EMCOM
Emergency Preparedness
Series
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FAMILY AND NEIGHBORHOOD EMERGENCY COMMUNICATIONS

Compliments of:
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i. Record of Revisions

Version	Date	Name	Explanation
1.0	21 OCT 2012	J. Ames	Reformat from webpage; typeset HTML source for print
2.0	23 MAR 2015	J. Ames	Reflow for PDF

ii. Purpose

The purpose of this document is to establish common guidelines for the planning, establishment, administration and operation of a nationally coordinated **Neighborhood Emergency Radio Communications Service (NERCS)** which provides a fast, efficient and economical means of fulfilling emergency communications requirements while decreasing frequency (channel) and message handling congestion. Standards, policies and procedures are strongly suggested to ensure commonality in purpose, operations and equipment allowing for simple interface and integration with other agencies and services including both local organizations/entities and those that may respond from other areas to aid in emergency / disaster situations. Such uniformity insures seamless, uninterrupted direct radio communications.

This should be considered to be be a 'living' working document under constant refinement and update, and with appendices added as required to detail specific recommendations, policies and procedures.

iii. Certification

Specific requirements for certification as a NERCS program in compliance with the general tenants of this document are under review by the EMCOM communications committee and will be published when final recommendations are released.

I. Introduction

One of the most important, yet often overlooked facets of family and neighborhood Disaster Preparedness is that of Emergency Communications. In many/most cases, telephone and even cell phone communications may not be available after an emergency situation, and if they are, they are often congested or overloaded to the extent that the prospects of reaching required emergency responders are significantly reduced.

Emergency responders such as fire/rescue and medical personnel are trained to respond immediately to emergency calls from the nearest available facility. Subsequent calls for help must then be dispatched from locations further and further from the disaster scene, causing precious minutes to be lost in situations where seconds may mean the difference between life and death for a loved one. Those who prepare best for such emergencies will often be those that receive the fastest response to emergency calls, while others must wait.

Most recommendations for the preparation of a family disaster kit include acquiring back-up communications such as walkie-talkies; unfortunately though, they do not propose a methodology for their use, including the answers to the following questions:

- Who will you call?
- Will they be 'listening'?
- What frequency / channel should be used?
- How will they contact emergency help if phone/cell communications are overloaded due to the situation?
- If everyone in the neighborhood tries to transmit simultaneously, no one will get through... how will this be handled?

The importance of well thought out, coordinated emergency communications cannot be overly stressed. Planners must take into account all possible scenarios and geographic considerations to prepare a comprehensive neighborhood plan, and insure that all individuals and families are trained in the necessary procedures if the plan is to be successful when it is needed.

This paper will attempt to discuss many of the details to be considered, and propose a basic plan of implementation and procedures to be used as a starting point for designing communications for a neighborhood area. It must be stressed that the basic structure provided herein will most often be required to be modified to fit the needs of the individual region, and take into account the limitations of that region.

II. Present Situation

Even for professional emergency communications personnel who train and practice for emergency situations on a continuing basis, communications during an actual emergency can oftentimes be described as little more than controlled chaos. The key to maintaining any sort of effectiveness lies in maintaining discipline, and sticking as closely as possible to the policies and procedures implemented to maintain a useable communications structure.

Unfortunately, little emphasis has been placed on emergency communications for family and neighborhood units. Often individuals and families are left to attempting their own communications, and in the case of radio communications, attempt to transmit their emergency message to anyone that they can contacts. This often leads to multiple persons attempting to simultaneously transmit on the same frequency or channel, making none of the transmissions 'readable'. Compounding the situation are multiple untrained persons hearing the transmissions, and each attempting to 'help' by trying to use telephone communications to call emergency responders. This simply adds to the congestion and overloading of these communications, and duplicate calls waste precious time for dispatching personnel. How would a 'do-gooder' feel if their duplicate call to emergency personnel actually preempted a call that could have saved someone else's life? The fact is, that uncoordinated, uncontrolled communications simply serve to increase communications congestion for everyone, and may actually be to blame for more lives being lost than saved.

