White Paper:

Community Disaster Network (CDN)

A Wireless Network for Disaster Response and Recovery

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Definition of the Community Disaster Network (CDN):

The Community Disaster Network (CDN) is a consortium of neighborhood, non-profit organizations, and community-based organizations, working together to solve the long-neglected problem of how neighborhoods communicate in a disaster and how to tie communities (including businesses, homeowners' associations, etc.) to the government Incident Command System (ICS) in compliance with the National Incident Management System (NIMS).

The lead sponsor of CDN is the City of Palo Alto as a project of the new Palo Alto/Stanford Citizen Corps Council (CCC).[1] A key goal is linking to local jurisdictions, the private sector, non-government organizations (NGOs), and community based organizations (CBOs). CDN will deploy a resilient, solar-powered, wireless data network and a set of software and data-management systems (for use in the field as well as in emergency operations centers) that are designed to operate independently of existing infrastructure and that will survive a major earthquake or other event.

The short-term objectives of CDN are to put up a (rudimentary) solar-powered WiFi[2] network in portions of the mid-Peninsula[3] and create a test bed. Longer term, the functionality of the CDN Test Bed can be evaluated as part of the Golden Guardian homeland security exercise (www.goldenguardian.org) and other such drills. The CDN Test Bed will prove out linkage from the government Emergency Operations Centers (EOCs) down to various neighborhoods and private sector (corporate) points of contact, as well as demonstrate novel visualization and data-management tools for incident commanders, first responders, volunteers, and neighborhood teams.

Expansion of the CDN to other Bay Area communities and beyond is envisioned to occur in conjunction with regional efforts such as the Disaster Management Initiative (DMI) at Moffett Field.[4] Eventually, the CDN will connect to other systems. However, the core focus at the outset is linking community-level entities.

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[1] CCC is a federal best practice. See www.citizencorps.gov.
[2] IEEE 802.11. We will, of course, explore WiMAX (IEEE 802.16) and other options.
[3] This would be the "greater Palo Alto area", encompassing Stanford University, parts of northern San Mateo County and portions of northern Santa Clara County, especially our mutual aid partners: the City of Menlo Park, East Palo Alto, Atherton, the Menlo Park Fire District, etc.
[4] http://www.cmu.edu/silicon-valley/dmi/

The CDN is also to be consistent with the *Regional Emergency Operations Center (REOC) and Plan (RECP)* of the State of California Office of Emergency Management (Cal EMA)[5] and the Bay Area Urban Area Security Initiative (BA UASI).[6]

The CDN welcomes input and assistance from these and other groups. CDN, while looking to government partners for assistance and guidance regarding NIMS, ICS, and such matters, seeks to maintain a true community-based, grass-roots emphasis. While there are manifold initiatives regarding "interoperability" for government systems, the connection to neighborhood and community groups is generally given short shrift. The CDN, therefore, will focus on this neglected, but crucial, link.

By facilitating real-time information sharing with "eyes and ears" in the community, the Incident Commander can be provided with large data sets without the human overhead and frictional costs endemic to existing systems. A synchronized map is displayed in each command center, showing icons representing events, personnel, and other information, reducing confusion, rumors, and inefficiency. Community members become part of the solution, relaying in key information about their neighborhoods, including resources they may have to share. In essence, the Community Disaster Network could be viewed as "geoblogging" during a disaster and bringing social networking tools to bear against a common foe.

Introduction:

The San Francisco Bay Area relies upon a complex telecommunications infrastructure. A large disaster, in particular a major earthquake, would destroy or disable this infrastructure.[7] The Bay Area cannot rely on the telephone and data networks to remain intact in a major disaster. The proliferation of wireless data technologies such as WiFi provides an opportunity to adapt off-the-shelf tools to facilitate disaster communications. Most importantly, the linkage challenge among neighborhoods, volunteers, and first responders, can be overcome. A resilient, "off the grid" data network, the Community Disaster Network (CDN), is proposed to provide an emergency communications platform for response and recovery.

Data management automation is the other core element of CDN. The core irony is that EOCs cannot function if the phone system stays completely intact, because of information overload. In other words, if the connectivity problems are solved, emergency managers and incident commanders will be overwhelmed with information. In other words, community based policing and disaster management best practices advocate that community members be "eyes and ears" for the Incident Commander, but do not consider the "drinking from a fire hose" quandary that results. Using rules-based systems and maps-based displays, large quantities of information can be received, processed, routed, displayed, and shared. Many steps can be automated, reducing the time and human resources required. This process should happen as close to real-time as possible, especially the promulgation of information to field units and the community. Current pen-and-paper and other labor-intensive, inefficient methods are not sustainable.

