

Narrowband Transition Update

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This briefing is an expanded version of the briefing that national Communications Team Leader Mike Marek, Lt Col, CAP, would have given to the National Board on 8 August 2008, if there had been time.

You are all aware that over a decade of planning has come to fruition and CAP is moving ahead with the final phase of its transition to compliance with federal standards in its VHF-FM system. Starting as soon as possible, every one of our VHF-FM repeaters will be exchanged for a repeater with increased capabilities operating on new "narrowband" frequencies.

Although "interoperability" has been a major goal in Emergency Services since 9-11 and Hurricane Katrina, visionaries in the CAP Communications system saw over a decade ago that full compliance with federal standards set by the National Telecommunications and Information Administration (NTIA) would serve CAP well by providing full interoperability with other federal users, both CAP operating on the frequencies of other agencies, and stations of the other agencies operating on CAP frequencies. The Air Force agreed to fund the transition, which had the effect of replacing a decentralized Comm system that had been "built on the backs of members" because it largely relied on member-owned equipment. As the result of Air Force funding received to support the transition to NTIA compliance, all of the Mission Critical and Mission Essential (see definitions of these terms below) VHF-FM communications assets are now corporate owned.

After completion of the transition, CAP will have many more frequencies to conduct our missions with, including two sets of replacement repeater frequencies and a third frequency pair for both airborne and ground temporary repeater use, as well as having our simplex frequencies entirely separate from our repeater frequencies. This will provide more flexibility and less congestion of mission radio channels. The result is a more effective and scalable system, in keeping with the NIMS/ICS program standards.

The Johnson base, mobile, and handheld radios that you already have in service in the wings are part of this transition. The repeaters we will be replacing over the coming year will allow CAP and its federal "customers" to make maximum use of the capabilities of these radios.

Frequency/Repeater Transition

Fundamental Requirements & Assumptions:

- Ten-year planning process, coordinated and approved by NB, NEC and Command
- USAF funding is to accomplish USAF missions – high degree of standardization required for all equipment
- Given freq. status, waiting longer would be irresponsible use of \$
- Transition needs to have the minimum impact on operational missions as possible

The items above are the basic requirements affecting CAP from the Air Force and other federal "customers," and the key assumptions the national and headquarters staff employed in developing strategies for accomplishment of the narrowband transition.

Frequency Transition

- Since 1998, CAP has been on coordinated track to change VHF-FM frequencies
- New narrowband channels allow interoperability with other Federal users
- We have received \$30 million to support this change:
 - Aircraft, base, mobile and handheld radios already in service on "old" frequencies
 - New repeaters standing by for new frequencies

It is important to remember that CAP made the decision to comply fully with standards set by the NTIA over a decade ago and that decision was fully coordinated and approved by command, the National Board and the NEC.

Years before the current "push" for interoperability, visionaries in the CAP Comm program saw the benefits of full compliance with NTIA standards. The Air Force agreed and has already provided CAP millions of dollars worth of end-user VHF-FM radios (the Johnson base, mobile and handheld radios) and repeaters that are vital to CAP's ability to interoperate.

Why now?

- About 450 fixed repeaters are at NTC
- Waiting to clear frequency coordination issues with Canada
 - Best to program & tune at the NTC
 - Takes a technician with advanced skills and sophisticated test gear
- Canadian coordination is 87% complete
- Transition may take up to a year
- Taxpayer obligation to get them on the air

CAP made a coordinated decision two years ago to hold our new repeaters at the National Technology Center, in anticipation that we would shortly receive the go-ahead to begin use of narrowband frequencies. If we had known then that it would take over two years before the frequencies were ready, we might have adopted a different tactic. However, given the information we knew at the time, the decision was the best option.

We did not know then what the final frequencies would be. Delivery on the "old" frequencies would have meant that each repeater would have to be reprogrammed and its duplexers retuned "in the field." This is an advanced operation that many commercial radio shops do NOT do and many DCs were very concerned about the feasibility of doing this.

Repeater Distribution

- New repeaters will be distributed on new frequencies ASAP
- Outsourced retuning
 - Beginning as soon as contractor can start work at NTC
- Preference - shipped first to wings that can get them on the air soonest IAW updated Wing plans
- Wings on freeze will receive repeaters

We hope that some of these new repeaters can go on the air this fall, or over the winter in warm weather states. Readiness to put individual repeaters on the air will play a big role in which repeaters are shipped first.

Tactical Repeaters

- 130 tactical (portable) repeaters will also be shipped soon
 - Suitable for temp. ground or airmobile use
 - Many older aircraft have the “wrong” AUX jacks and/or antenna connectors
 - Most G1000 aircraft should have correct jacks
 - Addressing this with MX; will send info to field
 - For interoperability, power plugs & connectors on repeaters must not be changed
- Shipped on new frequencies

Below you see photos of the suitcase-sized tactical repeaters, left, and the full-sized fixed repeaters, right. The fixed repeaters are 60.5 inches tall, or just over 5 feet. They weigh around 175 lb, but crated for shipping will be over 250 lb.



