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# Cupertino Citizen Corp Technology Roadmap

Author: Jim Oberhofer

Contributors: Stuart Chessen, Lloyd Dickman, Ken Ericksen Allan Gontang, Gerd Goette, Stephene Gross, Phil Harris, Puttappaiah Muniyappa, Darryl Presley, Grace Romero, Skip Stevens, Mark Taylor, Justin Unger, Judy Wang

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# 1 Introduction

## 1.1 Introduction

City of Cupertino volunteers have actively driven volunteer response procedures in all volunteer organizations. With this empowerment in hand, they continue to look to make their methods and procedures as efficient as possible.

City residents essentially volunteer in one or more of the key emergency response organizations, that constitute the Cupertino Citizen Corp (CCC).

### 1.1.1 Community Emergency Response Teams (CERT)

Community Emergency Response Teams (CERT). CERT members take a 21 hour training course covering topics of First Aid, fire suppression, search and rescue, communications, and ICS procedures to name a few.

The mission of CERT is to promote proactive involvement of private citizens, business groups, civic organizations and schools in homeland security and integrated emergency management.

Once trained, they usually deploy in 1 of 2 (or both) ways:

- Organized Neighborhoods. These are groups of residents on a street or other logical neighborhood that agree to work together during an emergency to stabilize their immediate surroundings.
- City Arks. Arks are located throughout the City and provide a location to organize and address the needs of the surrounding areas where Organized Neighborhoods do not exist.

CERT members may be cross-trained in one of the other volunteer organizations operating within the City.

### 1.1.2 Medical Reserve Corps (MRC)

MRC members focus on all things medical with their response limited to the skill level that they attained. Members have training ranging from First Aid through Emergency Medical Technicians (EMT) to professional medical personnel.

The mission of Cupertino MRC is to provide basic first aid to Cupertino residents.

### 1.1.3 Cupertino Amateur Radio Emergency Service (CARES)

CARES members are licensed by the Federal Communications Commission (FCC) to operate radios on specific allocated frequencies. Members participate in organization, City, and County communications drills, as well as peruse qualifications as a field responder, net control operator, radio room operator, and shift supervisor

The mission of CARES is to recruit, maintain, and train Amateur Radio volunteers capable of providing professional emergency communications, increasing the City's emergency response effectiveness, and speeding the recovery effort.

## 1.2 Ark Strategy

The City of Cupertino recognizes that there will be insufficient city staff to respond to a resource-consuming city-wide emergency. To this end, it has made a significant training and financial investment in and adopted a Regional ARK strategy as part of the city-wide emergency response. The Arks become rallying points for CCC members.

The mission of the Cupertino Arks is to provide an organization point for Cupertino volunteers and resources for the purpose of receiving local resident reports and providing feedback to the EOC.

### 1.2.1 Responsibilities of the City

The City of Cupertino supports the Arks as follows:

1. Sponsorship: supports the CCC members as City Volunteers.
2. Infrastructure: provides funding for acquisition and outfitting of the Arks.
3. Training: provides access to specific training relevant to an emergency response.
4. Oversight: provides City Staff for management and coordination with other City departments.

### 1.2.2 Responsibilities of the CCC

The Cupertino Citizen Corp supports the Arks as follows:

1. Staffing: volunteers their time to work within the City's emergency response structure.
2. Approach: defines processes, procedures, methods, and tools that will accomplish the City's Ark Mission.
3. Training: holds regular drills to exercise their capability to respond and support the City.
4. Outreach: Promotes the CERT, MRC, and CARES functions to the community.
5. Readiness: provides regular reviews and upkeep of the Arks and the material that they include (generators, rotating consumables, inventories, etc.)

## 1.3 Technology Roadmap Approach

Since the Arks have been in place (over 3 years as of 2012), the City has held 3 annual drills where the Arks were activated. Following each drill, After Action Reports are developed that identify what worked and areas for improvement.

As the teams get more comfortable with the manual processes that have been defined, it is clear to many CCC members that more efficiencies can be achieved by applying specific technologies that are common in our homes and where we work. It is with this in mind that the need for a Technology plan or Roadmap was proposed.

