

# ARRL NTS Manual

## Chapter One: The National Traffic System

The National Traffic System (NTS) is a structure that allows for rapid movement of traffic from origin to destination and training amateur operators to handle written traffic and participate in directed nets. These two objectives, which sometimes conflict with each other, are the underlying foundations of the NTS.

NTS operates daily, even continuously with advanced digital links.

The personnel consists of operators who participate for one or two periods a week, and some who are active daily. The National Traffic System is an organized effort to handle traffic in accordance with a plan which is easily understood, and employs modern methods of network traffic handling in general acceptance today.

NTS is not intended as a deterrent or competition for the many independently-organized traffic networks. When necessitated by overload or lack of outlet for traffic, the facilities of such networks can function as alternate traffic routings where this is indicated in the best interest of efficient message relay and/or delivery.

One of the most important features of NTS is the system concept. No NTS net is an independent entity which can conduct its activities without concern for or consideration of other NTS nets. Each net performs its function and only its function in the overall organization. If nets fail to perform their functions or perform functions intended for other nets, the overall system may be adversely affected.

Nets may sometimes find it necessary to adopt temporary measures to ensure the movement of traffic, and this is considered improper operation only when no attempt is made to return to the normal schedule. Nevertheless, improper operation of any NTS net is the concern of all NTS nets, and every effort should be made to assist in returning any non-functioning or improperly functioning net to its normal operation.

### 1.1 Membership in NTS

Individual station participation in NTS is recognized by issuance of certificates, and by appointment to the field organization's traffic handling position, the Official Relay Station. Organizationally speaking, the "members" of NTS are the nets and digital nodes which participate therein. Most nets and many of the NTS-sanctioned nodes were created and organized for NTS purposes only and operate for specific purposes to be described later. Procedures are somewhat specialized, particularly at Region, Area and TCC levels.

Frequently, ARRL Headquarters is asked how a net or digital node (BBS) may become a part of NTS. This usually isn't easy, because NTS is not a "club for nets"

which any existing net may join at will. In addition, making nets a part of NTS is less a matter of official action than a "state of mind" of the net itself. In this connection, the following points deserve mention:

Nets or packet nodes (BBS's) operating within ARRL section boundaries, or otherwise at local or section level, may become a part of NTS by performing the functions of such.

Nets whose coverage extends beyond section boundaries but within region (roughly, call area) boundaries may become a part of NTS only by foregoing their general membership and setting up to operate as a session of the region net.

Such nets would act as one of that region's net sessions and would be under the jurisdiction of the region net manager appointed by ARRL. All present NTS region nets were organized specifically at the outset for NTS region coverage.

HF digital stations capable of storing-and-forwarding NTS messages in a system of such stations may be certified as NTS Digital Relay Stations by NTS Officials known as Area Digital Coordinators. They are responsible for handling NTS traffic to the same high standards as their counterparts in the traditional system.

Since operation at the area level is so specialized, it is not possible for nets whose coverage extends beyond region boundaries to be a part of NTS at any level.

Any net or digital node which becomes a part of NTS is expected to observe the general principles of NTS procedures.

Generally speaking, participation in NTS is best performed by individual-station participation in an already-existing NTS net, at any level.

Lack of recognition as an NTS net does not imply that such a net is without ARRL recognition or support. Many public service nets on which information is received are included in the League's on-line Net Directory, and activities are often summarized in the appropriate part of the ARRL Web. Although NTS is the League-sponsored organization for systematic traffic handling, it is far from being the League's only interest in public service communication.

## 1.2 Mode

The National Traffic System is not dedicated specifically to any mode or to any type of emission, nor to the exclusion of any of them, but to the use of the best mode for whatever purpose is involved. The aim is to handle formal written traffic systematically, by whatever mode best suits the purpose at hand. Whether voice, CW, RTTY, AMTOR, packet or other digital mode is used for any specific purpose is up to the Net Manager or managers concerned and the dictates of logic. There is only one National Traffic System, not separate systems for each mode. Modes used should be in accordance with their respective merits, personnel availabilities and liaison practicalities. Whatever mode or modes are used, we all work together in a single and thoroughly integrated National Traffic System.

## **Chapter Two: Principles of NTS Operation**

The National Traffic System includes four different net levels which operate in an

orderly time sequence to effect a definite flow pattern for traffic from origin to destination. A message flows through the National Traffic System in a manner similar to an airline passenger who starts out in a small residential town with a destination across the continent in another small town. He has to change carriers many times in the process, starting with a local ground conveyance to a feeder airline, to a transcontinental airline, to another feeder airline, then local transportation to deliver him to his destination. In a very similar manner, the transcontinental message starts with the originating station in a local net, is carried to the section net, the region net, the area net, via Transcontinental Corps (TCC) to a distant area net and then back down the line to delivery.

Of course the message, like the passenger, can "get on" or "get off" at any point if that's the origin or destination. Thus, a message from, say, New York to Detroit would never get on TCC, but would "get off" at area level. A message from San Francisco to Los Angeles would not go beyond region level, and one from Syracuse to Buffalo would remain inside the section net.

Messages may also be passed through NTS-affiliated local and section traffic nodes that employ digital modes with store-and-forward capabilities and bulletin board operations. Long hauls can be made by NTS Digital Relay Stations at HF, that interface with Section traffic nodes, and the traditional nets of the system.

