NTS White Paper NTS-004
National Traffic System (NTS)
Response to Emergency Communication Advisory Committee Report

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1 Scope

1.1 General

The Emergency Communication Advisory Committee (ECAC) studied the operation of the Amateur Radio Emergency Service (ARES) and National Traffic System (NTS). Their efforts culminated in a very detailed analysis paper with suggestions on how to improve both the ARES and the NTS going forward. This paper was presented to the ARRL Board of Directors, who referred it to the ARRL Programs and Services Committee (P&SC), with thanks to the ECAC members and "sunsetting" the ECAC at that time.

Officials of the National Traffic System analyzed the report and found a basic misunderstanding of NTS operations, its organization and structure, and its operational status. A reply was made, including alternative suggestions for improvement of the ARES / NTS interface. Regrettably, given the short time to respond, our draft lacked detailed explanations even as our frustration came through loud and clear. This lead to further misunderstanding that we address here, with the intent of responding rather than reacting.

1.2 Purpose

The purpose of this paper is four-fold:

1. Address the major misunderstandings about NTS that have arisen since both papers were published,
2. Provide up-to-date information about the operation and organization of the NTS and Digital NTS (NTSD) as well as the Radio-email communications layer (Winlink 2000) and how it may be used by both the ARES and NTS,
3. Present a more detailed explanation and rationale of the NTS counter proposal where it differs from the ECAC proposal,
4. Clarify the NTS position regarding all portions of the ECAC report where NTS is addressed.

2 Applicable Documents

ECAC	ARRL Emergency Communications Advisory Committee Final Recommendations - November 19, 2013 http://www.arrl-mdc.net/ECAC/Documents.html
ARRL	Public Service Communications Manual (PSCM) http://www.arrl.org/public-service-communications-manual
ARRL	NTS Methods and Practices Guide (MPG) (Appendix B of the PSCM) http://www.arrl.org/table-of-contents-nts-methods-and-practices-guidelines
NTS Staff	NTS Digital Operations white paper http://dl.dropboxusercontent.com/u/73013707/NTS%20Digital%20Operations.pdf
NTS Central Area Staff, STMs, SMs	NTS Status white paper http://dl.dropboxusercontent.com/u/73013707/NTS%20Status.pdf
NTS Winlink Committee	Exhibit A of original NTS response to the ECAC report http://dl.dropboxusercontent.com/u/73013707/Exhibit_A.pdf

3 NTS Position Clarification

From the replies to the NTS proposal, it became apparent that there are some misunderstandings of the intent. This section will address some of those issues known to be a problem. Sections 5 and 6 will provide more explanation.

1. NTS consists only of the region, area, Transcontinental Corps, and NTS Digital hubs.

NTS is a system of cooperating, hierarchical networks essentially modeled on the idea of a federation. It is a "bottom up" governance and participation system. Section and local nets are the actual "members" while the remainder of the System is designed to coordinate and interface member nets. Taken in the aggregate, they all form and function as an integrated national traffic system. (See Section 4.)

2. NTS wants to make ARES nets part of NTS.

NTS does not desire to absorb or merge with ARES nor is it practical given organizational and procedural incompatibilities between them (e.g., ARES weekly or monthly net schedules vs NTS daily operations). NTS desires only increased cooperation and interoperability.

The Public Service Communications Manual (PSCM) assigns ARES the responsibility of establishing communications for served agencies and the public, while the NTS is assigned to provide messaging services for ARES when deployed.

NTS believes the newly developed "Radio-email" Layer is the best means available to facilitate ARES and NTS cooperation. NTS experience demonstrates the practical reality of providing nearly real-time messaging services to and from anywhere in the country, within an hour's time, "24/7", inside and beyond local ARES jurisdictions.

Radio-email has also provided a ready means for ARES and NTS to exchange traffic. The NTSD already provides a national Radio-email peer-to-peer, "radio-all-the-way" Radio-email service as a back up to the Winlink 2000 Radio-email network. It makes great sense to suggest that ARES include Radio-email capability at their deployed points of contact, such that all jurisdictions and served agencies operate on a common network including the NTS. This concept meets the network requirement for all ARRL EMCOMM providers, as specified in our many MOUs, and generally requires nothing more than existing VHF packet radio stations.

We believe ARES would benefit from using NTS networks in their drills and exercises. Close cooperation is necessary between the local EC, SEC, STM, and all involved nets to be successful, as demonstrated by several Sections today.

For a number of years, NTS has conducted a nationwide Radio-email EMCOMM exercise as part of the annual SET. It is a coordinated interactive drill for modern national messaging, managed by the NTS Winlink Committee. W1AW is always invited to participate as is every ARES jusisdiction in the country.

3. NTS wants the ARES management structure to be the same as NTS.

We believe NTS and ARES both would benefit from improved cooperation and visibility at all levels of operation. NTS does not desire changes to the ARES management structure although we acknowledge ECAC's identified deficiency in higher-level ARES management (See Section 5). NTS agrees ARES and NTS have different tasking, which of necessity requires different management structures to address.

We propose that Section ARES leadership elect representatives to Region and Area levels, or ARRL Divisions where appropriate, with an additional liaison from ARRL HQ, to establish MOUs, help coordinate exercises, deployments and disaster communications. This superstructure, similar in function to that of the NTS, would provide the opportunity to establish mutually agreeable methods and practices, terms of reference documentation, official pathways for coordination and planning, and closer ties between Sections, between ARES and NTS, and with the HQ emergency support staff.

A codified structure will also provide guidance to ARES operators and facilitate national coordination in the same way the NTS PSCM and Terms of Reference guide NTS personnel. In addition to a common frame of reference "at the top", it also connects at the very base of the "network" at each and every station in ARES and NTS, operating on the common Radio-email network used by NTSD and WL2K.

4. Radio-email using Winlink 2000 (WL2K) must be used in order to interface with NTS

NTS agrees with the ECAC observation that ARES needs a standard technical platform to provide interoperable communication and believes that Winlink 2000 is the obivous solution. We further note WL2K can also provide linkage to other ARES units as well as the NTS when infrastructure failure otherwise compromises direct communication.

It is noteworthy that many ARES groups have installed and maintain VHF packet-based RMS gateways to WL2K. This is fairly widespread in metropolitan areas of the country, and NTS members already use these packet gateways, with the permission of the local ARES leadership, for formal Radiogram transfers among NTS liaison stations.

It is also worth mentioning that NTS devised a simple method for ARES stations to post Radiogram message traffic directly to NTSD hub stations for national distribution, as well as providing a means for the sheltered public to originate Radio-email from those same points of contact via WL2K. This is done directly, without encumbering busy emergency nets with manually handled welfare traffic. Radio-email between served agencies likewise is removed from manual net loading. This can provide a dramatic reduction in deployed manpower and net loading which, as any EC can tell you, is a primary and critical concern.

5. ARES has only a local emergency communications response/focus with no reason or need to communicate with others outside the section.

This fallacious view has likely hampered communication for served agencies for decades and is a major risk factor to the continued presence of ARES in emergency management planning. If a deployed ARES station cannot reach and be reached by other deployed ARES stations anywhere in the country, it is not “on the network”.

“Being on the network” is even more critically important when one considers the NIMS/ICS command structure in which disaster boundaries are established as needed, regardless of geopolitical limits, and communication requirements are extended accordingly. ARES and the ARRL should carefully reflect on the implications of a “local only” communications policy if ARES is to continue being a useful and attactive provider to served agencies. Radio-email provides a communications reach across county and state lines with the same ease and efficiency as it does within their local jurisdictions.

Radio-email may be used everywhere by ARES, NTS, and NTSD. The NTS and NTSD generally specialize in handling Radiogram traffic (messaging without a network address), hence an easily used bridge between ARES and NTS/NTSD via Radio-email and direct connections provides digital access by ARES to NTS and vice versa. In fact this is a classic reason for the continued existence and maintenance of the National Traffic System for manual handling and delivery of such traffic. In addition, as mentioned above, the NTSD also provides for national backup Radio-email transport, radio-all-the-way, for carrying Radio-email messages as well as Radiogram traffic..

6. Section Traffic Managers should be brought under the NTS Chairs.

Section Traffic Managers should not be brought “under” the NTS Chairs. While the STMs are an important part of NTS, and they serve as assistants to the Section Manager, they would be more helpful as a formal part of the NTS staff, providing input to the NTS national staff and receiving shared information to use in their Sections. The Pacific Area already includes STMs as associate staff members, the Central Area is in the process of formally including them, and several STMs are already members of the Eastern Area Staff.

4 NTS, NTSD, and Radio-email Use by the ARES and NTS

4.1 Current Status of the NTS and NTSD

The diagram shown in Figure 1 illustrates the function of NTS in the Central Area for the evening Cycle 4. Cycle 2 is similar. As can be seen, the majority of the NTS activity occurs below the region level. All but two sections are represented via liaison stations sent to the region net. Special routing of Arkansas traffic is performed from region to the state using a wide-area HF net. Not all local nets are depicted.

The region and area nets meet seven days a week, as do the TCC representatives to the area net. Most section nets meet at least six days a week; many meet seven days with two sessions as provided for by the PSCM.