The approach for a Roadmap lays out the evolution and deployment plan for technologies in a manner that ensures they can be defined, understood, adopted, deployed, and supported.

A Roadmap essentially defines a phased rollout; it is not a BIG BANG (deploy it all at once). A phased approach allows the teams to incrementally improve the operating environment so that the entire Ark response is not in rework at any one time. A PLAN-DO-CHECK-ACT cycle is one way to think about the high level sequence of events that could be followed.

### **1.3.1 Plan – Design our enhanced response process**

There is plenty that we can do. The question is what should we do? The Ark Mission will be used as the litmus test for selecting technologies. It can also help keep the team focused on the critical few things that will have the biggest impact.

### **1.3.2 Do – Develop and test the solution**

The selected technology components are identified and developed (or acquired). Additionally, Ark procedures may need to be reviewed, adapted, or revised to take full advantage of the technology in question. The cost of adoption needs to be weighed with the benefit it provides.

With the plan implemented, the new technologies and procedures are put through their paces during regular drills and/or table-top exercises.

Prototyping and pilots are used to confirm a technology element as refined will actually live up to expectations before a full rollout. One Ark may deploy the solution as a pilot as part of a field test to see its performance under live conditions.

### **1.3.3 Check – Assess the performance**

Information collected from the DO step lets us review and adjust the solution (if necessary) to ensure we maximize the potential for the organization. Special attention is paid to how well it integrated with our operating procedures.

The CCC makes the final recommendation to deploy.

### **1.3.4 Act – Implement the solution**

Roll-out will be driven by our ability to confirm the readiness of the individual Arks to take on the new technology. Ideally, the roll-out will occur at a time so that all Ark procedural processes are the same and therefore familiar as CCC members get reassigned from one Ark to another.

## **1.4 About this Document**

The balance of this document describes the Cupertino Citizen Corp Technology Roadmap. This is provided here with the following assumptions:

1. This is a living document. It will never be done, and will be updated as new ideas emerge and capabilities are identified.
2. This is a collaborative effort. The effectiveness of this document lies in the insight of members who have vested interest in improving the Ark response. A broad user input is needed to ensure the end result is as effective as possible.



## 2 Requirements

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### 2.1 In General

The goal of a Technology Roadmap is to enable CCC users to achieve a higher level of response efficiency and accuracy.

The recommended technologies need to meet several requirements to be viable for the Ark environment.

1. Operates independently of the commercial infrastructure. We assume that we are on our own and cannot depend on commercial power or communication infrastructure.
2. Supports self-sufficiency. We have the skills, expertise, and resources within the organization to operate and maintain the system components.
3. Common solution across all participating sites. The approach is to design once and deploy to many sites.
4. Minimize any single point of failure. The solution components should remain operational even with the loss of some associated components.
5. Minimum user configuration at turn-on. The technical solutions should be pre-configured for easy turn-on.
6. Short learning curve. Technical solutions are intuitive in their operation.
7. Supports Intel PCs, MACs, and other Wi-Fi-enabled user devices.
8. Allows for a graceful fall back to legacy technologies and methods (FM voice, Packet, sneaker-net, paper).
9. Supports an information archive for collecting, storing, and retrieving event data.

### 2.2 Assumptions

1. Responders are pre-certified to operate within the environment. This means any devices they bring need to be confirmed operational prior to a real emergency activation.
2. Commercial Power and communications means are generally not available.
3. Responders still operate within the ICS and SEMS reporting hierarchy.
4. With increased technical capability comes increase complexity. CCC will only adapt what we think we can support.

### 2.3 Considerations

1. Need to assess the level of supportability and resources required to support the environment.
2. Local power requirements will grow with incremental technology introduction. Need to profile roadmap power requirements, power constraints, and what we can support.
3. ...

## 2.4 Participating Sites

<b>Participating</b>	<b>Pending</b>
Lawson Ark	Montebello Ridge Ark
Monta Vista Ark	Stevens Canton Ark
DeAnza College Ark	
Hyde Middle School Ark	
Garden Gate Elementary School Ark	
Seven Springs Ark	
Comm Van	
Cupertino EOC	

Table 1 –Participating Sites

## 3 Roadmap Overview

### 3.1 In General

The CCC Technology Roadmap is described in terms of attributes and time. The roadmap provides the framework, and just enough detail to guide those tasked with its implementation.

