructure.

Comprehensive remote risk analysis (#37)

Problem statement: When the power goes down in a disaster area, there needs to be a way of determining what other infrastructure is affected as a knock-on result. Similarly, there needs to be a means of determining what actions should be taken to preempt or interrupt the cascade-down effect.
Goals: Perform an all-hazards risk analysis of medical and emergency centers-of-control within San Diego County using tools entirely remote from the sites. No dedicated site visits are to be performed unless incidental to other meeting requirements.

Rapid epidemiological assessment, analysis, and reporting (#25)

Problem statement: There is a widespread need for information specific to the outbreak, disaster victim identification and tracking, and for generalized medical reporting. The challenge is how to collect, transport, and deliver this information rapidly and where there is little or no communications infrastructure.
Goals: Develop a system for epidemiologic reporting using "Pony Express" collections at five remote sites. Incorporate automated database populating, fixed analysis and report

generation, and automated GIS mapping. Provide a way for service providers to gain access to medical information on displaced persons over the web.

Devise reporting systems for wireless communications in quarantine zones (#30)

Problem statement: During a period of restricted mobility (quarantine, terrorist attack, civil unrest), it is difficult to transmit localized information across physical zones and networks.
Goals: Using mobile technologies, like hand-held devices, and wireless communications, provide ways to collect and transmit data across 5 quarantine zones in the city and aggregate the data into a report (Google Earth, Virtual Earth) for analysis and wide distribution.

Assessment of medical facilities and critical medical data (#40)

Problem statement: How do we report medical information from a non-standard place where injured or sick people are accumulating during a disaster, like a ballpark field or nursing home?
Goals: Maintain GIS understanding of new cases in shelter-care sites, hospital load, and EMS availability based on four-hour intervals. Code outbreaks and problems visually and exchange information with relevant medical institutions and command & control sites.

Search and Rescue sensor integration (#12)

Problem statement: Search and Rescue workers in the field need to have a full sensory assessment of ground zero in order to evaluate and complete a successful rescue mission.
Goals: Deploy robotic sensing technologies for Search and Rescue operations near the SA-III Core. Integrate all sensor modalities into remote visualization, evaluations, and reporting.

Rapid situation assessment using sensor networks (#13)

Problem statement: Rapid assessment in the field can be potentially dangerous, depending upon the type of threat (hazardous environment, polluted landscape, enemy warfare), and may require using a blend of different modes for perceiving information. Identifying environmental hazards becomes a key issue.
Goals: Establish a non-voice sensor grid using multiple types of sensors and communication methods, and integrate that information and analysis into both the internal and external daily briefings.

Remote Medical Reach-back and Telemedicine (#47)

Problem statement: Communications flow and medical expertise is limited in remote locations during a humanitarian crisis.
Goals: Demonstrate medical reach-back from SA-III to global humanitarian operations in Afghanistan, and other locations by linking information flow and medical consultation from SA-III to remote sites.

Requirements analysis for providing power to a stadium shelter (#20)

Problem statement: In a disaster situation, people often need to relocate for safety, shelter, and to receive basic provisions. Collection points, such as a stadium or convention center, are key locations for emergency response teams to provide basic medical care, power, and communications. The task of providing such a facility with power is enormous, and significantly more difficult than a small site such as an Emergency Operations Center. *In this scenario:* while pre-planning is always best, when disease or terrorist threats are present a good contingency plan is essential, particularly if key staff may be absent or sick.
Goals: On a remote site, prepare, BY DESCRIPTION ONLY, rapid provisions for a large and stable power supply, equal to the light, heat, and power required for a stadium of 10,000 people for three days.

Sustain and deepen the response in the face of disruptions, changing needs and the involvement of new groups.

Harmonize and strengthen the responses of different stakeholders and the links between them.

Inform everyone of everything important (#18)

Problem statement: In an emergency situation, not being able to organize and distribute daily briefings and urgent need-to-know information to core operations and across multiple organizations is a major impediment to successfully delivering disaster relief.
Goals: Publish daily both electronically and in 25 printed copies a briefing document with sector reports, a calendar of upcoming events, and a summary text written for both news media and public distribution. Create and distribute emergency alerts to all participants via a number of redundant methods.

Effective volunteer integration (#31)

Problem statement: People, both those affected directly and indirectly by the disaster, often wish to volunteer and thus be part of the solution. Many of these folks are better able to heal when they are able to feel useful and distracted from their own problems. However, in the past, many of these people were turned away by relief agencies for reasons including a) the volunteer's lack of training b) lack of trainers within the organization c) no process to record volunteers and their abilities. This potentially robs relief efforts of valuable and motivated assistants. It also disconnects them from the community, increasing distrust and making difficult community decisions harder.
Goals: Design and implement a volunteer integration tent and registration database for new-participants and observers. Daily brief and train five new arrivals to the system and events underway. Link the accumulating volunteer database to four different accepting agencies (one government and three NGO). Accept each day 25 volunteers with varying skill sets and complete the re-direction into an appropriate agency. Identify five (planted) unusual and useful skills from the interview process. Disseminate their capability. Have five rejected and unhappy. Manage them effectively.

Team Tracking (#38)

Problem statement: In a disaster, it is very important to know where people are located in order to deliver supplies and relief, and to plan and run rescue missions. We need to physically know where core team members are located as they move around.
In this scenario: In an environment where there is a significant external threat, this capability is also important for field workers delivering services .
Goals: Maintain GIS localization of all core USA participants, updated AT LEAST every two hours. Confirm periodically on positive contact. Repeat using multiple methods and tools.

Situational Awareness & Visualization (#39)

Problem statement: Situational awareness is problematic in crisis situations, and there is a constant challenge found in collecting, analyzing, and disseminating accurate information frequently and rapidly. Situational awareness includes staff locations, threat identification, identification of needs and ongoing projects/actions and the identification of available resources.
Goals: Maintain visual Geographical Information System (GIS) understanding of the 2.5 mile hemisphere over and around SA-III for wireless coverage, shelter-care populations and acuity, logistics requirements, hospital loads, EMS backlog, and all other sector requirements that are most desirable.

Virtual Team Management (#48)

Problem statement: In response to a contingency, members of diverse organizations must be able to discover one another, form virtual teams, and work effectively under austere network conditions.
In this scenario: in a pandemic ,travel may be restricted and virtual teams may be the only way to establish and coordinate a response, or any kind of work.
Goals: Deploy a range of peer-to-peer/mesh applications, such as Groove, BlueForce, and CoordiNet, and demonstrate the use of such tools for sharing Contacts, Facilities, and SITREPS with like peers, with one another, and with external systems.

Establish and train users on effective trans-boundary communications (#8)

Problem statement: Life and death communications across the civil/military, professional/amateur and other boundaries have often devolved into people passing unstructured scraps of paper or digitally photographing maps to email because more structured or efficient systems are more than untrained users can cope with. Remote support to these users is always a significant problem that leads to many technical initiatives failing. Security, technical and cultural reasons usually lead to either failed, or unreliable communications.
In this scenario: Due to absenteeism many key communications and systems posts will have to be filled by those not trained for them or who aren't comfortable with the process for communicating between different systems e.g. reserve ambulance assistants may not be able to fully utilize radios, or air-ground radio becomes inoperable.
Goals: Distribute, teach, and confirm effective communication methods over up to five freely available communication methods capable of bridging civil military and other divides. Use

VOIP voice, radio voice, and text chat both locally in the room and outside to sites beyond either ad hoc or conventional access point range. Distribute a different word of the day over each mode and confirm receipt. Set up a help desk and offer daily scheduled short classes and training to participants. Explore different ways to provide remote user support.

Extend the use of text and other forms of messaging (#14)

Problem statement: During the Indonesian earthquake, people discovered that they could not make phone calls at the most critical times because the system was overloaded. The most reliable form of communication between Banda Aceh and Jakarta was through the use of SMS messaging on GSM cell phones. Richer messaging offers more detailed, and structured, communications and assessments.
In this scenario: the general capability must be provided to enable community-wide assessments of public health and other services.
Goals: Develop and test integrated communications capabilities including ad-hoc mesh networks, FM radio broadcast messaging, single and group SMS text messaging, distributed intercom alerting, and distributed mp3 radio traffic in near-real time to a set of at least 50 core and edge participants. Integrate the SMS techniques developed by a variety of providers for public health and other forms of reporting. See task 25.

Interoperability of Emergency Communications (#15)

Problem statement: Different actors often have different communications methods and technical standards such as family band/military radio, or digital/analog systems. The inability to readily relay communications through emergency communications systems often leads to an impaired response.
Goals: Establish interoperability standards for all electron flow, then implement standards and bridging technologies and assess success within systems commonly designed to be used in the field.

Civil-Military radio management and interoperability by protocol (#23)

Problem statement: Civil and military don't always speak the same language. In particular, the military has a strict code of terminology that civilian operations may not understand. So how does everyone work together in an emergency response situation?
Goals: Develop a radio management protocol that demonstrates the capability to provide continuous radio management for five days among 20 participants using multiple spectra and both scheduled and random voice checks.

Create a mesh of Simple Sharing feeds for information flow (#35)

Problem statement: Rapid establishment of post-contingency information flow typically faces a number of obstacles, including intermittent connectivity, information ownership concerns, and a heterogeneous assortment of applications, platforms, representational schemas and devices in use by various participating organizations. A simple, open, asynchronous data sharing and synchronization platform such as a mesh can be used to enable and extend a number of applications.

Goals: Use RSS Simple Sharing Extensions (SSE) to create an asynchronous mesh for information flow between diverse systems across organizational boundaries.

Create interoperable relief management systems (#22)

Problem statement: A very complex crisis situation requires a combination of management tools for use across multiple agencies and networks. Those systems rarely talk with each other yet information sharing is a critical component of response efficiency. Competing stovepipes of information result, leading to poor analysis and response. Individual response agencies are loath to surrender control of their information for a number of valid and petty reasons. A way to easily share or synchronize structured information between disparate loosely coupled systems would be a significant advance.
In this scenario: Multiple assessments of hospital systems by different organizations lead to fragmented and incomplete operational picture of what the real needs are. Different groups end up with different (partial) views of the situation which leads to competing priorities. Synchronization capabilities will enable the aggregation of data from a range of sources, significantly improving analysis and relief delivery options.
Goals: Use a software tool, like SSE, to cross-subscribe between multiple disaster/relief management software tools simultaneously, and synthesize data onto a single display. That capability is dependent upon other systems sharing their data design and providing access for cross-subscription. Use disaster management tools, including open source ones like Sahana, to provide accessible standards-based interaction across a published humanitarian support schema.

Use VOIP for voice communications (#24)

Problem statement: During the time period immediately following a destructive incident (natural disaster or terrorist), the cellular networks are oftentimes shut down, yet voice communication is the primary method responders use to transfer information to designated personnel. Family band radios, emergency cellular systems including push-to-talk and integrated WiFi technology on hand-held Smartphones and broad area WiFi cloud networks allow people to talk to each other during a crisis, and at very little cost.
Goals: Provide continuous Smartphone VOIP and local area radio on family radio handsets and local network cellular phones. Use scheduled and random voice checks between 10 or more local and national participants. Exchange messages hourly among a subset of the group for the duration of the demonstration.