Tactical Repeater
(temporary ground or air mobile use)



Fixed Repeater
5 feet 1/2 inch tall

EVERY Wing

- Where to start
 - Review and submit updated plan & budget
 - Reprogram key radios to interim channel set combining new, old and your local frequencies
- Physically change out each repeater
- After all/most repeaters changed (NLT 1 Oct 2009)
 - Reprogram all radios to remove old frequencies
 - Dispose of replaced repeaters IAW directives ASAP

Wings should start by preparing their transition plans and budgets. Wing DCs were advised of these requirements on 4 August and should have briefed their commanders. You should also begin programming radios with the interim channelization plan as soon as possible. Your DCs should access to the data files and related materials for programming this week.

Note: Some of the radios need to have their firmware upgraded, ideally **before** reprogramming the channels, in order to use the full standardized capabilities in these radios across the country. The NTC is working with E.F. Johnson now to finalize a process to facilitate firmware upgrades for the thousands of radios we have across the country.

Transition Plan

- National and NHQ staff are developing plans to start the transition ASAP
- Many elements will need Commander's policy letters and/or CAPR 100-1 changes
- Purpose of this NB briefing and the preceding Comm Managers' meeting:
 - Seek feedback and support
- DCs gave unanimous support to key staff recommendations in their meeting 6 Aug 2008

The national volunteer and headquarters staff sought your staff's inputs and support on the strategies for this transition, consistent with accomplishing the requirements of our funding agency, the Air Force, and other federal agencies that supported funding. There are still many details to work out, but we are very pleased that NONE of the DCs attending the 6 August Comm Managers' meeting (including those viewing the streaming Internet feed of the meeting and replying by email) indicated non-concurrence with the key strategies.

Interim Channelization

- Standardized interim channelization preserves *intra*-operability during transition
 - No non-concurs from Comm Managers
 - Includes the full new channel set, plus sufficient old channels for inter- and intra-wing support during transition
 - Space for your local interoperability channels
- Final permanent channel & programming plan will be presented to a future National Board or NEC for approval
- DCs have the frequencies now – FOUO

Our requirement from the Air Force and other federal client agencies is for a nationally standardized VHF-FM system. A major part of meeting this requirement is that for the first time, we will have all VHF-FM radios programmed with ALL repeater and simplex frequencies used by CAP.

In the interim, during the transition, the nationally standardized channel plan will have all of the new frequencies, sufficient old frequencies for intra-operability, while still leaving a large number of channels for your local interagency needs.

Your DCs have already received these frequencies. They are For Official Use Only (FOUO) meaning that they can only be provided to CAP members who have signed the nondisclosure agreement after completing OPSEC training. They can only be given to people outside of CAP who have a NEED TO KNOW, and who have been approved by HQ CAP-USAF.

Your DCs will receive a process for obtaining permission to give frequencies to people outside of CAP in the near future. Many of your repeater sites will require local frequency coordination before we can use the new frequencies there. This process will allow you to promptly receive permission to provide the frequencies to the trusted people doing the site studies.

Critical Transition Tasks

- Having Standardized interim channel plan in key radios during the interim is vital
 - Start soon
- Even after YOUR repeaters are switched, you may be tasked to support another wing that has not switched yet
- Transition within YOUR wing may be phased, but should be as short as possible
- In any given repeater coverage area, once you begin using new channels, use of old must absolutely end (rep. & simplex)

The interim channelization plan is a critical part of this process. You should work with your DCs to start getting them into your radios as soon as possible.

Remember that the MAIN purpose of the interim plan is to make sure our radios are ready when we cross wing boundaries to help other wings with major missions, or when such CAP forces come to our wings to help. We cannot afford the delays that would result if someone shows up with radios needing reprogramming (which has happened too often in our past).

You will BEGIN using the "new" repeater and simplex frequencies when your first fixed repeater is switched out (the only exception is that you may use the tactical repeaters on the new frequencies as soon as you receive them).

Once any given repeater has been switched, you must stop using the "old" frequencies within the coverage area of that repeater, including both "old" repeater and "old" simplex frequencies. But radios from that area may be taken to another part of your wing (or another wing) where the old frequencies are still in use. As a result, careful planning is very important.

Interim Channelization

- Originally talked in terms of “all radios”
- Now recommending a three-level priority scale
 - Must
 - Should
 - May
- Based on past Red Cross formula for local chapter services

Originally we talked in terms of ALL CAP VHF-FM radios needing to be reprogrammed. Many DCs were very concerned about the resources that it would take to do that twice, once at the beginning of the transition and one at the end. As a result, we developed a strategy based on the American Red Cross policy from several years ago that defined programs in local chapters.

