

ASRC COMMUNICATIONS COMMITTEE REPORT

3 OCTOBER 1987

1. GENERAL PURPOSE

The purpose of the ASRC Communications Committee is to expedite the effective and proper use of all forms of electronic communications within the ASRC, and within the SAR community.

2. SPECIFIC DUTIES AND RESPONSIBILITIES

The ASRC Communications Committee is responsible for, and has the authority for, the following areas within or interfacing to the ASRC and/or elements thereof:

- A. All radio, tactical (field), and special purpose communications.
- B. Development, interpretation and enforcement of applicable rules, regulations, and policies.
- C. Licensing and compliance of communications equipment and installations.
- D. Training and approval of communications personnel.
- E. Coordination of communications related information, activities, and initiatives.
- F. Other communications activities as necessary.

3. RELATIONSHIP TO BOD AND GROUPS

The Communications Committee serves the ASRC membership and the SAR community directly and through the BOD and special liaisons as shown in the Communications Committee Organizational Chart.

4. GOALS FOR 1987

- A. Develop communications training materials. IN PROCESS
- B. Renew radio license for 155 MHz channels. ACCOMPLISHED
- C. Participate in FCC National Public Safety Planning Advisory Committee (NPSPAC) and fight for SAR needs and resources. ACCOMPLISHED
- D. Develop coalition of SAR emergency communications leaders for regional and national activities. ACCOMPLISHED
- E. Obtain new license for UHF Emergency Medical Services frequencies. ACCOMPLISHED
- F. Exploit new technology agile radios within ASRC. ACCOMPLISHED
- G. Assist ASRC Groups and other SAR teams in obtaining equipment and supplies at minimum (usually dealer or factory) cost. ACCOMPLISHED
- H. Develop Committee member job descriptions. IN DRAFT
- I. Improve intracommittee communications to support dramatically increased ASRC size, regional expanse, and communications activities. IN PROCESS
- J. Obtain bylaws change to stabilize and formalize the Committee. IN PROCESS

5. GOALS FOR 1988

- A. Continue 1987 goals A, H, and I; maintain gains and thrusts of the others.
- B. Expand 155 MHz license for more capabilities.
- C. With SAR emergency communications coalition, continue battle for special nationwide SAR channels.
- D. Develop regional SAR data communications systems to support all phases of SAR activities, including wireless and wired.
- E. Assist ASRC Groups to become self-sufficient in initial

response and small tactical operations communications
equipment and capabilities.

NPSPAC RECOMMENDATIONS, 8 MARCH 1987

GENE HARRISON, MITRE CORPORATION

GROUP 1, TEAM 1

INTEROPERABILITY REQUIREMENTS, and also related to
NATIONAL EMERGENCY SCENARIOS and
TECHNOLOGY and
SPECTRUM PLANNING

NATIONAL EMERGENCY CHANNELS AND RADIO EQUIPMENT, or to be specific,

REQUIREMENTS FOR NATIONAL MUTUAL AID AND CALLING CHANNELS, AND FLEXIBLE
VHF/UHF AND LONG-HAUL HIGH FREQUENCY AND SATELLITE EQUIPMENT, FOR
INTERJURISDICTIONAL AND NATIONAL DEPLOYMENT OF PUBLIC SAFETY EMERGENCY
RESPONSE RESOURCES DURING MAJOR OR NATIONAL CRISIS OR DISASTER
OPERATIONS

BACKGROUND: COMMUNICATIONS IS THE VITAL LIFELINE

Mount Saint Helens volcano. Florida Everglades aircrash. Texas City
disaster. Washington, D.C. 14th Street bridge aircrash. Mexico City
earthquake. Public Safety and emergency service personnel all recall
these traumatic events, and in all there is a common and clear message:
communications is the vital lifeline for effective and coordinated
response to emergency and critical situations. As has been experienced
all too many times, failure of communications usually leads to
operational inefficiency as a minimum, and it often leads to needless
trauma, loss, and death for both victims and emergency responders. It is
from the painful lessons learned from past mistakes that Public Safety
organizations have learned to plan, establish, and protect their vital
lifelines of communications. However, this in itself is not sufficient,
for organizations must cooperate with each other. Certainly no Public
Safety organization has unlimited resources or is universally expert and
capable. Therefore, multiagency mutual aid responses have become
essential parts of almost all Public Safety operations. And the key to
mutual aid operations is communications interoperability.