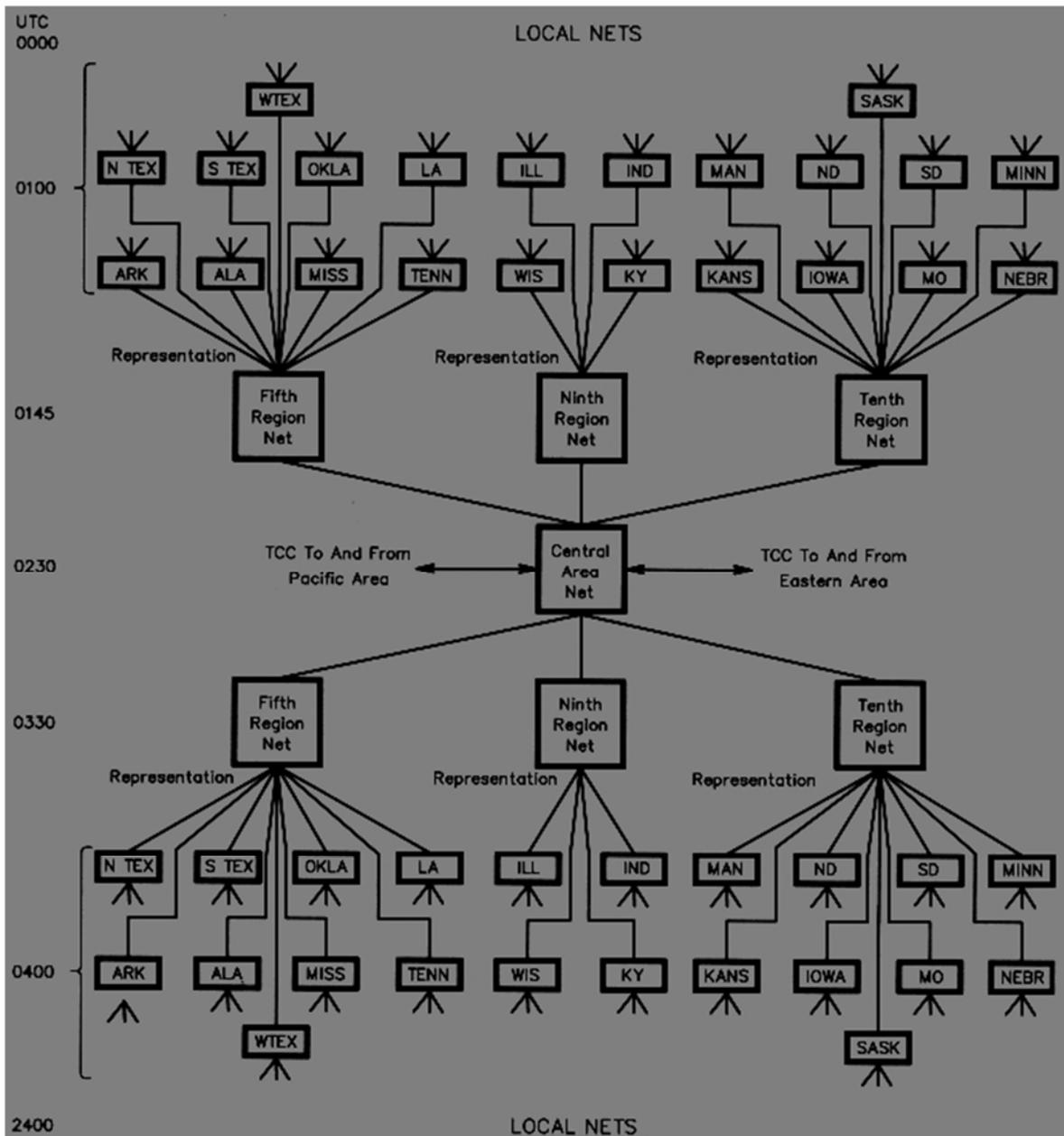


Figure 3, organization chart for the evening cycle four NTS setup in the Central Area.

## 2.1 Local Nets

Local nets are those which cover small areas such as a community, city, county or metropolitan area, not a complete ARRL section. They usually operate by VHF (typically 2-meter FM) at times and on days most convenient to their members; some are designated as "emergency" (ARES) nets that do not specialize in traffic handling. The time slot designated for them is thus nominal and will vary considerably. Local nets are intended mainly for local delivery of traffic, inasmuch as such delivery could ordinarily be effected conveniently by non-toll telephone. Some NTS local nets operate on a daily basis, just as do other nets of the system, to provide outlets for locally-originated traffic and to route the incoming traffic as closely as possible to its actual destination before delivery -- a matter of practice

in a procedure that might be required in an emergency.

Most local nets and even some section nets in smaller sections use repeaters to excellent effect. Average coverage on VHF can be extended tenfold or more using a strategically located repeater, and this can achieve a local coverage area wide enough to encompass many of the smaller sections. Since propagation conditions on the high frequencies are erratic, more use of VHF and repeaters is recommended at local levels.

A local net or node may also be conducted on a local packet BBS, where radiograms may be stored, forwarded and picked up by local operators for delivery. A Net (Node) Manager is appointed by the Section Traffic Manager to manage these functions, and assure that traffic is moved expeditiously in accordance with basic NTS principles, just like their counterpart nets on local repeaters.

## 2.2 Section Nets

Organizational and procedural lines begin to tighten at the section net level. Coverage of the section may be accomplished either by individual stations reporting in, by representatives of NTS local nets and nodes, or both. Ordinarily, all section amateurs are invited to take part; however, in a high-population section with several metropolitan areas covered by local nets, representation may be by such liaison stations plus individual stations in cities or towns not covered by local nets.

The section may have more than one net (a CW net, a VHF net, an SSB net or even a section packet BBS, for examples), or two or more sections may combine to form a single net operating at section level, if low population or activity seem to make this desirable. Section nets are administered through the office of the Section Manager, with authority for this function often delegated to an appointed Section Traffic Manager and/or designated Net Managers.

In the case of combined-section nets, officials of the sections concerned should collaborate on the designation of a qualified amateur to manage the net. The purpose of the section net is to handle intra-section traffic, distribute traffic coming down from higher NTS echelons and put inter-section traffic in the hands of the amateur designated to report into the next-higher NTS (region) echelon. Therefore, the maximum obtainable participation from section amateurs is desirable.

## 2.3 Region Nets

Region nets cover a wider area, such as a call area. At this level the object is no longer mass coverage, but representation of each ARRL section within the region.

Participants normally include:

A net control station, designated by the region net manager.

Representatives from each of the various sections in the region, designated by their section net managers.

One or more stations designated by the region net manager to handle traffic going to points outside the region.

One or more stations bringing traffic down from higher NTS echelons.

Any other station with traffic.

There may be more than one representative from each section in the region net, but more than two are usually superfluous and will only clutter the net; however, all section representatives are required to represent the entire section, not just their own net.

The purpose of the region net is to exchange traffic among the sections in the region, put out-of-region traffic in the hands of stations designated to handle it and distribute traffic coming to the region from outside among the section representatives. Region nets are administered by managers who are elected by NTS Area Staff members.

#### 2.4 Area Nets

At the top level of NTS nets is the area net. In general, the area net is to the region net what the region net is to the section net; that is, participation at area level includes:

A net control station, designated by the area net manager.

One or more representatives from each region net in the area, designated by the region net managers.

TCC stations designated to handle traffic going to other areas.

TCC stations designated to bring traffic from other areas.

Any station with traffic.

Points (3) and (4) are functions of the Transcontinental Corps. There are three areas, designated Eastern, Central and Pacific, the names roughly indicating their coverage of the U.S. and Canada, except that the Pacific Area includes the Mountain as well as the Pacific time zones. Area nets are administered by managers who are elected by NTS Area Staff members.

#### 2.5 Transcontinental Corps

The handling of inter-area traffic is accomplished through the facilities of the TCC. This is not a net, but a group of designated stations who have the responsibility for seeing that inter-area traffic reaches its destination area. TCC is administered by TCC directors, or as delegated to the Area Digital Coordinator, in each area who assign stations to report into area nets for the purpose of "clearing" inter-area traffic, and to keep out-of-net schedules with each other for the purpose of transferring traffic from one area to another.

## 2.6 Digital Stations

The handling of traffic among sections, regions and areas can also be accomplished alternatively, on a supportive/cooperative basis, through liaison with the traditional aspects of the system, by the set of NTS Digital Relay Stations across the country. These stations, certified by their respective Area Digital Coordinators, handle traffic by digital modes at HF. The system structure is more loosely defined than is the traditional system. They serve to supplement the existing system, providing options, and flexibility in getting traffic moved expeditiously across the country, especially in overload conditions.