Radio networks do and have existed for many decades. These services are provided by volunteer radio operators through organizations such as ARES/RACES. They provide emergency radio communications for both public and private emergency

agencies including law enforcement, fire/rescue, hospitals, aid stations, and shelters. These dedicated people train and practice year round to perform these duties.

The key to creating a viable emergency communications plan for families and neighborhoods is to create an interface with these existing networks. They do not have to rely on relaying emergency messages to agencies via telephone since their own personnel are providing emergency radio services directly for and within these organizations, and have direct radio contact to them.

III. Goals & Objectives

The goal of each neighborhood should be to create an back-up emergency communications system that directly interfaces with the existing emergency radio communications infrastructure in such a manner as to be able to provide clear and concise emergency messages to the relay system without disrupting the existing system with compound and/or extraneous transmissions.

The objectives to be achieved should include:

- A means and discipline by which individuals and families within the neighborhood can communicate directly with a neighborhood 'communicator', whose duty is to interface with and relay the information directly to the proper emergency radio network.
- Establish communications which do not interfere with those of adjacent neighborhoods; this will include choosing equipment and coordinating frequency / channel usage with nearby neighborhoods so that they do not conflict, yet be compatible and flexible enough to interface with the communications of adjacent neighborhoods should that need arise.
- Work with the individual(s) from the existing emergency communications networks to establish the frequencies/channels that those persons will monitor during an emergency, and the communications protocols and message structures that will be used to pass messages as quickly, concisely, and with as little redundancy as possible.

- Provide Standardization of methodology, policies, procedures, administration, operation and equipment to insure efficient, effective integration and coordination of emergency communications.

IV. Considerations

The first consideration to take into account is where the neighborhood communications will be directed; i.e. directly to a volunteer radio operator participating with one of emergency communications networks such as ARES/RACES, or to an intermediary operator that will relay the communications. Obviously, the best and fastest communications will come from having an emergency communications network associated radio operator in your own neighborhood. Unfortunately, the perpetuation of the inclusion of covenants and deed restrictions against outdoor antennas in recent years has caused many neighborhoods not to have this invaluable emergency resource available to them, since the operators cannot have the antennas needed to assure competent communications. Emergency communications personnel that do live in such neighborhoods are often the first to leave then neighborhood in advance of, or directly after an emergency to man a station with a local hospital, or other public or private agency so that their training and resources can be used effectively. Planners will have to determine where the closest emergency radio network is in relation to their neighborhood, and make the proper choice of equipment and communications arrangements.

The next consideration will be the radio equipment to be used within the neighborhood itself. Emergency radios should be chosen based upon the function they are to perform. Radios should be chosen that provide clear communications, but, if used for intra/inter neighborhood communications, **should be of limited range so that they do not interfere with the communications of other, nearby communities**. An example of bad planning can be the use of 5 watt Citizens Band (CB) radios for this purpose. Transmissions meant for within the neighborhood can be transmitted and disrupt communications for 20 miles or more. With possibly hundreds of persons attempting to communicate simultaneously, communications can quickly become

unusable for many miles, and can actually serve to disrupt the response of emergency personnel more than enhance it.

When considering radio equipment, the make/model of the radios to be used may/should be taken into account, especially if key features provided on some units are to be incorporated into the system. This includes signaling capabilities between units, privacy codes or 'scrambling', etc. Having a network of incompatible equipment is a useless system.