Use HAM radio to connect to outside locations and resources (#26)

Problem statement: Communication systems break down in disaster situations, yet communications need to be maintained between responders and authorities to provide effective relief services. Amateur (Ham) radios remain a relatively archaic, yet versatile and reliable, technology that is often overlooked when community communications solutions are designed. They can operate virtually anywhere, anytime, and are often used in conjunction with other cross-communication technologies during emergencies and major relief operations.
Goals: Establish initial Amateur Radio links from the USA site to ten global sites every six hours. Provide Situation Reports to a selection of those sites every 6 hours. Establish a confirmation response back to SA-III from a geographically remote site that is only linked to

HAM operators by amateur radio, and then code-word confirmed to us through another, different, communications mode. Complete and confirm the circle of awareness.

Video-VOIP for interviews and secure reporting (#16)

Problem statement: Relief workers and rescue teams have difficulty communicating with one another, with victims, and with local emergency centers for rapid assessment and secure information sharing. Remote sites often cannot see what is currently happening in other areas of a crisis, limiting understanding and generating misunderstandings. Messaging in written text format is a slower means of communicating than video-VOIP. Audio requires a spoken distraction or sound without sight—a significant reduction in understanding and one that takes dedicated time from a valuable site resource. Most workers assume video-VOIP is too bandwidth heavy or difficult to configure to be useful, though this is often not the case.
Goals: Use Video-VOIP on a number of connections to report from a remote shelter site, nursing home, or high-school gym to SA-III, and then from SA-III to both a local and remote EOC such as Joint Forces Command in Virginia. Encrypt, record, and re-transmit to the EOC information regarding the data submitted from the remote site.

Secure tele-microscopy (#28)

Problem statement: Remote sites and rural facilities without regular access to medical expertise need a secure means of transmitting information, especially when physical movement is limited.
In this scenario: with medical services overwhelmed, it becomes extremely valuable to have the ad-hoc ability to easily send slides and other medical data for remote diagnosis or quick.
Goals: Develop a system for using Video-VOIP to link a microscope to remote evaluators regionally and remotely. Communicate with the tech on-site for preparation. Clearly identify the object under scrutiny.

Explore failure modes for power and communications (#9)

Problem statement: As noted above an early priority in a crisis is to identify and connect key decision makers and establish the ability to communicate critical information to citizens. The three areas that fail most frequently are communications, transportation, and power (comms, lift, and power). Emergency power and communications are often unstable and difficult to reconnect as systems are often overloaded, or unfamiliar. Providing affordable reliable, robust and redundant communications and power sources is a necessity.
Goals: Link a core subset of SA-III participants to each other through AT LEAST three completely independent modes of communication, one of which does not require either batteries or grid power. Test the resilience of these communications.

Reach-out to the community

Engage in conversations with the local community and the media that make the response more relevant and transparent.

Community involvement (#44)

Problem statement: Inclusion and openness are critical for community acceptance for a complex project or event like Strong Angel. Being able to have the project viewable in a way that makes sense and resonates for each stakeholder is critical for comfort levels, acceptance and cooperation.
Goals: Offer tours of the Strong Angel III event in progress. Collect feedback on the tour message from the event, the intelligibility of the goals and tasks, and thoughts regarding message improvement.

The public face of Strong Angel III (#45)

Problem statement: There is always an inherent challenge to cultivate community resilience in response to a complex disaster; there needs to be an effective way to ensure public involvement and open communications (one-to-one, one-to-many, and many-to-many). There need to be a better and clearer model for how to communicate to stakeholders before, during and after a relief operation or emergency.
Goals: Ensure we record and broadcast live cameras in work areas and during meetings. Establish a feedback mechanism for information distributed and submitted over TCP/IP, and ensure that SA-III team acknowledges and replies within 4 hours. Enable local and national media interviews on the purpose and goals of SA-III before and during the demonstration.

Ensure that field assessments are used rapidly and transparently. (#16)

Problem statement: Resource disruptions predictably lead to a loss in social continuity and cohesiveness. It should be, but rarely is, easy to understand how assessments are made and how to incorporate the results of those assessments into planning and policy decisions. In another sense, we need to incorporate valuable lessons learned in our decision making and planning in order to be better prepared for the next crisis. The trust of communities and individuals being assessed can be quickly broken without clear communication back of results and analysis.
In this scenario: In both pandemic and terrorist scenarios, mistrust and fear can quickly build when relief workers aren't fully transparent about how they perform and report on the information they collect. Very quickly they can be accused of "hiding something." Similarly for poor or vague analysis.
Goals: Connect both remote field assessment teams and appropriate responding agencies with GIS-registered information and an analytical capability. The analysis will then be summarized and pushed back to the field with actionable direction.

Machine translation of communications (#33)

Problem statement: Effective communications in disaster relief operations and international development field work are often hindered by language barriers. The challenge is to quickly provide reliable information to a vulnerable population in order to help them understand the situation, and to gain and maintain trust of the affected population when impeded by a language barrier.
Goals: Design and implement machine translation services for five languages (other than Spanish—too common) within the San Diego metro area. Develop broadcast information messages and two questionnaires regarding medical epidemiology and resource requirements.

Send three teams of three into the appropriate neighborhoods each day to administer the questionnaires and to collect information on the utility of communication through machine translation.

Ethical oversight to ensure a consistent focus (#36)

Problem statement: There needs to be a way to ensure a consistent focus for the SA-III demonstration and to define how it contributes to social change. In some situations, particularly with inexperienced relief workers or highly stressful environments, the technical solutions or programs become an end in themselves rather than just a tool. This leads to the affected community being underserved or ignored. A continual trusted reminder that re-orients people on the appropriate values and approaches is a useful education.
Goals: Engage a professional ethics advisor for thoughts on each of the designed objectives and their eventual performance. Ask for, and respond to, advice regarding the value and place of each SA-III objective both individually and within the whole. Continue that evaluation on-site during the demonstration. Request periodic and summary thoughts as appropriate based on the advisor's impressions of need. Provide an opportunity for briefings to individuals and to the group as requested by the advisor.

Depart well by creating a sustainable transition with the local community

Sustainability is made possible by ongoing principle of community engagement of the Strong Angel demonstration, together with the focus on learning lessons, and making that learning available to the local community. Of course many issues, items, and demonstrations will leave nothing more than the recognition that some problems are actually solvable, rather than perpetually being dismissed as too-hard. The focus on solutions led to a number of new products and technologies and solutions that will improve the capacity and resilience of the local emergency services. Furthermore, all of the SA-III participants were asked to consider leave-behinds from their activities and involvement, though this was clearly more feasible or useful for some participants rather than others.

Learning Lessons from SA-III

In addition to the direct learning associated with each experiment, trial or discussion that at SA-III, there are a number of objectives that were explicitly research or learning oriented. The overarching need for the entire demonstration to have an impact drives the need for a clear evaluation and "next steps" framework, led by the experiments, and summarized for later follow-up at the debriefing and Lessons Learned reporting sessions.

Evaluation and analysis for SA-III activities (#43)

Problem statement: It is difficult to know when we are achieving results if we do not set standards and objectives beforehand. The key to success of a process often lies in identifying measurable objectives that are consistently evaluated.

Goals: Develop an overarching graphical representation of the comprehensive communications synthesis present in the design of Strong Angel III and publish a paragraph description of the reason for each task and its place in the whole. Similarly, develop Measures of Effectiveness for each of the described tasks. When the objectives are complete, assign an impartial and dispassionate team to assess completion, shortfalls, exceeded goals, final costs, functional capability as demonstrated, and further improvements likely to enhance utility.

Economic assessment of SA-III exercise components (#29)

Problem statement: Without an assessment of the economic impact of SA-III as a demonstration, we will not be able to determine analyses and recommendations for replication in the future.
Goals: Assess the economic impact of both the demonstration, and the subsequent recommendations from the demonstration, through both academic and private sector resources.

Crisis Management Leadership (#34)

Problem statement: Leaders and teams need to be established or discovered to confront challenges in a crisis situation. There needs to be a way to rapidly identify leaders within crisis situations and bridge the gap between leadership theory and practice.
Goals: Design and evaluate metrics for leadership within crisis situations.

Examine how measures work-efficiency and social dynamics can be used within urgent environments (#7)

Problem statement: We have only a general understanding of the effort it takes to work within a disaster, and the way we build and invest in relationships. We know, however, that there can be debilitating consequences when capabilities are exceeded and staff lose efficiency and heart. The loss in resources and morale can severely impede a response. We need to better understand what tools and approaches provide more effective work environments and rhythms.
In this scenario: the psychosocial impact of a pandemic will be immense. People will fear for their lives and their loved ones. A terrorist attack increases the vulnerability and stress on those responding.
Goals: Establish a method for assessing cognitive work metrics within the SA-III site along the lines of the work by David Woods at Ohio State University for disaster management in the field. Integrate that assessment into SA-III staff management evaluations. Link the subsequent cognitive assessments into the social computing research appropriate for small groups under pressure.

Fust Fragility Indicators—Social Vulnerability Index (#41)

Problem statement: There needs to be a way to know when a population is at risk for civil unrest and societal breakdown before it begins to occur.
Goals: Evaluate metrics regarding societal breakdown based on discussions with Ambassador Walter Fust, Director-General of the Swiss Agency for Development and Cooperation in

Geneva. Implement those indicators as a management problem within the scenario and propose assessment methods and tools for those indicators.

Ghani-Lockhart Framework and Standards for Failed State Reconstruction (#42)

Problem statement: Failed states/communities breed instability and insecurity and present a real-time challenge for developing strategic planning. Attempts to address multiple facets of the problem simultaneously and a lack of understanding of the sequencing of critical tasks often leads to confusion as to appropriate priorities, and gridlocks in supply chains and tasking. There is often a lack of clarity as to which organizations have which capabilities to address which tasks, meaning that roles and responsibilities are misaligned to tasks, and multiple actors compete to perform the same task in the same area, or no actors are assigned certain responsibilities leaving a vacuum. There is often Lack of clarity as to goals for intervention and realistic timelines for delivery, which means that the expectation of the population is set unrealistically high, and so hopes are easily disappointed. Short term goals are made a priority, which hinders meeting the goals for the medium to longer term.
Goals: Using the Ghani-Lockhart Framework for Failed State Reconstruction, map the existing resources and assets; design frameworks for use of assets; sequencing and prioritization of tasks and assignment of responsibilities; design a process to strengthen relationships and accountabilities between communities and those in authority; advise communicators on appropriate messages to enhance citizen trust; and advise on the design of a process for orderly leadership including succession in the event of further disruption.

Complex System Monitoring (#46)

Problem statement: It's important to be able to capture a high-level view of how an operation is running, and to identify gaps and weaknesses. Some approaches provide hope for structured and repeatable analysis. Need to capture important topical conversations about SA-III objectives in real time so that the group can see the larger set of connections as a whole system rather than just a local perspective.
Goals: Integrate System Dynamics modeling and simulation tool with SA-III objectives, and quickly display the health of a system based on the parameters set.