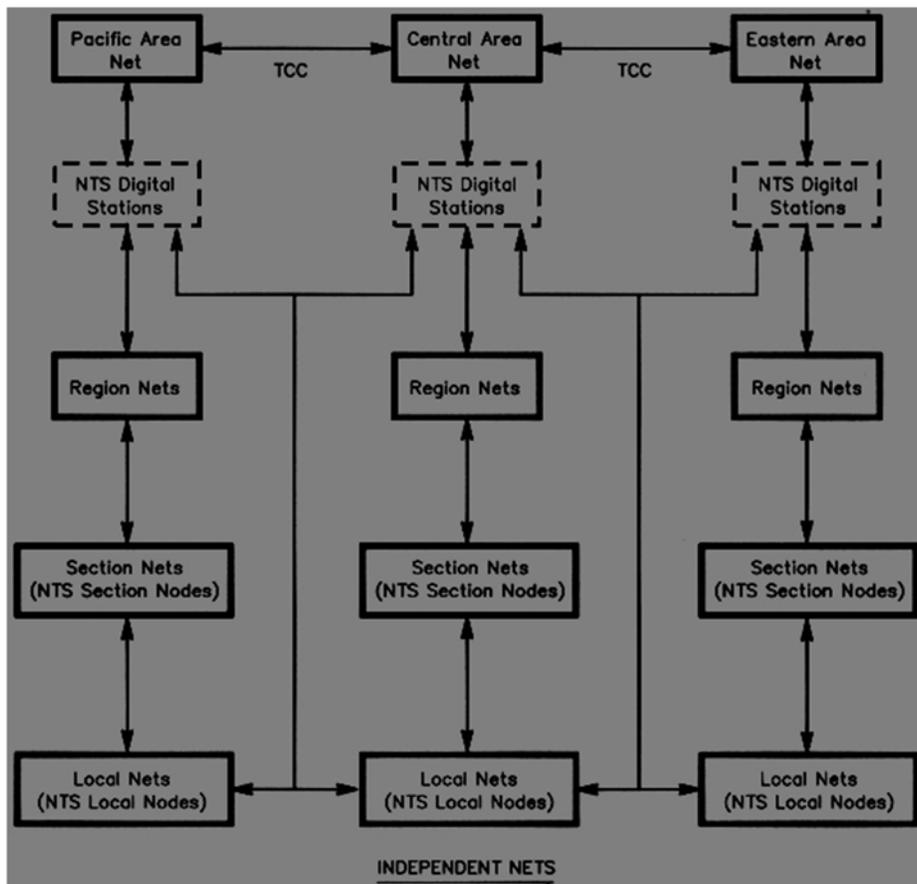


Figure 4, NTS organization chart.

## Chapter Three: NTS Policies

### 3.1 Sequence of Net Meetings

The order that the various nets meet is essential to the proper operation of the system. The effectiveness of the National Traffic System depends on a delicate balance of voluntary cooperation and adherence to established procedures. In 1979, the NTS Area Staffs jointly recommended a symmetrical, four-cycle NTS net sequence which is now the formal system definition for voice and CW modes.

Cycles Two and Four are, at this time, implemented in all three areas. In addition, Cycle One is implemented in the Pacific Area, and Cycle Three is implemented in the Eastern Area to facilitate intra-area and west-to-east traffic flow. Cycles One and Three were initially designed for high-volume situations to improve and enhance the response of NTS to emergency and overload situations. However, the entire four-cycle sequence can, if need be, be activated in three-hour shifts when needed.

Table 2  
NTS Net Schedule

Cycle One

10:00 AM Section  
10:45 AM Region  
11:30 AM Region  
12:30 PM Region

Cycle Two

1:00 PM Section  
1:45 PM Region  
2:30 PM Area  
3:30 PM Region

Cycle Three

4:00 PM Section  
4:45 PM Region  
5:30 PM Area  
6:30 PM Region

Cycle Four

7:00 PM Section  
7:45 PM Region  
8:30 PM Area  
9:30 PM Region  
10:00 PM Section

A few features of NTS structure may need some elaborating. The primary function of the Transcontinental Corps (TCC) is to link the activated cycles. The schedule plan calls for each area net -- Pacific Area Net (PAN), Central Area Net (CAN), Eastern Area Net (EAN) -- to hold a session per day at 11:30 AM, 2:30 PM, 5:30 PM, and 8:30 PM local time, and a maximum of 60 minutes allotted to them, to clear inter- and intra-area traffic. The system is symmetrical, regular and repeatable. This means, first, that the structure of the net sequencing is consistent from area to area; second, that a net session occurring at a given local time in the Eastern area should subsequently occur at the corresponding local times in the Central and Pacific areas.

Expansion of the four-cycle system schedule for emergencies and emergency-preparedness exercises, such as SET, augment the basic cycles. More importantly, normal daily sessions of nets at all levels of the system (ideally) remain intact during emergency operations. Expansion of the system during overloads is simple, involving a duplicate of the existing schedule, slid over an adjacent three hour period. Potential new area net sessions can be held, along with their

associated region, section and local nets. Minimum implementation currently consists of Cycles Two and Four.

Traffic from EAN to CAN is handled by direct check-in to CAN by the TCC operator. Many of the other TCC functions are out-of-net schedules, allowing optimum choice of band and mode to fit varying propagation conditions and operator preference. The time between the end of the Cycle Two PAN session and the start of the Cycle Four EAN session allows for an out-of-net TCC sked, followed by direct section net check-in on the East Coast, to speed up the same-day delivery service.

TCC skeds are from one cycle to the same cycle for westbound traffic, or from one cycle to the next cycle for eastbound traffic. That is to say, TCC functions which bring traffic from the West Coast to the East Coast, for example, connect the daytime PAN session with evening nets in the east, or the evening PAN session with the first next day EAN sequence. The significance of this concept is that it combines the discipline and training of a predetermined schedule, with the spontaneous determination of the level of activity required for any specific emergency exercise.

The original goals of the four-cycle plan are as follows:

Make daytime and evening NTS part of a single, unified system.

Resolve net time conflicts between areas.

Enhance daytime/evening participation. TCC functions provide daytime/evening crossovers, so that traffic is delivered in the next available cycle of NTS, regardless of time of day or mode.

The system will be consistent from area to area, from cycle to cycle.

Evening participants will understand (and support) the daytime cycle and vice versa, with no additional training.

No traffic will be compromised for any other traffic by irregular net sequencing.

### 3.2 Options

NTS is a volunteer traffic system, and it is not always practical to find traffic stations able to participate in nets at various levels at particular times. While in principle NTS nets find the personnel who can participate at the time designated, rather than change the time to suit the personnel, there is occasionally a necessity for a certain amount of non-uniformity in net meeting time, and options may be used at the discretion of the net manager. However, any such options are to be considered temporary and a return to normal NTS-recommended operating times should be made as soon as possible.

Whenever changes from normal routings and sequences are made, the appropriate Area Staff Chairs and Headquarters should be notified so that accurate net information will be available at a centralized point. In NTS, the right

hand should always know what the left hand is doing. No NTS net should consider itself independent of or unconcerned with the functioning of other parts of the system.

### 3.3 Deviation from Normal Routing

Failure to use the normal routings described above, if carried to the extreme, will result in "strangulation" of one or more NTS nets at region or area level. That is, if section nets send representatives to other section nets to clear traffic direct instead of through the region net, the region net will "starve" for traffic.

Similarly, if region nets maintain liaison with each other direct instead of through the common medium of the area net, the latter will have little traffic and will not prosper. It is in the interest of efficiency, organization, system, training and conservation of skilled personnel to use the NTS structure as it is intended to be used. [Let's not be ridiculous, however. Those who would follow the system to the letter are occasionally guilty only of unnecessarily delaying delivery.]