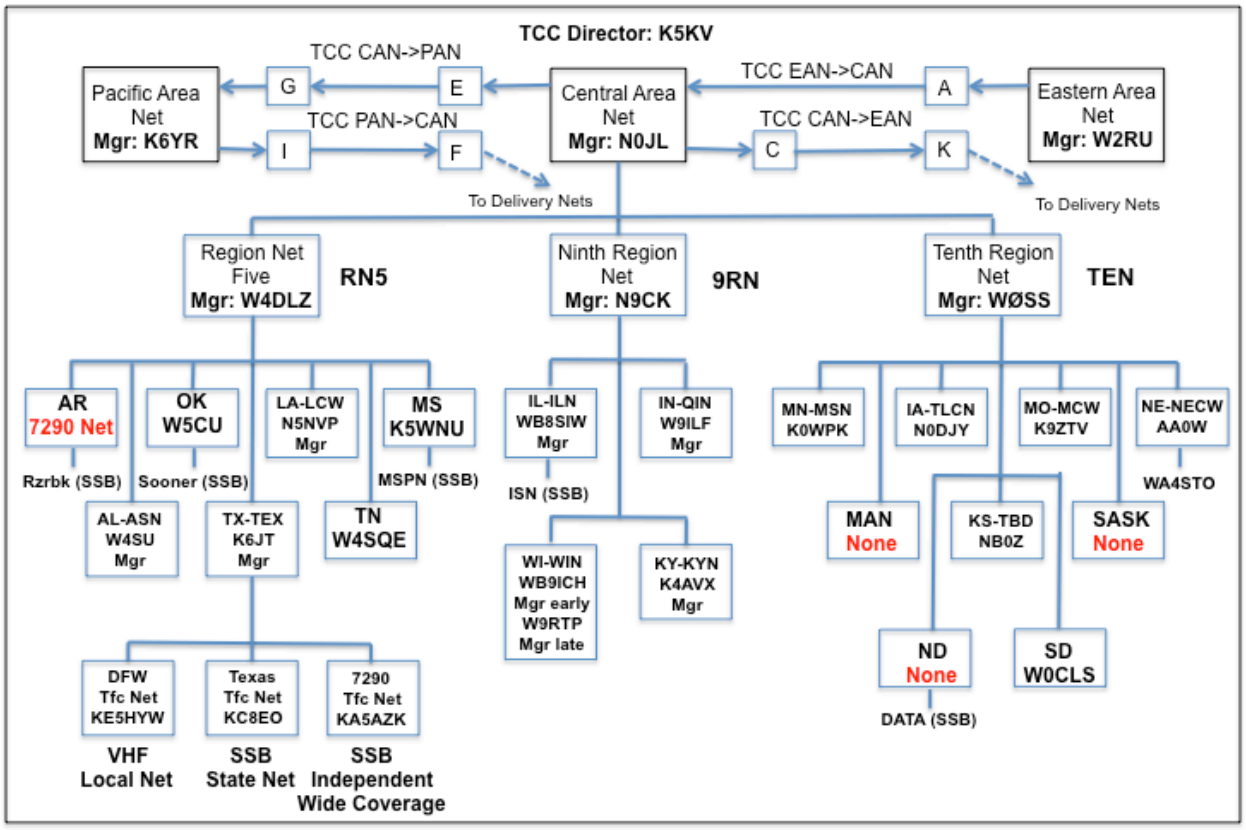

Figure 1 Cycle 4 Networks and Connections (Central Area)

Similarly, the Eastern and Pacific Areas have TCC, area, and region nets meeting seven days a week with section nets also connecting with regional nets for movement of traffic. All nets can be activated to run additional cycles, both day and night -- or even continuously -- as done during past disasters, notably the 7290 Traffic Net, which has supported communications during hurricane-related emergencies. All NTS operators receive “On the Job Training” during normal NTS operations, including the core skills of traffic handling, net control, and whole-net discipline, preparing them to operate efficiently when true need arises. No other form of amateur radio operation provides this critical training.

NTS Digital is a parallel system that essentially operates at the TCC, Area, and Region levels. Digital Relay Stations (DRS) appointed in each ARRL Section, move traffic to and from Section and local nets daily, often multiple times a day to NTS daytime and nighttime nets. Some digital traffic also is routed via the manual region nets when it is expedient to do so.

Figure 2 illustrates the NTSD hierarchy in the Central area and its connections to Pacific and Eastern areas, which have a similar structure of Area and Regional MBO/Hubs and section-level DRS liaisons.

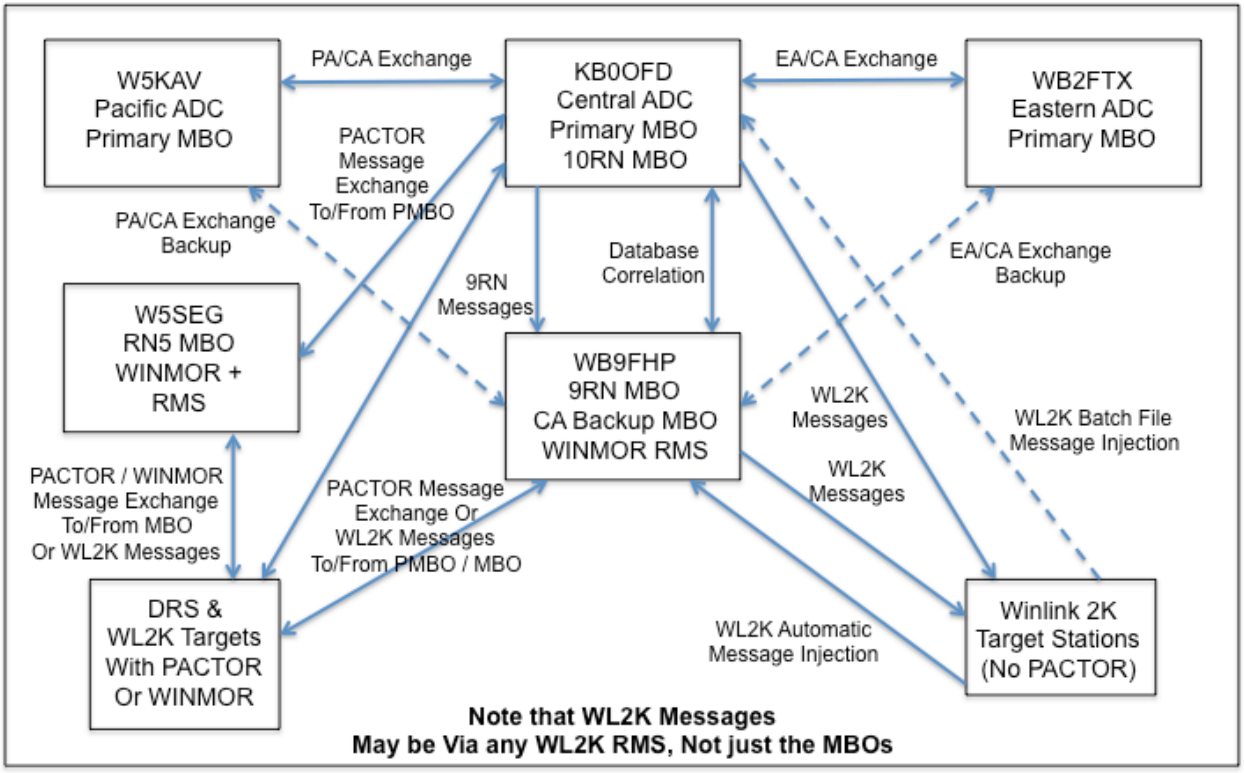

Figure 2 NTS Digital Hierarchy (Central Area)

Noteworthy in this diagram is the use of Winlink 2K to pass Radiogram traffic to NTS "Target Stations". Target Stations are located in every section of the country, and are also appointed DRS by the appropriate Area Digital Coordinator (ADC). Routing to sections is done automatically via ZIP code by NTSD software. Area MBOs communicate with each other on a regular schedule when traffic is available to send. To conserve bandwidth and minimize QRM, connections are not attempted in the absence of traffic.

Similarly, the Region MBOs connect with the Area Hub on a regular basis, again when traffic is waiting to be sent. The Area Hubs will normally contact the Region MBOs with incoming traffic and any that is then waiting at the region Hub will be sent during that connection. All MBOs use high speed Pactor 3 modems for the most efficient and least time-on-air data transfer. Some DRS also have Pactor 3, but Pactor 1 is most common. Also noteworthy is that the Region 5 MBO, W5SEG, is operating with the BPQ32 software that also supports the WINMOR sound card mode. DRS in Region 5 may connect with either Pactor or WINMOR to receive traffic. For those sections without Pactor or WINMOR capability, the MBOs automatically route Radiograms using Winlink.

The normal period of time between connections is one hour for all MBOs holding traffic for transfer. However, this is a settable parameter and can be shortened should the need arise.

To illustrate how NTS is a *system*, multi-mode operators routinely carry traffic among and between all three NTS branches. This is particularly true of DRS that also send traffic between themselves. For example, if traffic is received for a given Section on the late nets, after the normal section nets have closed, it is sent using WL2K to a DRS that participates in the daytime cycle. The same method is used to move unhandled daytime session traffic to a DRS with nighttime schedules.

Liaison stations to the Region nets, particularly the CW nighttime last cycle, take traffic to daytime SSB Region nets for relay. Alternatively, the traffic can be put into NTSD if it is destined outside the area and received after the meeting of the area net. In many cases this does away with the time-zone penalty when sending traffic eastward that would normally wait for the next day's cycle to move.