Network distribution and traffic modeling (#11)

Problem statement: In an emergency response or in the wake of a disaster, it's difficult to predict the number of people who will be on any given network. Excessive load, or interference between networks may radically reduce communications capability. Predicting performance requires close monitoring of the network traffic in order to ensure that people can effectively communicate and that networks and wireless technologies are more robustly designed.
In this scenario: with most normal communications methods significantly disrupted, the ease of setup and reach of wireless networks of various kinds means that there is an enormous possibility that they will interfere or even be overwhelmed by non-essential user traffic.
Goals: Monitor, manage, and model the traffic on, and performance of, the wireless communication capabilities established by SA-III. Map key challenges and possible approaches to rapid large-scale multi-system and multi-method wireless communications deployment.

Experiment Emergency Operation Plan (#49)

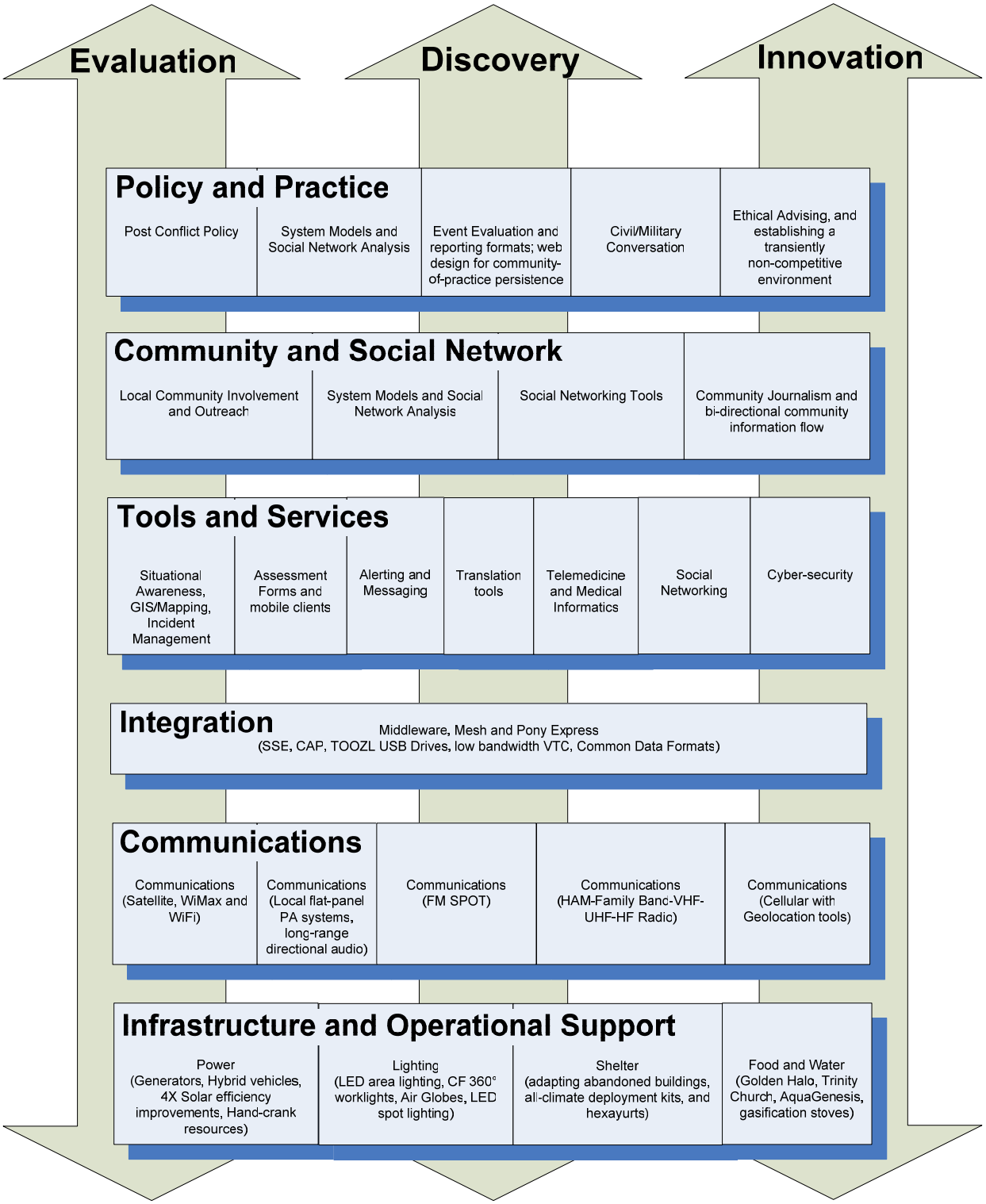
Problem statement: Policies and procedures that normally provide the operational framework within which institutions function are not usually adapted for a ground zero pandemic crisis situation and the operational plans that are normally drafted to respond to contingencies.

Goals: Use the X-EOP to create a set of procedures and processes for community groups to implement a standardized operations plan.

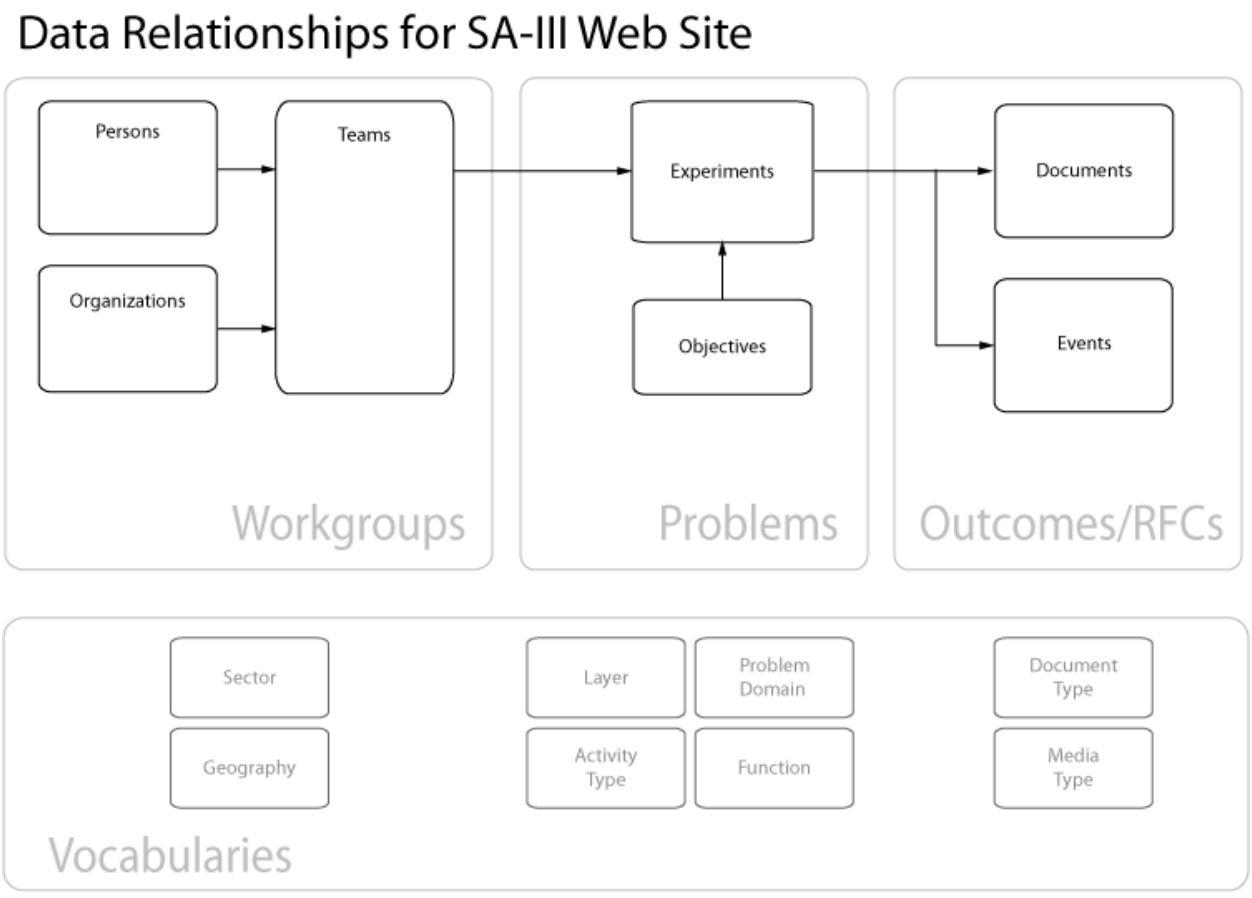
(END Objectives)

Annex 6: The Strong Angel Experimentation Framework

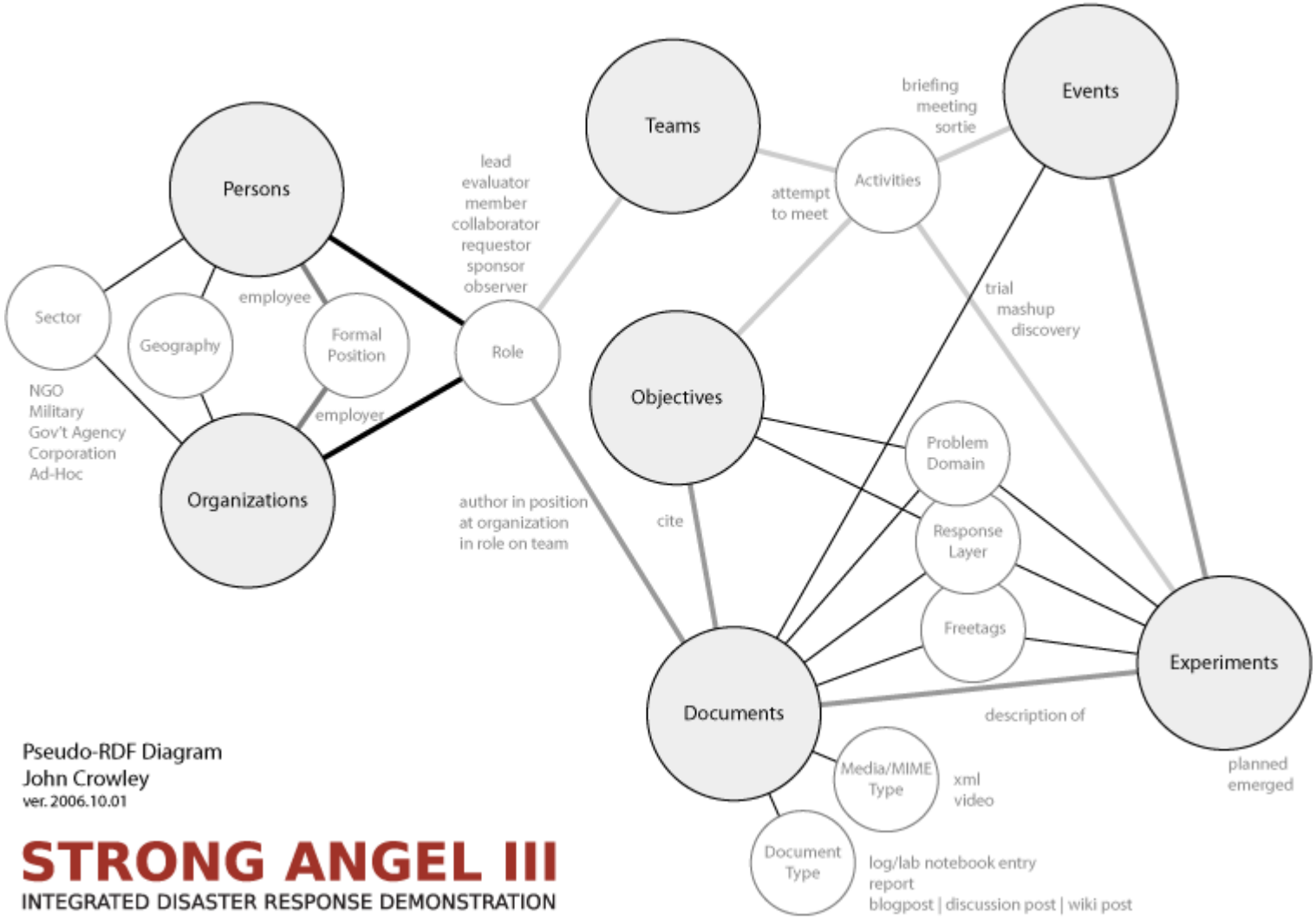
Strong Angel III Experiment Architecture



