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COMMUNICATIONS NETWORK PLAN

VOICE OF COMMAND

Civil Air Patrol
Communications

National Network Plan

1 May 1999

Purpose

The purpose of this plan is to define the CAP radio communications network. Today's digital technologies are providing new, efficient and beneficial methods by which CAP can and will communicate. There still remains, however, a critical role which can only be filled by radio-based systems. This plans addresses those systems which are under CAP's control but does so in light of other systems by which we may benefit.

Therefore this plan is intended to:

- Define the CAP communications network
- Assign responsibility for its various segments
- Provide overall vision and needs of the system

Structure

This plan is structured into the following sub-parts:

- This introduction and instruction.
- Tab A, National Network Plan
- Tab B, The NHQ Segment
- Tab C, to be provided by each region
- Tab D, to be provided by each wing
- Tabs E, F., etc. to be provided by groups or squadrons at wing discretion

This introduction describes the Network Plan as both a document and a process and provides instructions for that process. Tab A provides the overall network expectations as well as the description and definition of the network. Tabs B, C, D and so on, apply this network planning to each successive echelon.

Instructions

Each echelon of the organization must apply this planning to their unique requirements and define their specific portion of the overall national communications network. The expected end result of this planning process is a thoroughly mapped network from top to bottom with completely defined requirements at all levels.

National headquarters has begun the network planning process by providing this network plan including Tabs A and B. Each region will author their own Tab C addressing that portion of the network which is within their jurisdiction and

defining their own specific requirements. Then, each wing will write their own individual Tab D addressing all requirements and expectations enumerated in Tabs A, B and C, as applied to their unique situation and requirements.

The wing plan (Tab D) will either directly address all requirements of those echelons below them or the wing may delegate this planning to those lower echelons. In either case, each plan at each echelon will identify how all the communications requirements will be met including people, their training levels, and the equipment assets needed to perform the mission.

Validation

Once completed, each Network Plan becomes the official statement of communications planning and requirements of that headquarters and is released over signature of the commander. It must be forwarded to the next higher echelon for validation. Each higher headquarters will review the plan and, if approved, forward it up the chain. NHQ will collect, review, and provide final approval for all Network Plans within the CAP communications network.

Acquisition Planning

An approved and validated network plan is a valuable tool for all future acquisition planning. NHQ will use the total figures provided by the network planning process to pursue funding for the communications program and secure contracts with equipment vendors to satisfy the needs of the organization. In addition, lower echelons may use their network plan for their own acquisition planning as needed to supplement NHQ efforts.

Equipment Distribution

All communications equipment distribution will be in accordance with the applicable network plan. NHQ/DOK will work to modify the logistics database to show both equipment requirements and allocation.

Annual Review

Each headquarters will review all network plans for which they are responsible on an annual basis or whenever changes to the network may are required. If changes are made at time of review the plan will be resubmitted for validation.

JAMES C. BOBICK
Brigadier General, CAP
National Commander

Civil Air Patrol
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Tab A

1 May 1999

The Congress of the United States has charged the Civil Air Patrol with three missions: Emergency Services, Aerospace Education and Cadet Programs. In order to execute this charter the Civil Air Patrol requires an effective nation-wide communications system capable of providing command and control communications (C3) in both the fixed and tactical arenas. The CAP communications network exists solely to provide this support.

Mission

The mission of the Civil Air Patrol Communications Program is to organize and maintain a reliable, nationwide, point-to-point, air-to-ground, and ground mobile radio capability in support of the missions of CAP. *(CAPR 100-1, Vol I, para 1-1)*

Goals

The goal of the CAP communications network is to provide a flexible and survivable radio-based communications system through which:

- Commanders are able to exercise *command and control* of CAP forces.
- All CAP units are able to *relay* command direction, as well as administrative information, up and down the chain of command in a timely manner.
- The applicable controlling authority is able to *direct* field forces in the execution of a mission.
- Air and ground forces are able to *coordinate* operations in the field and communicate with the controlling authority.
- Liaison communications are possible between all agencies engaged in mission activity.