4.2 Radio-email and What it Means to the ARES, NTS, and their Joint Efforts

While Section 4.1 dealt with movement of formal Radiogram traffic, the WL2K system is primarily designed to support what we call Radio-email. Any message format and any attachment file format may be injected into the WL2K system at any node. Multiple destinations are supported and standard Internet email addresses may be used. This is nearly identical to sending and receiving Internet-based email, except it uses HF and VHF radio for interfacing. Although normal WL2K operation uses Common Message Servers (CMS) distributed around the world and connected by the Internet, the Winlink Development Committee has created software that enables the user-connection nodes, termed Radio Mail Server (RMS) to intercommunicate via radio alone, should there be a wide area Internet failure. This system upgrade was requested by the three MARS commands and is being rolled out across the country at the present time.

Digital NTS MBO/hub stations -- which have never been Internet dependent – are also being upgraded with G8BPQ's acclaimed BPQ32 software suite for Windows. BPQ32 is a robust packet node environment capable of handling conventional "text" messages, network chat, and importantly for NTS and ARES, Radio-email including binary file attachments. When all hubs are upgraded, NTSD will provide a valuable and unique capability for ARES. Any format message may be used, including the ubiquitous ICS-213 interoffice memo form. Detailed information about how to use both NTS and WL2K is provided in the NTS Digital Operations white paper (See Section 2).

The NTS Parser program facilitates injection of Radiogram messages into NTSD by ARES operators who may not be familiar with the Radiogram format. The NTS Parser also builds batch files of Radiogram messages. These batch files are then sent to any NTSD MBO stations using WL2K. A companion version of the Parser, installed at all NTSD MBOs, takes those files containing Radiograms directly into its database for automatic routing.

The Outpost Packet Message Manager software provides input templates that generate Radiogram and ICS forms. Outpost Packet Message Manager is very helpful to relatively untrained ARES operators who are often deployed into challenging environments.

The recently updated NTS Methods and Practices Guide (MPG), in particular Chapter 6, describes the various Radio-email messages and their format specifications, available on the ARRL website.

The description in this paper is intended only to orient readers unfamiliar with the various digital systems. For those SEC and SM officials who are not currently famliar with digital operations, note that the software used at VHF Packet and HF Pactor WL2K RMS stations, many of which are currently implemented by ARES groups, is described and available via links on the Winlink website, http://www.winlink.org . VHF Packet stations may be configured with the RMS Relay software in addition to the standard RMS interface for user connections. This software allows the particular node to act as a stand-alone message bulletin board for ARES local interchange, even when the Internet has failed. When combined with Tri-Mode HF software and the addition of a Pactor modem, that VHF node is also capable of reaching other RMS nodes in places where the Internet is still operational for forwarding of Internet-address destined messages for served agencies.

Digital NTS operators have the experience and expertise to assist ARES in setting up and using the tools discussed and are quite willing to do so when called upon.

5 NTS Proposal and Clarification

The original NTS response to the ECAC report contained a conceptual proposal, diagrammed in Figure 3, that was developed by the NTS Winlink committee in cooperation with the NTS chairs and staff. The Radio-email communication layer is shown as the means for intercommunication between ARES and NTS as well as between ARES functions. Our proposal takes into account shortcomings documented by the ECAC, particularly with respect to higher-level ARES coordination.

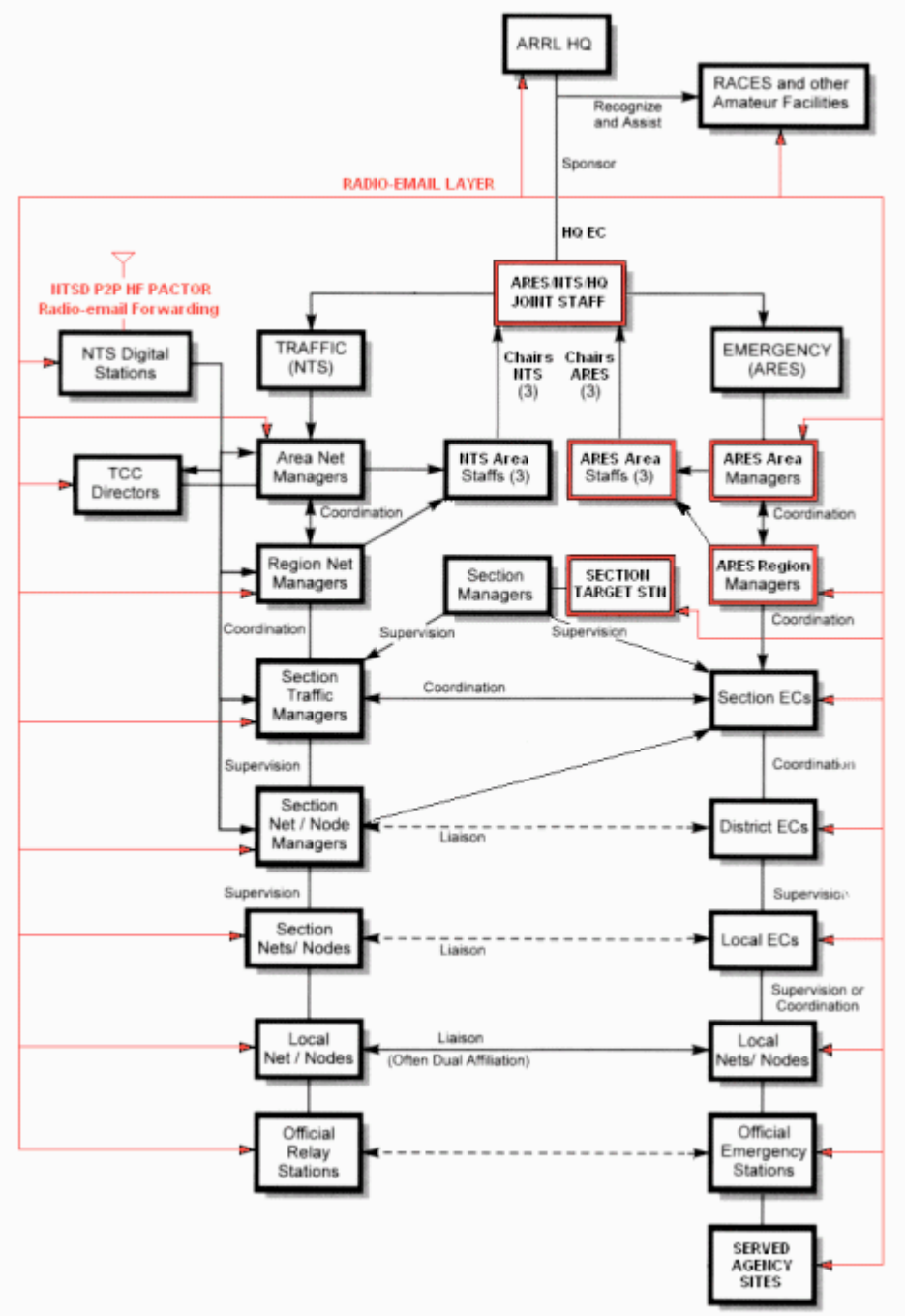

Figure 3 NTS – NTSD – ARES Structural Concept

NTS agrees with many of the goals established by the proposed JECC (See Section 6). But without formal power to direct and implement changes, this seems a questionable approach.

This NTS proposal shows an alternative to the proposed JECC. At first glance, it would appear to advocate creation of a management structure that mirrors that of the current NTS. Some changes to the current NTS structure are also part of this, but the main goal is to provide higher-level oversight of ARES operations, by ARES-elected officials, above the Section level, while at the same time advancing coordination points with NTS and even with ARES colleagues.

The diagram emphasizes coordination paths rather than management chains. It also includes oversight by Section Managers. Data linkages are also proposed based on our experience in the field. These are supplemented by the Target Station concept, as described in the NTS MPG, making full use of the Radio-email communications layer, also depicted.

Also proposed is the establishment of higher-level ARES Region and Area managers, shown as red blocks in Figure 3. The actual geographic territories would not necessarily align with NTS Region and Area territories, but would be chosen according to the needs of ARES itself at the local level where existing agreements and traditions are already in place. (We note there is no particular reason why individual SECs, DECs, or Assistant Directors could not fill these positions, and in fact that may be a viable way to initially set up the higher regional / area structure.) Multiple Divisions would generally comprise the Area level through coordination of each Division's directorate. Obviously, this is only the barest framework of a proposal and many other organizational possibilities exist, best left to a future study committee. comprised of experts in ARES operations.

Selection of Chairs for the highest level ARES coordinating group would provide a point of contact to work with both the NTS Area chairs and ARRL HQ as a joint staff.

Information on the use of Radio-email, Target Stations, and other operational and organizational concepts available in the original NTS Winlink propsal, referenced as Exhibit A, is accessible via the link shown in Section 2. and should be viewed in light of the revised Chapter 6 of the NTS MPG.

5.1 Rationale and Benefits

The conceptual proposal for integration of ARES and NTS creates a parallel ARES organizational structure above Section level at Region (or Division), Area (multiple Divisions or MOU entitles), and national levels, which can coordinate operations, exercises, and the establishment of MOUs, etc. This structure also would help coordinate consistent national messaging layer access within and between Sections and coordination of all such operation across the aforementioned boundaries.

The proposal establishes requirements, applied to both ARES and NTS Section operations, with respect to providing the root networking connections and mutual support. This essentially codifies the integration and ensures interoperability above Section level.

As pointed out by the ECAC report, no national oversight for ARES exists, other than the ARRL HQ staff called into action to address and coordinate specific responses to disaster or emergency situations. While ARRL participation at this level is beneficial, it is believed that a much better coordinated ARES response to a widespread disaster would be served by establishing the oversight and cooperation as an ongoing effort.