Annex 7: Data Relationships for SA-III Web



Proposed Intertwingularity for Strong Angel III Web



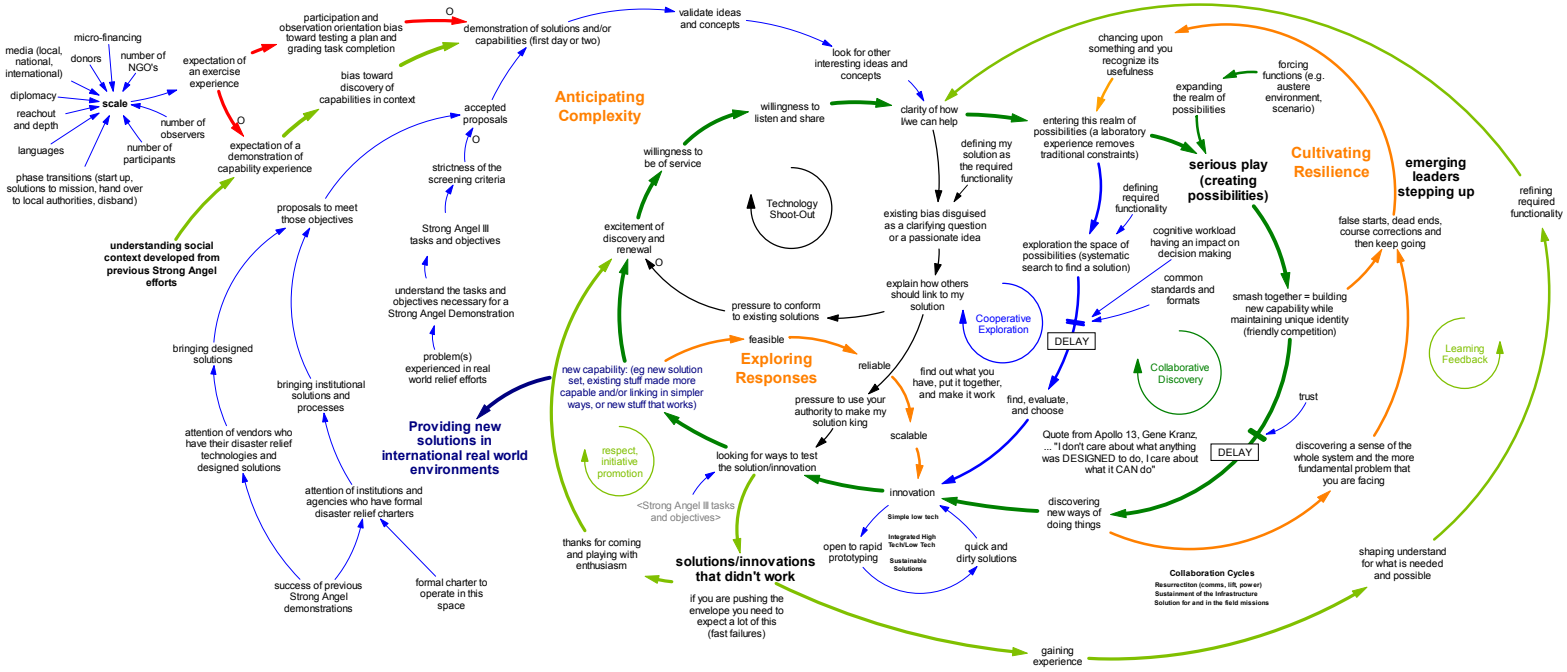
Laboratory For Collaboration

Strong Angel III

Integrated Disaster Response Demonstration

San Diego 21-26 August 2006

Anticipating Complexity **Exploring Responses** **Cultivating Resilience**



Annex 10: Summary SA-III opinion blog by Sanjana Hattotuwa,

Founder of the peace-building NGO *InfoShare* in Sri Lanka

Strong Angel III—Final Observations[5]
August 30, 2006

Now that the melee is over, I can finally pen down some reflections of Strong Angel III.

It's been one helluva week. **Simply put, SA III was the most interesting meeting of minds, ideas and people I have been to thus far in my life and needs to occur at a regular interval in the future as well.** With over 820 people passing through the SA III site over 5 days, the event was chaotic, frustrating, enlightening, humbling, educational, innovative and cutting-edge. No doubt in my mind that the core team of incredibly experienced people who put together SA III were, much more than the technology on display and deployed, responsible for the fantastic interactions between people and tech solutions.

SA III, was as Dan Gillmor calls it, mind-boggling. The thoughts that follow don't really capture the rich texture of collegial partnerships, friends, alliances and strategic social networks created during SA III, but they aim to stimulate interaction and debate between those who attended SA III and a larger public.

All my other posts related to SA III can be found here.

Mash-up, mash-up, mash-up

SA III was all about mash-ups—hardware, software, social.
The exercise itself was the largest and most interesting real life mash-up I've ever encountered, and quite frankly, that I believe has ever been held. There was a mix of local and international participants, a mix of theory and practice, a mix of civilian and military, a mix of mobile and fixed, a mix of print and graphics, a mix of offline and online, a mix of platforms and programmes, a mix of exchange and storage—the ideas generated at SA III, saw

[5] Pasted from <http://ict4peace.wordpress.com/2006/08/30/strong-angel-iii-final-observations/>

for instance, competitors such as ***Google and Microsoft work closely together*** and 5 or 6 of the fiercest GIS competitors share information and work with each other.

This level of interaction, interoperability, and platform agnostic information exchange was unprecedented and, as expected, led to many migraines as companies used to proprietary data standards jostled with each other to accommodate information delivered and produced in rival data formats. For us practitioners on the ground who have long since sought greater interoperability between disaster response, humanitarian and peace-building platforms, SA III was a joy to participate in and see vendors cast aside their bickering and working together for a common goal.

Data transports, such as Microsoft's SSE, were in high demand, and were shown to effectively move data from one programme / platform / device to another. Notable is SSE's open nature—the technology is completely open source and to hear Jack Ozzie, Ray's brother from Microsoft say that he was fully supportive of open standards and throughout the experiment, stressed the need for interoperability with as many systems as possible, was alone worth the participation at SA III.

But what's simple to Ray Ozzie, the creator of SSE, isn't necessarily simple to the rest of us—few I feel saw the potential of SSE and though SA III was a test of this embryonic technology, a proof of concept, directed at the layperson / NGOs, would be useful in helping those other than geeks understand what is made possible through it and how it can under-gird disaster support operations.

GIS was *huge* at SA III. Almost all of the big names in GIS—ESRI, CH2M Hill, Intergraph, Information Patterns, Google Earth, and Microsoft Visual Earth were all present and working together. I was splendid to meet Gabriel Coch for the first time and share ideas based on a common understanding of conflict and developing country contexts, which really was rare amongst the tech / geek community at SA III. The amount of mash-ups using GIS was mind numbing—many used GPS devices—dedicated GPS devices, devices embedded in mobile phones, connected via Bluetooth to mobile phones, and other location data including SMS / MMS, to plot, often in real time, the movements of various teams in the field and feeding in information to the Operations Centre. Mitre's solution was particularly elegant and one that I

hope developing country mobile phone companies such as Dialog in Sri Lanka can take up to support peace and humanitarian initiatives.

While Sahana perfected its Volunteer Registration Module, a Singaporean group tested a web based social network mapping solution. Paper cutouts at the entrance ramp to the main staging area of SA III reminded participants that paper based solution were the most resilient to network outages. Gay Matthews was seen with a business card reader to capture the organisational information of the hundreds of those present at SA III, but the last I heard a box containing the business cards went missing—which is a valuable lesson in itself given the number of times important information—electronic as well as print—goes missing and is lost in real world scenarios of humanitarian responses and peacebuilding.

What I would have liked to see at SA III but didn't was ways you could ***visually map relationships***. I truly think that we have long since reached the limits of pure textual representations of complex, dynamic and changing (social) relationships—visual mapping methods such as the Visual Thesaurus, the Semantic Navigator for Groove or the library at the Dropping Knowledge Initiative seem worthy of further exploration, development and adaptation to fit the needs of humanitarian and peace-building contexts (see also Social networks poised to shape Net's future & information visualisation).

During the week, I wondered whether mash-ups provided a very useful way to develop ***humanitarian aid systems that were responsive and sensitive to different cultures***. For instance, face to face meeting, virtual or physical, often result in dynamics wholly different to a text based (email, IM) based interaction between the same group of people. This is especially true in mixed sex groups—where in some cultures, men & women in visually interactive virtual simulations / interactions, for fear of the loss of face, agree to things they are uncomfortable with or downright opposed to, rendering the understanding of agreements reached at the end of the meeting quite useless. Some cultures are deeply uncomfortable with synchronous communication, while considerations of age, language and education render some modes of communication better than others. In this complex web of cross-cultural interactions, that form the bedrock of any humanitarian and peacebuilding initiatives, many mash-ups offer multiple ways of communicating and displaying information—ranging from text to video, from synchronous to asynchronous, from printed to electronic.

It would be interesting to see the further exploration and development of (multimedia) mash-ups as culturally sensitive approaches to the development of humanitarian aid systems, as well as those in support of peace-building initiatives.

Products vs. services

I believe that services will be more important than products in peacebuilding and humanitarian aid. Ideas such as the Nobel Peace Laureate Foundation's Peace Tools provide a set of services for stakeholders in a peace process—from information and knowledge management to peace negotiations decision support systems. Services such as Microsoft SSE, RSS, web services that connect products together (a)synchronously and under-gird mobile / PC mash-ups are far more interesting and useful than standalone products that, by definition, are limited in what they can do.

I didn't see as many services as I would have liked at SA III, apart from the obvious plug on SSE. Again, this was perhaps because of the lack of communication between the needs of NGOs on the ground and the assumed needs of such users by developers and designers. I'm really interested to see the development of web services that allow me to use FOSS software on devices such as the OLPC initiative's laptop, now called the CM1, to plug into a range of information services ranging from situational awareness to resources and needs matching.

Treating failure as success

Many of those who came to SA III with the aim of fulfilling a certain task or objective failed to do so, sometimes after repeated attempts. SA III was structured in such a way that failures were as instructive, if not more, as the successes. Humanitarianism and peace-building are inherently iterative frameworks, with only satisficing solutions realistically possible.