These goals are our network expectations and serve as the basic design criteria for the CAP communications network. All echelons of the organization must evaluate their ability to meet these expectations in their unique situation. A specific list of objectives relevant to that echelon will be the starting point of each subsequent network plan.

Two Modes

The CAP radio communications network has two primary modes of operations: fixed and tactical. In its fixed mode the network provides connectivity between echelons of command even in a stressed environment where normal means of

communications are unavailable. This mode is employed and exercised on a routine day-to-day basis as the radio backup to normal administrative communications up and down the organization's structure. On the other hand the network's tactical aspect is mobile and flexible in nature. It primarily supports the Emergency Services mission by providing ES forces the ability to operate and communicate in the tactical environment.

Fixed Communications

- Commanders are able to exercise command and control of CAP forces.
- All CAP units are able to relay command direction, as well as administrative information, up and down the chain of command in a timely manner.

Technology now provides many efficient and effective communications tools which provide better administrative support to CAP than the radio-based network. The number of these other administrative systems is ever-increasing and of great benefit to the organization. Therefore, the communications program incorporates these non-radio communications solutions wherever possible. The fixed radio network will continue to provide an important survivable means of backup administrative communications.

Therefore, the ever-increasing challenge to commanders and communications managers is to find creative ways to keep the system exercised and ready for its survivable role by providing sufficient use of its administrative support capability. In routine use the network can still provide valuable service to the organization by providing a relatively inexpensive communications media saving travel and long-distance telephone expenses. The use of scheduled nets as on-the-air staff meetings is one method commanders can use to regularly exercise their radio capability. The mandatory use of communications exercises to test current capabilities is yet another. Effective and well-planned comm exercises must be employed at wing, regional, and national levels on a periodic basis.

The fixed radio network will be organized along command lines so that fixed voice networks exist at each echelon in the nation-wide network. These networks will be maintained and exercised on a regular basis for the purpose of passing C3 information up and down the chain of command in the stressed environment. As needed, either VHF FM or HF SSB may be used.

Each command echelon will operate a command net providing communications to, and among, its subordinate commands. As an example, NHQ will operate a national command net providing communications between NHQ and the regions and providing the regions communications with one another. Similarly, each region will operate a command net providing its wings access to the region HQ and providing communications between the wings. And, wings will operate a command net providing their subordinate units access to the wing HQ and communications with one another. At wing discretion command nets may be utilized below wing level as necessary to provide C3 capability down to the lowest levels of the organization.

Each command echelon will operate a number of stations sufficient to provide primary and alternate support to the headquarters staff with stations designated to provide upward and downward connectivity in the C3 structure. For example, each region will have primary and alternate stations designated to provide connectivity upward to the national level by meeting the National Command Net and they will have primary and alternate stations designated to provide downward connectivity to its wings by meeting and/or running the region net. This may be performed by one station or many different stations each with a specific tasking.

Each echelon will coordinate and de-conflict routine command net schedules as appropriate. Nets should meet regularly but there is no minimum schedule requirement. In a volunteer organization it is often more advantageous to have nets meet less often but with more emphasis and content when the net does meet. Consideration must also be given to the suspense of routine schedules and emergency call up of nets when necessary to support mission tasking.

The mode of operation at national and region levels will be HF SSB because of the distances involved. Wings may utilize either or both as necessary. Below wing level, command nets will typically utilize VHF FM where practical.

Tactical Communications

- The applicable controlling authority is able to *direct* field forces in the execution of a mission.
- Air and ground forces are able to coordinate operations in the field and communicate with the controlling authority.
- Liaison communications are possible between all agencies engaged in mission activity.

Unlike formal scheduled nets which meet on a regular basis, tactical communications take whatever form is necessary---*within the confines of design criteria and authorizations*---to meet mission objectives. In this environment the structure of formal network protocol is not required but can be helpful in some situations.