The Chairs of the proposed ARES staff would establish a formal "terms of reference" document, analogous to those used by NTS, and would meet regularly and consult jointly with the staff chairs of the NTS. This is propsed in order to coordinate and exercise the integrated services. The joint ARES/NTS/NTSD chairs would meet and consult with HQ emergency planning leadership.

This organizational nexus would coordinate joint EMCOMM and ARESMAT operations and exercises, along with the creation and application of ARRL MOUs with served-agencies. The joint chairs and their staff would also be responsible for training of leadership and providing training support for Section operations, and, upwards, supporting the creation of appropriate training and educational literature for HQ publication. The joint chairs would also manage the Target Station database for maintaining current records of clients on the Radio-email system and/or other networks. Such an ARES structure allows preserving the integrity of all the ARES groups as traditional organizations while integrating their operational responsibilities in both Radiogram and Radio-email services in cooperation with the NTS.

The proposal includes establishment of a Target Station database, accessible via Radio-email by stations across the country, as established by ARESCOM in 2004, easily retrieved and modified prior to and during emergencies.

In other words, all clients wishing to direct network traffic to specific Sections and NTS/NTSD stations are provided the client addresses for the “To:” line of Radio-email. Each Section should establish at least one Section Primary Target station, which would check Radio-email daily and be able to communicate with Section staff independent of the ground infrastructure. NTS Target Stations already exist and would be part of the database provided for joint NTS / ARES operations.

The Radio-email layer provides the means for national alerting, exercises, and operations messaging for ARES, NTS, NTSD, and ARESMAT, and during emergencies permits contact with clients as often as necessary. ARES shelter and served-agency “root” station operators may exchange Radio-email with Target clients anywhere, including Radio-email exchanged with addressees on the public Internet, virtually real-time, via radio, and without the need for extensive manning for intermediate relaying stations or nets.

The proposal provides the concept of an organizational structure to help coordinate joint ARES and NTS operations across any boundaries as is consistent with NIMS and NRP strategies, and helps ensure efficient execution of Section Emergency MOUs and those with other agencies involved in an emergency response.

6 ECAC Report and NTS Position

6.1 ECAC Report Comments – Executive Summary

The ECAC Final Report was well-written and reflected the many hours of discussion and preparation that went into it. As stated in the report, the majority of the ECAC members were familiar with the ARES but lacked working knowledge of the NTS and its operation. There are many valuable observations and suggestions in the paper, and the NTS Area Chairs agree with a large number of them as they apply to the ARES.

Unfortunately, due to lack of first-hand experience, and apparently input from section leaders where NTS is not well represented or even viewed with some measure of hostility and disdain, some observations and conclusions are inconsistent with the true operation of the majority of the system.

The following paragraphs, where NTS is addressed in the ECAC Final Report, are followed by what are hoped will be clarifications of actual NTS function where it differs from the report as well as concurrence where we agree.

6.1.1 Organizational Structure and Objectives:

Page 1, Executive Summary:

• Both programs' organizational structures are generally appropriate to their needs

We agree that the NTS organizational structure is appropriate to its needs. ARES structure appears to be good at the section and county level. Higher level interfaces, which are admittedly only needed in specific disaster scenarios, need improvement.

• NTS' organization is top-down and based on its continent-wide network structure

This simply is not true and likely due to over emphasis on published system diagrams, designed to illustrate our transport mechanisms, not organizational management. NTS is comprised of local and wide-area nets of various sponsorship and dedicated traffic nets at the Section, Region, Area, and Transcontinental Corps levels. The Digital NTS equivalents are Area and Regional "hubs" and officially appointed Digital Relay Stations (DRS), analogous to section and local net members. The three NTS components, daytime, nighttime, and digital, interoperate to form a cohesive, efficient and robust system. (See Section 4.1.)

The three NTS Area Staffs are comprised of operators who have had many years of experience with NTS, starting with local or Section level traffic nets and working their way up as they gain proficiency. For example, the combined NTS experience of the three Area chairs is well over one-hundred years. The chairs are the focal point of problem resolution, recruiting, education, and policy. They are responsible for documenting best practices and approving updates to the Public Service Communication Manual (PSCM) and its Methods and Practices Guide (MPG) for use of all levels of NTS. They are assisted by other experienced traffic handlers who have accepted positions of management responsibility for the Transcontinental Corps, Area nets, and Region nets, as well as the Area Digital Coordinators and Regional Digital Hubs. In many Sections, STMs and NTS affiliated net managers participate in the review and decision-making process. In sum, NTS is an experience-based hierarchy of managers-participants as well as ordinary members.

•NTS' structure does a good job of managing its day to day needs, but it needs a more formal mechanism for long-term strategic planning and oversight

The NTS Ares Staff oversees the upper levels of NTS, i.e., Region and above. The ARRL details one of its paid employees to materially assists with this function. (At the present, this role is performed by Steve Ewald, WV1X.) All NTS activities are reported "up the ladder" on a monthly basis. This includes not only net manager and digital coordinator reports but also STM reports of section activity; summaries of Section and local net operations; ORS Station Activity Reports; and Public Service Honor Roll totals. Potential and actual problems also are reported and resolution assistance provided where possible and necessary.

In the past, this involved publication to various Field Organization reflectors where input and advice may be obtained and productively criticized.

NTS also sponsors a weekly Echolink conference of NTS chairs, Area Digital Coordinators, Winlink (Radio-email) Advisory personnel, and other interested parties. Many agenda items are considered including strategic planning issues. In conjunction with ARRL staff, this group is currently working on the publication of the updated MPG at arrl.org. (UPDATE: the MPG was officially published on 4 AUG 14).

Other efforts underway include

- revision of the NTS portions of the PSCM.
- Upgrades of NTS Digital software from the legacy Winlink Classic to the modern BPQ32.
- Interfaces with Winlink 2000 groups, software development to aid ARES operators and
- the ECAC report and the content of this paper.

This serves as our formal mechanism for strategic planning and oversight and has been in operation for some time. We regret ECAC did not recognize this status during their analysis process.

• *NTS provides medium and long haul message handling for both agencies and the public*

NTS agrees completely with this statement, which we see as our founding purpose. NTS is deeply involved in the training of local and section-level operators in the origination and delivery of third party messages, specifically in support of disaster communication.

6.1.2 Training, Certification, and Accreditation:

Page 2

• *ARES and NTS both require additional and regularly updated official training materials.*

NTS agrees and notes we are updating certain of our material right now.

• *NTS in particular lacks official training materials, relying almost entirely on unvetted member produced material and on the job, trial and error learning.*

The majority of operator training is performed at the local and Section levels. These efforts include:

- on-the-air training sessions,
- monthly (or at least regular) newsletters,
- presentations by experienced personnel at major Amateur Radio Conventions, and
- formal documents produced and distributed as widely as possible.

A common problem observed with NTS, and likely ARES too, is that many potential partcipants are simply strapped for time and do not have the interest to spend that time studying detailed process documentation such as the PSCM and MPG. These are, of course, used in the production of the training materials.

NTS has found it more fruitful to provide shortened training sessions where the basics of message formatting and network protocols are taught. Then we move to get those trainees active in practical use of that knowledge on the air, building their expertise over time. Newsletters such as *QNI – the NTS Newsletter* and Section net newsletters such as *The TEXAN* provide additional tutorials.

But that is only the basic knowledge needed to begin participation in NTS. Learning advanced skills, such as net control duty, takes a considerable amount of time. While there are some tutorials on the subject, and net managers work one-on-one with potential NCS operators, it is not something that can be taught by a book, although written guidelines are available in the PSCM. Rather, it is learned by observing others and trying it live on the air. Similarly, acting as a liaison station requires advanced training. In short, advanced NTS skills are best learned on the job.

Digital NTS operation requires a completely unique set of skills. Aside from learning to format the messages, which is common to all NTS, there are software programs to configure and master, computer and modem connections, etc. This is relatively new territory, so of necessity most training material is

produced by the Area Staffs and Area Digital Coordinators. An example is the NTS Digital Operations white paper, which explains digital NTS operations, and how to get started. (See Section 2.)

• *Much member produced ARES and NTS material available is inconsistent with accepted modern best practices, and suffers from poor production quality.*

Given the bottum-up nature of NTS, it is only natural that our documents and other materials vary in style and quality. While most is produced to professional standards, it is true some is not. Our material comes in many formats, ranging from simple PowerPoint decks to PDF documents and even YouTube videos. While we are pleased with our members' contributions, certainly we would welcome advice and sponsorship from ARRL headquarters.

6.1.3 ARES-NTS Integration:

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1. *NTS and ARES have allied missions, but have become somewhat disconnected from each other in recent years. In the early days, ARES nets handled nearly all local NTS traffic, but over time, dedicated NTS-affiliated nets were created as ARES' mission evolved. Since the introduction of email, these independent NTS affiliated nets have begun to fade away in many Sections, leaving large gaps in coverage.*

Regrettably, NTS agrees ARES and NTS have become disconnected in recent years. While in some sections ARES nets handled local NTS traffic, that was not always the case. By their nature, ARES nets do not meet frequently enough to meet NTS guidelines for traffic delivery, which traditionally has been the domain of NTS-affiliated Section or state nets that meet daily. It should be noted that in past years, significant crossover existed between ARES and NTS personnel who were effectively cross-trained and mutually supportive at the Section level. Section nets were "section nets" and served as a meeting place or "watering hole" for public spirited amateurs. There is nothing quite like it at present and NTS believes this is to the detriment of the larger amateur radio community.