### 3.2 Attributes

Introduction to Adoption	This is the time range when the changes described are both introduced and adopted.  The Date of Introduction means when the change is first tried, usually during a prototype or an initial pilot run.  The Date of Adoption is when the change is fully integrated into the operating environment and is now part of the standard response.
Description	A phrase that references the change. While it may not be all-encompassing, it does provide a descriptive point of reference when comparing phases.
Modes of Communications	This is specific to the known types of communications, currently understood as Voice, Digital, and Video. Others may be added as they are defined.
Technologies	Describes the means by which information is managed and handled.
Protocol	Many technologies rely on a defined protocol (standard procedure for regulating data transmission). These are listed here as technical reference points.
User Tools	The technology components users could bring to fully exploit the deployed technology.
Data Transport	The means and methods for moving data from one point to another.
Information Management, Applications	The tools that support the collection, use, and management of information from one or more sources and the distribution of that information to one or more audiences.
Services	Describes the user information services that the underlying technologies will enable.
Infrastructure	Aspects of other infrastructure that needs to be in place to support the deployed technologies.

Other attributes may be identified from time to time.

### 3.3 Timeframe

The timing defined in this document is *only a suggestion*. It is not absolute and will always be based on the CCC membership's ability to move the Roadmap forward.

However, it does offer a view of what is possible within the constraints of a volunteer organization's available time.

The Timeframe does not acknowledge the differences with how two key elements of the roadmap can progress:

1. Technical: In general, technical changes can be defined, prototyped, piloted, and deployed fairly quickly. Most of the technologies being considered are either "off the shelf" or well

understood to the point that technical solutions could be defined and implemented rather quickly. The imagined constraint may be acquisition or funding to implement the solutions.

2. Process Adaptation: For the technical changes and their capabilities to be fully realized, user and information processes will need to change. Before making these changes, a full understanding of the technical capabilities needs to occur. Only then can CCC processes, procedures, and information management tools be adjusted. This step may take longer depending on the desired degree of standardization across all Ark sites.

### 3.4 High Level View

The following is a high level view of the roadmap. Items in **BOLD** are the items introduced in that Intro/Adoption period.

**NOTE:** This table will continue to change as it is refined with the broader CCC community.

Introduction to Adoption	1985 – 2002	2011 – 2012	2012 – 2013	2013 – 2014	2014 – 2015
<b>Description</b>	Voice Messaging	Digital Messaging	Local Hot Spot Arknet Phase 1	Networked Hot Spots Arknet Phase 2	InterLink to ArkNet Arknet Phase 3
<b>Modes of Comm</b>	Voice	<b>Digital</b> , Voice	Digital, Voice	Digital, Voice, Video	Digital, Voice, Video
<b>Technologies</b>	FM transceiver	<b>TNC+Radio</b> FM transceiver	<b>LAN Router</b> TNC+Radio FM transceiver	<b>Mesh Net Router</b> LAN Router TNC+Radio FM transceiver	<b>Tie to Interlink</b> Mesh Net Router LAN Router TNC+Radio FM transceiver
<b>Protocol</b>	Net Procedures	<b>AX.25</b> <b>BBS protocol</b> Net Procedures	<b>IP</b> AX.25 BBS protocol Net Procedures	IP AX.25 BBS protocol Net Procedures	IP AX.25 BBS protocol Net Procedures
<b>User Tools</b>	Paper forms	<b>Stand-alone PCs</b> Paper forms	<b>Networked PCs</b> <b>Tablets</b> <b>Smart phones</b> Paper forms	Networked PCs Tablets Smart phones Paper forms	Networked PCs Tablets Smart phones Paper forms
<b>Data Transport</b>	Voice Messaging	<b>Packet Messaging</b> Voice Messaging	<b>Online Chat</b> <b>USB Flash Drive</b> Packet Messaging Voice Messaging	<b>PtoP VOIP</b> <b>Streaming Video</b> USB Flash Drive Online Chat Packet Messaging Voice Messaging	PtoP VOIP Streaming Video USB Flash Drive PtoP VOIP Online Chat Packet Messaging Voice Messaging
<b>Information Management, Applications</b>	Paper Folder Mgmt	Paper Folder Mgmt	<b>Ad-hoc Tools</b> <b>Networked app</b> <b>PC File Mgmt</b> Paper+Folder Mgmt	<b>Arknet eMail</b> <b>On-line Info Mgmt</b> Ad-hoc PC Tools Networked app PC File Mgmt Paper+Folder Mgmt	<b>Skype</b> <b>ARC Safe&amp;Well</b> <b>WebEOC</b> <b>Incident Reporter</b> On-line Info Mgmt Ad-hoc PC Tools Networked app USB Flash Drive PC File Mgmt Paper+Folder Mgmt
<b>Services</b>		<b>Stand-alone Print</b>	<b>Networked Print</b> <b>File Shares</b>	Networked Print File Shares	Networked Print File Shares
<b>Infrastructure</b>		<b>Power</b>	Power	Power	Power