Any station in NTS, regardless of the function the operator performs, who receives a message destined to a point in his local calling area, should deliver that message rather than filter it further through the system. There are many metropolitan areas which straddle NTS net coverage boundaries but have common toll-free telephone coverage.

### 3.4 Adherence to Schedules

NTS depends on chronology of net meetings for its efficiency, so adherence to NTS schedules is of the greatest importance. In particular, TCC and liaison stations should not be held on any NTS net beyond the time they are scheduled to meet another net, even if all their traffic has not yet been cleared. Leftover traffic should be held, put on alternate routes including the NTS Digital Relay Station network or handled by special schedule later.

NTS nets should not operate beyond the time allotted to them. The time sequence in Table 2 shows the normal length on nets at various levels.

### 3.5 Alternate Routings

Deviations are made from normal routings only when normal channels are for some reason not available. A return to the use of normal NTS channels should be made as soon as possible. The net manager shall be the judge as to whether normal facilities are available, satisfactory or adequate in making any deviations. Alternate routings, if and when necessary, can include regular or specially arranged schedules, direct liaison to the NTS destination net, or use of the facilities of independent and NTS Digital Relay Station networks.

### 3.6 Check-In Policy

National Traffic System nets at local and section level are open to all amateurs in the coverage area of the net. At region and area level, participation is normally restricted to representatives of sections, and designated liaison stations. However, stations from outside the coverage area of the net concerned, or other not-regularly designated participants who report in with traffic will be cleared provided they can maintain the pace of the net as to procedure, speed and general net "savvy." Such stations reporting in without traffic will immediately be excused by the NCS unless they can supply outlets unavailable through normal NTS channels. Visitors to NTS nets should bear in mind that NTS nets operate on a time schedule and that no offense is intended in observance of the above check-in policy.

### 3.7 Boundaries

NTS net coverage areas are strictly defined and strictly observed in daily operation of the system, at section level, by ARRL section boundaries, at region level in accordance with the grouping of the sections into NTS regions based originally on call areas. Some of the regions are on call area basis (First, Second, Third, and Eighth), but others cover parts of two or more call areas. At area level the original basis was standard time zones, and the boundaries still roughly follow these lines without dividing any sections. The NTS routing guide gives details of boundaries of the various NTS echelons of operation.

Sections can be changed from one region to another at the request of the section leadership provided no disruption of the system's operation is involved. Normally, such requests will be considered only for sections located on boundary lines between regions. The time zone in which a section or region is located or mostly located exerts a strong influence in its assignment to a region and area.

The NTS HF Digital Station network is organized loosely along Area lines, with an Area Digital Coordinator in charge of the NTS Digital Stations in his/her Area.

### 3.8 Nomenclature

NTS nets at region and area level officially carry the name of the region or area they cover (Sixth Region Net, Pacific Area Net, etc.). Net "designations" at these levels vary somewhat (First Region Net is 1RN, Fifth Region Net is RN5, Twelfth Region Net is TWN and Eleventh Region Net, the only Canadian region net, calls itself Eastern Canada Net and uses the designation ECN). Section nets customarily carry the name of the section or sections they cover, but the actual name used is optional with the net. Some examples are Pine Tree Net (Maine), Buckeye Net (Ohio) and Northern California Net (five California Sections).

### 3.9 Combined Section Nets

Some ARRL sections which have little or no traffic interest have not organized section nets, while in some cases two or more sections have combined their facilities into a single net operating at section level. This latter practice is considered a desirable one where circumstances make it necessary and feasible. Such a combined-section net can participate in NTS in the same way as any other section net, with each representative representing both (or all) sections covered.

It is recommended that traffic handlers in sections which do not at present boast a section traffic net or packet node take steps to organize one for NTS representation. Lacking this, it might be possible to participate, temporarily at least, in the NTS net of an adjoining section, and be considered members of that section's net until such time as it is feasible to establish one. Such an arrangement, of course, requires the approval of the SM, STM and net manager of the section net concerned.

### 3.10 Limited Load Capability

Because the system operates on a time schedule with a definite flow pattern, NTS has difficulties under heavy load just as do all communications systems. Thus, in normal times, the system observes the "limited load" policy. It is the general policy of NTS to strive for handling the greatest quantity of traffic through efficiency rather than through long hours of operation. NTS nets must begin and terminate within certain time limits in order that liaisons can be maintained without delay. If traffic is not all cleared within the time limit, it is considered "overflow" traffic and must use alternative routings including the NTS digital station network or be held over.

Load capacity can be increased by providing additional stations to carry on liaison functions and TCC operations; by providing separate receive and transmit stations; and by pre-net sorting of traffic by region (outside the area of origination) and area, and concentrating the traffic in the hands of separate operators. This allows more expeditious operation in the area net. Use of liaison operators to the HF Digital Station network is also encouraged.

### 3.11 Observation of Time

In order to avoid confusion and effect standardization, NTS nets should endeavor to meet at the times officially designated for them in this booklet. Where temporary departures are necessary, care should be taken that this will not adversely affect the traffic flow or cause interference to other NTS nets because of time differences.

### 3.12 Frequencies

There is no specific NTS frequency plan. Each NTS net selects its own operating frequency in consideration of its requirements. Because in an emergency it may be necessary to operate many NTS nets simultaneously which ordinarily operate at different times, it is desirable for nets within normal interference range of each

other to use different center frequencies if possible. Within this consideration, it is also desirable to concentrate NTS operation on as few spot frequencies as possible to conserve frequency space, and to make full use of those spot frequencies used in order to help establish occupancy. ARRL's on-line Net Directory records net frequencies and times and is useful to study in planning new nets.

### 3.13 Manager Appointments

NTS net (packet node) managers at the local and section level are appointed or designated by the STM. All other NTS managers, including Area Digital Coordinators, are elected by NTS Area Staff members. Net Managers and Area Digital Coordinators are appointed for no specific term of office.

The Area Digital Coordinators are responsible for appointing the NTS Digital Relay Stations at HF.

### 3.14 Certification

NTS certificates are available at local, section, region, and area levels as well as for fulfilling TCC assignments. A participating station is eligible for an NTS net certificate when it has completed three months of performance (at least once per week), on an assigned basis, of one or more of three essential duties:

Regular participation as a net station. In the case of region and area nets, this means official representation of a section or region within its respective region or area. No credit is given in region or area nets for random participation.

Liaison with other nets of the National Traffic System. This applies only to regular liaison in accordance with the NTS flow pattern as assigned by the appropriate net manager. In the case of section nets, liaison with their proper region nets; in the case of region nets, liaison with their proper area nets; in the case of area nets, liaison with other area nets through regularly-assigned functions in the Transcontinental Corps.

Net Control Station (Net Control Station). The NCS is the operator that presides over the net session.

Certification in the Transcontinental Corps is available through the TCC area director on completion of at least three months of regular performance of an assigned function.

Net Managers (or TCC directors) may use their discretion in "excusing" any station working for a certificate if that station is unable to perform its regular duty in any specific instance. Net managers (or TCC directors) shall be the sole judges as to whether a duty, even though performed regularly, is performed adequately to merit certification.

Area Digital Coordinators issue certificates to NTS HF Digital Relay Stations.