In the days when ARES was AREC, before the daytime SSB NTS nets were established, the annual Simulated Emergency Test (SET) was a joint function of ARES and NTS in the majority of League Sections, with exercises designed to test interoperability between both components of the Field Organization. To this end, NTS advocates a revival of the "Joint SET" concept as beneficial to the larger amateur service and our communities. We note that a Joint SET would require as well as promote closer cooperation in the Field Organization at all levels.

Regarding Internet email as a cause of decline in Radiogram traffic: we should add for completeness that inexpensive, nationwide cellphone and Voice-over-IP unlimited calling plans have certainly reduced public interest in "telegrams" – Western Union sent its last telegram on January 27, 2006. Radiogram origination opportunities were once common. Newly enlisted servicemen could send a message home from boot camp, such as the Marine Corps' Recruit Depots in San Diego and Parris Island. Amateur radio exhibits offering free Radiograms were a fixture at state and county fairs.

It is true: the general public perceives little need of Radiograms.

But it is equally true the public sees little need for ARES. Common to both services is their low-profile status as a backup to government emergency and disaster operations. This is a simple fact of human nature and, as public service minded citizens, we are motivated by a spirit of preparedness through our chosen avocation that is quite indifferent to public relations, to our own disservice. Indeed, effective public relations for the ARRL Field Organization is an important concern fit for its own study effort.

To fill the gap left by the loss of publically originated Radiograms, and to maintain the NTS in a state of practice and readiness, several NTS operators have taken it upon themselves to originate Radiograms by mining the F.C.C. database, producing the ubiquitous "Welcome to Amateur Radio" bulk messages. Variations include license renewal reminders, license class upgrade congrautulations, and "welcome to the neighborhood" texts for address changes. NTS believes these messages, while admittedly controversial, represent a potential recruiting bonanza for local clubs and ARES units that would take up delivery within their localities. NTS also encourages a return to Radiograms for ARRL Field Organization communication, in which Section leaders, for whom email is the defacto standard, would be encouraged

to use the NTS as an additional channel to their people. The advantages of such a policy would include on-going training in traffic handling and delivery; beneficial promotion of the NTS and ARES to a broader audience; a public relations boon in which Radiograms will serve a public and useful purpose in a context that makes sense: amateur radio communicators using their own networks. None the less, it is true that some section nets have discontinued operation or merged with other sections due to lack of "business". Those of us who have lived through disaster operations know NTS remains an important and meaningful emergency resource and will be for the foreseeable future, thanks in large measure to our NTSD effort and its inherent interoperability with the Winlink 2000 system.

2. *Local efforts have been made to reengage the two programs as a way to bolster the local reach of NTS with mixed success, and no national mechanism exists to promote it. We were able to identify many things that both programs could do better given a closer relationship. These include improved operational coordination, finding better ways to interface at the Section level, coordinated exercises, cross-promotion, improving methods and modes, and most important, building a viable, robust, and an interoperable Digital Common Messaging Layer that can be directly and reliably accessed by anyone at the Section level.*

NTS is in agreement with all of these goals, and seeks to work closer with ARES to implement them. We disagree only with the "advisory only" nature of the JECC, which we feel inadequate to the job given the realities of the bottom-up nature of the Field Organization. Stronger means will be required, as in the example of the defunct ARPSC from the 1960s and 1970s. (See Section 5.)

NTS believes our NTSD infrastructure provides the "interoperable Digital Common Messaging Layer" with the Winlink 2000 system. WL2K is widely used by NTS personnel and has significant support from ARES, particularly in metropolitan areas where RMS Packet gateways have been established. In other words, NTSD provides a clear linkage with Winlink 2000, potentially serving as a fallback system should there be a major outage. (See the NTS Digital Operations white paper listed in section 2).

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3. *NTS has internal and external communication problems that inhibit its growth, lacks a practical, consistent interface with the Section Level, and has no formal training program. NTS' legacy voice and CW nets are likely to see a gradual reduction in the number of participants over time, and the system is too slow for modern disaster response needs. On the other hand, NTS is making great strides in building a rapid, interoperable, and robust RF-only digital communications network. NTSD lacks a viable Section-level component at the moment, a gap that needs serious attention.*

While there is some truth to this statement, NTS believes it is unfair and wishes to correct the misstatements .

1. Internal communications: : As discussed earlier (See Section 6.1.1) area staffs have a longstanding communication policy for internal NTS business. Communication between local and section nets to higher NTS levels is quite good in many areas but can stand improvement elsewhere, especially in those Sections with a weak or missing STM. NTS believes integrating the STM with the respective Area Staff will foster better communication up and down the NTS structure, especially at the Section level. We note the Central Area and Pacific Areas are already implementing this concept. It will also be codified in a future TOR update in those Areas.
2. NTS growth: Growth is dependent on motivating and inspiring operators to become active in NTS, especially at the local level. We already discussed several cultural barriers to recruitment and acknowledge NTS and ARES must be "sold" to a wider potential market. The ECAC report suggests a regular editorial presence in QST; naturally we agree and wish the League would support its own NTS with an on-going national awareness campaign.
3. Training programs: Formal NTS training is available in many areas and is provided both on-the-air and in person at major conventions. Such efforts are often "preaching to the choir" as participants are usually active members of the NTS.
4. Gradual reduction of legacy nets: This is true even as we lament the loss of these operators. However, net operations inherently promote a sense of camaraderie. NTS believes exposing and

inspiring new operators to join existing voice nets will benefit the Field Orgnization as a whole even as they develop core traffic handing skills.

5. NTS is too slow: NTS notes the expectations of served agencies have made delays of more than a few hours unacceptable. Digital NTS, coupled with Winlink 2000, alleviates network latency issues. Manual nets may increase operational tempo and capacity as long as trained personnel are available should the need arise. (See Section on "recruitment") The routine schedule of NTS nets are designed for efficient message flow and practical reasons of operator availability. However, they can and do activate more frequently, even to a continuous cycle, if the circumstances demand it. Existing net cycles generally cope well with Health & Welfare messages, while NTSD is available for high-load situations.

6. NTSD Section level component: The Digital Relay Stations already provide the section-level component of NTSD. They work with all the available Section or state resources. NTS is studying the "alerting" problem for DRS operators with the goal of alleviating delays to Priority and EMERGENCY traffic.

4. *In addition, discussions and survey results clearly indicated that both programs suffer a lack of coherent national strategic planning, guidance, and program support, mostly because no mechanism exists to provide it. Both programs need help with training materials development, outreach, and developing mechanisms for long-term strategic problem solving.*

(See response in Section 6.1.1.)

In our opinion, ARES and NTS could benefit from not only a closer relationship, but from shared and coordinated national guidance and support. At the outset, we identified two possible scenarios – merge NTS and ARES into a single program, or create a shared supporting and/or governing body.

NTS agrees that ARES and NTS would benefit from a closer relationship even as we disagree with any proposed merger. NTS believes a shared supporting governing body as proposed by ECAC will not serve our interests and we offer alternate proposals instead (See Sections 3 and 5).

5. *It quickly became apparent that a merger would face significant challenges. ARES and NTS have very different structures and cultures, designed to meet their markedly different needs. We feel that merging them into a single program would likely create larger problems than any it was intended to solve. Moreover, we concluded that a merger is not necessary to achieve the stated goals, nor was a committee with command authority.*

NTS agrees completely with this statement.

We opted to propose a "superstructure" in the form of an elected joint national "steering" committee. We put steering in quotation marks because we believe the committee must take a supportive leadership role rather than a command role as is the case with a traditional steering committee. We've given it the working name "Joint Emergency Communications Committee" (JECC).

As discussed earlier, this is a primary disagreement with the ECAC report. NTS prefers a stronger organization along the lines of the defunct Amateur Radio Public Service Corps. (See Section 5)

6. *The JECC would be charged with developing, implementing, and promoting cooperative training and operational efforts involving both ARES and NTS, voluntary operating and other standards and best practices across both programs, training programs and materials, national ARES mutual assistance programs, operator and group accreditation programs, member identification and credentials, recruitment, outreach, and other aids to assist ARES and NTS to remain relevant in the evolving world of emergency communications. But perhaps most important, it would be charged with maintaining a "30,000' view" of both programs to ensure continued relevance into the future.*

The question of how NTS fits into a JECC is still a matter for disussion, although our proposal in Section 5 clearly spells out the main interfaces. From a 10,000 foot view, where the air is a bit more dense, it appears that a higher level support entity is indeed needed by ARES. The NTS proposal for this was described in Section 5 and we refer the reader there for details.

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7. *As designed, the JECC would have no direct command authority over anyone in NTS or ARES at any level, and would not be empowered to compel compliance with any standards or participation in any program it might develop.*

Based on experience, NTS views the "advisory only" nature of the proposed JECC as a significant weakness of the concept. As JECC's primary function would be to establish national standards, it should be within their purview to enforce compliance for the order and discipline of the larger system.

6.2 Report Main Body – Introduction and Survey

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Many respondents felt our first NTS survey questions displayed a lack of knowledge about how NTS operates today. This turned out to be a well founded criticism. Their ultimate value was in stimulating further conversation and education, and helped point out a key issue for NTS – that it isn't well understood even within its own ranks, let alone by those outside.

The survey questions, as amended, could be properly addressed only by someone active in the NTS. It was obvious to us that some respondents had never participated in NTS and had no idea how it operates or what functions it provides. We are curious about the ARES survey reponses and wonder if they were similar in perspective.