Because of it flexible nature tactical communications requires the most detailed and thoughtful network planning. Communications managers at all levels of the organization, and particularly at wing and below, must carefully scrutinize the real communications requirements of the mission.

In the execution of the Emergency Services (ES) mission, communications is required between certain definable groups and individuals. Communications managers must ***identify*** these mission-critical "nodes", ***determine*** their communications requirements, and ***plan*** primary and backup communications solutions.

Some likely nodes within CAP ES are: the mission base; mission coordinators when operating from other than a mission base; remote or secondary mission base(s); mission aircraft; and ground teams. Within a mission base there may be a need for radio communications support between air ops, the flight line, etc.

CAP ES operations are activated by some outside controlling agency so up-channel communications will likely be required with some agency such as the Air Force Rescue Coordination Center (AFRCC), state emergency operations center (EOC), FEMA National Emergency Coordination Center (NECC), CAP National Operations Center (NOC) and possible others. In addition, because CAP frequently cooperates with lateral agencies, some type of liaison communications may be required the state or local authorities, such as law enforcement, or other mutual aid agencies such as the American Red Cross.

Again, in network planning, the task of commanders and communications managers is to think through likely mission scenarios, ***identify*** who needs communications support, ***determine*** their requirements, and ***plan*** a solution.

Put another way, ask yourself; "Who needs to communicate with whom?" "What kind of communications do they need?" "Under what conditions and time constraints will they need it?" And finally, "Which combination of solutions would best meet these requirements and how do we employ those solutions."

Of course, all of this requires close collaboration with those you are supporting. Only those who rely on your support can truly validate your assumptions and planning. Include key staff elements (communications users) in your planning process, especially those whose mission success depends on the support you provide. And, before you proceed to developing a plan, validate your assumptions with your commander.

Bubble Charting

The process we've been describing is called "Nodal Analysis" and there are some tools you may find helpful. The first of these is communications diagramming, or the "bubble chart" The bubble chart is a simple way of sketching out visually the many various--and often confusing--communications requirements. See the example at Attachment A-1.

The first step is to identify your "nodes"--that is, entities which need to communicate--and represent them on the chart by a circle or "bubble." Then, all the communications requirements of each node (bubble) are depicted by drawing a line to the node (bubble) with whom communications is required. These lines are your communications "links". One note: When identifying mobile nodes it is frequently helpful to identify their operating areas rather than the actual entity. For instance, "Ground Teams operating south of Interstate 10."

Once you've identified all your "nodes" you can begin to determine what communications path or service will provide the best support for each "link." Each different type of communications solution can be depicted by a different type of line to illustrate visually the mode of communications you've identified for each link. In some cases the best solution for a voice communications requirement will be simplex VHF/FM radio whereas, in others, it might simply be a telephone. You may have a requirement for "record" communications instead of voice. A fax machine or email could possible satisfy this requirement.

Work your way through each link for each node. Don't forget about redundancy and backup communications. These can be identified on the same bubble chart or on a separate one depending on what works best as a planning tool for you.

As you begin to plan for each communications link you'll find that some cannot stand alone but require assistance or "relay." This assistance can be in the form of a repeater (fixed, mobile or airborne) or simply a relaying station. In bubble charting these relays can be depicted as diamonds. In a perfect scenario all direct links would greatly simplify communications but most realist situations--and bubble charts--rely heavily on relays.

While you are considering the optimum communications solutions to your various requirements, keep in mind a few planning standards CAP will use nation-wide.

- Where possible, conventional telephone, fax, and high-speed digital communications (email/WWW) should be used.
- When a radio solution is called for, VHF/FM simplex is the first choice.
- When a repeater is required, installations that support both the tactical mission as well as fixed operations should be considered.
- When a fixed repeater is not possible, mobile, portable and air-mobile repeaters should be considered.
- When tactical repeaters are not possible or unpractical, manned relay stations should be considered. These can be fixed stations, mobiles or "highbirds."
- Links which cannot be supported by any of the above will use HF.
- All links will have at least one back-up mode and all mission-critical links should employ a sufficient level of redundancy.