### 3.15 Special Liaison Methods

Often managers at region and area levels will find that while one section or region can send few or no liaison stations, others have sufficient personnel to send several. In such cases, it is possible and perfectly permissible for the higher-level manager to propose to the lower-level manager to arrange that any excess personnel be used to effect liaison not being properly performed through lack of available stations.

Example: The manager of the Umph Region Net finds that many stations are available to represent Section A in his region, but Section B is seldom represented. He contacts the manager of the Section B Net and proposes that a Section A station be sent to the early meeting of Section B to take its "thru" (out-of-section) traffic. This station then brings such traffic to the Umph Region Net to be distributed among net stations as required. In addition, a Section A station in URN may be designated to receive all Section B traffic; this station then reports into the Section B Net to clear this traffic. Both receiving and sending functions must be completed for full representation.

The above technique is an alternative method of getting the traffic through and is under no circumstances to be used in preference to having a station from the section itself report to the region net. Normally, liaison of a lower-echelon net to a higher-echelon net is the responsibility of the manager of the lower-echelon net.

### 3.16 Volume Routine Traffic

Originating routine traffic in volume has the potential to lower delivery percentages thereby diminishing the viability of the system as a back-up for emergency use, simply because "operating enjoyment" becomes "work" and amateur radio operators with limited time are generally willing and able to cope with only finite quantities of routine messages. While in emergencies these amateur operators would be willing to move volumes of traffic at a sacrifice of time in the interest of public service, the origination and transmission through NTS of large volumes of routine messages over an infinite period of time, especially those with common texts to addressees unknown to the originator and absent of time value, can be counter-productive to the system's purpose and structure.

While such routine messages are welcome and indeed necessary for the continued training and practice of operators and for maintenance of the system, it may be necessary for NTS Area Staff Chairs, in consultation with their respective staffs, to establish guidelines for volume traffic in order to maintain the over-all health of the system.

## **Chapter Four: Operation During Disasters**

The National Traffic System is dedicated to communications during disasters on behalf of ARES, as well as the daily handling of third-party traffic. When a disaster situation arises, NTS is capable of expanding its cyclic operation into

complete or partial disaster operation depending entirely on the extent of the disaster situation and the extent of its effect. The normal cycles may be expanded as required by the situation, so that more traffic can be handled and so that it can be handled more rapidly. In the extreme case, the cycles can operate continuously, with required representation present in all nets continuously, with stations designed for this function replacing each other as others are dispatched to the higher or lower nets with which they make liaison.

In a situation like this, who alerts or activates NTS nets in a disaster and who determines which net or nets should be activated? ARRL Emergency Coordinators in disaster areas determine the communications needs and make decisions regarding the disposition of local communications facilities, in accordance with the need and in coordination with agencies to be served. The Section Emergency Coordinator, after conferring with the affected DECs and ECs, makes his recommendations to the Section Traffic Manager and/or NTS managers at section and/or region levels. The decision and resulting action to alert the NTS region management may be performed by any combination of these officials, depending upon the urgency of the situation.

While the EC is, in effect, the manager of ARES nets operating at local levels, and therefore makes decisions regarding their activation, managers of NTS nets at local, section, region and area levels are directly responsible for activation of their nets in a disaster situation, at the behest and on the recommendation of ARES or NTS officials at lower levels. The following "check lists" apply to officials at the levels indicated:

Figure 5, NTS alerting plan.

#### 4.1 Section Traffic Manager, Section Net Manager Functions

You may be contacted during a disaster situation by the SEC, to activate your section nets, whether NTS or not, either to provide section-wide contact or, in the case of NTS nets, to provide liaison with the "outside." Have some means of activating your net(s) at any time. Make it understood in your net that in the event of a disaster, net stations should monitor the net frequency. Some net stations, at locations badly needed, can be activated by telephone if phone lines are available.

Make contact with your NTS region net managers in the event that communications connected with the disaster transcend section boundaries, recommending extraordinary activation of the region net. You should have some prearranged method of contact for this purpose.

Designate net stations to conduct liaison with the NTS region net, either through another section net or direct. This is your responsibility, not that of the region net

manager.

#### 4.2 Region Net Manager Functions

Any one of the section officials in your region or another NTS region may contact you should a disaster situation develop. Try to predict such contact on the basis of circumstances and be available to receive their recommendation.

Make contact with your NTS area net manager in the event that communications connected with the disaster transcend region boundaries, recommending extraordinary activation of the area NTS net. Have some prearranged method of contact for this purpose.

It is your responsibility to see that the region is represented in any extraordinary session of the area net, in addition, of course, to all regular sessions.

#### 4.3 Area Net Manager Functions

There are only two area net manager appointees for each area, but their function during and after disasters is of paramount importance.

Maintain a high sensitivity to disasters in your area which extend or may extend beyond region boundaries. When one does, take the initiative to alert the region net manager involved to determine if extraordinary NTS operation is indicated.

In the event high precedence inter-area traffic is involved, contact the two TCC directors in your area to assist in making arrangements to clear the traffic to other areas.

Contact other NTS area net managers to confer on possibilities of their having extra net sessions if deemed required to handle the traffic reaching them through NTS inter-area handling. Under some circumstances, direct representation or "hot lines" may be indicated.

Maintain close contact with all region net managers in your area and make decisions regarding overall NTS operation in consultation with them.

#### 4.4 Transcontinental Corps Director Functions

These NTS officials will be involved only where traffic of a precedence higher than routine is to be handled between NTS areas, or when extreme overloads are anticipated.

Be ready to alert your TCC crew and set up special out-of-net schedules as required.

You may be called upon by the area net manager to set up "hot line" circuits between key cities involved in heavy traffic flow. Bear in mind which of your TCC stations are located in or near enough to large cities to man such circuits.

#### 4.5 Area Staff Chair Functions

The three Area Staff Chairs administratively oversee the NTS Officials and their operations, and will advise their TCC Directors, Area and Region Net Managers when appropriate. Their advice may be based on information forwarded by ARRL Headquarters.

Maintain a high sensitivity to disasters and other emergencies that may develop. Contact the other Area Staff Chairs via the International Assistance and Traffic Net and other prearranged schedules.

#### 4.6 General Policy

NTS operators should be self-alerting to disaster conditions that might require their services, and should report into an appropriately assigned net or other function without being specifically called upon. That is, the assignment should have been worked out with your net manager in advance. Each NTS operator should ask himself or herself: "What is my disaster assignment? If I hear of a disaster condition, what should I do?" If he/she cannot answer the question, he/she should seek an answer through his/her Net Manager. It may be as simple as "report into the X Net on X frequency." If the operator concerned is highly specialized, it might be "report to your TCC director in the X net on X frequency for a special assignment." Such an assignment might be an extra TCC function, or it might be as a functionary in a "hot line" point-to-point circuit needing special abilities or equipment.

Flexibility is needed, but a definite assignment pertaining to disaster operation is something that all NTS operators should have. If you don't have a specific assignment, push the matter with your net manager. NTS should be the front line of available Amateur Radio disaster communication.

#### 4.7 Health and Welfare Traffic

One of the biggest problems in a disaster is the handling of so-called "health and welfare" traffic or "disaster welfare inquiries." The ARRL-recommended

precedence for this type of traffic is W or "Welfare," and refers to either an inquiry as to the health and welfare of an individual in the disaster area or an advisory from the disaster area that indicates all is well. The influx of W traffic into the disaster area may be large, and NTS may be called upon to assist with this overload.