No matter the reason, such answers, among amateurs selected for their presumed experience with the Field Organization, confirms our call for national marketing and awareness support from the ARRL.

6.3 Task 1. ARES and NTS Objectives and Organizational Structures

The broad objectives for ARES and NTS have not changed significantly over the years. ARES provides local emergency communications support, and NTS acts as a medium to long distance carrier for routine day to day and disaster related written messages.

It is NTS' point of view that ARES is the focal point for served agencies and their primary interface to amateur radio resources. NTS is a background function by design. NTS recognizes our services are not always required for a given disaster scenario, but cross-state and cross-section scenarios do exist and NTS can be used to advantage in such cases. ARES and the public interest would benefit from improved awareness and understanding of NTS capabilities. Closer relationships between Section Managers, STM and SEC appointees would materially assist in closing this objective. Bringing STMs into the complete NTS staff proceedings would also benefit individual Sections as discussed perviously.

NTS wishes to offer its expertise in establishing and operating digital networks to ARES. We can also supply training and support assistance. Our NTS Parser program is specifically intended for assisting inexperienced ARES operators deployed to public shelters, and properly formats outgoing message traffic for batch loading into the NTSD network. Outpost Packet Message Manager is also intended for ARES use. NTS works with the developer of Outpost Packet Message Manager to assure its outputs are both accurate and complete for NTSD use. Similarly, there is an NTS group specifically oriented to fostering use of Radio-email with ties to the Winlink Development community.

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NTS has struggled in the years since email became commonplace, losing much of its traditional message traffic. So-called "ham-spam" traffic has driven many NTS participants away, and some Section level NTS affiliated nets have disappeared over the years, leaving large gaps in local delivery and origination capability. Message accuracy has been an ongoing issue.

As previously discussed, the first statement is true. Yes, there are also some operators and even STMs who are vocally opposed to "book traffic" as it is known. This has resulted in the need of workarounds for certain Sections. Even so, these Section nets are willing and able to handle third-party traffic although their proficiency is questionable due to want of practice. We reiterate, "ham spam" provides NTS with vital traffic for training and practice.

Local delivery gaps do exist but workarounds have so-far filled them and serve well enough under the circumstances. Traffic handling is a perishable skill and message accuracy has suffered from lack of practice and experience. Digital relay is error-free but origination formatting errors are possible due to inexperience and stress. We note the NTS Parser and Outpost Packet Message Manager address origination errors directly.

NTS leadership has responded to this shift by building a fast, modern digital network better suited to the needs of emergency communications in an era where more is expected of fewer active participants. NTS Digital (NTSD) is still a work in progress, but shows great promise. NTSD and its cousin, radio email, can rapidly handle large volumes of messages with perfect accuracy, and a minimum of labor. At present, NTSD still depends primarily on the legacy voice nets for local delivery and origination, so more digital development work is needed at that level.

No matter how many digital liaison stations we recruit, they cannot match the reach and sheer manpower of available to SSB local and state nets. Any amateur with access to a radio may participate, the only requirement being a certain level of training in core traffic handling skills. Rural towns especially benefit from the ubiquity of phone equipment and operators. CW section nets have adapted by becoming "clearing houses" for message traffic, with assigned liaison stations for daytime and nighttime cycle SSB nets. In fact, multi-mode operators are the rule rather than the exception, especially when combined with NTSD and make NTS a robust network independent of any single technology as a potential point of failure.

6.3.1 Organizational Structure

(Page 8, NTS)

NTS is a stand-alone field organization program of ARRL, tied only loosely to what we typically think of as the ARRL Field Organization. Its organization is based on a structure of integrated networks, designed primarily to facilitate day to day operations. In that regard it functions reasonably well. However, through our surveys, and conversations and meetings with various NTS staff, we did identify several areas needing improvement or adjustment. Some NTS staff agreed with our opinions, others did not.

Naturally there will be differences of opinion and views among NTS staff, depending on their experience and local operation. We address each of the following statements in turn.

At the highest level, we believe NTS needs new formal processes for big-picture, long range strategic planning and problem solving. Currently, these issues are dealt with on a reactive, informal, as needed, basis primarily by the three Area Chairs and their digital coordinators. We feel that a more formal process would enhance NTS' ability to proactively make needed changes that ensure the program's viability and relevance into the future. How that might best be accomplished will require further discussion with NTS leadership.

The term "formal process" is not clearly defined. NTS staff meets weekly, as discussed previously. The process used for planning, problem resolution, and advancement takes the form of discussions followed by email exchanges and, in some cases, the production of white papers that are distributed to all NTS levels for comment and dissemination. NTS grants this is not formalized by written directive, but we are willing to update our Terms of Reference documentation to do so.

A lack of management accountability for NTS staff except through the election and appointment processes was noted in our joint discussions. This evidences itself in certain staff members failing to adequately carry out the duties they accepted, with little or no recourse for upper management. This is a complex issue, so we recommend that NTS leaders, perhaps with the assistance of disinterested outsiders, review the management structure and look for ways to build in appropriate accountability and oversight.

NTS respectfully and vehemently disagrees as accountability is built into the NTS system. Every manager of all affiliated NTS nets is required to report monthly to the STM on the net's activity. Regional and above net reports are made directly to ARRL HQ as are NTSD reports with copies sent to the Area chairs. The chairs in turn are are responsible for monitoring operations, assisting with problems as they arise, and for replacing Regional and higher managers due to resignation or performance deficiencies.

Area chairs also make recommendations to STMs concerning problems with lower level net operations and management. STMs themselves report monthly to ARRL HQ with net and individual operator status. NTS staff has no power to replace a non-performing STM, but in difficult cases, issues are brought to the appropriate SM, often with good results.

To a great degree, net managers and participants are compartmentalized such that they have limited awareness of what is happening across the organization. Their sense of community is confined to their particular nets. In our opinion, part of the problem stems from the lack of an official formal internal communications tool, such as an official newsletter. We recommend that an official e-letter like the ARES e-letter be created specifically for NTS, issued at least quarterly, devoted to discussion of operational, planning, and training issues, as well as relevant motivational human interest and success stories. In fact, we believe so strongly in this need that we would recommend it be given top priority.

With the first issue debuting in September of 2012, *QNI the NTS Newsletter* is privately published by NTS operators James Wades, WB8SIW, and Kate Hutton, K6HTN, with contributions from interested NTS members. The newsletter offers articles about the NTS itself, operating tutorials, and related anecdotes. A common theme is improving the working relationship between NTS and ARES and how they can work better together. To that end, past articles have explored the use of ICS-213 forms and other unique requirements of ARES operations. Some articles are written for beginning traffic handlers while others are focused on those more advanced. *QNI* is published quarterly, more or less, with nine issues produced thus far. *QNI* is distributed via email and the web, with notifications going to all NTS Officials and STMs via the ARRL reflectors. (Copies may be found via links on the http://www.k6jt.com/ website. Note also that the K6JT website hosts monthly newsletters targeted to the Texas CW NTS net, the Texas Slow Net, and the Cycle 3 and 4 Region Net 5. These have been very valuable in keeping interest in the nets and fostering a deep sense of camaraderie.)

Frankly, we are not at all convinced ARRL HQ could do a better job producing an NTS newsletter. We would appreciate their support and assistance however, should such interest be expressed.

NTS doesn't have formal membership, simply referring to everyone without a specific appointment as a "participant." A greater feeling of belonging to something much bigger than themselves or the nets they participate in would help build an expanded and stronger sense of community and purpose. Therefore, we believe NTS would be better served if all participants from the Region level up be officially designated and formally recognized as "members."

Traffic handlers at all levels, and especially at the Section and local levels, think of themselves as net and NTS members. Operators at Region and above think of themselves as NTS officials as well as members. All active NTS participants are eligible for appointments as Official Relay Stations after demonstrating a certain level of activity and regularly reporting to their STM or SM. We note that elected SMs make all Section appointments although they may choose to defer to the judgement of their STM. Those in the digital realm are eligible for Digital Relay Station appointments by the Area Digital Coordinators, also after demonstrating the capabilities defined by the ADCs. There are also other official titles with attendant certificates, provided by the ARRL staff, for membership in the Transcontinental Corps, Area Nets and Region Nets.

As such, we see no apparent need for a formal membership registration such as used by ARES. It would seem that ARES registration is necessary primarily for recognition by served agencies to allow access to disaster sites and official government buildings. These are not issues for NTS members.

6.3.2 ARES-NTS Interface

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The loosely structured connection between NTS and the Sections was identified by NTS staff as a serious problem in many areas of the country. From the NTS perspective, some STMs are not seen as doing their jobs properly, or at all. NTS Region Net Managers say they have been frustrated in their attempts to correct the situation due to the lack of any formal management connection between NTS and the STM. Section Managers point out that the STM position is not an easy one to fill in the first place, making any solution that much more difficult to identify.

NTS believes all the above statements are essentially correct. The interface with STMs is very good in some sections and poor or missing in others. We also note the STM position remains unfilled in certain Sections. While frustration with Section management's lack of support for NTS is real, we disagree it is primarily caused by a lack of any formal management connection between NTS and the STM. In many cases, regardless of any directives coming from the ARRL, there is simply no SM interest in NTS.

One suggestion from an NTS staff member was that the Section Traffic Manager be moved directly into the NTS hierarchy, removing it from the Field Organization. While we understand and appreciate the arguments presented, we also feel that such a move would have the unintended consequence of creating a disconnect with the Field Organization, particularly ARES – essentially trading one problem for a nearly identical one.