[5] http://www.oes.ca.gov/WebPage/oeswebsite.nsf/content/F39818FB706ECED68825743D00738C6A?OpenDocument
[6] http://www.bayareasuasi.org
[7] Even an event, such as a pandemic, that does not directly affect telecommunications infrastructure can still impair the phone system, since such carrier systems are generally designed for a 20% utilization rate. Similar to over-booked airline flights, such systems are not capable of handling everyone trying to make a call simultaneously.

The military, with the advantages of more funding and more-unified command structures than civil governments, should be looked to as a model. The military phrase that encompasses the CDN requirements is "command, control, communications, computing, intelligence, surveillance, and reconnaissance" (C4ISR).[8] The synthesis and real-time sharing of such information is termed Common Operational Picture (COP or COMPIC).

Part of this effort will be to survey and digest the efforts of other groups and programs with relevance to our goals. CDN does not seek to reinvent any proverbial wheels, but will utilize other technologies and partner with other organizations to provide a practical test bed. Ongoing experimentation and testing are inherent to this iterative development process.

Community disaster exercises and drills will provide further opportunities for improvement.

The Problem of Neighborhood Communication and Emergency Operation Centers:

Numerous local jurisdictions have started or are expanding their Community Emergency Response Team (CERT) programs and other citizen volunteer efforts. For example, the Menlo Park Fire District started their CERT program in 2004 and now has over 800 CERT team members. As other agencies have also grown such programs, there are now thousands of disaster volunteers in the Bay Area.

Furthermore, grassroots community groups have become more active in encouraging residents and local businesses to be resilient. For example, the Palo Alto Neighborhoods (PAN), the umbrella group of all the neighborhood associations in Palo Alto, group states: "Residents should be a resource, not victims."[9]

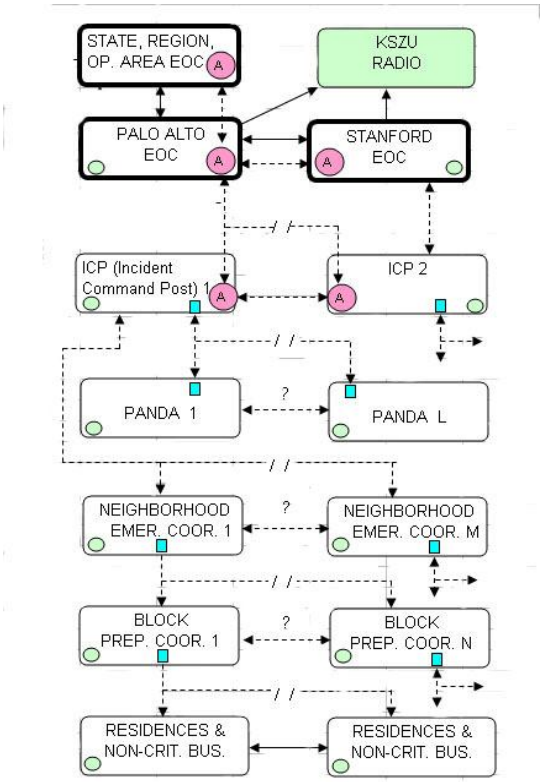
This sentiment underscores evolving best practices, redefining the relationship and roles of the general public in a disaster, as described by the National Crime Prevention Council (NCPC): "It is not enough for a local neighborhood group to have its own neighborhood in its sights. That neighborhood must be connected with local law enforcement through reliable links and must connect effectively with other neighborhood groups and community organizations...."[10]

The NCPC explains the missing ingredient to make this a reality:
"Residents need to be accessible through neighborhood/block level networks that provide formal and informal communication."[11]