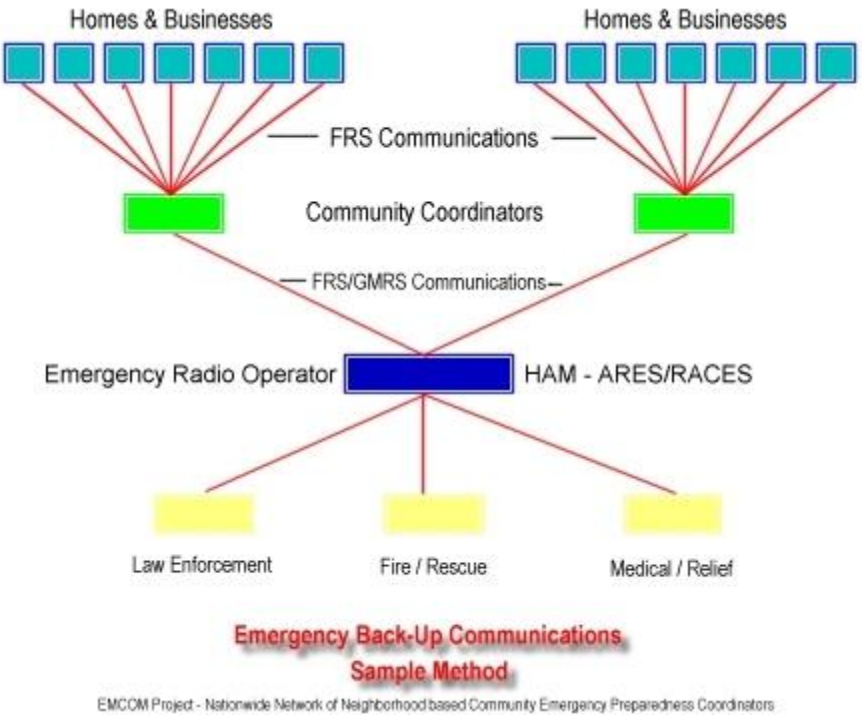
The next consideration will be towards the establishment of a frequency or channel plan for the neighborhood. It must not interfere with the communications of adjacent affected neighborhoods, but must take into account the various kinds of communications that will be taking place during an emergency. This includes frequencies / channels used to/for:

- Communicating to neighborhood emergency coordinator
- Communications within/between families
- Communications relating to Search/Rescue efforts
- Communications relating to Evacuation/Relief & health/welfare efforts

The next consideration is what the residents of the neighborhood can afford. If it is a neighborhood where not all residents can afford the cost of emergency radios, arrangements should be made for alternate means of checking on, and relaying emergency information to/from these residents.

V. Basic Communications Design

It is virtually impossible to create a "one size fits all" neighborhood emergency communications network. The one depicted below is proposed as an example system to use as a starting point for neighborhood emergency coordinators to modify as required for their particular circumstances. It supposes a typical urban/suburban neighborhood, with surrounding neighborhoods also setting up like communications, and the existence of an amateur radio (ham) operator within 2 miles of the neighborhood.



This system recommends Family Service Radio (FRS) walkie-talkies for each family in the neighborhood. These radios are relatively inexpensive, provide clear, crisp, static-free communications, and are limited in range (typically in an urban area) to 1/2 to 3/4 of a mile in range, and offer up to 14 channels upon which to communicate. This will serve to lessen the congestion that serves to cripple communications. Additionally, these types of radios are already in wide usage for camping trips, boating, skiing, etc. for families to communicate between themselves. [1]

A "channel plan" is developed to limit the amount of communications for each purpose, based on using 3-4 channels, thus leaving (or coordinating) channels for use by adjacent neighborhoods for their own communications.

- Channel 2 - Emergency messages to be relayed to the neighborhood coordinator, or designated communications coordinators (there should always be a backup communicator designated in case the primary assignee is incapacitated.
- Channel 8 - Intra/Inter Family Communications
- Channel 9 - Neighborhood light search and rescue efforts
- Channel 10 - Evacuation/Relief/Health/Welfare efforts

- Channel 5 - Secondary Emergency Message Channel - Assigned to one side of the neighborhood that is close to another neighborhood using Channel 5 as their primary Emergency channel. This should only be used when one cannot reach their primary neighborhood coordinator(s).
- Channel 6 - Secondary Emergency Message Channel - Assigned to the other side of the neighborhood that is close to another neighborhood using Channel 6 as their primary Emergency channel. This should only be used when one cannot reach their primary neighborhood coordinator(s).