Under this strategy, some radios **MUST** be programmed with the interim channelization, others **SHOULD** have the interim channelization, and there are some programming options that **MAY** be used:

Must Reprogram

- Radios in operational aircraft
- First response ground team vehicles
- Key radios used in mission operations
 - Net control stations
 - GTL handhelds
- All radios eligible for deployment:
 - To other wings for major missions
 - Must carry the Interim plan

The key radios most likely to be used in missions **MUST** be programmed with the interim channelization in the early phases of the overall transition. This includes operational aircraft and primary ground team vehicles, as well as other radios most likely to be used on actual missions, such as net control radios and Ground Team Leader handhelds.

All VHF-FM radios sent across state lines to support major missions **MUST** have the interim channels already loaded before they depart.

Should Reprogram

- Remaining radios assigned to “Mission Critical” functions should have interim load

The remaining radios defined under the Communications Table of Allowances (TA) as assigned to Mission Critical functions SHOULD be reprogrammed, in keeping with the spirit of readiness. The SHOULD category, however, provides wings some discretion.

See slide below for a refresher about the Table of Allowances.

May Categories

- Selected “Mission Essential” radios may be temporarily reassigned to serve “side-by-side” with “Mission Critical” radios in the SHOULD category
 - One on the old and one radio on the new frequencies

In this category, selected radios in the less stringent Mission Essential roles may temporarily be reassigned to serve side by side with Mission Critical radios, one on the new frequencies and one on the old. When the transition is completed, these Mission Essential radios must be returned to their permanent purpose, as defined in the TA.

Table of Allowances

- Mission Critical
 - ICs
 - GT/UDF teams
 - ICP packages (mobile or deployable)
 - Region/Wing NCS & DC
- Mission Essential
 - Other ICPs & staging bases
 - Region/Wing/Unit HQs and Comm staffs
- See full PDF for numbers for each wing
- Compliance with TA is not voluntary

The Table of Allowances is the primary document that has allowed CAP to obtain \$30 million for radio equipment in recent years. It was originally based on input from the

wings, and defines radios required by CAP to accomplish its missions for the Air Force and supporting federal agencies. Because it was originally approved by the Air Force, it truly represents a document of "requirements" that is BOTH a justification for funding and a structure for assigning the radios based on the requirement.

For every radio your wing has, your Comm property managers should be able to tell you which function in the TA the radio is assigned to. As long as the radio serves that function, it MAY be used for other secondary functions. For example, an HF radio assigned to support a unit headquarters might actually be stationed across town from the unit HQ, where a reliable member could use it for regular training nets and confidence checks.

The full Table of Allowances is in a PDF file on the NTC website in the Comm Downloads area. This document includes a process for amending the TA, if in retrospect you conclude that it does not currently address your real needs. Keep in mind that amendments to the TA have to be approved by CAP-USAF.

Antenna Questions

- Most repeater sites are currently in use
- In theory, replacement antennas and feedline not needed now
 - A few sites are brand new with no existing antennas
 - A few moved sites, not practical to move antennas
 - A few may fail on repeater installation
- NHQ is working to support the new antenna and feedline needs:
 - This must be kept to a minimum in the near-term because of funding constraints

We are lucky that MOST of the repeater sites where we will be installing new equipment are already on the air on our old frequencies. Although the antennas on many of these sites are old, they are still functioning.

Replacement antenna systems were originally in the budget for this transition; however the federal government added a requirement to purchase repeaters capable of encryption. The encryption option cost more so there wasn't money left over for replacement antenna systems.

Headquarters is seeking funds for this unfunded requirement for capital replacement of antennas and feed line, which CAP could possibly receive as early as FY09. For the moment, however, CAP has VERY limited funds for new or replacement antennas. See the more detailed discussion of budgets below.

New Repeaters - Responsibilities

- Endorsement letter asks wing/CC promise:
 - Strictly prevent interconnection of outside equipment to the repeaters
 - Not permit reprogramming of repeaters
 - Not allow physical reconfiguration of repeaters
 - Liability for damage from unauthorized technicians or modifications
 - Photos of installations (like vans)
- Fixed repeaters cost \$13,500
- Procedures for seeking variances in letter

These repeaters represent a \$5 million investment on the part of the Air Force. They come with significant new responsibilities for standardization and integration of our overall VHF-FM system, including our new repeaters.

Commanders will soon receive a letter from General Courter asking them to make several promises with respect to the new repeaters. In the first three cases above, you will be asked to promise to not allow several categories of changes to be made to the repeaters, without first receiving approval from Headquarters.

The letter will provide a process for obtaining this approval. Furthermore, in compliance with CAPR 100-1, your DCs will also soon receive a procedure for requesting permission for a local technician to do such approved modifications.