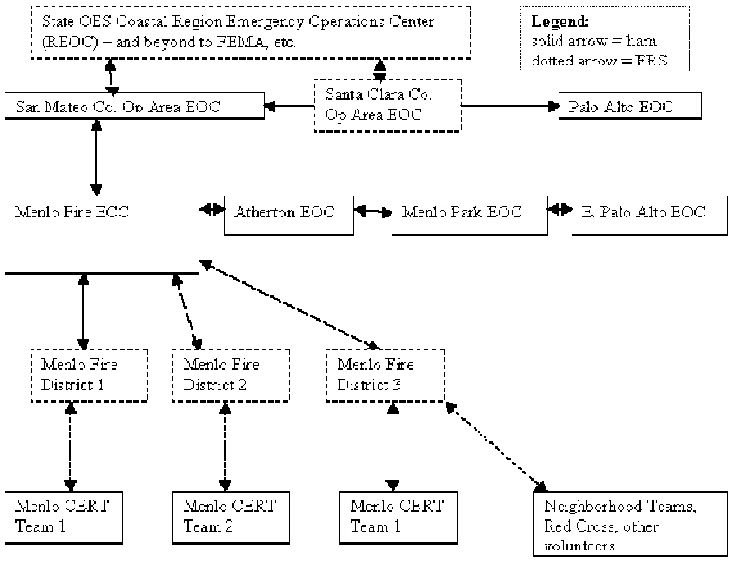
Palo Alto, in partnership with PAN, has surveyed other models and has come up with a Block Preparedness Coordinator[12] program that is in the early stages of implementation. The communications challenge of "plugging in" the community to Palo Alto's emergency operations center presents a

[8] http://www.disa.mil/main/about/jcc.html
[9] http://paneighborhoods.org/ep
[10] National Crime Prevention Council, "Crime Prevention Can Spur and Support Homeland Security in Neighborhoods and Communities", Nov. 2003; available on www.ncpc.org.
[11] National Crime Prevention Council, "Crime Prevention Can Spur and Support Homeland Security in Neighborhoods and Communities", Nov. 2003; available on www.ncpc.org.
[12] Similar to a "block captain" model, but more encompassing of social activites.

significant challenge, as there are potentially 2,500 Block Preparedness Coordinators. The proposed PAN neighborhood communications diagram[13] is illustrated below.



Similarly, the Menlo Park Fire Protection District identified emergency community network requirements as shown in the figure below:



[13] Prepared by Albert Dorsky and Don Nielson and PAN with input from the PAN communications subcommittees.

However, the traditional communication methods to link EOCs with field operations are not optimized to handle such large numbers of personnel and radio traffic ("span of control" problems also arise).

In other words, even if the physical radio channels could support all users, the EOC would suffer information overload and would be unable to benefit from the inputs.

While some jurisdictions have implemented Computer Aided Dispatch (CAD) and Geographic Information System (GIS) tools, the focus of such tools is on first responders and government resources, not community based organizations and other such non-government resources.

Furthermore, the implementation of NIMS places new requirements on jurisdictions and volunteers, both with regard to training (viz. ICS 100, 200, etc.) and response (credentialing, typing & activation). Simply put: The local governments do not have sufficient tools and systems to facilitate a true community response to a disaster.

A recent thesis from the Naval Postgraduate School summarized the policy issues that surround this topic:

> "The proposed predeployment response gap should also add a box to the Incident Command System (ICS) algorithm to include a 'Predeployment Neighborhood Initial Action Response' system that initially shows a dotted line to the professional ICS. This system would follow the same model as the ICS."[14]

Local communities need to share information and collaborate on these topics, supporting regional planning efforts.

Current Technologies & Protocols:

A "fully-impaired" situation is defined by the loss (from physical damage or system overload) of traditional communications infrastructure during a disaster. In the absence of telephone and other carrier systems, radio channels are the remaining option.

Neighborhoods and communities have a number of voice radio options[15] that can be utilized. These are generally considered part of the Auxiliary Communication Service (ACS), as defined by the State of California Office of Emergency Services (CA OES):

- Amateur Radio (ARES/RACES) [a.k.a. "ham" radio]: requires a license (FCC exam) and is designed for longer-distance communications
- Family Radio Service (FRS): an unlicensed, low-power (0.5 watt) 14-channel "walkie-talkie" radio type for intra-neighborhood communications
- General Mobile Radio Service (GMRS): 5 watts with some channels that overlap with FRS channels; fee-only (no test) FCC license required
- Citizen's Band (CB): 40 channels @ 5 watts
- Multiple User Radio Service (MURS): 5 channels @ 2 watts

[14] Biladeau, Pamela G. , STRENGTHENING AND EXPANDING THE CITIZEN CORPS, Naval Postgraduate School Masters Thesis, March 2006, p. 26.