Note that whenever possible, channels 1-7 should be used for Emergency communications that are to be relayed. These channels are universally accessible by General Mobile Radio Service, so can be accessed by each. Channel 1 (FRS) should be further reserved as a 'General' emergency channel common to all areas such that coordinators and/or other emergency services, agencies or organizations entering a defined neighborhood area can receive information including the main frequency (channel) assignments for that area. Other internal neighborhood communications can be assigned channels 8-14.

Neighborhood coordinators should be equipped with General Mobile Radio Service (GMRS) radios when possible. As indicated, these radios can communicate on the first 7 channels of FRS radio, plus 8 additional frequencies. These radios have a farther effective range (typically reliable to 2 miles in urban areas, and farther using repeater systems). Use of these should be limited so as not to cause undue frequency congestion.

Neighborhood coordinators will receive emergency messages on channel 2 of their radio, and communicate it to their assigned participating amateur radio operator. In this case it is assumed that the operator is an ARES/RACES operator with direct radio contact with law enforcement, fire/rescue, medical personnel, etc., and has agreed to monitor Channel 8 of GMRS radio as a primary channel, and Channel 2 (both FRS and GMRS) as a secondary frequency.

Since the ham operator is already involved in emergency message relaying, he/she is most likely monitoring several other radios/frequencies, and will potentially be receiving messages from multiple neighborhood coordinators via the GMRS/FRS link. To insure quick, concise communications, a communications protocol has been

established to standardize (and thus simplify) the message handling process. This protocol includes contacting the operator by using the appropriate call signs, and the channel and service being used for transmission, so that the ham operator will know which radio to use. (It can be confusing with several frequencies being monitored.)

Discussion

The above assumes a fairly typical scenario. Obviously it would be better to have an amateur radio operator in the neighborhood acting as the communications coordinator to provide faster, more direct access to emergency responders. A viable alternative which we fully support, is for the neighborhood emergency preparedness coordinator or communications coordinator themselves become 'ham' operators. Licensing is now easier than ever, and no longer requires knowledge of morse code to get a "technician" class license which has the privileges of voice communications on the frequencies used by emergency communications. These personnel could then utilize more powerful handi-talkies to communicate directly into the network. (They should also join, participate and train with the ARES/RACES organization.) While they would not have the range and versatility of base station ham radio equipment, using a handheld and/or mobile radio would not violate neighborhood restrictions on antennas.

One final area in the realm of communications to be discussed is communicating with emergency responders once the arrive in the area. It is critical that they waste as little time as possible. Rather than having to implement a full house-to-house search for victims, they should be apprised of the current head-count by the neighborhood emergency coordinator. Additionally, a simple, yet very effective means of communication is for every family to have a sign, imprinted on one side as a red sign with the word HELP, and the other side green with the word 'OK'. This appropriate side should be displayed immediately after an emergency in an area easily visible from the street. Emergency personnel can then quickly assess where available resources need to be allocated without wasting critical time.

VI. Recommended Communications Equipment & Procedures

EMCOM has surveyed the marketplace of FRS and GMRS radios with an eye to recommending specific equipment to be used in terms of features, standardization and compatibility issues. While virtually all of the makes and models of radios offer basic compatibility and can be used for basic level communications, there is a wide variety of features available on various models; some helpful in an emergency situation, some not. We have reviewed these systems in terms of price, performance, reliability and features, as well as universal availability and manufacturer participation. We offer our recommendation in light of achieving the maximum possible standardization.

In this way, useful features should be universally available, and persons that are in a neighborhood other than their own at the time of an emergency (i.e., at work, visiting, shopping, etc.) will have the best chance for compatibility of organized emergency communications in that area. Equally important is the ability for neighborhood radios to *share charging facilities and interchange rechargeable battery packs* when needed in an emergency. Normally different brands and even different models use different charger and/or battery pack configurations. For the same reasons that emergency agencies insist on single-source compatibility for their systems, we advise neighborhoods to do likewise.