The NTS policy with respect to the handling of W traffic is to handle as much of it as possible, but to adhere to its precedence. Higher-precedence traffic must be handled first, W traffic only when the circuit is free. Routine (R) traffic is not normally handled by an NTS net operating under disaster conditions, because usually they more than have their hands full with higher precedence, but should a disaster circuit be temporarily available, there is no reason why it cannot be handled until the circuit again becomes occupied with higher-precedence traffic.

In a widespread disaster situation, it is seldom possible to handle all the Welfare traffic with efficiency and dispatch. Sometimes, in fact, such traffic piles up alarmingly, to the extent that much of it is never delivered. There are a number of ways in which this can be controlled, but few of them are consistent with public relations objectives.

The best way to handle such situations is to maintain close contact with the Red Cross or the Salvation Army as appropriate, since most inquiries are handled through these organizations. Civil preparedness organizations also can often set up procedures for handling such traffic. In the past, special digital circuits have been established with great success. Until or unless means for handling such traffic are established, it is usually wisest not to accept it from the general public, or to do so only with an explicit understanding that chances of delivery are not guaranteed.

## **Chapter Five: NTS Standard Net Procedures**

The following procedures are recommended as NTS standards. Deviations from these procedures are made at the discretion of the net manager in cognizance of either necessity or desirability arising out of extraordinary circumstances, but always as a temporary expedient until standard procedure can be resumed.

The following procedures apply to all NTS nets:

The net control station (NCS) transmits a net callup promptly at the pre-established net meeting time.

Stations reporting in indicate their function or the destination(s) for which they can take traffic, followed by the list of traffic on their hook, if any.

Time-consuming pleasantries and other superfluous matters are not to be a part of the procedure while the net is in session.

Net stations follow the direction of the NCS without question or comment if such directions are understood.

Explanations of any kind are not transmitted unless they are absolutely essential to the net's conduct.

Stations reporting into a net are held for 15 minutes, after which they are excused if there is no further traffic for them at that time. Stations in the net do not leave the net without being excused and do not ask to be excused unless absolutely necessary.

All nets follow the general precepts of net operation outlined in the ARRL Operating Manual.

## 5.1 Section Nets

The random call-up method should be used in most cases. The clearing of traffic should commence as soon as stations reporting in the net have traffic for each other, rather than waiting until all stations have reported in. The use of side frequencies (QNY) should be used extensively. The QNA procedure (stations answering in prearranged order) should only be used in times of traffic overload, or for acknowledging the region net representatives at the beginning of the net.

The following additional procedures are used in Section Nets:

Stations reporting in to the net with traffic, list the destination city first, then the number of messages for that city. Example-- "W2RQ DE AA2Z QTC Paterson 1 AR" Traffic destined outside the section is designated "through" (or "thru") followed by the number of "thru" messages. "Thru" traffic can also be listed for the appropriate region net.

The region net representative is selected beforehand by the section Net Manager, but nevertheless indicates his purpose in reporting in.

Stations do not list their traffic until first recognized by the NCS.

If a particular city for which there is traffic is not represented on the net, the NCS may inquire who will handle such traffic, direct that it be sent to the station who can take it to a local net or bulletin board for delivery, who is nearest to the destination or that it be mailed. In any case, there should be a minimum of discussion.

## 5.2 Region Nets

Stations reporting in indicate the section they came from if they are officially reporting for the purpose of handling traffic to or from that section. If their function is limited to sending or receiving, they should so indicate; otherwise the NCS will assume the station will do both.

Traffic for destinations within the region is reported by section. If the destination is outside the region, the traffic should be designated "thru" or for the area net. For example, "DE W9QLW QIN QTC WIS 3 ILL 2 CAN 2 AR" tells the NCS that W9QLW represents the Indiana section (QIN), and has traffic.

The area net liaison station (designated beforehand by the region net manager) receives all traffic designated for the area net.

Stations reporting in who are not authorized section representatives or liaisons simply indicate the traffic they have to send. If they do not have any traffic, they are immediately excused by the NCS, unless they can provide an outlet not available on the net through regular NTS channels.

In the event that a particular section is not represented in the region net, the NCS will use special liaison methods or any alternatives that are available for clearing traffic to that section.

### 5.3 Area Nets

Stations reporting in indicate traffic by region if it is destined for a region within that area or by area if it is destined to a point outside that area. All stations reporting in with assigned receive functions indicate for which region in the area or for which other area they are authorized to receive traffic.

The TCC representative designated to take traffic for another area so indicates in his QNI (check-in). For example, "DE W2MTA PAN QRU AR" tells the NCS that W2MTA has been assigned to take any traffic destined to the Pacific area and that he himself has no traffic.

### 5.4 Send and Receive Stations

Many NTS nets have adopted the procedure of sending more than one representative to the next-higher NTS echelon -- one to take the traffic up and report it in, another to receive traffic from the upper echelon and bring it back. More than one transmit or receive liaison may be provided if the traffic load is heavy and the personnel available is sufficient. It is perfectly permissible, and has many advantages in overload conditions -- to the NCS and the net -- for traffic both going and coming to be divided among two or more liaison stations.

Representatives who do not indicate which function they are performing will be assumed to be ready to perform both transmit and receive functions, at the discretion of the NCS. To indicate which you are performing, on CW send RX or TX after your QNI; on phone, say "receive only" or "transmit only," or "both."

## 5.5 Miscellaneous Procedures

When "QNY procedure" (dispatching stations to clear traffic on an adjacent or different frequency) is used, the station designated to receive traffic should call first, after zeroing on a spot near the QNY point comparatively free of QRM. When a two-way exchange is to be made on the net frequency, the station named first by the NCS is to call first.

In QNY procedure, (which should be used whenever traffic is heavy, if possible), the frequency designated by the NCS is not intended to be exact. NTS stations using this procedure will be careful not to disrupt other traffic nets or ongoing QSOs by carelessly plopping down and starting to call on the frequency. If QRM is heavy on the spot designated by the NCS, it is expected stations will attempt to find a spot nearby on which to clear their traffic rather than returning to net frequency without having cleared it.

It is not the policy for NTS nets to insist on a clear channel. Other stations operating on the frequency of an NTS net have a perfect right to be there. Net control stations should not request such stations to move. If the net frequency is occupied at net starting time, the NCS should call the net on a nearby clear frequency.

## 5.6 Section and Local NTS Traffic Nodes

On a daily basis, under the direction of Net (Node) Managers appointed by the STM, "Net" members, including Official Relay Stations specializing in packet traffic handling, ensure that NTS traffic is forwarded properly, or remove traffic from the boards and either deliver it or bring it to Section- and Local-level NTS nets for handling.

## 5.7 HF Digital Relay Stations

On a daily basis, under the direction of the Area Digital Coordinators, Digital Relay Station operators ensure that traffic is forwarded properly, or is removed from the nodes and either delivered or relayed to the appropriate Area, Region, Section- and Local-level NTS nets for handling.