[15] An excellent summary of neighborhood communications can be found on: http://nerp.myeweb.net/whats_new_4.html

Generally, ARES/RACES provides longer-distance radio links among EOCs and certain key facilities. FRS is commonly used for CERT and neighborhood teams.

While voice radio[16] communication is essential in an emergency, the mode suffers from some fundamental limitations:

- efficient radio usage requires training (perishable skills)
- voice is subject to errors in transcription
- voice is not well-suited to relaying large quantities of information (such as damage reports)
- voice is not encrypted / no access-level control

The popular buzzword "interoperability" describes the problem of incompatible radio systems. For example, the local police department might not have the ability to transmit on the fire department radio channels. However, it also extends to how CBOs, NGOs, and other groups need to communicate in a disaster. Radio interoperability is an important topic, but it is being addressed through various other initiatives. The more fundamental problem is not the interconnection of radios, but the use of wireless data systems, GIS, and other tools to develop a Common Operational Picture.

For example, UASI has an effort underway to install a hardened microwave link among all EOCs in the Bay Area. CDN could provide a data-management module to facilitate COP among these EOCs over that microwave link. Similarly, in the event of a pandemic, tele-presence and web-conferencing tools could be utilized to affect social distancing.

Disaster response and recovery operations work best when resources are efficiently matched to needs. Generally, the closest resource is the best resource. In the case of neighborhoods, residents and community groups need to be able to identify and allocate such resources at the neighborhood and block level. It is not productive for resource requests of all types to be directed to the jurisdiction's EOC. Residents need to realize that they need to be self-sufficient and be provided with data management tools to allow them to implement their own neighborhood command posts (or command areas).

It is a principle of disaster management to push decision-making down to the lowest level. This extends to residents and neighborhoods, therefore.

In short, a crucial concept for all parties to grasp is that the highest-value communication type for a neighborhood is intra-neighborhood. This is a corollary to the general rule that the best resource is the closest resource. The matching of needs and resources, therefore, is a very local undertaking.

Proposed Community Disaster Network:

While voice radio systems will continue to be essential for disaster response, they cannot support the bandwidth and data management needs of a regional event where the goal of community involvement is attained. Data networks are simply more efficient for relaying certain types of information, especially, of course, information that cannot be relayed via voice, such as video feeds or digital images. The proliferation of wireless data network technology combined with the increasing reliance upon network-

[16] Packet data radio is used on ARES/RACES systems, but remains awkward and non-web-centric.

centric communications in the Bay Area as well as local first responders compound the disruptive nature of a failure of this resource.

The significant needs of local communities to communicate, both internally and with outside entities, using computer data networks requires the establishment of the Community Disaster Network. The CDN will be comprised of wireless data nodes that are completely independent of hard-wired infrastructure and electrical power. Each CDN node will have a solar-charged battery capable of running the system for at least 72 hours (probably, indefinitely, if the solar panel is sized to exceed the power demands of the attached load). Portable data devices (WiFi-enabled cell phones, etc.) will also be used. Like the original ARPANet, the progenitor of the Internet, the CDN will function as a "hardened" network, continuing to operate even if various nodes are disabled.[17] Furthermore, for portable and mobile devices, caching can be used to handle disruptions in wireless connectivity.[18]

The "client" side of the CDN will be optimized to require no or very little training. Indeed, the objective is that a person could begin using CDN without prior specialized training. It is imperative that the user interface (client) be as "standard" as possible – that is, use e-mail and the Web as if it were that person's "normal" computer (or cell phone). While there will be large opportunities to write client software and middleware, the basic precept of a familiar user interface must hold to ensure that the training burden for users of CDN is minimized.

Another design objective is that, as much as possible, standard off-the-shelf hardware is to be used.

System Features:

- Secure Option: encrypted/VPN; varying levels of network access (policy), etc.
- 802.11 ("WiFi") and related protocols
- Standard "off the shelf" hardware (low cost, easy maintenance/replacement)
- Little/no training required: computer uses familiar e-mail and Web interface clients
- Hardened installation with solar and battery power system capable of running at least 72 hours (continuous)
- Portable/mobile (in police cars, etc.) can connect to Network
- Supports video feeds and other high-bit-rate data
- Virtual telephone connectivity via VoIP (voice over IP) [virtual channels; talk-groups]

Expansion Options:

- Satellite link to Internet (gateway / backhaul)
- Connectivity/support to "Health and Welfare" Website where families (including first responders) can (securely) log in to check the status of their loved ones and friends after a major event.[19]
- Voice patch to KZSU and KCEA for community notification/communication (back-up to existing hard-line "remotes")
- Addition of sub-nets for certain groups such as hospitals, schools, neighborhoods

[17] This Paper will not get into the technical details, but there is ample literature on the use of directional antennas, mesh networks, special frequency bands, and other tools to solve the physical layer issues for CDN.