In all cases, we are committed to giving your requests for approvals a fair review and a prompt response.

Old Repeaters

- Current Quantars (about 90) to be shipped back to NTC for rehabilitation and reissue
- All others to be disposed of IAW directives
- All frequency determining elements must be removed before disposal (FOUO)
- Comm staff is coordinating with CAP/LG re: efficient disposal

There are about 90 of the new model of repeaters currently in service in CAP. In certain cases, if you have one of these repeaters, you will receive a new repeater to replace it and

you will ship the original back to the NTC, where it will be overhauled and updated. It may be returned to you or reissued to another wing. These reissued repeaters are included in the total of about 540 repeaters that will go on the air with our new frequencies.

Other, older repeaters that cannot serve on the new narrowband frequencies and modes must be disposed of, with frequency determining elements removed. They must be disposed of via the DRMO system, however we are working with CAP/LG to develop ways that you can comply with all laws and regulations, but NOT have to truck the repeaters hundreds of miles to a physical DRMO. Details will be forthcoming.

Regardless, we do not want the wings to have to store the "old" repeaters for extended periods of time.

Frequency Coordination

- Still negotiating with Canada
- They want restrictions along border
 - Seattle, Detroit, others in New England
 - Altitude limits within 75 miles of border
- NTIA definition of CAP recently changed
- NHQ gave highly successful briefing to a key government communications committee made up of all Federal Agencies
- 1st AF/AFNORTH ready to provide support
- International diplomacy
 - Our case is now much stronger

The frequency coordination process with Canada is not completed. They still want restrictions in several places along the Canadian border. Some are minor, of only a few square miles. Others are major and would sharply restrict the frequencies we can use in those areas.

The good news is that several positive things are happening:

The NTIA and the Military Communications Electronics Board recently changed their joint definition of what CAP does. Until recently, the definition presented a 30-40 year old view of CAP as ONLY a search and rescue agency. The new definition highlights our roles in homeland security and emergency preparedness. Headquarters also did a highly successful briefing recently for a key federal committee involved in the international frequency coordination process, and 1st Air Force is ready to provide its additional support.

As a result, CAP's formal reply to Canada is much stronger than our original proposal. We have high hopes that many of these restrictions can be lifted.

Altitude Issues

- Current restrictions in border zones
 - Border zones are 75 miles -- Canada/Mexico
 - No VHF-FM radio use above 3,000 ft. AGL
- Issues being worked at higher levels

One fact of life is that we will probably begin our use of the new frequencies with a restriction of no VHF-FM use above 3000 feet AGL in BOTH the Canadian and Mexican border zones (within 75 miles).

Budgets

- SOME limited funding may be arranged
- Transition/Installation work will have A or B mission status
- Possibly some in FY08, some in FY09
- Wings to submit expanded transition plan & budget
 - Must be reasonable, realistic, and justified
 - If short term need is TOO high, it may be necessary to request reallocation of funds from training and other flying budgets
- DCs have details

Headquarters is working to find funds that can be reallocated from other CAP line items to support the transition, including possibly travel, per diem and lodging. The plan is to approve the transition/repeater installation work via "A" or "B" mission status using missions loaded in WMIRS.

Your DCs have already received information on plans and budgets that Headquarters needs in order to be able to identify funds. Candidly, we have little idea today of how much the wings feel they need. This information is critical for planning and we ask your assistance in identifying a budget that is reasonable, realistic, and justified.

Because this money is being reallocated from other line items, as opposed to "new" Air Force funding, it is vital that the requests be the bare bones needed. Again, let me stress your budgets must be submitted to NHQ ASAP and they must be reasonable, realistic and very well justified. The more money you request, the better the justification will need to be.

Scope

- This may be the biggest single project CAP has ever undertaken!
- Structured to minimize cost and effort for wings, but there will still be cost and effort
- Every repeater replaced, many radios reprogrammed twice
- Planning is vital – alternative is problems in operational missions during transition
- Gen. Courter asks for our professionalism and support

As the above slide says, CAP has NEVER undertaken a project as big as this narrowband transition. It will require the coordinated work of hundreds if not thousands of CAP volunteers, in every wing.

We are doing our best to structure plans and policies to minimize cost and effort, but there will certainly be costs, hard work, frustration, and unexpected problems that we will all have to deal with.

I told the DCs in our meeting 6 August that there are many things about this transition that we probably wish we could decide locally or do differently. However, our leadership and the "customer" agencies providing the funding have significant requirements for standardization and coordination with which we must comply.

As professionals, we will do our best to meet those requirements while conducting the transition in ways that cause minimum disruption to our vital operational missions. CAP will have much more mission capability once we complete the transition so it will all be worth it in the end. We request your full support during this mission critical project. Thank you.

Submitted by Mike Marek, LtCol, CAP
Communications Team Leader

Questions can be addressed to me at michael@themareks.com.