The framework for treating failures as instructive was a unique feature of SA III, giving even seasoned industry specialists an opportunity to take their solutions to the limit and see the cracks appear in the real world application of lab tested models and solutions. As the week progressed, many who came to SA III under various assumptions—the availability of bandwidth, central command and control, help to set up and move things around etc—were

forced to accept the chaotic realities of SA III's operational framework, which attempted to mirror as closely as possible a real world scenario.

Failure is a dreaded "F" word in many corporate cultures—you are simply not promoted on the basis of how many times you've failed, as The Apprentice shows us so clearly. And yet, the very nature of humanitarian support is that you will inevitably support to match the expectations of the affected populations, and those of your own as you set out to help. Missing targets is anathema in corporate circles, and yet, ascertaining why these targets were missed is extremely important in any process of institutional and individual learning in humanitarian aid. I don't know to what effect this lesson was learnt by the bigger industry names present at SA III.

Gender @ SA III

Gender, as defined in the Sphere Handbook, is defined as:
Gender encompasses the socially defined sex roles, attitudes and values which communities and societies ascribe as appropriate for one sex or the other. Gender does not describe the biological sexual characteristics by which identify females and males are identified.

SA III was, most regrettably, not gender sensitive. It did not mainstream gender considerations in the design, adaptation, application and the monitoring and evaluation of solutions developed during the exercise. The rich textures of experience, valuable insights and interesting ideas of the women in the Executive Committee were hidden to the majority of participants at SA III. The majority of those developing solutions were male—some with absolutely no experience of humanitarian disasters and the special needs of women and children (including how even within conflict / disaster affected communities, how precarious their human security is).

While SA III lead Eric Rasmussen specifically mentioned the importance of gender during his briefing on the second day, much more could have been done to push the participants to recognize that gender is a vital consideration of any humanitarian and peacebuilding initiative.

Civilian—Military interactions

Something that I never expected I would do at SA III was to interact with the military and the intelligence community. That both occurred surprises me still and was in one way testimony to the social interaction design of SA III that brought diverse and in the real world, quite disparate communities, under the same roof for a week to interact with each other.

SA III opened my eyes to the US Department of Defense Directive 3000.05 for Military Support for Stability, Security, Transition and Reconstruction (SSTR) Operations, which aims to bring about, on many levels, greater interaction between civilian and military operations to engender stability in violent regions. This directive, repeated many times throughout the week, seems to be a powerful mechanism that is propelling the US military towards a complete revolution in the way it interacts with civilian agencies such as NGOs in the regions it deploys in.

SSTR, in sum, is the new buzzword for "civ/mil" (as it is called) cooperation. Though overtly positive, the greatest danger of 3000.05 lies in the possibility of conflating military objectives with the long term stability operations that involve (I)NGOs, and by extension, for those opposed to the military objectives to also see (I)NGO personnel, by virtue of the perception of their association with the military, as prime targets. We have already seen this in Afghanistan and Iraq, and if the frameworks of civ / mil collaboration aren't clearly drawn up and communicated effectively, it may well be that the growth of such incidents prove to be a damning stumbling block to the effectiveness of 3000.05.

I brought up a few points in two civ / mil meetings during SA III, such as the lack of gender sensitivity in the current approach to civilian interactions—men who looked like Hulk with electronics and kevlar guarding every orifice hardly look approachable, humane and trustworthy for women and children traumatised by war. On the other hand, some participants said that the military could bring about confidence in security and stability in certain war zones—especially those over-run my terrorist groups and militia in civil garb.

I also asked the military to stop looking for a coordinated body or voice from NGOs—coordination was not a *forte* of NGOs, who often struggle with collaboration. I submitted that the technology at SA III could possibly help greater civ / mil collaboration, since the very

perception of collaboration with the military would, in many instance, put NGOs working with certain non-state actors and in humanitarian aid in conflict zones in harm's way. To this end, I also said that though the military wanted full disclosure from NGOs on where they were operational in and what they were doing, very often, this information could be used to impose sanctions against NGOs working with certain actors, even though these interactions were absolutely crucial in the specific geo-political context to maintain access to humanitarian aid.

The sheer complexity of SSTR operations, I strongly feel, is not something the US military is fully aware of—an observation supported by the viewpoints of those from other countries serving in the military who acknowledged the difficultly of SSTR in long term humanitarian operations and the need to create frameworks of institutional trust in the relationships between the military and civilian actors.

I also called for a sense of larger history at these meetings. While greater mutual respect between the military and civilian / NGO sectors needed to be encouraged, I asked those present at the meeting to not forget the burden of history of US militaries and their nefarious deeds, that in many instances the grim socio-political and economic effects of which many NGOs were struggling to address—thus putting them in direct opposition with the institutional memory of the armed forces and indeed, their *raison d'etre*.

There was also one particularly irritating CIO from a large and well known INGO that cares for a lot of people internationally—obviously without much field experience in post-disaster scenarios. Over the week, I heard him say many things that gave a skewed idea of (I)NGOs and their *modus operandi*—for instance, that many NGOs would like to rely on and willingly participate in army reconnaissance to ensure greater security for staff on the ground in turbulent areas. I put this nonsense down to a latent inferiority complex, but it was a stark reminder that the same stupid arrogance one often associates with the military can also be found in the NGO sector as well.

As a result of these interactions, I was asked by two representatives of the Swedish military for a series of video conferences on the situation in Sri Lanka and how armies can better prepare for the exigencies of a long-term humanitarian aid effort that over time interacts

with and necessarily needs to support existing peace-building initiatives in a country or region gripped by ethno-political strife.

In conversations with Ambassador Daniel Stauffacher, hugely experienced in facilitating global policy making, I also stressed the need to engender protocols of information exchange between the military and civilian / NGO sectors. While the technology for secure communications already exists, the protocols of information exchange—by whom, for what limited purposes, confidentiality of sources, institutional agreements that don't rely of personal largesse, ownership of information, the manner in which it will be shared, why and with whom etc—are issues that need a global compact between States and trans-national civil society, so as to support SSTR operations and at the same time safeguard the operational processes, complex relationships and human security of NGO personnel working in conflict zones.

I found these interactions tremendously useful and hope that someday, SA III is recognised as the genesis of progressive frameworks between the military and NGOs that help safe lives through greater information sharing in post-disaster operations and long term humanitarian aid efforts.

Spooks at SA III

The plethora of defense, intelligence and military agencies at SA III was both heartening and disconcerting. It was on many levels disconcerting to mingle with the same folks whose agencies grill me upon entry to the US and have laid waste to economic, political and social futures of so many regions and countries across the world. On the other hand, it was heartening to see, on an individual basis, what seemed to be a genuine willingness to talk and exchange ideas on how their agencies could help in humanitarian aid.

There was some notable, and not entirely unexpected, instances where they really did piss me off—for instance, in including Sahana in an initiative championed by the US Department of Defense called Harmony Web, with no consultation whatsoever with the representatives of Sahana who were present at SA III, and a brochure distributed by a US defense contractor based in Huntsville, Alabama that was ostensibly in support of SSTR, but used images of US

soldiers in full body armour and none whatsoever of friendly interactions with civilians and / or humanitarian aid workers coupled with some text that beggars disbelief.

At the same time, there was the recognition that the capabilities of these institutions and actors could easily be transformed into powerful disaster aid mechanisms—for instance, de-classified information on social, political, cultural and economic factors and actors in a disaster region that no doubt many of these agencies possess in great detail could be of immense utility to backstop humanitarian aid operations.

InfoShare has tested tools developed for the highly controversial Total Information Awareness project (TIA), such as the Semantic Navigator by ISX Corporation', but in no way endorses complicity with intelligence and defense services, given the largely incompatible *modus operandi* and objectives of each sector.

However, as noted in an earlier post in this blog, from the internet onwards, many of the technologies now used or considered for peacebuilding and humanitarian aid are precisely those that were developed for war and combat operations. SA III was useful in this regard, in helping create embryonic links between those who developed cutting edge technology and those who could envision its use in ways that the developers themselves did not foresee or plan for, the resulting symbiosis the foundation of what would hopefully be a constructive dialogue in support of satisficing solutions for humanitarian aid and peace-building.

The ethics of leave-behinds and their long term implications

SA III stressed the need to leave behind technologies, equipment and solutions to help address the needs of communities in San Diego. Because the central SA III scenario was largely a first world pandemic scenario (or was interpreted as such by many of those present) considerations of the ethics of leaving behind technology and alien frameworks were not discussed as fully as I would have liked.

Some issues I've pointed to in earlier writings as well are:

- What are the ethics of leaving behind a framework of dependency on particular technologies that may not be sustainable in the long term?
- What are the commitments to long term training of staff?

- Does the spirit of collaboration and interoperability that lasts in the first phase of the response a guarantee of long term systems that continue to share information based on open standards in the affected regions?
- What are the implications of leaving behind proprietary hardware / software solutions, that may have worked impeccably during the first phase, but are an ill fit to the larger systems present in the region?
- What are the social, political and cultural implications of leaving behind technologies? How does one map the consequences?
- How does one reconcile the expectations of the community and what is really left behind?
- What are the ethics involved in the branding of leave-behinds? How does one ensure that such branding does not undermine the development of local expertise & technology?
- Do leave behinds require high maintenance—if so, how are the associated costs going to be met?
- What are the ways through which the potential uses of leave-behinds and the continued commitment to region can be communicated to affected communities and their governments that prevent the growth of negative perceptions?

Most of the tech gear at SA III was tremendously expensive on the open market. Eric Rasmussen noted that there was more than $35 million worth of equipment at SA III, which is more than the combined budget of many in-country aid agencies and peace support NGOs in developing countries. ***The cost of a single large plasma screen used by some of the GIS folks was alone more than a couple of years of my salary***. In this light, is it more useful to set up a training academy for local aid workers and peacebuilders rather than leave behind equipment?

Furthermore, the problems associated with leaving behind equipment with market costs that dwarf the economic structures of communities affected by disasters are worth exploring with far greater emphasis. I would submit that the long term costs created by the real and perceived economic imbalances created by the influx of post-disaster aid and a callous leave-behind policy can wreck havoc on the socio-political dynamics of local communities—well worth taking note of when entering a disaster zone.

Corporate branding vs. humanitarianism—The imperatives of sensitive aid delivery

As I've mentioned in a paper I wrote detailing the use of technology by InfoShare in response to the tsunami:

> *It is grossly tactless to belabour the merits of a certain system and use it in the field for short term visibility, commercial capitalisation and marketing purposes in the immediate aftermath of a disaster. The trauma and loss of life associated with large scale disasters cannot be the bedrock for marketing campaigns. Some of those who approached Info Share wanted us to promote the use of tools and programmes for their own gain, given that for them, this was a case study in the use of their programme that could not be replicated by any statistical model or hypothesis. Others wanted us to issue statements on how the use of their technologies helped communities to regain a semblance of normalcy. We refused all such requests. The danger of acquiescing to such demands is that it creates in the minds of those who most desperately need assistance the impression that one is only trying to help for parochial or mercenary gain, instead of a deep seated commitment to help the community stand on its own feet. Any organisation or stakeholder rooted in principles of social justice and social empowerment would find this perception anathema and a death blow to any trust that can be built over the long term.*

Humanitarian aid is emphatically not about commercial branding.