## **Chapter Six: ARRL Precedences and Handling Instructions**

All messages handled by Amateur Radio should contain precedences -- that is, an evaluation of each message's importance, made by the originating station. A

precedence is an "order of handling." There are four precedences in the ARRL message form: Emergency, Priority (P), Welfare (W) and Routine (R), in that order of handling. When and as they appear on a net or any other kind of circuit, messages will be handled in this order.

## 6.1 Emergency

Any message having life and death urgency to any person or group of persons, which is transmitted by Amateur Radio in the absence of regular commercial facilities. This includes official messages of welfare agencies during emergencies requesting supplies, materials or instructions vital to relief to stricken populace in emergency areas. During normal times, it will be very rare. On CW, RTTY, AMTOR and packet this designation will always be spelled out. When in doubt, do not use this designation.

## 6.2 Priority

Use abbreviation P on CW, RTTY, AMTOR and packet. This classification is for important messages having a specific time limit, official messages not covered in the emergency category, press dispatches and emergency-related traffic not of the utmost urgency.

## 6.3 Welfare

This classification, abbreviated as W on CW, RTTY, AMTOR and packet, refers to either an inquiry as to the health and welfare of an individual in the disaster area or an advisory from the disaster area that indicates all is well. Welfare traffic is handled only after all emergency and priority traffic is cleared. The Red Cross equivalent to an incoming Welfare message is DWI (Disaster Welfare Inquiry).

## 6.4 Routine

Most traffic in normal times will bear this designation. In disaster situations, traffic labeled Routine (R on CW, RTTY, AMTOR and packet) should be handled

last, or not at all when circuits are busy with higher-precedence traffic.

The precedence will follow, but is not a part of the message number. For example, a message may begin with NR 207 R on CW, "Number Two Zero Seven, Routine" on phone.

## 6.5 Handling Instructions

Handling instructions (HX) are less used but quite useful in handling messages. They serve to convey any special instructions to handling and delivering operators. This "prosign," when used, is inserted in the message preamble between the precedence and the station of origin. Its use is optional with the originating stations, but once inserted is mandatory with all relaying stations.

The following definitions apply:

HXA--(Followed by number) Collect landline delivery authorized by addressee within X miles. (If no number, authorization is unlimited.)

HXB--(Followed by number) Cancel message if not delivered within X hours of filing time; service originating station.

HXC--Report date and time of delivery (TOD) to originating station.

HXD--Report to originating station the identity of station from which received, plus date and time. Report identity of station to which relayed, plus date and time, or if delivered report date, time and method of delivery.

HXE--Delivering station get reply from addressee, originate message back.

HXF--(Followed by number.) Hold delivery until...(specific date).

HXG--Delivery by mail or landline toll call not required. If toll or other expense involved, cancel message and service originating station.

Example: NR 207 R HXA50 W4MLE 12...(etc.).

If more than one HX prosign is used, they can be combined if no numbers are to be inserted, otherwise the HX should be repeated thus: NR 207 R HXAC W4MLE...(etc.). On phone, use phonetics for the letter or letters following the HX, to ensure accuracy.

Public Service >> NTS Manual >> Chapter Six: ARRL Precedences and Handling Instructions

## **Chapter Seven: Operation of the Transcontinental Corps**

The purpose of the Transcontinental Corps (TCC) is to relay traffic from one NTS

area to another, conducting liaison with NTS nets to do so. Each NTS cycle has specific functionaries under the supervision of a TCC director.

The function of the TCC director is to assign functions, centralize, coordinate and supervise these activities and file status reports each month with ARRL Headquarters. There are six TCC directors, two for each area.

TCC functions are performed in several ways, according to circumstances. In many cases, the method used is an out-of-net schedule between TCC counterparts of different areas to effect the exchange of traffic from one area to another.

Times and frequencies of the schedules are worked out by the TCC directors working together and are arranged in accordance with time available, propagation conditions, stations available and other factors, always with the objective of the best service possible on an organized, systematic basis.

TCC stations must have the following qualifications:

Adequate signal power and appropriate mode to perform the job to be done.  
The highest caliber of operating ability and NTS net savvy.  
Capability (both operator and equipment) to keep the required schedules.

## 7.1 TCC Station Functions

A TCC station might perform only one TCC function per week. On other days of the week, other stations perform the same function. TCC operates on a seven-day-per-week basis. Each function consists of two steps, as follows (all times in UTC):

### Station A

Normally located in the Eastern Area, this station reports into Eastern Area Net at 0130, receives all traffic for the Central Area.

Reports into Central Area Net (CAN) the same night at 0230, distributes the traffic upon direction of the CAN control station.

### Station B

Normally located in the Eastern Area, this station reports into Eastern Area Net (EAN) at 0130, receives all traffic for the Pacific Area.

Keeps a schedule with Station H some time between 0230 and 0430 and sends this traffic to him/her.

### Station C

Normally located in the Central Area, reports into Central Area Net (CAN) at 0230, takes all traffic for the Eastern Area.

Keeps a schedule with Station K some time after 0330 and sends this traffic to him/her.

Station D

Normally located in the Eastern Area, this station keeps a schedule with Station J some time between 0530 and 1930 to receive traffic for the Eastern Area.

Sends this traffic into destination Local, Section, Region or Eastern Area Nets at first opportunity.

Station E

Normally located in the Central Area, this station reports into Central Area Net (CAN) at 0230, receives all traffic for the Pacific Area.

Keeps a schedule with Station G between 0330 and 0430 and sends this traffic to him/her.

Station F

Normally located in the Central Area, this station keeps a schedule with Station I between 0530 and 2030 to receive traffic for the Central Area.

Sends this traffic into destination Local, Section, Region or Central Area Nets as soon as possible after received.

Station G

Normally located in the Pacific Area, this station keeps a schedule with Station E between 0330 and 0430 to receive traffic for the Pacific Area.

Reports into the Pacific Area Net (PAN) at 0430 to distribute this traffic under direction of the PAN control station.

Station H

Normally located in the Pacific Area, this station keeps a schedule with Station B between 0230 and 0430 to receive traffic for the Pacific Area.

Reports into the Pacific Area Net at 0430 to distribute this traffic under direction of the PAN control station.

Station I

Normally located in the Pacific Area, this station reports into the Pacific Area Net (PAN) at 0430 to receive traffic for the Central Area.

Keeps a schedule with Station F between 0530 and 2030 to send this traffic.

Station J

Normally located in the Pacific Area, this station reports into the Pacific Area Net (PAN) at 0430 to receive traffic for the Eastern Area.

Keeps a schedule with Station D between 0530 and 1930 to send this traffic.

Station K

Normally located in the Eastern Area, this station keeps a schedule with Station C between 0330 and 1930 to receive traffic for the Eastern Area.  
Sends this traffic into destination Local, Section, Region or Eastern Area Nets as soon as possible after received.

Station L

Normally located in the Eastern Area, this station reports into Eastern Area Net (EAN) at 1930, receives all traffic for the Central Area.  
Reports into Central Area Net (CAN) at 2030, distributes the traffic upon direction of the CAN control station.

Station M

Normally located in the Eastern Area, this station reports into Eastern Area Net (EAN) at 1930, receives all traffic for the Pacific Area.  
Keeps a schedule with Station S some time between 2030 and 2230 and sends this traffic to him/her.

Station N

Normally located in the Central Area, reports into Central Area Net (CAN) at 2030, takes all traffic for the Eastern Area.  
Keeps a schedule with Station V some time after 2130 and sends this traffic to him/her.