Table 2 –Technical Roadmap Summary

### 3.5 Voice Standalone Operations

Introduction to Adoption	1985 – 2005	Description
<b>Description</b>	Voice Messaging	The historical operating model for a CARES Field Responder was to be dispatched to each of the Arks, or other assignment requested by the EOC. They reported to the local Planning & Intel Section and operated as an information exchange point with the outside world.
<b>Modes of Comm</b>	Voice	The exclusive emergency messaging method was voice traffic; absolute fall-back mode if all else fails.
<b>Technologies</b>	FM transceiver	The exclusive emergency messaging method was voice of the Amateur Radio bands.
<b>Protocol</b>	Net Procedures	<p>Messages are originated either as formal message traffic between the Arks and a remote station, or as informal observations submitted by the Field Responder.</p> <p>Message passing follows a specific protocol of net check-in, message origination, request to pass traffic, message serialization, message passing, and closure. While this procedure varies from agency to agency, CARES had a well-defined protocol for its message handling.</p>
<b>User Tools</b>	Paper forms	<p>The Ark Staff uses paper forms to manage the information associated with the response processes.</p> <p>Request, inquiry, and reply messages are written down and handed to the CARES Field Responder for transmission.</p>
<b>Data Transport</b>	Voice Messaging	Message passing keeps the Arks connected with the EOC.
<b>Information Mgmt</b>	Paper Folder Mgmt	<p>Information is exclusively paper-based. CERT teams have evolved forms and procedures for capturing and recording information specific for the Ark response.</p> <p>Copies of sent and received messages are stored at various locations across the message path based on team requirements for information retention.</p>
<b>Services</b>		Other than message passing, there are no other services associated with this operational environment.
<b>Infrastructure</b>		

### 3.6 Digital Standalone Operations

Only the new items will be described. All past operational descriptions still apply.

Introduction to Adoption	2011 – 2012	Description
<b>Description</b>	Digital Messaging	One or more CARES members are deployed to support voice and digital messaging from the field.  This change was formally introduced in 2011. The plan is to formalize Packet Radio adoption in 2012.
<b>Modes of Comm</b>	<b>Digital</b> , Voice	Adds digital messaging as a new capability to the Field Response. Digital messages, specifically by Amateur Radio Packet, allow for more efficient means for passing lists, detailed instructions, or other complex data. Voice traffic continues in use for short, high priority messages as well as tactical coordination.
<b>Technologies</b>	<b>TNC+Radio</b> FM transceiver	A separate “radio modem” (TNC), PC, and dedicated radio are used for Packet Operations. CARES will deploy Packet Kits to all Arks during any response.
<b>Protocol</b>	<b>AX.25</b> <b>BBS protocol</b> Net Procedures	Ham Radio Packet is based on the AX.25 protocol, an adaptation of the X.25 Packet protocol. AX.25 is a connection-based protocol with a rigorous error correction scheme to ensure data accuracy.  Radio Bulletin Board Systems (BBS) are used as mail drops for packet messages. BBSs have a specific command structure that forces a standard method of interaction with a connecting user.
<b>User Tools</b>	<b>Stand-alone PCs</b> Paper forms	PCs are used specifically to support Packet operations.
<b>Data Transport</b>	<b>Packet Messaging</b> Voice Messaging	Packet messaging relies on a Store and Forward method for message exchange. A BBS will act as the Message Server for posted messages. Messages can be posted and retrieved at any time independent of whether the recipient is on line or not.  Outpost PMM is the Message Client recommended by Santa Clara County RACES and is used in Cupertino.
<b>Information Mgmt</b>	Paper Folder Mgmt	CERT or MRC uses a paper-based message form to be handed to CARES for passing. The message can be passed either by voice or Packet.  Copies of sent and received messages are stored at various locations across the message path based on team requirements for information retention.  Additionally, any message sent by Packet is automatically retained electronically as part of the event record.
<b>Services</b>	<b>Stand-alone Print</b>	Packet messages are printed directly from the message client to a locally connected printer. Printers are part of the CARES Packet Kits.
<b>Infrastructure</b>	<b>Power</b>	While the packet kit can operate on battery for a limited time, sustained operation will require generator support.