Occasionally the right answer for a particular requirement is, "We don't know yet". If you have defined a communications need that you don't currently have the ability to satisfy, it is your responsibility to find a solution. If a solution can't be found as your plan is being written, the entry for that area in the plan may be an annotation of the fact that a solution is being researched. When you find an answer at a later date, amend your Network Plan appropriately. The key here is that network planning helped you identify a problem that needed to be solved.

As you are "bubble charting" your communications requirements, you are likely to find that one chart can't handle everything. In fact, a well planned communications system can require many charts to adequately represent all the pieces of the communications puzzle. Use bubble charts to help you sort out the details.

We have introduced Bubble Charting under tactical communications where planning is the most challenging, but this process works equally well in planning the fixed aspects of your network. You may want to develop intersecting and overlapping bubble charts depicting each communications requirement.

Aftermath

Once you've finished charting your communications requirements you will probably have learned a great deal. It is very likely that you found needs for communications relay that you don't currently have. This process will help you identify where you need repeaters or where relay stations may be necessary. You may be disturbed to find that some of them are not currently located where you really need them to be. Or, you may even find that you have repeaters that aren't justified by your requirements. In fact, if all you did was draw out the communications system you currently operate, with no need for change, you either cheated yourself by short-circuiting the process or you have one very admirable network.

Coordination of Plans

The end result should be a clear picture of your overall requirements. Now, the final step in network planning is to make use of the information you gained. Of course, one such use of this information should be in your other communications plans. At their next publication, your Emergency Communications Plan, Operations and Training Plan, and Repeater Plan should be directly tied to requirements identified in your Network Plan.

Statement of Requirements

The final step in this network planning process is the determination of your equipment requirements. Your bubble charts will be central to this process and should be detailed enough to allow you to total the equipment requirements for each link in order to deduce a system total.

At this point you are stating types of equipment required and personnel slots with certain training specialties. You would not normally specify a particular brand/model of equipment or a particular individual. Acquisition plans and ops/training plans are the appropriate place to define HOW you are going to meet the requirements you state in your network plan.

As you are calculating your total equipment requirements remember to consider cross utilization. This means using an asset to do more than one job.

For instance, if it's located correctly, a repeater routinely used to provide administrative support to a group headquarters may also be able to provide service to a mission base or a mission critical operations area. Fixed VHF/FM or HF stations which are routinely employed to support command nets can be activated to provide support to search aircraft or ground teams in a particular area. Communications managers must make every effort to consolidate requirements between fixed networks and the infrastructure requirements of the tactical mission.

Putting it all together

Now that you've been through the process of planning out your network, it's time to put the information you've collected into a Network Plan. As we stated at the beginning of this tab, the starting point of a network plan is expectations.

Begin with the general expectations given from your higher headquarters and then list those you developed to cover your unique situation. These expectations serve as your goals and provide your plan with direction and purpose.

Next, describe your plan, that is, define what your specific requirements are and how you plan to support them. Your bubble chart will prove useful for this.

Finally, state the assets you require to implement this plan. This should include personnel with defined training/certification levels as well as equipment assets.

Conclusion

A few final words as you begin to put this plan into action. Remember that the communications program does not exist to support itself. We have a reason for engaging in this process and that is to provide something the organization must have to perform its mission. It is imperative that you work closely with those who will use what you are providing. It is important that input and participation of those that depend on communications (command, operations, emergency services, etc.) be incorporated as an integral part of your planning.

Network planning is a group process. Strive to involve a group of people working together to ensure the best possible product of your planning. And, at each step of the way, validate the accuracy of your planning with those you are supporting. Only they can tell you if you've hit the mark and met the expectations they helped you set. Check your planning, allow helpful criticism and you *will* achieve excellence in communications support to the Civil Air Patrol mission.