[18] Google is working on a new system that does this:
http://www.smh.com.au/news/biztech/gears-puts-google-in-the-drivers-seat/2007/05/31/1180205350391.html

[19] The Red Cross has developed a Web-based system where families, co-workers, friends, etc. can list their status after a major disaster. It is somewhat analogous to bulletin boards where missing or unaccounted-for people can be listed.
Web: https://disastersafe.redcross.org/

- Utilization of public safety bands for certain operations
- Addition of specific modules for image collection and processing (i.e., digital camera IP feeds)
- Sensor networks

The CDN will invite commercial and non-profit developers to demo their technology.

Features & Modules:

The CDN system modules will provide data tools to all members of the Bay Area community: individual residents, businesses, non-profits/NGOs, as well as government entities at all levels.

It transcends the old-fashioned, one-way "notification" paradigm where emergency information is broadcasted. The information now flows in all directions through CDN, empowering community members to assist.

After an earthquake, in particular, the collection of transportation and road status information is a top priority. If residents (not just CERT and affiliated volunteers)[20] could survey their neighborhoods and report road closures *and* such information could appear automatically on maps (GIS, COP, CAD) at ICPs and EOCs, that would be a huge boon to disaster response. In essence, this is "geoblogging" during a disaster.

This functionality can be illustrated by examples of events that could occur in a major earthquake (where phones are out):

Event	**Comm Need (in order)**	**Today**	**CDN**
10:05 a.m.: Willow Road Overpass @ Hwy 101 collapse: seen by a Menlo CERT team member	Menlo Fire ECC Menlo P.D. Palo Alto Disp/EOC San Mateo Co. EOC Santa Clara Co. EOC	FRS radio to ECC to San Mateo Co. Fire Dispatch & San Mateo Co. Op Area EOC	Wireless device: enters data; automatically appears (icons) on maps at Menlo ECC, others
10:10 a.m.: same event as above seen 5 minutes later by a PAPD unit	same	PAPD Dispatch would not likely know about event; time wasted, repeated effort	PAPD officer would see the event on COP Map; could update the info
10:12 a.m.: multiple injury accident Hwy 101, north of Willow	same	PAFD apparatus responding under auto-aid would not know about road closure	PA EOC/Dispatch would know of road closure & could advise PAFD units to re-route
10:34 a.m.: Civil Air Patrol (CAP) plane	same	Plane would have to land, make copies of	From the air, the plane downlinks real-

[20] The reporting party information could be coded, so that incident commanders know its source/origin. If an untrained person made a report of a damaged building, for example, a trained person could be then assigned to go to the site and update the information.

from Palo Alto Airport flies over Hwy 101, takes pictures of downed overpass		photos, and physically distribute – taking hours or days	time photos and video

So, the problems in current technologies and methodologies include:

- inefficient collection and sharing of event information
- same event can be reported by different people (inefficient; creates confusion)
- jurisdictional "silos" compound problems
- excessive time and human labor requirements at every level (aggregates at EOCs and ICPs)

The components of CDN include hardware, middleware, and software as described below.

Field User Client:
This is the user interface (UI) for people in the field: portable (PDAs, cell phones), mobile (computers in vehicles), and fixed (command posts, schools, hospitals).

The most basic implementation might involve Simple Messaging System (SMS) text messaging via cell phones (if the phone system were up). However, the use of Web-based tools is likely preferable. The core function is to allow a field user to 1) see local disaster event info (based on their "permission level") and 2) report events. By correlating GPS coordinates to parcel information, address information about the location of an event could be accurate and the needless data-entry step of entering location could be obviated.

Example: A CERT team is on foot in a neighborhood and finds a house off of its foundation. The team could use a WiFi cell phone to report that incident – perhaps even filling out an on-line initial damage assessment form or other ICS forms, etc.

Incident Sharing Middleware:
This system operates as a meta-CAD module, collecting incident information from the Field User Module and other data feeds. Incident or message numbers and time stamping could be automated. The data are then propagated out to the other modules.