Time and again I've stressed how important it is to consider the side-effects of commercial branding in traumatised communities, the ethics of doing so and creating what may be really problematic perceptions between the brand and services provided (thus psychologically locking in communities to a particular brand not out of any inherent worth, but because they are hard wired into using it). We see this tendency in the medical industry, where brand names often mean an unconscious premium paid for by consumers who are ignorant of the actual drug (Panadol vs. paracetemol tablets for instance).

At the same time, as a participant expressed at the SA III debriefing, many commercial companies offer their service in support of disaster relief and aid precisely because it offers an opportunity to market their products—directly to the governments and civil society of the countries affected by the disaster, but also to those outside of the affected area by writing

up partisan case studies that almost inevitably posit the product as the single most important link in the aid chain.

I'm increasingly aware of the parochialism of corporate agendas and, at a time of great need, the judgment call one has to make as to whether one invites a mercantilism into the aid and relief framework or eschews it totally and instead relies on initiatives such as Sahana that put needs of those affected first. While the sustainability of the latter may be question, the desirability and long term consequences of the former need also to be examined more fully. It is as ever a compromise between solution vendors and responders from (I)NGOs active on the ground and one that, I suspect, can only be worked out on a case by case basis, though I would also submit that some yardsticks for CSR in humanitarian aid are imperative.

New media

Dan Gillmor's presence for the first couple of days of SA III was tremendous—his ability to see mash-ups in his mind and his tenacity in getting developers to interact with each other in order to build what he envisioned created what little new media experiments in SA III (see my interview with him here). In many ways, the interface with community / local / ethnic media—bloggers, ham radio operators, local mobile phone users, local newsletter groups, podcasters, video bloggers etc—was abysmal in SA III.

This was disappointing as it debilitated the ability of the SA III demonstration to fully use the resources already present on the ground to support the relief efforts for the "pandemic." Kathleen Reen and Mark Frohardt from Internews were particularly vocal on this issue, bringing them a vast experience of using media in relief efforts. I wish I could have used podcasts more and video interviews with participants and those from the field (to test the range of possibilities of using just my MacBook Pro to influence media awareness and decision making) but without a support framework, it was not worth the effort. As it turns out, entries on this blog exceeded the number of posts on SA III's own website during the demonstration !

This being said, Microsoft's FM watches were really very interesting to see and use (see my podcast with Mark Frohardt here), Dan Gillmor's efforts at creating a smart mob were noteworthy and there were also some interesting GIS / SMS / mobile devices / PC mash-ups made possible by RSS, SSE and SMS / MMS. For the lay-person, all this means that it is now

possible to use mobile devices for location specific information in a disaster response. For me personally, the tech mash-ups show the potential of using mobiles to bear witness against human rights violations, to provide grassroots level viewpoints when mainstream media is prevented from going to a war zone by the combatants, help provide opinion that tempers propaganda, can aid in the modeling of IDP, refugee movements thereby assisting the planning for displaced populations and a whole raft of other uses.

Dan Gillmor's kind offer to be of any assistance possible to my own endeavours in Sri Lanka was not just a measure of his willingness to truly help engineer old / new media frameworks to assist in peacebuilding, but was facilitated by the environment that SA III, that allowed people who did not know each other develop relationships that will last far longer than the exercise itself.

NGO developer interaction

Unfortunately, there was a distinct lack of structured NGO—developer interaction. For the most part, developers were in their cocoons doing their thing, while the NGOs were treated as an adjunct to the entire exercise, there to bring a touch of reality that many thought were unnecessary and in far too big doses.

During SA III, some of the NGOs came together and drafted a set of guidelines / recommendations for the design of humanitarian aid solutions that reflected some of my own. These were read out and distributed to all those present at SA III, but I'm fairly certain that they were forgotten at the end of SA III.

That said, it was particularly heartening to see several developers come up to me and ask me to sit down with them and go through their ideas and solutions, asking for my (trenchant) critique to help them better understand the realities of ground conditions and designing for humanitarian emergencies. A structured interaction—like an NGO bazaar, where we were challenged to put up our needs and ideas for the perfect system and have developers respond to them best they could—would have been tremendously useful given the wide spectrum of actors and technologies represented at SA III.

Face to face dynamics vs. virtual interaction

Perhaps a greater lesson here—meeting Eric Rasmussen, Nigel Snoad, Gabriel Coch, Ashok Hingurani, Gay Matthews and so many others from Groove, Microsoft and elsewhere with whom I had communicated and in many cases, become firm friends with online, for the first time in real life strengthened our friendship and changed the dynamics of our online interaction.
Even with the increasing ease of online communications, from email to VoIP, from video conferencing to collaborative platform like Notes and Groove, face to face communication brings with it dynamics of inter-personal interaction that simply are replicated in internet and web mediated communication. Non-verbal gestures, subtle facial gestures, eye movements, posture, silence, the warmth of a smile and the embrace—these are not thing things that are seen, felt and heard online. Perhaps many years into the future with developments in 3D imagery, holography and the ability to transmit sensual information electronically (as experiments in transmitting smell via the internet point towards), we may be able to do away with human contact, but how many of us today can contemplate such a life?!

On a related note, though a long time inhabitant of Second Life, I was struck by how detailed the Strong Angel Island sim, created by The Magicians, was when shown to us towards the end of the week. I have a separate post on this issue, but think that we are only beginning to explore the possibilities of using platforms such as Second Life to bring people together in simulations that explore, without bodily harm, responses to violent conflict and disasters.

The sim developed for SA III re-kindled an interest to see the application of Second Life sims in online dispute resolution (ODR), the treatment of PTSD, addressing issues of reconciliation and co-existence amongst youth and a range of other activities related to conflict transformation and peacebuilding.

Capturing the information and advanced social network visualisation

During and after SA III, the central challenge for those in charge of creating, maintaining and strengthening the social ecology of those present at SA III will be to farm the information, assimilate it, create the connections and then ensure that the resulting knowledge database is kept up to date.

This is a formidable challenge that I've been grappling with on a larger scale with the myriad of actors and factors involved in a peace process. Like the Dropping Knowledge initiative and the Visual Thesaurus, as I've written earlier, part of the solution may be in visualisation techniques for complex relational databases. Reflecting the changes in our lives, each record needs to be organic allowing for AI algorithms to farm through the information and create connections based on semantic analysis, geographic proximity, industry association, academic and research interests, product and services overlap, sex, age, nationality, expertise and any public domain information on the internet (such as CV's and published papers).

The frailty of assumptions

SA III was interesting because it brought together those with field experience and those with little or none at all. Almost all of those who didn't have any field experience where from the US, from big name corporate vendors of GIS and other hardware / software technologies. SA III offered them a taste of a real world disaster response scenario, that forced them to question many assumptions, including:

- The availability of connectivity. Many who came expecting broadband availability were sorely disappointed—even though SA III itself was plagued with connectivity issues (for an entire week, I could not connect to the internet at a speed greater than 23kbps) this mirrored real life disaster responses in the chaotic first few days of setting up operations.
- GIS—snazzy large format multi-colour maps are great for press and government briefings, but utterly useless in the field. The edge needs black and white, A4 size maps, with patterns instead of colours, that can be photocopied easily. The very different needs of the edge and the operations centre was a learning experience for many present from the GIS world.
- Web based GIS—not everyone around the world uses, or wants to use, Internet Explorer. Yet a key example of web based GIS only ran on Windows XP and Internet Explorer. I was the only one at SA III who spoke out against this, and wondered aloud whether nothing had been learnt from Katrina.
- The culture of corporate America vs. the humanitarian aid—Many of those present thought that big brands and the brash advertisement of products they felt fitted perfectly the needs of humanitarian aid would guarantee better coordination and more efficient information sharing. Problem was, there was

more than one company at SA III that thought so. Seeing them jostle and finally agree to a common, platform / programme / device agnostic information sharing framework was fascinating.

I would have liked to see a greater emphasis on ethno-political conflict and its interplay with humanitarian aid in SA III, since it would have sensitised the participants to the very real conditions on the ground, where key personnel are wounded, killing, go missing, suffer from PTSD, sometimes go AWOL, where equipment breaks, is stolen, sabotaged or hacked into, where food and supplies run short, communications fail and RPG's and tracers light up the night sky.

Technology can help in such instances, to an extent. For instance, in-country data-centres are a bad idea in conflict zones—peer to peer communications are far better. Technologies that are designed to be as redundant and fail safe as possible—from RAID to relays that transmit data even if others fail (replicating the essential architecture of the internet) are very useful on the ground, as are low bandwidth video conferencing tools such as Microsoft's Portrait, VoIP (such as Skype) and asynchronous collaboration platforms, such as Groove Virtual Office. Furthermore, there were some cutting edge network threat identification systems at SA III, such as Bit9 (which unfortunately does not work on Linux or OS X).

These were just some of the lessons identified (and hopefully learnt) at SA III by those present who did not have field experience, and were engaged in the design of tools aimed at first responders and humanitarian aid workers.

Take back

I don't think there was a single participant at SA III, from those who had little or no experience with humanitarian aid to those with years of experience, who went home without learning something new. The central challenge for SA III is precisely this success—how it aims to continue interactions of this nature in the future, without burdening Eric Rasmussen or relying on his incredibly powerful and engaging personality to bring people together, will be an issue the organisers need to flesh out.

While I would have liked to see a greater internationalisation in SA III's pandemic / terrorism scenario, it by no means dilutes the appreciation of what was a definitive exercise in brining people and technology together to collectively address how we can do a better job when disaster strikes.

I think SA III was about 3 key things—ideas, technology and people.

Ideas

SA III was a mash-up for ideas. People from all over America and a few countries from around the world came together in one place to grapple with the vexing question of how to design solutions for a humanitarian disaster. The sheer noise of conversation on the first day of SA III in particular, and during the entire week, was literally and metaphorically deafening. I got more ideas for the potential of satisficing solutions in SA III than I would have had staying in Sri Lanka for a couple of years—it was that good.

Technology

Truth be told, there was some cool gear and tech at SA III.
From touch screen plasma displays to mobile phones with built in GPS, almost every single table was brimming with cutting-edge equipment. Vsee had set up an entire rack of flat screen monitors on one end of the operations site, and for the entire week was engaged in video conferencing and other highly distracting experiments. The GIS corner was a melting pot of plasma screens and high end GIS visualisation interfaces that looked and felt delicious. I would never have seen most of this technology in Sri Lanka. Seeing the technology alone is enough to kindle the imagination to put it to uses the developers may have never thought of, in the same way we used Groove Virtual Office in Sri Lanka to support the One Text process.

People

From a peacebuilding practioner's perspective as well as that of a theorist involved in Online Dispute Resolution (ODR) and the design of humanitarian aid systems, **I strongly believe SA III needs to continue at regular intervals in the future**. It would be useful, however, to keep it to a smaller group—the sheer number of participants and interactions at SA III made it at

times unwieldy and tremendously difficult to capture and learn from the knowledge generated by the social and technological interactions.