Civil Air Patrol
Communications

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Tab B - National Headquarters

1 May 1999

National Level Goals

The goal of the CAP communications network is to provide a flexible and survivable radio-based communications system through which:

1. Commanders are able to exercise *command and control* of CAP forces.
2. All CAP units are able to *relay* command direction, as well as administrative information, up and down the chain of command in a timely manner.
3. The applicable controlling authority is able to *direct* field forces in the execution of a mission.
4. Air and ground forces are able to *coordinate* operations in the field and communicate with the controlling authority.
5. Liaison communications are possible between all agencies engaged in mission activity.

Unit Goals (National Headquarters)

1. Voice and record communications are available between the NHQ staff and field commanders and their staff officers nation-wide.
2. Voice and record communications are available between NHQ staff and national-level lateral support agencies nation-wide as required.
3. Voice and record communications are available between NHQ Maxwell, and NHQ geographically separated offices and staging areas nation-wide.
4. Voice and record communications are available between the National Operations Center and field commanders, their staff officers, and operational CAP forces nation-wide in a communications-stressed environment.
5. Voice and record communications are available between the National Operations Center and lateral support agencies nation-wide in a communications-stressed environment.
6. Local voice communications are available in the vicinity of Maxwell AFB and the Montgomery metropolitan area between the National Operations Center, key NHQ staff, visiting commanders and their staff, and special event staff.
7. Deployable local voice communications are available to national level special event staff.

NHQ Network Plan

1. Bi-directional voice and record communications are available between the NHQ staff and field commanders and staff officers.

Routine day-to-day voice communications between NHQ and CAP field offices will be conducted by conventional telephone. NHQ is provided full telephone support by the 42nd Communications Squadron, Maxwell AFB, AL. All NHQ offices have unlimited connectivity to the Defense Switched Network (DSN) and commercial long distance at no cost to CAP. A list of all key phone numbers is published to the field by Mission Support (MS) in the Key Personnel Directory.

The backup for the voice portion of this requirement will be the CAP Command, Control, and Communications (C3) Radio Network. Access to this service will nominally be limited to "Priority" precedence traffic and above or time sensitive communications which cannot wait for restoral of conventional telephone service. Access to the CAP C3 Radio System will be provided via the National Operations Center (NOC). See NOC communications plan item 4 below.

Routine day-to-day record communications between NHQ and CAP field offices will be conducted by conventional fax and email. All directorates and key offices at NHQ have operational fax machines. A listing of the fax numbers is provided to the field in the Key Personnel Directory.

NHQ operates a Local Area Network (LAN) providing email service to all internal offices. Some NHQ and field-level email addresses are published in various directories but this listings are not complete or standardized. Organized nation-wide email accessibility does not yet exist.

- Action Item: DOK will work to develop a standardized nation-wide email addressing and routing scheme.

Problem: There is no backup for the record portion of this requirement. A DOK working group, in conjunction with the National Technology Center (NTC), is collaboration with the Defense Information Systems Agency (DISA) to research a potential HF-email solution. Some equipment to support this project (including four TSC-122 Communications Central comm vans) have been acquired and testing will begin as system configuration issues are resolved.

- Action Item: DOK will oversee the DISA HF-email project for potential incorporation as record communications backup for NHQ to CAP field offices.

Problem: Both NHQ fax and email service is dependent upon commercial power. Currently there is no back-up power source available.

- Action Item: DOK will work with MS to secure emergency backup power, as determined to be necessary, to support critical communications.

2. Bi-directional voice and record communications are available between NHQ staff and national-level lateral support agencies as required.

Routine day-to-day liaison communications with lateral support agencies will be conducted via conventional telephone, fax, and email. See plan item 1. above.

Backup for the voice portion of this requirement will be the National Communications System (NCS) SHARES HF Radio Network. The capability for SHARES connectivity will be maintained by the NOC in addition to other HF requirements. (Plan item 5 below)

There is currently no backup for the record portion of this requirement. It is expected that the solution to this will be provided by the DISA HF-email project. See plan item 1 above.

Communications links for this item are also affected by the lack of emergency backup power. See plan item 1 above.