### 3.7 Local Hot Spot (Arknet Phase 1)

Only the new items will be described. All past operational descriptions still apply.

Introduction to Adoption	2012 – 2013	Description
<b>Description</b>	Local Hot Spot Arknet Phase 1	Creates a local area network hot spot at each ark. Creates opportunities for local <i>IntraArk</i> collaboration.
<b>Modes of Comm</b>	Digital, Voice	Adds local computer-based information management capabilities.
<b>Technologies</b>	LAN Router TNC+Radio FM transceiver	A standalone wireless router is configured and deployed. It creates a subnet that allows local user to connect and Ark-wide information sharing within the local site network.
<b>Protocol</b>	IP AX.25 BBS protocol Net Procedures	802.11 is a set of standards for implementing wireless local area network (WLAN) computer communication.
<b>User Tools</b>	Networked PCs Tablets Smart phones Paper forms	PCs are on the same local area network. Tablets and smart phones can also connect and operate peer to peer.
<b>Data Transport</b>	Online Chat USB Flash Drive Packet Messaging Voice Messaging	<b>Online Chat:</b> An instantaneous transmission of text-based messages from one user to another. Online chat may be point-to-point communications as well as multicast communications from one sender to many receivers. It also supports file-sharing between chat clients. <b>For CCC:</b> within an Ark site, this capability could provide the Ark ICS staff with the means for more rapid information exchange between ICS sections, including quick message requests to CARES. Think <i>Instant Messaging</i> at the Arks.
<b>Information Mgmt</b>	Ad-hoc Tools Networked app PC File Mgmt Paper+Folder Mgmt	<b>Ad-Hoc tools:</b> CERT and MRC may see opportunities to introduce some PC-based information management. Tools such as spreadsheets offer simple record-based data management for various purposes. <b>Networked apps:</b> Outpost includes ICS213mm, a program that can reside on a remote PC for creating and transmitting official ICS 213 messages to and from the local Outpost installation. This program puts the message creation in the hands of the users; CARES now manages the message transport environment and is out of the message transcription business. <b>File uploads:</b> Supports the means for uploading pictures, movies, and text from smart phone and tablets into the local environment. For PCs that cannot get on the local network, USB Flash Drives can move PC-originated data from one PC to another (sneaker-net).
<b>Services</b>	Networked Print File Shares	<b>Network Print:</b> The printer is configured as a shared printer accessible by all users on the local network. <b>File Shares:</b> data files can be stored on local File shares for access and review by other users.
<b>Infrastructure</b>	Power	More PCs, more power needed. The power budget needs to be understood and closely managed.

### 3.8 Networked Hot Spot (Arknet Phase 2)

Only the new items will be described. All past operational descriptions still apply.