The majority of the NTS staff believes the STM should be an associate staff member and not removed from the Field Organization.

Instead, we believe it is vital that a formal relationship be established between the NTS Region and the Section to improve working relationships in general, and help bring both parties to the same table as a means of solving issues common to both programs. This might be simply accomplished by emphasizing it in the job descriptions and training documents for both positions, but the issue requires more research and discussion than ECAC had time for.

The NTS Section nets are tasked with providing liaison stations to the Region nets, so a relationship is already in place. Problems arise in sections without an effective STM to oversee Section and local net operations. Section net managers should be well aware of their responsibility to interface with higher level NTS, particularly the Region level. Since they are recommended by the STM, the STM himself must be knowledgeable and interested in the NTS; we find this to be something of a paradox but resolvable only at the Section level.

6.4 Task 2. Training, Certification, and Credentialing

New members joining NTS or ARES have no expectation they will make a commitment and be held to any training, participation, or performance standards, as someone joining a volunteer fire or rescue squad would. As has been said, if you expect nothing, that's often what you'll get. We believe that ARES groups and NTS should be strongly encouraged to require a standard minimum level of basic training for all new members, and to consider a participation requirement to maintain active membership. In areas where this has been tried, the reports indicate "dead wood" quickly drops off, and over time a better quality of membership is built up.

NOTE: This is addressed in the paragraphs below.

6.4.1 NTS Training

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At present, NTS has no official formal training program or materials beyond a fourteen year old instructor's training guide for voice nets, relying primarily on mentoring and self-training with the use of the Public Service Communications Manual (PSCM) and its appendices, including the MPG, as reference material. Many NTS staff believe this situation may be a deterrent to new participants, and is likely impacting the quality of service. ECAC recommends that NTS develop a series of well produced online training tutorials with the assistance of qualified outside volunteers and staff.

We agree that having a base set of presentation materials is a good idea, but we also believe that local modifications are an ongoing necessity. At present, NTS material is produced by individual members addressing the particular needs of their locality. However, they are widely shared and circulated to the NTS staff for review, providing no small measure of consistency in message and accuracy to NTS policy. Examples include listings of active nets and contact officials, which provide a formal template for others to populate with their own information. Other material takes the form of PowerPoint presentations, white papers, and even YouTube videos for use at club meetings and conventions. In particular, the instructor's training guide mentioned has actually been twice updated since the version referenced above,

2008 and again in 2014. It is independently produced and maintained by its author, Mark Rappaport, W2EAG.

Further, the PSCM, MPG, and relevant NTS appendices need to be reorganized and rewritten to make information easier to locate and read. All sections of the documents, especially including MPG Chapter 6 (NTSD), need to be published in full on the ARRL website in order to make them easily accessible to all. The current situation is hampering NTS' ability to further develop its digital capability by creating the false impression that NTSD is not officially part of NTS.

The MPG, including Chapter 6, is now published on the ARRL website. We also agree that reorganization of the PSCM and MPG, including better hyperlinks, is needed and work has started on just that. We note the MPG document is not intended as a training document but rather as a reference guide. The PSCM is outdated and also needs improved cross-referencing. There have been excerpt booklets derived from the PSCM and MPG, even published as paperback training guides by the ARRL, that should be .updated and made available once again.

There are a few independently produced local training programs circulating, one posted on arrl.org. None are officially vetted by NTS staff for accuracy and consistency with published standards and are often geared to the needs and systems of a single Section or county. Production values vary widely. We've also seen materials produced by one group modified by others to suit their own situation. The fact that these programs are widely modified and used indicates the appetite for training materials. The problem is that each plagiarist tends to put his or her own spin based on the material, further contributing to a lack of interoperability. We believe that a set of well produced and vetted national materials would largely solve this problem.

As stated above, we agree that a nationally produced base set of presentation materials would be useful. But it is generally necessary to give them a local flavor when actually presenting the information to an audience, further adapting the materials to the target audience. It is not possible to produce a "one size fits all" type of document for anything beyond how to format a message, an introduction to net discipline and operation, and an overview of NTS. Information about local and section nets that are part of NTS need to be added along with how to get in touch with local officials for additional information. For example, specialized information about NTS Digital may be needed for some target audiences, but should only be introduced at a high level for others.

6.4.2 Standards for Training Materials

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In order for ARES and NTS to reach full potential and maximum interoperability, training materials must speak with a unified voice. Too much reliance is placed on locally produced materials that reflect the opinions of one person, not reflecting best practices based on shared experience. In order to gain broad acceptance, all materials must be widely applicable, peer reviewed, accurate, up to date, and of a consistently high quality.

We agree, with the caveats mentioned in the previous section.

NTS, by its very nature, requires consistency in function and operations across the country. All new NTS training materials, regardless of source, need to be vetted and approved by the Area Chairs before being posted on the ARRL website by staff.

NTS does review such material as a routine process; for example, the newly posted MPG was reviewed, comments solicited, and updates made by senior staff members, and we believe the final product justifies the effort expended.

For both ARES and NTS, a formal process must be established for course and materials development that establishes specific, detailed training goals, determines the best delivery vehicle, selects an appropriate author or writing team, and vets the completed material to ensure quality, consistency with best practices, and accuracy.

A writing team selection process has begun for updates to the NTS portions of the PSCM, part of the normal process followed by the NTS staff members. As ECAC points out, the first step is to determine

the goals of the revised documentation. Technically, our documentation is published in Adobe PDF format for distribution and hosting on the ARRL website. ARRL staff assists materially with this process using their licensed PDF conversion software with Microsoft Word documents as input from the NTS.

6.4.3 Updating Existing Material

All training material needs a thorough review and update on a regular schedule to prevent it from becoming outdated and irrelevant. We believe that no more than three to five years between update cycles is appropriate. Certain material dealing with rapidly evolving operations and technologies (digital communications, for example) may require more frequent updating.

We agree with this process and strive to adhere to it with our roster of knowledgable NTS staff members, STMs, local and section net managers. ARRL HQ's contribution is to assist in converting and hosting the finished product, which they have been doing.

The Public Service Communications Manual needs a ground up redesign in order to be of real value.

We agree.

Based on comments from the various surveys, we believe the (ARRL) website must provide a one-stop shop for a full and comprehensive range of training materials and tools. At present, this is far from reality.

There are so many things hosted on the ARRL website that it will take active Information Technology efforts to assure training and other materials are easily found by search criteria and that they are all grouped in a relatively small area, accessible via hyperlinks.

While we recommend a further survey of ARES and NTS membership to learn which information is needed most in order to set priorities, some additional narrowly focused modules might include:

Introduction to NTS; A Brief Orientation to Pubic Service and Disaster Communications; Manual traffic handling skills; NTSD operations; Operating an NTSD liaison station

There was a 1970s vintage booklet, "Public Service Communication" which is emphatically NOT the "PSCM" of the last twenty years. In its day, it served well to introduce both NTS and ARES candidate members to the duties and procedures needed for operation. Resurrecting or re-creating this type of document, including some of the material in the NTS Digital Operations white paper that currently exists to guide NTSD DRS stations, is viewed as the best approach to satisfying this need. NTS experts are currently working on a draft version but it has not been circulated to the staff as of this date.

6.5 Task 3: Relationships with Served Agencies

We find no NTS content in this task.

6.6 Task 4: Integrating the ARES and NTS Programs

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Both ARES and NTS face significant challenges to maintain relevancy going forward, separately and together. Neither program has the structure or capacity to solve these problems on its own.

While we cannot speak for ARES, NTS has the necessary structure, interested participants, and management to "bring NTS kicking and screaming into the 21st century", as put by one member of our Wednesday evening Echolink conference.

Both programs could benefit from closer coordination with regard to planning, operations and training. Their missions need to be more clearly articulated, and posed in ways that complement each other. We also identified a number of needs common to both programs:

- *Strategic Planning – Someone to maintain a "30,000' view" of both programs to make sure they remain relevant and strong. National level resources and guidance are limited for both programs, particularly ARES. This is arguably the single most important need.*

We believe that NTS management already encompasses this function. The NTS proposal in section 5 provides for this as well.

- *Program Interface – ARES and NTS do not connect well in many areas of the country from leadership, technical and operational standpoints. Improved formal communication between programs is needed.*

This is a primary rationale for our NTS counter-proposal in section 5.

- *Network Continuity at the Section Level – At present, most NTS affiliated Section level nets are not part of ARES. The two programs operate almost in parallel, with ARES members deploying to the field and NTS providing the message handling backbone. However, with fewer hams active in NTS, ARES often provides the only wide coverage network structure at the Section Level, much as it did in the early days of NTS when ARES nets provided all service at the Section level. This situation is not without its difficulties, given that ARES' mission does not include day to day network operations, likely the reason for the shift away from this model. A solution to this situation will require additional research and discussion well beyond the time available to ECAC.*

We polled current NTS participants, many of whom have long histories of joint participation – even going back to the Amateur Radio Emergency Corps. There is no recollection of ARES nets ever acting as the "Section Level" component of NTS, although there was often a high degree of common membership between organizations. ARES maintained its direct relationships with served agencies while NTS concerned itself with its operation. It was an effective relationship and NTS staff believes the model outlined in section 5 could succeed in bringing the two services back into much closer communion.