3. Bi-directional voice and record communications are available between NHQ Maxwell, and NHQ geographically separated offices.

NHQ geographically separated offices (GSOs) include the Liaison Region HQs, Wing Liaison Offices, CAP Supply Depot, CAP Washington Office, and the NTC. Routine day-to-day liaison communications with these offices will be conducted via conventional telephone, fax, and email. See plan item 1 above.

Backup for the voice portion of this requirement will be the CAP C3 Radio Network. Access to this service will nominally be limited to "Priority" precedence and above or time sensitive communications which cannot wait for restoral of conventional telephone service. Access to the CAP C3 Radio System will be provided via the NOC. See NOC communications plan item 4 below.

There is currently no backup for the record portion of this requirement. It is expected that the solution to this will be provided by the DISA HF-email project. See plan item 1 above.

Communications links for this requirement are also affected by the lack of emergency backup power. See plan item 1 above.

4. Bi-directional voice and record communications are available between the National Operations Center and field commanders, their staff officers, and operational CAP forces in a communications-stressed environment.

Normal day-to-day support will be provided as detailed in items 1 and 2 above. However, the mission of the NOC requires it to have complete communications capability even in a situation where normal communications infrastructures may not be available.

The voice portion of this backup requirement will be satisfied, in part, by the CAP C3 Radio Network. The NOC will maintain and operate an HF station and an HF network capable of providing backup voice communications to the national command staff, the eight region HQs and the NHQ GSOs.

Operation of the National Command Net (NCN) will be in accordance with the CAPR 100-1 series. Each region headquarters is required to appoint a primary and alternate HF station to participate in the NCN and provide communications to the region HQ and downward to the entire organization. NHQ DOK will work with regions and wings to arrange support to the national staff and NHQ GSOs.

Problem: Traditional operations of this net have been on a daily basis regardless of traffic flow requirements. Actual communications of information has transitioned to other media such as fax and email leaving very little activity on the NCN and little motivation for net participation.

- Action Item: The NOC will reduce the NCN schedule and increase information flow. In day-to-day non-emergency situations, the NCN will be exercised weekly. The NOC staff will develop some method of collecting and assembling brief informational items for publication to the field via the NCN.

Additional backup voice capability for this requirement is being researched by DOK and the NTC. DoD Tactical Satellite (TACSAT) service may be available on a limited basis. INMARSAT or Iridium may be possibilities. If feasible, a satellite solution which reconnects the NOC back to the Public Switched Telephone Network (PSTN) during a comm-isolated situation is highly desirable.

There is currently no backup for the record portion of this requirement. It is expected that the solution to this will be provided by the DISA HF-email project. See plan item 1 above.

Communications links for this requirement are also affected by the lack of emergency backup power. See plan item 1 above.

5. Bi-directional voice and record communications are available between the National Operations Center and lateral support agencies in a communications-stressed environment.

Backup for the voice portion of this requirement to federal government and other national-level agencies will be the National Communications System (NCS) SHARES HF Radio Network. The NOC will maintain and operate an HF station utilizing Automatic Link Establishment (ALE) protocol and programmed to the NCS SHARES frequency suite. Operations of the SHARES station will be in accordance with the SHARES Operating Manual.

Problem: Currently the NOC has one HF radio serving both CAP C3 Network duties as well as SHARES ALE. The switching back and forth of radio modes frequently results in unavailability of the station to one network or the other.

- Action Item: DOK will acquire a separate HF radio to allow an independent radio for each mission. This will also provide 100% redundancy for both links.

Additional backup voice capability for this requirement is being researched by DOK and the NTC. DoD Tactical Satellite (TACSAT) service may be available on a limited basis. INMARSAT or Iridium may be possibilities. If feasible, a satellite solution which reconnects the NOC back to the Public Switched Telephone Network (PSTN) during a comm-isolated situation is highly desirable.

There is currently no backup for the record portion of this requirement. It is expected that the solution to this will be provided by the DISA HF-email project. See plan item 1 above.