Introduction to Adoption	2013 – 2014	Description
<b>Description</b>	Networked Hot Spot Arknet Phase 2	Connects all Ark network hot spots together. Creates opportunities for city-wide <i>InterArk</i> Collaboration.
<b>Modes of Comm</b>	Digital, Voice, Video	Adds a video component to the suite of information services.
<b>Technologies</b>	<b>Mesh Net Router</b> LAN Router TNC+Radio FM transceiver	Interconnects the Ark standalone networks and creates a subnet for City- wide information sharing and messaging. Mess Networking is suggested here; other approaches may exist. Check out <a href="http://www.hsम्म-mesh.org/">http://www.hsम्म-mesh.org/</a> .
<b>Protocol</b>	IP, AX.25 BBS protocol Net Procedures	In place with Arknet Phase 1.
<b>User Tools</b>	Networked PCs Tablets Smart phones Paper forms	In place with Arknet Phase 1.
<b>Data Transport</b>	<b>PtoP VOIP</b> <b>Streaming Video</b> USB Flash Drive Online Chat Packet Messaging Voice Messaging	<b>Voice over IP telephony:</b> a family of technologies, methods, protocols, and transmission techniques for delivering voice communications and multimedia sessions over Internet Protocol (IP) networks. <b>For CCC:</b> Within the City, this capability could provide the Ark ICS staff with the means to “pick up the phone” and calling another Ark site, the EOC Comm Van, or City EOC. It would be for informal tactical communications and coordination. <b>NOTE:</b> This capability needs to be rationalized with the need for formal messaging and the traceability that comes with it. <b>Streaming Video:</b> Or Live streaming, this is the delivery of video content over the network. <b>For CCC:</b> Assuming Mesh Networks provides a broader city-wide coverage, Streaming Video could be the means for transmitting video from the field back to the Ark ICS or the EOC. Point to Point VoIP method to be identified.
<b>Information Mgmt</b>	<b>Arknet eMail</b> <b>On-line Info Mgmt</b> Ad-hoc PC Tools Networked app PC File Mgmt Paper+Folder Mgmt	Introduces a central mail server supporting local email clients. On-line Information Management: CERT and MRC may see an opportunity for developing more formal data management tools that help roll up the local situation into a city-wide tactical view. Tactical situations could be interrogated by the CCC Liaison in the EOC, and City support directed to the Arks more efficiently based on more quantifiable and real-time information. Empowers decision makers.
<b>Services</b>	Networked Print File Shares	In place with Arknet Phase 1.
<b>Infrastructure</b>	Power	

### 3.9 Intralink to Arknet (Arknet Phase 3)

Only the new items will be described. All past operational descriptions still apply.

Introduction to Adoption	2014 – 2015	Description
<b>Description</b>	InterLink to ArkNet Arknet Phase 3	Provides Cupertino's Arknet access to the Internet.
<b>Modes of Comm</b>	Digital, Voice, Video	In place with Arknet Phase 2.
<b>Technologies</b>	<b>Tie to Interlink</b> Mesh Net Router LAN Router TNC+Radio FM transceiver	Connects The <i>InterArk</i> Network to the Internet.
<b>Protocol</b>	IP AX.25 BBS protocol Net Procedures	In place with Arknet Phase 1.
<b>User Tools</b>	Networked PCs Tablets Smart phones Paper forms	In place with Arknet Phase 1.
<b>Data Transport</b>	PtoP VOIP Streaming Video USB Flash Drive PtoP VOIP Online Chat Packet Messaging Voice Messaging	In place with Arknet Phase 2.
<b>Information Mgmt</b>	<b>WebEOC</b> <b>ARC Safe&amp;Well</b> <b>ARC FindaShelter</b> <b>Skype</b> Arknet eMail On-line Info Mgmt Ad-hoc PC Tools Networked app USB Flash Drive PC File Mgmt Paper+Folder Mgmt	If access to the internet is enabled by Interlink, then this opens access to several emergency services, such as:  WebEOC: web-enabled crisis information management system. Safe&Well: American Red Cross website to register yourself and status, or look for someone. FindaShelter: American Red Cross website to find the closest open shelter. Skype: internet-based video, text, and voice messaging. <b>NOTE:</b> The above assumes the internet is up AND Interlink can get to it.
<b>Services</b>	Networked Print File Shares	In place with Arknet Phase 1.
<b>Infrastructure</b>	Power	