As Eric kept stressing through the exercise, SA III was ultimately about people—not about cool tech. It was a message that deserved to be re-iterated throughout the week, and again after the end of the exercise, echoing the sentiments I expressed in early 2005:

> *Natural disasters in regions wrecked by conflict can be the source of life. Ignorant and dismissive of ethnic identities, death can level entire villages and uproot millions. It is our response to the disaster that holds the promise of life and of renewed hope. Used appropriately in ways that strengthen local capacities, technology can act as a catalyst - channeling aid to those who need it, facilitating knowledge flows, engender trust, foster collaboration and rekindle a shared humanity forged by trauma that is felt by all.*
>
> *Even though there remains much to be done to capture its role in more rigorous ways, Info Share, along with many other stakeholders in Sri Lanka and in other countries affected by the tsunami have irrefutably proved that technology can help relief and aid efforts – in the immediate aftermath of a disaster and also in planning for the medium and long term conflict sensitive planning.*
>
> *We stand humbled at the injustice of history that inadvertently catapulted us to a position in which we used what we knew best to help those less fortunate. It is the work of ordinary individuals in the very heart of the affected areas worst hit by the tsunami that continues to inspire us in our work towards the creation of sustainable IT architectures that fully harness the indomitable nature of the one thing the tsunami couldn't sweep away.*
>
> *The human spirit.*

Annex 11: Strong Angel Executive Committee Information

Members:

Eric Rasmussen, MD, MDM, FACP	*Director*
Eric Frost, PhD	*Regional Coordinator*
Brian Steckler	*Communications Director*
Robert Kirkpatrick	*Application Integrator*
Nigel Snoad, PhD	*Demonstration Designer*
Peter Griffiths, CDR, USN	*Civil-Military Liaison*
Doug Hanchard	*Technical Communications Advisor*
Milton Chen, PhD	*Visual Communications Advisor*
John Crowley	*Information Architect*
Gay Mathews, MA	*Volunteer Integrator*
Suzanne Mikawa	*Information Coordinator*

Biographies:

Eric Rasmussen, MD, MDM, FACP

Commander, Medical Corps, United States Navy

Director, Strong Angel

RasmussenE@gmail.com

Dr. Eric Rasmussen spent seven years enlisted in nuclear submarines before leaving the Navy to receive his undergraduate and medical degrees from Stanford University. He worked in Haiti with the State Department and on the graduate research staff as a molecular biologist for Los Alamos National Laboratory before completing a Residency in Internal Medicine at the University of Texas in Dallas. He returned to the Navy as Chief Resident in Medicine at the Naval Medical Center in Oakland, California and continued there as assistant program director for the Internal Medicine teaching program. Since then he has held several positions, including Director of Surface Fleet Medical Programs at the Navy's Medical Institute in Florida, and as Fleet Surgeon for the US Navy's Third Fleet.

In addition to time in submarines Dr. Rasmussen has served as a physician-at-sea aboard the nuclear aircraft carrier USS Abraham Lincoln (CVN-72) and on deployment with the missile cruiser USS Yorktown (CG-48). He served three brief rotations on the ground in Bosnia, and during that period was appointed a Principle Investigator for the Defense Advanced Research Projects Agency (DARPA). In 1996 he was awarded both a Certificate of Meritorious Achievement from DARPA and an appointment as a Fellow of the American College of Physicians.

His work with DARPA and the Navy has included international exercises that deeply incorporate UN relief agencies into the exercise development process. He has also actively promoted the field evaluation of technologies specifically developed to improve integration at the civil-military boundary. In the course of developing US-UN civil-military support criteria he worked with Civil Affairs teams within Bosnia just after the siege of Sarajevo in 1996 and again twice in 1997, then in a Sudanese refugee camp in Kenya, in an Angolan refugee camp in Zambia, and as a guest within the International Committee of the Red Cross (ICRC) hospital for Sudanese war-wounded in northern Kenya. His collaborative guidance document for civil-military cooperation was placed in the public domain in 2000 and personally briefed to the Chief of Naval Operations, the Secretary of the Navy, and the Chairman of the Joint Chiefs of Staff.

Dr. Rasmussen returned in mid-2001 to the medical faculty at the Naval Medical Center in San Diego, with a simultaneous appointment as a Principle Investigator for the Defense Advanced Research Projects Agency (DARPA) and a teaching position within the United Nations Office for the Coordination of Humanitarian Affairs (UN-OCHA) in Geneva. He then completed a Master's in Disaster Medicine (MDM) through the European Center for Disaster Medicine and the World Health Organization. During the 2003 Iraq War he was first deployed to the planning staff of US Central Command Headquarters as the Medical Coordinator for J-5 (Civil-Military Operations). From there he was deployed forward by CENTCOM in February 2003 as a physician to the USAID Disaster Assistance Response Team (DART) in Kuwait. Through the war he served as the disaster-response physician to the Iraq Humanitarian Operations Center in Kuwait City, and later worked within several cities in post-war Iraq, including Basra and Baghdad. He returned to San Diego from Baghdad in the late summer of 2003. For his work on the design and implementation of humanitarian information flow during the war he was selected for the DARPA 2003 "Sustained Excellence in a Principle Investigator" award.

His position as director of the Strong Angel humanitarian coordination exercises led to his 2005 deployment to Indonesia as head of a Civil-Military Coordination Team for the tsunami response. He was later deployed with Joint Task Force Katrina as the Joint Force (Maritime) Surgeon (Forward) in New Orleans. Currently CDR Rasmussen is the Chairman of the Department of Medicine and director of the Hospitalist and Critical Care Program within Naval Hospital Bremerton near Seattle, Washington. He also holds a simultaneous appointment as the Special Advisor in Humanitarian Informatics for the Office of the Secretary of Defense.

Dr. Rasmussen is a Senior Fellow at the Rocky Mountain Institute, an Associate Professor of Epidemiology and Biostatistics within the Department of Public Health at the University of South Florida, an adjunct full Professor within the College of Sciences and the School of Public Health at San Diego State University, and a Principle Investigator for both DARPA and for the National Science Foundation. He is also a Reviewer for the Journal of the American Medical Association (JAMA) and the American Journal of Public Health. He sits on several advisory boards including the Crisis Management Resources Board for the National Academy of

Sciences. He is published in wilderness ecology, biophysics, clinical medicine, humanitarian medicine, decision analysis, shipboard medical care, urban search and rescue, and trauma research. He has been awarded three Meritorious Service Medals and a number of other personal, unit, and theater military decorations.

Eric Frost, PhD

Regional Coordinator

Eric Frost is Co-Director of several centers at San Diego State University, including the Center for Homeland Security, the Visualization Center, and the Center for Information Technology and Infrastructure (http://citi.sdsu.edu), which he co-directs with Bob Welty. Eric also directs two other centers, one on Central Asia and the other on advanced water technologies, and is Co-Director of the Homeland Security Master's Degree Program, an interdisciplinary program linking policy and technology to help educate officials and managers to lead regional, national, and international efforts to serve the public in all-hazards situations.

All of these roles involve humanitarian and homeland security efforts that use technology and geospatial imagery to help solve difficult problems in difficult circumstances, like the recent Indonesia earthquake and volcano and their impact on the people of the region. Eric and his colleagues use many new technologies and protocols that are enhanced and tested during real-play demonstrations such as Strong Angel III (http://www.strongangel3.net/) on avian flu and web pages such as http://www.geoplayer.com/gateways for Banda Aceh, Katrina, and Indonesia earthquake and volcano efforts.
With formal training as a structural geologist focusing on teaching geologists how to find oil and gas, Frost teaches classes in Sensor Networks, Collaborative Visualization, Remote Sensing, and Homeland Security, and helps link SDSU to the community to assist in many aspects of Public Safety and humanitarian assistance and disaster response. He has traveled widely in the world, helping draw together international teams to use technology in assisting with drawing countries and people together in mutually beneficial ways. Eric also works with advanced Internet and fiber-optic applications to build infrastructure, applications, and visualization products to demonstrate how science, education, entertainment, performing arts, and cultural exchange can draw people together and blossom existing social networks.

Brian D. Steckler

Communications Director

Mr. Brian Steckler is Associate Chair for Special Programs at the US Naval Postgraduate School (NPS) in Monterey, CA. Brian specializes in telecommunications, information technology, information operations, information warfare, computer network attack/defense, e-commerce, Internet technologies, computer networking and related fields. In his current role, Brian provides business development expertise to NPS's Research Department, and is an occasional lecturer. His areas of teaching and research include: basic networking (LAN/WAN),

Information Operations to include Computer Network Defense, Attack, & Exploitation, Psychological Operations, Military Deception, Electronic Warfare, Operations Security, and Information Warfare.
Brian also conducts research for the U.S. Department of Defense in mobile wireless network security, hastily formed networks, information technology applications for Humanitarian Assistance/Disaster Relief, mobile network operation centers, voice verification and recognition technologies, and various broadband internet access device technologies including fixed broadband wireless, ultra wideband, free space optics broadband, and broadband over power lines. He has led major NPS research efforts including deployments of Hastily Formed Networks (HFN's) in Thailand after the December 2004 SE Asian tsunami as well as in the U.S. Gulf Coast after Hurricane Katrina.

Brian's last assignment in the corporate world was as the founder and CEO of a California business-class Internet Service Provider (ISP) and software engineering firm. He operated that business for 7 years until selling it in the summer of 2001. Prior to that Brian had a successful 20-year career in the U.S. Navy, ten years as an enlisted Crypto logic Technician and ten years as a Commissioned Officer. During his Navy career he qualified as a Surface Warfare Officer, Supply Officer, Communications Officer, Operations Officer, Weapons Officer, CMS Custodian, Mine Countermeasures Officer and Officer of the Deck (underway).

He received his undergraduate degree from the University of Washington in 1987 in Business Administration. He received a Masters of Science in Information Technology Management from the Naval Postgraduate School in 1994.

Robert Kirkpatrick

Application Integration

Robert Kirkpatrick is Lead Architect for Microsoft Humanitarian Systems (MHS), an expeditionary solutions team reporting to Chief Software Architect Ray Ozzie. He is responsible for design and development of solution prototypes to address collaboration challenges within the areas of humanitarian relief, development, peace-building, human rights, and civil-military cooperation. Robert's recent work includes design of software for coordination of humanitarian relief for earthquake victims in Muzaffarabad, Kashmir, and a telemedicine solution for remote diagnosis of tissue samples; the system linked rural health clinics in Afghanistan with hospitals in Kabul and pathologists in Europe. He has co-authored several papers on topics related to civil-military collaboration in austere communications environments.

In 2003, Robert developed the Virtual Iraqi Health Logistics center, a system which was used during the Iraq War by both humanitarian and military personnel for needs assessment, situation reporting, and the evacuation of injured civilians. Also that year, he served in Baghdad under US Ambassador Paul Bremer as a member of the Coalition Provisional Authority Executive Secretariat, facilitating collaboration and information sharing between civilian, military, and local Iraqi members of the new ministries. During this period, he also collaborated with OSD and NAVAIR on a project to enable secure information sharing between community leaders in Baghdad and a battalion of the US Army's 82nd Airborne.