PROBLEM: INTEROPERABILITY IS OFTEN IMPEDED OR MINIMIZED

There are several approaches to achieving interoperability. Often
interoperability is achieved by allowing other agencies to operate on an
agency's own channel. However, in the struggle to obtain frequencies in
an increasingly crowded spectrum, and in the effort to be protective of
these hard-won channels, Public Safety organizations often avoid this
approach. They are naturally concerned about possible interference on,
or abuse of, "their" channels. If it is implemented at all, it is
usually on the absolute minimum number of channels and with the absolute
minimum number of other agencies. This implementation, or lack thereof,
may unintentionally cripple their capability to achieve interoperability
and may therefore impede their effective participation in essential
mutual aid operations.

Another approach to interoperability is to "patch", or establish
bilateral connectivity, between the radio systems of two different
agencies. This is typically achieved by using telephone circuits between
the agencies' dispatch centers, and sometimes by using other radio or

microwave links. Although this approach provides significant control of its own channels by each agency, it is spectrum wasteful and requires significant additional equipment costs and complexity, plus careful personnel training and operational procedures. And in a really major disaster, it may be unlikely that the telephone central office is still functional or the microwave tower is still standing.

A third approach is to "loan" agency radios to the other involved agencies at the time of the mutual aid crisis or operation. Although this sometimes works on a small scale, such as with two agencies on a localized operation, it usually is unsuitable for major events and many agencies. If the operation is a crisis, no time is available for distribution and installation of base or mobile radios, and portables are often insufficient. And if there are many agencies, few have or could afford the necessary quantities of equipment for immediate availability.

SOLUTION: ESTABLISH NATIONAL EMERGENCY CHANNELS

The fourth approach to achieve interoperability is to establish commonly shared channels that are not "owned" by any single agency, but are shared by all as "our" mutual aid channels. Specifically, each type of Public Safety activity would have a dedicated, nationwide frequency which would be accessible to, and monitored by, all Public Safety agencies involved in that type of activity. An existing example is the Nationwide Police Emergency Channel, 155.475 MHz. All Police agencies are eligible to apply for this frequency as an additional channel, with the understanding that it is to be used for interagency and interjurisdictional calling and mutual aid purposes and not for routine or intra-agency uses. Therefore, a Police unit could go anywhere within the United States and contact other Police agencies for mutual aid and emergency operations. Once contact has been made, messages may be passed on the same, or preferably a different but mutually available, channel.

When properly implemented, this is an extremely valuable capability. However, no such channels exist for the other equally essential Public Safety and associated organizations such as Fire, Rescue, EMS, Emergency Management, or even Highway or Forestry-Conservation. This is clearly a deficiency in the provision of effective Nationwide mutual aid and interoperability. Fortunately, such essential channels could be established by the designation of Nationwide channels at 800 MHz, by the re-allocation of other frequencies given up when previous users move up to 800 MHz, or by the re-designation of existing frequencies already used for similar purposes.

It has been suggested that five 800 MHz channels should be designated for Nationwide calling and mutual aid use. This seems to be an excellent concept, although additional research should be conducted to determine if five channels will be sufficient. It is highly dependent on the size and nature of the disaster or emergency operation and the agencies involved. And it is also affected by the technology, for a trunking system may be able to be more efficient than a manual system, although trunking systems evidently may not be appropriate for certain Public Safety communications functions such as dispatching or on-scene operations.

Re-allocation of given-up frequencies may be possible, but it is

unlikely that every agency will abandon any particular frequency. Also 800 MHz is not expected to be a panacea, and it simply cannot perform as needed in all terrain for all agencies. Thus, the qualified licensees which remain will have to be accommodated by the provision of an additional substitute frequency (perhaps itself from give-ups) to provide the previously achieved service levels. The non-qualified licensees which must be moved must also be given reasonable transition times and conditions.

SOLUTION: VHF-HIGH BAND NATIONWIDE EMERGENCY CHANNELS

Perhaps the best alternative is to re-designate certain existing frequencies which are already in use for similar purposes. In general, it appears that VHF High Band is a good candidate for this approach. The Nationwide Police Emergency Channel 155.475 MHz already exists. The International Marine Emergency and Calling Channel 156.800 MHz also exists in this band. Examination of certain Government references such as FCC Part 90 and the United States National Search and Rescue Plan reveals additional possibilities. Fire could use the already designated intersystem frequency 154.280 MHz. Rescue could employ the widely used National Search and Rescue frequency 155.160 MHz. EMS could likewise use the existing mutual aid frequency 155.340 MHz. Emergency Management might use the recently established Federal channel for emergency operations employing NIIMS (National Interagency Incident Management System) or an equivalent. Each of the Public Safety agencies would monitor and operate primarily on its own designated type of Nationwide Emergency Channel. In addition, every one of them, including selected additional and associated agencies such as Highway and Forestry-Conservation for necessary uses, would be expressly permitted to temporarily move to and call on any of the other Nationwide Emergency Channels as needed during emergencies to establish contact. The following messages would preferably be conducted on another mutually available channel.