## 4 Technologies

### 4.1 TNC + Radio

Phase:	Digital Stand alone
Prerequisites:	None
Description:	<p>The packet radio model follows the Store and Forward approach similar to that of commercial email. A central message server (Ham Radio Bulletin Board system, BBS) is always available to users. Remote message clients connect to the BBS to leave messages for someone else or pick up messages addressed to him/her.</p> <p>CARES is assembling packet kits that include the following:</p> <ol style="list-style-type: none"> <li>1. PC running Windows.</li> <li>2. Radio – standard FM Radio dedicated to packet operations.</li> <li>3. TNC – Terminal Node Controller. Essentially, this is a modem that interfaces the PC to the Radio.</li> <li>4. Power supply – powers all of the above.</li> <li>5. Magmount Antenna</li> <li>6. Printer – connects to the PC for printing incoming packet messages.</li> <li>7. Outpost PPM – Software program used as the message client on this PC.</li> <li>8. 13.8VDC gel cell battery – backup power for the Radio and TNC</li> </ol> <p>Packet Radio is ideal for passing messages with the following characteristics:</p> <ol style="list-style-type: none"> <li>1. Not time sensitive. The recipient does not need to be on line at the time the message sent.</li> <li>2. Message content is made up of long lists, complex instructions, or subject details that would be tedious to pass by voice.</li> </ol>
Configuration:	<ol style="list-style-type: none"> <li>1. No BBS configuration is required.</li> <li>2. Packet Radio Stations need to be set to the same frequency on which the BBS is operating.</li> <li>3. Outpost is set up with the users information and information about the BBS.</li> </ol> <p>Packet Configurations are captured in the Cupertino Packet Field Operating Manual.</p>

## 4.2 Wireless Router

Phase:	Local Hot Spot / Arknet Phase 1
Prerequisites:	None
Description:	<p>The intent is to deploy a wireless router and establish a local Hot Spot to which responding volunteers, and their PCs and/or other wireless devices, can connect to take advantage of deployed applications and services. This is similar to what you do with your home network.</p> <p>For this phase, the routers will be operating stand-alone, that is, not connected to any remote internet feed.</p> <p>Almost any router can be used provided it has at least one wired port for set up and is, of course, wireless. During early demos, a Linksys WRT54G was used to confirm the concept.</p>
Configuration:	The router of each ark will be configured with an unique SID (System ID, MontaVistaARK, SevenSpringsARK, etc.).

## 4.3 Mesh Network Router

Phase:	Networked Hot Spot / Arknet Phase 2
Prerequisites:	Local wireless routers are deployed at each Ark.
Description:	<p>The intent is to link the different Ark hot spots together in a manner to create a true Wide Area network.</p> <p>The heading refers to Mesh Networks. This is suggested as an initial approach because of the following desired features of Mesh.</p> <ol style="list-style-type: none"> <li>1. No central administration. Mesh Networks are self-discovering and figure out the best means for getting a connection between 2 points.</li> <li>2. Locally managed. The goal is to own and operate our own city-wide emergency network between Arks and the EOC.</li> </ol> <p>Implementing Mesh needs some investigation. For starters, there is an activity already in progress within the Ham community, with the description here (<a href="http://www.hsmm-mesh.org/">http://www.hsmm-mesh.org/</a>). A summary description follows:</p> <ul style="list-style-type: none"> <li>• HSMM-MESH™ is a high speed, self discovering, self configuring, fault tolerant, wireless computer network that can run for days from a fully charged car battery, or indefinitely with the addition of a modest solar array or other supplemental power source. The focus is on emergency communications.</li> <li>• In its current form it is built using the Linksys WRT54GL wireless router and operates on channels 1-6 of the 2.4GHz ISM band, which overlaps with the upper portion of the 13cm amateur radio band. Other platforms and bands may be supported as development resources permit.</li> <li>• HSMM-MESH™ is currently being designed, developed and deployed as an amateur radio broadband communications system and being used in and around Austin, and Plano Texas, as well as other sites.</li> </ul> <p><b>NOTE:</b> there could be other solutions out there to link up the arks.</p>
Configuration:	TBD