In 2004, Robert worked as Collaboration Architect for the OSD-NII and DARPA-sponsored Strong Angel II demonstration, where he contributed to the design, execution and analysis of more than 80 experiments related to civil-military coordination during complex emergencies in austere environments. In 2005, he built the Tsunami Virtual Emergency Operations Center, a collaborative toolset used by US Pacific Command and the UN Joint Logistics Centre to coordinate activities during Operation Unified Assistance in Banda Aceh. Robert also designed and deployed the collaborative, GIS-enabled DPKO SatComms tracking system now used by UN Peacekeeping Forces to manage global UN satellite communications. Following Hurricane Katrina, Robert designed tools for the American Red Cross that were used for registration, medical treatment, and family reunification for more than 15,000 storm victims displaced into emergency shelters. He also facilitated collaboration between JTF-Katrina JFMCC, US Navy medical personnel, humanitarian NGOs, Red Cross, Air and Army National Guard units, and local hospitals.

Prior to the launch of MHS, Robert was Public Sector Solutions Architect for Groove Networks, where he designed collaboration systems to support a range of humanitarian operations and exercises, including Iraq, Banda Aceh, the US Gulf Coast post Katrina, and Strong Angel II. Robert holds a BA degree in Greek and Latin from the University of North Carolina at Chapel Hill, and has been a student in the Harvard University Graduate School of Arts and Sciences non-degree program.

Nigel Snoad

Demonstration Design

Nigel Snoad is the Lead Capabilities Researcher for Microsoft Humanitarian Systems where he heads Microsoft's investigations into the capabilities, approaches and future directions of solutions to address collaboration challenges in humanitarian environments. Microsoft Humanitarian Systems (MHS) is an expeditionary team under Microsoft Chief Software Architect Ray Ozzie, tasked with investigating and building working models of advanced solutions to address collaborative aspects of some of the most vexing, emotionally-charged, and least-served human interaction problems, including relief, development, conflict resolution, human trafficking, and human rights.

Prior to joining Microsoft, Nigel was Contingency Planning Advisor to Dr. David Nabarro, the United Nations System lead for Avian and Human Influenza. Nigel and his colleagues produced policy, plans, guidance, simulations and training establishing the UN system's response and operational continuity in the event of an influenza pandemic. Prior to this Nigel was deployed to Iraq in 2003 on loan from UNICEF as the chief information officer and deputy for operations of the United Nations Joint Logistics Center (http://www.unjlc.org) which provided emergency humanitarian logistics and civil-military coordination on behalf of UN agencies and NGOs. He was then one of the founding members of the Rome based UNJLC Core Unit, and responsible for information products and processes, including reporting, field assessments, GIS and mapping, the website, and the development and deployment of field applications such as cargo booking systems, assessment tools and relief supply chain management solutions.

Nigel's more recent field deployments include Sudan and Indonesia. In Indonesia Nigel established the UNJLC less than 48 hours after the Tsunami and led the logistics coordination for the immediate international response. This involved liaison with Governments, UN, NGOs and various military assistance missions. The UNJLC team produced maps, damage assessments and reconstruction plans, flight and cargo procedures and day-to-day prioritization, and pooled transport assets, including military and civilian helicopters, fixed wing aircraft and boats. In Sudan Nigel was a part of the UNJLC team that managed the supply of non-food items for more than 1.5 million displaced persons in Darfur. Nigel was a part of the UN rapid disaster response system, and helped draft the Civil-Military Coordination Handbook for UNOCHA.

Before joining the UN Nigel worked as lead for R&D, product management and business process analysis for tech startups that developed business process automation, data mining, search and optimization products using a range of web-services, software agents and natural language technologies. Nigel has worked as a research microbiologist and soil scientist, parliamentary lobbyist, designer, and has several years experience leading search and rescue teams in the USA.

Nigel has a PhD in Complex Adaptive Systems from the School of Computer Science and Engineering at the Australian National University. Nigel was a visiting fellow at the Santa Fe Institute, the Stanford Center for Computational Genetics and Biological Modeling and Chalmers University in Gothenburg, Sweden. Nigel has a BS with Honors in Laser Physics from the ANU.

Pete Griffiths

Civil/Military Integration

Commander Peter A. Griffiths is a native of Pelham, New York and a graduate of Marquette University with a Bachelor of Science Degree in Business Administration. While at Marquette he completed the four year Naval Reserve Officer Training Corps program and was designated a Naval Flight Officer in June 1985. Following his commissioning, Commander Griffiths reported to his first fleet squadron and flew the venerable A-3 "Skywarrior," and the ES-3A "Shadow" aircraft on numerous deployments and has flown from nearly every aircraft carrier in the Navy's inventory. Commander Griffiths served in the Mediterranean/ Arabian Gulf flying from and participated in a variety of worldwide operations including Operation ENDURING FREEDOM.

Selected for command in the spring of 1999, Commander Griffiths took command of Special Projects Patrol Squadron ONE (VPU-1) in June of 2001 flying the Navy's multi-mission P-3 Orion aircraft. Following his command tour Commander Griffiths was selected to attend the prestigious National War College in Washington, DC, where he completed a one-year curriculum in National Security Strategy and received his Masters Degree in June of 2003. He was then appointed Director, Joint C4ISR Decision Support Center for the Secretary of Defense for Networks and Information Integration (OASD-NII). Leading several government personnel and support contractors and managing a $5.5m annual budget.

In October of 2005 Commander Griffiths volunteered and deployed to the Waveland/Bay St. Louis area of Mississippi in the near-aftermath of Hurricane Katrina where he was able to directly support and assist with the installation of critical information technology systems assisting “first responder” and local government leadership global communications and collaboration. Commander Griffiths has accumulated nearly 3,000 flight hours in 10 different Navy aircraft and has survived over 300 carrier landings.

Doug Hanchard

Technical Communications Advisor

Doug Hanchard is Director of Signature Engagements at Bell Canada, where he is responsible for designing solutions that provide Disaster & Rapid Emergency Communications services, enabling Satellite, Wireless Technologies such as Radio, Wi-Fi and Wi-Max to integrate onto a common I.P. platform, thus providing crisis management agencies alternate communications tools such as Data links and VOIP to PSTN in a disaster zone. Doug is also a solution architect for the Canadian Federal Government, responsible for Network and Application Engineering for all Federal Government Ministries, including DND and RCMP.

Doug’s past roles at Bell Canada include providing designs and architecture reviews of complex enterprise data networks spanning in size from 100 to 5,000 nodes, designing and engineering Global Carrier core networks, involving integration and redesigning of legacy TDM networks to I.P. transport layer, and advising and consulting on networks worldwide based in Europe, Asia and the United States. Doug also served as Director of the Center of Excellence for the Physical Security Bell Security Solutions Inc., a Bell Canada subsidiary.
Prior to Bell Canada, Doug was a product manager for Telus, and a manager for AT&T Canada, responsible for national and international integration of Internet and data networks. He also has 11 years of prior Telecommunications experience with other disciplines including Storage Area Networks, Un-interrupted Power Supply Systems, Website (Intranet and Internet), HTML, XML, Java Solutions.

Milton Chen, PhD

Visual Communications

Milton Chen is the Chief Technology Officer of VSee.com, a low bandwidth videoconferencing and application sharing Web service for humanitarian operations. Milton’s pioneering PhD research at Stanford University has shown why videoconferencing has failed to become ubiquitous despite billions in investments since 1927. His unique insight in how to make videoconferencing an everyday experience has led to more than 40 invited talks to countries ranging from Iceland to Nigeria to Saudi Arabia.

Milton received a bachelor’s degree in Computer Science from UC Berkeley and a PhD in Electrical Engineering from Stanford University. He also received the DEMO God award at DEMO 06.

John Crowley

Information Architect

John Crowley is a technologist from Cambridge, MA and a web consultant to the Center for Public Leadership at the John F. Kennedy School of Government, Harvard University. As a classically-trained cellist who has been both programming and performing since the age of 7, John strives to build web-based communities that foster the collaborative, creative process of a chamber ensemble. John is also a researcher who focuses on the intersection of technology and social systems. John has authored the best-practice research report, *Knowledge Management Intranets* for the Corporate Executive Board's Working Council for Chief Information Officers. He is co-author of a legal and economic analysis of the 'Napsterization' of virtual worlds, which will appear in the Northwestern University Law Review. John holds a Mus.B. in cello performance and music history, *summa cum laude* with distinction, from Boston University, where he was a Trustee Scholar. He also holds an M.A. in the history of ideas from The University Professors Program at Boston University.

Gay Mathews

Volunteer Integration & Community Involvement

Gay Mathews, CCUE, has been the President/CEO for the last 19 years of the North Hawaii Community Federal Credit Union, a CDFI certified, island wide, low income community development credit union. She has over 30 years in the consumer, mortgage and small business financial services sectors, and is known throughout the state as being an innovative lender, creating a number of programs and products that serve the disadvantaged.

Mathews is currently working on a culturally appropriate financial life skills program for the incarcerated and the illiterate. She serves on a number of state and county-wide boards including the State Board of Credit Unions, Hawaii County Resource Center, Hawaii County Economic Development, Hawaii County Citizens Corp, Hawaii County Workforce Investment and the Hawaii County Reintegration Program for the Ex-Offender.

Mathews holds a Bachelor of Science in Business Administration, a Masters in Community Development and is currently working on a Masters in Organizational Change. Mathews has been an active participant in all three Strong Angel efforts, serving in a variety of capacities including volunteer coordination and integration, regional director, site and logistics coordinator, and executive assistance to Dr. Eric Rasmussen. In addition she has worked with Dr. Rasmussen on a number of other projects and charrettes focusing on humanitarian relief.

Suzanne Mikawa

Informatics Coordinator

Suzanne Mikawa is the Informatics Coordinator for Strong Angel III, responsible for operational organization, documentation, and information flow for the multinational integrated disaster response demonstration focused on experimentation in the use of cutting-edge techniques and technologies to facilitate improved communication and cooperation across the civil-military boundary in post-disaster and post-conflict field environments.

Prior to joining the Strong Angel team, she worked as the Cisco Networking Academy Program Coordinator, Information and Communications Technologies (ICT) Project, for the United Nations Development Program (UNDP) in Afghanistan, a joint project funded by Cisco Systems, Inc., the United Nations Development Program, and the United States Agency for International Development (USAID) to bridge the digital divide in Afghanistan. In this role, she managed the Gender Focused Expansion of CNAP Afghanistan across 6 provinces, launched the Afghan Women in Information Technology (AWIT) Initiative, and fostered public-private partnerships among government institutions, private firms, local NGOs, and academic communities to promote Afghan women's education and participation in ICT skills training.

Before her mission with UNDP-Afghanistan, she worked at Cisco Systems, Inc. as International Partnerships & Strategies Program Manager for Cisco's Least Developed Countries Initiative. At Cisco Systems HQ, she managed partnerships with USAID, UNDP, and government institutions and top universities in the world's 49 Least Developed Countries to implement an industry-standard computer networking training program, with a particular focus on Africa and Central and South East Asia. She also launched the Women in Technology (WIT) Initiative in 2004 through a partnership with USAID and the Institute of International Education awarding IT scholarships to women across 7 countries: Bangladesh, Mongolia, Nepal, Sri Lanka, Algeria, Tunisia, and Morocco. Suzanne graduated from Stanford University in 2003 with a B.A. in International Relations and a B.A. in French.