Communications links for this requirement are also affected by the lack of emergency backup power. See plan item 1 above.

6. Local voice communications are available in the vicinity of Maxwell AFB and the Montgomery metropolitan area between the National Operations Center, key NHQ staff, visiting commanders and their staff, and special event staff.

The NOC will maintain and operate one VHF/FM base station programmed to the CAP VHF/FM suite of frequencies and capable of scanning. Operation of the station will be in accordance with CAPR 100-1 series.

In coordination with Alabama Wing, NHQ will maintain a VHF/FM repeater station on a CAP standard frequency pair and capable of providing hand-held service to Maxwell AFB and mobile service to the Montgomery metro area.

In support of the communications needs of special event staff, the NOC will maintain and operate a VHF/FM base station and a UHF/FM base station programmed to discrete frequencies, as authorized.

In cooperation with 42nd Communications Squadron Land Mobile Radio (LMR) shop, NHQ will maintain a VHF/FM repeater and a UHF/FM repeater, on discreet LMR frequencies, and capable of providing hand-held service to Maxwell AFB and mobile service to the Montgomery metro area.

7. Deployable local voice communications are available to national level special event staff.

NHQ will maintain a deployable LMR communications system to support national level special events such as the National Congress on Air and Space Education (NCASE), the August National Board meeting, and national cadet encampments.

The system will be capable of providing two independent staff nets. The first will be capable of providing handheld service to the special staff working in and around a convention center hotel anywhere in the country.

The second will be capable of providing handheld service to staff operating at the servicing commercial airport and military airlift facility in use for the event as well as providing mobile coverage of the travel routes to the event location and providing all users communication with the event control center.

The system will consist of two sub-systems operating on discreet VHF/FM and a UHF/FM frequencies. The UHF system will be used for staff support at and near the event location. It will consist of a base station with wire-line remote, a low-power portable repeater and 36 handhelds. The VHF/FM sub-system will consist of a base station with wire-line remote, a low-power portable repeater, 18 handhelds, and 6 removable mobiles. Backup to critical links within this system will be provided by cellular telephone.

Requirements (equipment, personnel and training by unit goal)

1. Phone, fax and email equipment provided by MS. Backup HF as per item 4. Other backup items to be determined as per Action Item 2. Emergency power to be determined as per Action Item 3. One telephone technician additional duty to work telephone connectivity issues.
2. Requirements already covered as noted.
3. Requirements already covered as noted.
4. One HF base station with sufficient output power and antenna configuration to provide nation-wide coverage. Additional backup communications and emergency power to be determined as noted. One HF operator with technician-level communications training or equivalent.
5. One ALE capable HF base station with sufficient output power and antenna configuration to provide nation-wide coverage. Additional backup communications and emergency power to be determined as noted. One HF operator with technician-level communications training or equivalent.
6. Two VHF/FM and one UHF/FM base stations capable of scanning. Two VHF/FM repeaters and one UHF/FM repeater installed as noted. NOC staff duty officer with advanced communications user training.
7. One UHF/FM and one VHF/FM base station with wire-line remotes, one UHF/FM and one VHF/FM portable repeaters, 36 UHF/FM portables, 18 VHF/FM portables, and six removable VHF/FM mobiles. Two cell phones. At least two communications technicians and orientation training for event staff.

Action Items

- Action Item 1: DOK will work with MS to improve field email access to NHQ.
- Action Item 2: DOK will oversee the DISA HF-email project for potential incorporation as record communications backup for NHQ to CAP field offices.
- Action Item 3: DOK will work with MS to secure emergency backup power, as determined to be necessary, to support critical record communications.
- Action Item 4: The NOC will reduce the NCN schedule and increase information flow. In day-to-day non-emergency situations, the NCN will be exercised weekly. The NOC staff will develop some method of collecting and assembling brief informational items for publication to the field via the NCN.
- Action Item 5: DOK will acquire a separate HF radio to allow an equipment independent radio for each mission. This will also provide 100% equipment redundancy for both links.

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