SOLUTION: 800 MHz AND OTHER BANDS NATIONAL EMERGENCY CHANNELS

The new Public Safety 800 MHz plan should incorporate at least five National Emergency Channels for access to and use by all Public Safety agencies, including Police, Fire, Rescue, EMS, and Emergency Management, and also the other associated agencies such as Highway and Forestry-Conservation for those related emergency functions when required. Eventually 800 MHz may evolve to become the "common band" much like VHF-High evidently is now, but it may be many years in most areas and never in some, especially rural and rugged terrain. Therefore, Nationwide Emergency Channels may need to be established in each band, at least temporarily and possibly permanently, to enable access by users in those bands until the VHF-High and 800 MHz National Emergency Channels are effectively implemented. It will probably become the responsibility of major or regional dispatch centers, or specialized mobile communications facilities, to provide interfacing and patching as necessary in the interim until users modify or upgrade their equipments.

SOLUTION: FLEXIBLE RADIOS FOR RAPID DEPLOYMENT EMERGENCY RESOURCES

In the beginning of this paper, several major disasters were cited, and in each there were significant communications problems. One of the most difficult was the fact that the radios used by many of the deployed teams simply incompatible with the local agencies because they had the

"wrong" crystal-controlled frequencies in them. These teams, in most cases, were known to be rapid deployment resources and were equipped with their own organic communications, usually portable radios and possibly a few mobiles, which were normally channeled for their home area. In many cases they were unable to interoperate with the local agencies or even other deployed teams except by very inefficient and unreliable means. It is doubtful if any agency has attempted to correlate the unnecessary loss of life or property, of both victims and emergency responders, due to inability to interoperate. Fortunately, these unacceptable circumstances need not occur again, because there is now a technological solution to the problem. The currently available synthesized portable and mobile radios provide an unprecedented capability to operate on many different frequencies within the band of the device, and they are fully type accepted and generally rugged for field operations. Some of these radios are programmable at the factory or in the radio shop, take very specialized and fragile equipment, and are therefore unsuitable for such emergency and field operational use. However, certain of these new designs have programming devices and systems which are simple and rugged enough to deploy with the teams and to enable the radios to be rechanneled upon arrival at the emergency operational area. Such uses are necessary and within reasonable emergency operational guidelines. Of course, it is not as easy as the commonly available aircraft radios with their front mounted frequency switches. These flexible designs are truly essential to the successful interoperation of the emergency resources and to the life and safety of both the responders and the victims, and the availability of such equipment to such critical users must not be impeded. There appears to be no more rapidly achievable and broadly useful solution to the previously described critical interoperability and mutual aid problems. Therefore, should any restrictions be placed on availability or use of these flexible radios, the rapidly deployable emergency response teams must be declared exempt.

SOLUTION: HF RADIO AND SATELLITE LONG-HAUL COMMUNICATIONS

During almost every major disaster, the routinely used means of long distance communications, such as telephone and associated microwave or satellite, fail rapidly. It is often many days, if not weeks, before the circuits can be restored, even on a minimal basis. Meanwhile, this period of outage is perhaps the most critical for communications needs from the affected operational area to distant support, staging, and coordination centers. In the Mexico City earthquake, the American team was unable to report back to the United States, or to request more needed help, for about two days. About a year later, in the San Salvador earthquake, the American team was actually searching the rubble for victims in only twenty hours after the event, but it still took two days to reach the United States with requests for needed help. This situation will undoubtedly occur for emergency responders within the United States itself when the "big one" happens. There are few alternatives for the vitally needed long-haul communications, and they are primarily high frequency radio (1.6 to 30 MHz), and compact satellite terminals, both in self-contained and easily transportable form. Unfortunately, the satellite terminals are usually prohibitively expensive to buy, lease, or operate, especially for the smaller agencies and teams. The HF radios, in turn, are essentially denied to most agencies and teams because of perhaps overly restrictive regulations which probably predate

the present awareness of major disaster problems and needs. Only recently did the Federal agencies organize themselves to share their HF radio resources in the conducting of emergency messages for each other. This new capability, called the SHARES system, has greatly improved the ability of the US Government to handle emergency communications problems and outages. Perhaps it is time for a new look at the good uses of HF radio for Public Safety and allied emergency responders which must have vital communications capable of reaching out of isolated disaster zones. An HF radio can be easily carried into the zone and setup rapidly, and it can also be patched to the local area VHF/UHF radio network for range extension. Several frequencies seem to be available in Part 90, but it is unknown how many are really being used, or how many licensees can actually perform effectively, especially with emergency power or from an emergency relocation site. HF radio is available, effective, and reasonably priced, so it should be made permissible and much more accessible to these emergency response deployable teams and agencies. Satellite communications should also be made more readily available, although it may be necessary for cache or loan arrangements to be made with those Federal or other agencies which have the capability to obtain them.