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- *Recruiting – Comments from leaders in both programs indicate they face challenges in recruiting volunteers, and especially leaders. Some survey respondents feel that their efforts are hampered by the relatively low profile given them in League publications over the years, especially QST. We feel that both programs would benefit from greater prominence on a monthly basis, not just in occasional feature articles. In the same way that a construction article appears each month, an ARES or NTS article should be a standard feature. Relegating smaller articles to the Public Service column virtually insures that only those already interested will ever see them.*

NTS believes the ARRL Board of Directors and Division Directors must help foster this effort at the national level.

- *Interoperability – Even though ARES has widely varying mission requirements and resources across jurisdictions, the program could benefit from a degree of consistency in systems, methods, and best practices to improve interoperability between Sections and groups, especially in an ARESMAT environment.*

NTS believes the Winlink 2000 system and our own NTSD network can be used to advantage to provide this interoperability.

- *Joint NTS-ARES Exercises – Regular joint exercises are needed, using realistic agency- driven scenarios that exploit the strengths and discover the weaknesses of each program, while providing opportunities for each to improve. This presently happens in only a few areas of the country.*

As discussed in Section 6.1.3, making the SET a joint activity as it was years ago could materially help.

6.6.1 Why We Believe Simply Merging the Programs Wouldn't Work

Each program is organized and functions in fundamentally different ways. Culturally, NTS has many informal non-leadership participants in a single national program (although some consider themselves solely as members of a particular net), while the vast majority of ARES groups have a more formal "local team" culture. ARES is appropriately structured to support agencies with widely differing needs and resources, while NTS is structured to support a set of specific systems and networks. Although the two programs' missions are joined at the hip, their internal leadership structures generally suit different needs.

NTS' management structure is predominantly "top down," while ARES structure is based locally to better serve varying needs. The two structures are necessarily incompatible.

NTS agrees to some extent, but as previously stated, NTS is not a "Top Down" organization. NTS is a network of networks, which individually consist of all members who handle formal message traffic, from the 2m local net participant to Section nets, to the TCC and digital structures. As NTS and ARES serve different needs in each locality, NTS should be viewed by ARES management as a tool for their use, when appropriate and needed. NTS is responsible for developing the support methods needed by the ARES, and both of them certainly need to collaborate in this endeavor.

Due to these operational and cultural differences, we concluded that merging ARES and NTS was not a viable option. We also concluded that the challenges stated above could be met without actually merging the programs.

We agree but believe the JECC is flawed in its current presentation. (See sections 3 and 5 and the preceding discussion here in section 6).

7 Document Specifics

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7.1 Acronyms

Acronym	Definition
ADC	Area Digital Coordinator (NTSD)
ARES	Amateur Radio Emergency Service
ARESMAT	ARES Mutual Assistance Team
ARPSC	Amateur Radio Public Service Corps
ARRL	American Radio RELAY League
BPQ32	Software used at an NTSD MBO in lieu of the Classic Winlink software – developed by John Wiseman, G8BPQ
CMS	Common Message Server (WL2K Central Server)
CW	Continuous Wave (Morse Code)
DEC	District Emergency Coordinator
DRS	Digital Relay Station (NTSD ORS equivalent)
EC	Emergency Coordinator (ARES)
ECAC	Emergency Communications Advisory Committee
EMCOMM	Emergency Communications
FEMA	Federal Emergency Management Agency
HF	High Frequency (3-30 MHz)
HQ	(ARRL) Headquarters
Hub	Primary MBO for an NTSD Area or Region/State
ICS	Incident Command System
ISP	Internet Service Provider
JECC	Joint Emergency Communications Committee
MBO	Mail Box Operations (NTSD Hub station)
MOU	Memorandum of Understanding
MPG	Methods and Practices Guide (NTS)
NGO	Non-Government Organization (e.g., Red Cross)
NIMS	National Incident Management System (FEMA)
NRP	National Response Plan
NTS	National Traffic System
NTSD	National Traffic System, Digital subsystem

Acronym	Definition
OES	Official Emergency Station (ARES)
ORS	Official Relay Station (NTS)
P&SC	Programs and Services Committee (ARRL)
PACTOR	Digital Communications Waveform used by NTSD and WL2K
PSCM	Public Service Communications Manual
RMS	Radio Mail Server (WL2K Remote Server)
SEC	Section Emergency Coordinator
SET	Simulated Emergency Test
SM	Section Manager
SSB	Single Sideband (voice modulation mode)
STM	Section Traffic Manager
TCC	Transcontinental Corps (NTS service linking the Areas)
TOR	Terms of Reference (document governing NTS Area Staff)
VHF	Very High Frequency (2 meters and above)
Winlink 2K	Winlink 2000 Radio-email system
WL2K	Winlink 2000 Radio-email system
WINMOR	Digital Communications Waveform developed by the Winlink Development Committee to use with computer sound card modulation / demodulation systems in lieu of PACTOR

8 APPENDIX A: Historical Perspectives on Today's Situation

An institution is more than its collection of organizational charts, process flows and technological investment. It is a higher level form of the people that comprise it. "Institutional memory" is not merely a buzzword it is an actual thing. The NTS has its own set of memories and experiences that drive the present for good or ill. We believe it worthwhile to share this institutional memory to add context and rationale to our Response. We also believe an institution ought not change course lightly but rather give full weight to the experience of past generations because, frankly, human nature doesn't change, even if it cycles from here to there and back again repeatedly.

(For your edification and information, please read George Hart's first-hand account of his work establishing ARES, NTS and RACES in the years following the Second World War. The story was little known even at the time and is sine qua non to understand how those institutions got where they are today. September, 1949, QST, Pages 50-51 announced the National Traffic System. Other articles appeared in QST, August, 1974, and the QCWA Journal, Fall, 2005.)

Many of the difficulties faced by the ARRL Field Organization came from short-sighted, albeit at the time necessary, decisions made by the ARRL HQ in the 1970s. This is not surprising as the Seventies—and its aftermath which lasted some twenty years and perhaps longer—were a time of upheaval and wholesale abandonment of tradition, often on theoretical bases that in retrospect were simply wrong. Economic conditions played a hand as companies and governments struggled to survive under rampant inflation, unemployment, and escalating taxes.

With that in mind, and filtered through our brass pounders' ears, we notice several items that stand out.

1. *Joint Emergency Communications Committee*. ECAC's proposed JECC steering committee sounds very much like the defunct Amateur Radio Public Services Corps (ARPSC). ARPSC is the reason ARES changed its name from the Amateur Radio Emergency Corps as a "corps within a corps didn't make sense". Instead of reinventing the wheel, the ARRL should consider resurrecting ARPSC and its legacy of cooperative success and, in the process, meet every stated deficiency ECAC identifies. Apart from embracing the ARRL's past, ARPSC held one major advantage over the JECC: as the promulgating authority, its advisories had teeth.

2. *Section Communication Manager*. The ARRL's seventy-one Sections are the heart of our League and everything it does. In many ways, the Field Organization problems may be correlated with the change in nomenclature—sprung from a deliberate change in League priorities—from *Section Communications Manager* to the business-like and generic *Section Manager*. As long time radio operators, NTS believes the old job description emphasized the importance and necessity of maintaining full communications within and without the Section. Is it not obvious that ARES and NTS, including HQ itself, suffers a serious breakdown in our own internal communications? Communication is the core mission of the American Radio Relay League. A renewed emphasis on ARRL Section communications, if not a return to the old title, would aid our present effrots immensely.

3. *Section Traffic Manager and Section Emergency Coordinator*. The STM and SEC were originally envisioned as secretaries or assistants to the SCM for section-wide technical management. Net management was considered essential and thus provided a dedicated executive to oversee its functioning. Note the coordination role of the SEC – his job was to identify and literally coordinate amateur resources available to the Section for emergency response. The title was carefully chosen in acknowledgment of the roles played by affiliated clubs, local governments, private businesses, and individual amateurs. The SEC was as much diplomat as executive and remains so even under much diminished expectations. We believe revitalizing these positions at the Section level would have salutatory effects on the whole of the NTS and ARES operational condition and public perceptions.

4. *Official Relay Stations and Official Emergency Stations*. Much as the STM and SEC directly reported to and assisted the SCM, the ORS and OES credentials were a *de facto* requirement of NTS and ARES membership, a badge of honor for the operator, and the backbone of the Section's communication capability. Supervisory level positions, ORS and OES appointees were expected to demonstrate individual initiative and were allowed the authority to act on it, within parameters established by the Section leadership. At some point these credentials slipped into their present state of neglect. NTS believes it worthwhile to reinvigorate them, even to "putting teeth into" the credentialing process as a means of quality control and incentive management based on some minimum training and participation levels. We note the success of the MARS programs even as they retain stringent training and participation requirments. It should be no surprise that in 1925, the Army Amateur Radio Service took its lead from the ARRL (click the hyperlink to go to the history page) and now it's time to consider returning the favor. As a practical matter, MARS represents a wealth of knowledge and experience that the League ought to exploit for our own civilian programs.

5. Recently, HQ set off a dust up over QST's editorial decision to return to its traditional use of the term "public service communication" instead of "EMCOMM " and its variants. This is a welcome change as it reminds us the League was formed to improve public service communications – the efficient relay of the simple Radiogram—while explicit support of emergency communications preparation came much later. In other words, public service communication embraces many services commonly performed by League members from Radiogram relay to radio support of Memorial Day parades and everything in between.

6. Naturally the NTS considers "Radio Relay" a core skill for all amateur operators to master. It is unspoken today and many of our volunteers lose sight of their primary mission to relay messages by radio and think instead of their particular specialty. A return to earlier nomenclature would remind all League members, and the public we serve, that "radio relay" is a service not a technology, and encourage our people to perfect their ability to do it.