#### 4.4 Tie to SCEWN/Interlink

Phase:	SCEWN/Interlink to Arknet / Arknet Phase 3
Prerequisites:	
Description:	<p>The goal of the Santa Clara Emergency Wireless Network (SCEWN) is to promote network connectivity between key public service end points in the event of a disaster. See their link here (<a href="http://www.scewn.org/twiki/bin/view/SCEWN/">http://www.scewn.org/twiki/bin/view/SCEWN/</a>).</p> <p>Interlink is a commercial venture spun off from SCEWN that recognizes that an emergency network is not sustainable with a purely volunteer effort (as is the case with SCEWN). Interlink hopes to build a customer base and deliver formal support and services with paid employees. See <a href="http://infralink.us/InfraLink/Welcome.html">http://infralink.us/InfraLink/Welcome.html</a></p> <p>The immediate SCEWN/Interlink application for the EOC is WebEOC. If WebEOC was deployed, then this capability conceivably could be extended to the Arks over Arknet.</p> <p><b>NOTE:</b> A full review of the applications and services that an Internet connection can offer is required.</p>
Configuration:	The router of each ark will be configured with an unique SID.



## 5 Applications

### 5.1 Voice Messaging

### 5.2 Packet Messaging

### 5.3 Online (Peer to Peer) Chat

Phase:	Arknet Phase 1
Prerequisites:	Wireless network is operational, and there is more than one PC connected.
Description:	<p>Most Chat applications (AOL, Yahoo Instant Messenger, MSM) require a server for authentication (identify who you are). We need a Chat app that self-identifies itself to other users on the LAN. The following 2 applications when used together provide this capability:</p> <ol style="list-style-type: none"> <li>1. Bonjour: a serverless messaging protocol developed by Apple Inc. based on XMPP that operates only on a local network.</li> <li>2. Pidgin: a chat program which lets you log in to accounts on multiple chat networks simultaneously. Pidgin runs on Windows, Linux, and other UNIX operating systems. Looking for Pidgin for OS X? Try Adium!</li> </ol> <p>When installed together, Bonjour announces yourself to the network and Pidgin is the client for message handling. Pidgin also support file transfers from one PC to another.</p> <p>These 2 programs will be installed on the central file share and downloadable to users who connect to the network.</p>
Configuration:	The router of each ark will be configured with an unique SID.

### 5.4 Smart Phone File Uploads

Phase:	Arknet Phase 1
Prerequisites:	Wireless network is operational, and there is more than one PC connected.
Description:	<p>Currently, you can either upload your smart phone or tablet files to either “the cloud” or to your PC when synch’ing.</p> <p>This solution allows you to upload your files from your device wirelessly to a file share on the network. The following 2 applications when used together provide this capability:</p> <ol style="list-style-type: none"> <li>1. FileZilla FTP Server: FTP (File Transfer Protocol) is the means for remote users to connect to a FTP Server for posting or retrieving files. This application does the same thing. A generic logon can be defined and directories identified as either READ, WRITE, or READ/WRITE.</li> </ol> <p>This is a free program under the GNU licensing terms.</p> <ol style="list-style-type: none"> <li>2. FTP Client Pro. This is an iPhone app (\$1.99) that acts as the FTP client to the above server. This program knows about iPhone and iPad media files (pictures and movies) and can initiate the upload to the server. For text files, it creates the text file on the FTP server and provides a text editor for you to create the message.</li> </ol>

	<p>Other similar FTP clients undoubtedly exist for Android and Windows phones.</p> <p>When installed together, Bonjour announces yourself to the network and Pidgin is the client for message handling. Pidgin also support file transfers from one PC to another.</p> <p>These 2 programs will be installed on the central file share and downloadable to users who connect to the network.</p>
Configuration:	<ol style="list-style-type: none"><li>1. The Firewall on the PC hosting the FileZilla FTP Server needs to be set to allow the FileZilla program to respond to requests remote from the PC.</li></ol>

## 5.5 PtoP VoIP

## 5.6 Streaming Video

## **6 Information Management**

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Details to be filled in

**6.1 Paper+Folder Mgmt**

**6.2 PC File Mgmt**

**6.3 USB Flash Drive**

**6.4 Networked app**

**6.5 Ad-hoc PC Tools**

**6.6 On-line Info Mgmt**

## 7 Services

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Details to be filled in

### 7.1 Shared Printers

### 7.2 Network File Shares