SUMMARY

1. Communications is the vital lifeline of emergency operations.
2. Interoperability is the key to effective mutual aid operations.
3. Nationwide Emergency Channels must be established, in VHF-High Band, in 800 MHz, and in the other bands as needed.
4. Rapidly deployable emergency response teams must have flexible VHF/UHF radios for local communications and interoperation.
5. These teams must also have long-haul communications using HF radios and, if possible, satellite terminals.

COPIES:

Chairman, NPSPAC
Facilitators, Task Groups
Team Leader, Group 1, Team 1

NFSPAC RECOMMENDATIONS, 8 MARCH 1987

GENE HARRISON, MITRE CORPORATION

W(703) 883-6142

H(703) 777-6111

GROUP 1, TEAM 1

INTEROPERABILITY REQUIREMENTS

DEFINITION OF PUBLIC SAFETY

PUBLIC SAFETY shall include those functions which are PRIMARILY involved with emergency or critical safety or preservation of life or property. This includes the five major categories which are generally defined below:

POLICE, FIRE, RESCUE, EMS, EMERGENCY MANAGEMENT

It is expressly understood that any organization involved primarily with any one of the above functions may routinely or occasionally be involved with one or more of the other functions on a secondary basis. As a typical example, some Rescue functions may be performed by an organization primarily involved in Police or Fire, as well as by dedicated Rescue groups. Also, certain other specialized organizations, such as Highway and Forestry-Conservation, have essential secondary Public Safety functions, and they must have the capability to perform these functions, and interoperate with other required Public Safety entities in this capacity, without impediment. It is also understood that these functions are essential in all environments involving the Public and their Property, from urban to wilderness. It is generally accepted, as in the medical sense, that the Standard of Care must be maintained as high as possible, within the limits of critical resources, regardless of the location, from high-rise apartments to highways and even to mountain tops.

POLICE: Emergency or critical safety or preservation of life or property, principally related to criminal threat or activity. This includes activities such as dispatch, emergency response, patrols, arrests, SWAT/EOD, and surveillance. Non-emergency activities which are organic to Police missions, such as public relations and routine investigations, may be conducted on a secondary, noninterference, basis.

FIRE: Emergency or critical safety or preservation of property, primarily related to fire. This includes activities such as dispatch, emergency response, and fire containment and suppression. Non-emergency activities which are organic to Fire missions, such as public education and safety inspections, may be conducted on a secondary, noninterference, basis.

RESCUE: Emergency or critical safety or preservation of life, primarily related to accidents or nonmedical threats. This includes activities such as dispatch, emergency response, search for victims, access to victims, situational stabilization, extrication, and evacuation. Non-emergency activities which are organic to Rescue missions, such as first response and safety education, and standbys at special operations, may be conducted on a secondary, noninterference, basis.

EMS (Emergency Medical Services): Emergency or critical safety or preservation of life, primarily related to medical threats or crisis.

This includes activities such as dispatch, emergency response, triage, medical stabilization, basic and advanced life support, monitoring, and transport. Non-emergency activities which are organic to EMS missions, such as first response and safety education, and standbys at special operations, may be conducted on a secondary, noninterference, basis.

EMERGENCY MANAGEMENT: Emergency or critical safety or preservation of life or property, primarily related to coordination of involved Public Safety organizations and other support services concerning overwhelming events, such as earthquakes, floods, tornadoes, terrorism, and others generally beyond the capacity of localized Public Safety resources and individual jurisdictions. Non-emergency activities which are organic to Emergency Management missions, such as major disaster training, mutual aid exercises, and interoperability testing, may be conducted on a secondary, noninterference, basis.

(NOTE: This replaces the preliminary document read and presented at the 26 February 1987 NPSPAC meeting, and it incorporates appreciated suggestions from Forestry-Conservation, Highway, and Federal personnel.)

COPIES:

Chairman, NPSPAC
Facilitators, Task Groups
Team Leader, Group1, Team 1