There could be a separate module to interface to Emergency Public Information (EPI) pathways for community notification (alerting). Some of the currently deployed EPI systems in local use:

- http://www.firedispatch.com (showing both San Mateo Co. & Palo Alto)
- http://cad.chp.ca.gov (showing "Bay Area")
- http://www.cityofpaloalto.org/public-works/ew-creeklevels.html
- http://www.smcalert.info
- City of Palo Alto's Community Alerting and Notification System (CANS)

(There is great value in having neighborhoods and other stakeholders be able to access these information sources after a failure of telephone systems and the Internet.)

There are also numerous broadcast systems such as NOAA and the Emergency Alert System (EAS).

By using RSS and other tools, a Web portal could be developed to aggregate this information (and localize it with filters for a geographic region or topic, etc.)

Other EPI tools can be integrated to CDN, such as links to sirens or other legacy warning systems.

Personnel Identification, Credentialing, and Accountability (PICA) Module:
People are the most important resource in disaster response and recovery, yet the data systems to manage them are nowhere as sophisticated as the enterprise software tools that are used to manage human resources in the business world.

The key requirements for personnel management are:

- Identification
- Credentialing
- Accountability (tracking)

There is no standard ID card for professional first responders, volunteers, etc. This presents a significant security problem, especially if an incident involves a criminal act or terrorism. CDN can provide a "virtual credential" (through logon passwords) not only for government workers but for Disaster Service Workers (DSW) volunteers, affiliated as well as spontaneous.[21]

NIMS has been updated to require "typing" (asset type) and credentialing (training record) for all persons (including volunteers) involved in a disaster. The burden this places on local jurisdictions is large. CDN could facilitate a regional (RECP) solution. Personnel information could reside on a secure server and/or smart-cards issued to responders and volunteers. This could be integrated with spontaneous volunteer center plans, as well.

Traditional methods of tracking personnel at an incident such as T-cards are well-suited to use as an incident command post, but tend to fail in large-scale, regional events. Keeping track of personnel in the field takes substantial time and effort over current voice radio channels. CDN could provide automatic tracking as well as push-button "welfare checks" of deployed personnel.

The CDN PICA module could also eliminate the current need for responders to physically report to and check in at a command post by allowing such persons to log on via the CDN network. Similarly, teams can be formed (or joined) on the fly or based on pre-plans.

CDN PICA can also facilitate emergency recall or activation of personnel. For example, a major chemical spill occurs, and Menlo Fire and Palo Alto are affected. Dispatch can use CDN (in conjunction or instead of their existing tools) to call in off-duty personnel and activate volunteers or other resources. As such people receive the notification, they can log on, advise status/ETA, etc. The dispatch centers and incident commanders receive this information real-time, updated automatically. Off-duty personnel

[21] Entity-Affiliated Volunteers vs. Unaffiliated ("private citizens"): volunteers are either part of an entity (i.e., government-sponsored groups such as CERT or NGO-sponsored groups such as the Red Cross or ARES/RACES) or they are unaffiliated (a.k.a. spontaneous). Affiliated Volunteers are covered as DSWs or by the sponsoring entities liability/insurance plans. Unaffiliated volunteers are covered by Good Samaritan laws.

would be able to log on and receive COP information and be dispatched, all without tying up phones or voice radio channels.

CDN PICA, if coordinated through a regional plan, could also solve the "multiple counting" problem that besets volunteer programs. For example, Susie Smith might be a volunteer with the Red Cross. She might also be a ham radio operator for her home town. In a disaster, which agency "counts" (or "gets") her? The flip side of this is the advantage of having her be able to log on to a group, depending on where she is when the disaster occurs (or the nature of the event, etc.).

Global Positioning Satellite (GPS), Automatic Vehicle Locator (AVL), Automated Position Reporting System (APRS), and other related technologies could also be linked through CDN PICA.

CDN could also support sensor networks and telemetry (including human bio vital signs monitors for field personnel). For example, a fire HazMat team traveling down a road gets a "hit" on a sensor for a toxic gas. The sensor is networked and logged on to CDN; data are automatically transmitted. A CERT team operating a couple of blocks away receives notification (via a rules-based link via the CDN Incident Sharing Middleware Module) and takes appropriate precautions (evacuates).

Through VoIP, an incident commander could also transmit a voice message (i.e., intercom) for especially time-sensitive matters, such as the need to evacuate. A Cisco IPICs or other radio gateway could be linked to various voice radio systems, as well.

Other "overhead" functions could be handled or linked via CDN, as well.