Key features we feel to be important considerations:

- Full 14 channels for FRS Radios, 15 for GMRS (1-7 shared with FRS)
- Water Resistant/Weatherproof Design (for adverse weather conditions)
- 38 CTCSS Codes
- Key Lock
- Selectable call tones
- Programmable Channel Scan so that multiple channels can be monitored
- Hands-Free (VOX) operation with selectable sensitivity
- NOAA Weather Alert Radio
- Rechargeable NiMH Battery operation

When discussing emergency communications with neighborhood families, the almost unanimous question seems to be "What do you recommend?". In light of the desire for compatibility and standardization and in terms of price, performance, reliability and features, we have chosen to recommend the use of **Midland** brand FRS and GMRS radios where neighborhood emergency communications networks are designed in an FRS/GMRS type model. Midland is a name well known in communications, and their equipment is widely available.

Note that at one point we had recommended another brand of radios. They were a fine manufacturer, and if your neighborhood already utilizes those radios we recommend that for the standardization reasons listed above that you follow suit. At this point in time however, we not only feel that Midland is providing superior products, but is also taking a very active role in providing EMCOM neighborhoods with key communications needs, and in insuring that their products both current and future meet the needs of emergency communications. That dedication and demonstrated commitment to excellence and the safety and security of our families and neighborhoods is indicative of the kind of dependability upon which we need to rely.

[1]In cases where individuals/families already own FRS type radios, and although they will normally be capable of basic communications, we suggest the acquisition of a recommended radio to assure full compatibility and use of features.

FRS / GMRS Comparative Frequency Assignments, F.C.C. Part 95 "Citizens Radio Service"

Radio Channel	Frequency Repeater Output	Frequency Repeater Input	FRS Channel	FRS Output	GMRS Channel	Motorola Channel	GMRS Output	Notes
01	462.5625	--	1	500 mW	9	1	5 W	Unofficial national calling channel
02	462.5875	--	2	500 mW	10	2	5 W	
03	462.6125	--	3	500 mW	11	3	5 W	
04	462.6375	--	4	500 mW	12	4	5 W	
05	462.6625	--	5	500 mW	13	5	5 W	
06	462.6875	--	6	500 mW	14	6	5 W	
07	462.7125	--	7	500 mW	15	7	5 W	
08	467.5625	--	8	500 mW	--	--	--	
09	467.5875	--	9	500 mW	--	--	--	
10	467.6125	--	10	500 mW	--	--	--	
11	467.6375	--	11	500 mW	--	--	--	
12	467.6625	--	12	500 mW	--	--	--	
13	467.6875	--	13	500 mW	--	--	--	
14	467.7125	--	14	500 mW	--	--	--	
15	462.5500	467.5500	--	--	1	15	50 W	
16	462.5750	467.5750	--	--	2	16	50 W	
17	462.6000	467.6000	--	--	3	17	50 W	
18	462.6250	467.6250	--	--	4	18	50 W	
19	462.6500	467.6500	--	--	5	19	50 W	Do not use near Canadian border
20	462.6750	467.6750	--	--	6	20	50 W	Unofficial emergency/traveler assistance channel (Use PL 141.3)
21	462.7000	467.7000	--	--	7	21	50 W	Do not use near Canadian border
22	462.7250	467.7250	--	--	8	22	50 W	

Note: Red text indicates F.C.C. licensed operation only.

Note on GMRS repeater assignments: Eight (8) additional frequencies are available to GMRS for use only as repeater inputs. Commercial equipment and owner permission is required to access them.

Note on Motorola channel numbering: Be aware Motorola assigns GMRS channel numbers to coincide with FRS assignments. This is at odds with the standard F.C.C. channel numbering scheme.

Note on Midland's "Extra Channels": These are standard FRS/GMRS channels with precoded PL tones