Emergency Operations Center & Common Operating Picture Module:
This module provides:

- map-based and other visualization tools to EOCs and Command Posts
- expert systems (rules-based automation) to match needs with resources and control data interchange
- "hooks" to existing databases and information systems

Various "layers" (such as "transportation") can be selectively viewed over the base map.

Icons can appear to indicate events, assets, personnel, etc. Incident commanders might be able to "drag and drop" such icons to dispatch. Similarly, clicking an icon would bring up detailed information. For example, an icon might show the Willow Road overpass at Hwy 101 as damaged. Clicking the icon would show the times of reports, by whom the reports were made, and even digital images.

The level and types of GIS, CAD, and other technologies in Bay Area EOCs and dispatch centers are inconsistent. The CDN COP would be "agnostic" and would link to existing (legacy) systems or allow the use of common tools such as Google Maps. For example, one agency could share GIS information from their legacy GIS with another agency by having the CDN COP "translate" the data and put it onto Google Maps.

One of the most useful features that CDN can offer is the real-time linking of EOCs and command posts. In an event such as an urban-wildland interface fire in the Palo Alto Foothills, there would be numerous agencies (and their corresponding dispatch and EOC facilities) that could be involved from the initial moments of the event through the recovery period:

- CAL Fire (CDF)
- CHP
- Midpeninsula Regional Open Space District (MROSD)
- Menlo Park Fire District
- Woodside Fire District
- Town of Los Altos Hills
- Town of Portola Valley
- Town of Woodside
- City of Menlo Park
- City of Palo Alto
- City of Redwood City
- County of San Mateo
- County of Santa Clara
- Stanford University
- Red Cross (2 chapters covering San Mateo Co. and Santa Clara Co.)

Even if a proper Joint Command were set up, many of these jurisdictions will be operating their independent dispatch centers and EOCs, especially in the initial phase of the event. CDN could provide ability to have all agencies' dispatch centers, command posts, EOCs, and personnel be able to see all incidents in real time (including video feeds, etc.) via the Common Operational Picture.

Example of "Platoon" *Ad Hoc* Response Model:

In major disasters (on the scale of Hurricane Katrina), professional responders are in short supply. Similarly, trained CERT, Red Cross, and other affiliated volunteer teams are typically understaffed. With some leadership training, first responders and pre-registered disaster volunteers could be supervisors of *ad hoc* teams. For example, a police officer or even a CERT member could enter a neighborhood and encounter residents who want to help. The residents could be registered as volunteers (and possibly sworn in as DSWs) via a link to the appropriate officials via CDN. This is far more efficient and practicable than the current protocol which requires that such volunteers respond to a volunteer center or other facility.[22]

This Platoon model is also applicable to teams that consist of first responders in mutual aid. For example, a police officer from Palo Alto might be "stranded" in the Foothills during an earthquake or fire. That officer could be linked into a team consisting of Woodside Fire District and San Mateo Co. Sheriff members, with PAPD dispatch/EOC being automatically apprised of that officer's status, etc. CDN can be a tool to support formal mutual aid response, as well.

[22] It should be noted that peace officers and certain other officials can impress people into service (possee) per Cal. Penal Code § 150. In that case, CDN would allow for proper documentation of that act.

Implementation & Next Steps:

The Palo Alto/Stanford Citizen Corps Council (CCC) has formed a Technology Work Group which will be the overseer of the CDN test bed.

The CCC will identify initial locations for CDN connections, such as:

- Local EOCs, Fire Stations, Police Stations, and other Government Facilities: all
- Mobile EOCs and Incident Command Posts: all
- Hospitals & Clinics: Stanford Hospital (including satellite facilities such as Menlo Clinic); V.A. (Menlo Park & Palo Alto); Palo Alto Medical Foundation (campuses in Palo Alto, Menlo Park, Portola Valley, Mountain View, Fremont)
- Schools: PAUSD, etc.
- Shelters & other such facilities: Partner with the Red Cross
- Other critical infrastructure: utilities, water companies, radio broadcast stations
- Field Units: portable and mobile (vehicle)

The CDN team can partner with chambers of commerce and BENS (www.bens.org) to expand this to business EOCs.

The near-term objectives for the CDN Test Bed include 1) securing funding for the WiFi access points and related hardware infrastructure and 2) establishing a plan to support network administration, including defining long-term "ownership" of the system (possible public-private partnerships).

[END]