Station O

Normally located in the Eastern Area, this station keeps a schedule with Station U sometime between 2330 and 0130 to receive traffic for the Eastern Area.  
Sends this traffic into destination Local, Section, Region or Eastern Area Nets at first opportunity.

Station P

Normally located in the Central Area, this station reports into Central Area Net (CAN) at 2030, receives all traffic for the Pacific Area.  
Keeps a schedule with Station R between 2130 and 2230 and sends this traffic to him/her.

Station Q

Normally located in the Central Area, this station keeps a schedule with Station T between 2330 and 0230 to receive traffic for the Central Area.  
Sends this traffic into destination Local, Section, Region or Central Area Nets as soon as possible after received.

Station R

Normally located in the Pacific Area, this station keeps a schedule with Station P between 2130 and 2230 to receive traffic for the Pacific Area.  
Reports into the Pacific Area Net (PAN) at 2230 to distribute this traffic under the direction of the PAN control station.

## Station S

Normally located in the Pacific Area, this station keeps a schedule with Station M between 2030 and 2230 to receive traffic for the Pacific Area.

Reports into the Pacific Area Net at 2230 to distribute this traffic under the direction of the PAN control station.

## Station T

Normally located in the Pacific Area, this station reports into the Pacific Area Net (PAN) at 2230 to receive traffic for the Central Area.

Keeps a schedule with Station Q between 2330 and 0230 to send this traffic.

## Station U

Normally located in the Pacific Area, this station reports into the Pacific Area Net (PAN) at 2230 to receive traffic for the Eastern Area.

Keeps a schedule with Station O between 2330 and 0130 to send this traffic.

## Station V

Normally located in the Eastern Area, this station keeps a schedule with Station N between 2130 and 0130 to receive traffic for the Eastern Area.

Sends this traffic into destination Local, Section, Region or Eastern Area Nets as soon as possible after received.

In addition, functions equivalent to the Q/T and O/T schedules are implemented in accordance with Cycle One in the Pacific Area. Further, the Atlantic Region Net (ARN) maintains liaison with EAN for the movement of international message traffic into and out of the NTS.

Figure 6, how TCC works.

## **Chapter Eight: Operation of the Digital System**

### 8.1 HF Digital NTS Operations

Radiogram-formatted NTS traffic on HF is being handled by digital means on the so-called "APLink system." This system is a group of mailbox, store-and-forward (MBO) station operators spanning the country. Many of these stations have the capability of receiving and sending traffic via several digital modes including packet, by HF and VHF, all interchangeably. For example, a message received on HF Clover can be forwarded via VHF packet without modification. This flexibility is one of the system's assets as it allows for forwarding along the best path at the time, resulting in the highest efficiency and reliability.

The chief concerns of the digital system, of course, are responsibility and accountability -- most MBO system operators are not concerned about NTS traffic that passes through their systems. Radiograms arriving at their stations are occasionally passed out the VHF port into the packet forwarding system with no guarantee that they will get to their destination. Many of these messages end up in the infamous "black hole" or "bit bucket." Naturally, this violates the most basic principle of NTS: getting the message through all the way, from originator to addressee.

What's the answer? The solution is to introduce responsibility and accountability into the mix, just like we do with traditional NTS nets and operators.

Interested MBO system operators are now certified as "NTS Digital Relay Stations" and as such, they accept responsibility for relaying traffic only to other NTS Digital Relay Stations or NTS-approved nets or nodes. They are appointed by, and are accountable to, their Area Digital Coordinator, who is elected by the Area Staffs and who serves as an NTS Official and official member of the Area Staff. The ADCs maintain and publish a roster of these stations and report their activity to HQ. This way, the traffic stays "in the family," giving it the best chance for proper delivery.

The network of NTS-approved HF Digital Relay Stations is a mighty tool that, when used properly, can provide support to the traditional NTS nets, at any level. The digital network can pick up and move traffic when normal NTS nets cannot, due, for example, to an overloading situation, or lack of normal liaison operators.

## 8.2 VHF Packet Radio Bulletin Boards

NTS can take advantage of local packet radio bulletin boards for their ability in buttressing Local and Section NTS Nets and getting channels closer to traffic origination and destination points. Again, however, the concern is that traffic might end up in a "black hole." Fortunately, many Section Traffic Managers have recognized this potential problem, and are working to ensure that packet BBSs (PBBS) are being cleared of radiogram NTS traffic each day.

Some STMs have found it extremely effective to appoint "Net" Managers to manage the NTS element of these PBBSs. "Net" members, including Official Relay Stations specializing in packet traffic handling, ensure that traffic is forwarded properly, or remove traffic from the boards and either deliver it or bring it to Section- and Local-level NTS nets for handling.

Some STMs have gone so far as to affiliate a major PBBS as an NTS Local or Section "Net." If every Section were as vigilant, packet would be a more reliable

resource for moving traffic expeditiously, and with accountability.

## **Chapter Nine: NTS Traffic Routing**

The following example shows how traffic is or can be routed through the National Traffic System. In each case, perfect (ideal) operating conditions and 100% adherence to system as previously outlined are assumed.

### 9.1 Example of NTS Message Routing

This example demonstrates how a message originating in Florida finds its way to Los Angeles in the evening cycle. W4ABC is an amateur in St. Petersburg, Florida who has been asked to originate a message to Los Angeles. All times are UTC, assuming local standard time is being observed throughout.

W4ABC reports the message into the West Central Florida Section Net at 0000 and transmits it to W4ANK, the station designated to take traffic to 4RN.

W4ANK takes the message to 4RN at 0045, gives it to N4GHI, the station designated to take traffic to EAN.

N4GHI reports the message into EAN at 0130, gives it to W3PQ, who is TCC Station B.

W3PQ keeps a TCC out-of-net schedule with N6GIW (TCC Station H) and sends him the message. This is a transcontinental hop, but the two stations involved may pick any frequency or mode in any band. The exchange must have been completed by 0430, when PAN meets.

N6GIW reports the message into PAN at 0430, gives it to W6JXK, the RN6 (receive) representative.

W6JXK reports the message into RN6 at 0530, gives it to W6INH, the Los Angeles Section representative.

W6INH reports it into Southern California Net at 0600, gives it to K6INK, the Los Angeles station nearest the destination.

K6INK can telephone or otherwise deliver the message to the addressee upon receipt. The message originated in South Carolina at 0000, was delivered in LA at about 0630.

In addition to the NTS routing system, wide-coverage independent nets and direct connections to key cities in foreign countries are also available. These key cities, usually accessed through the independent nets, have been especially valuable in assisting with disaster communications in Central and South America. The independent nets take on a wide variety of types and forms with many of the most active heard daily on 40 and 20 meters. The 20-meter nets, particularly the International Assistance and Traffic Net, are especially important in covering the areas of the Caribbean, Central, North and South America.

## 9.2 NTS Routing Guide

State/Province	Abbr.	Region	Area
Alaska	AK	7	PAN
Alabama	AL	5	CAN
Alberta	AB	7	PAN
Arizona	AZ	12	PAN
Arkansas	AR	5	CAN
British Columbia	BC	7	PAN
California	CA	6	PAN
Colorado	CO	12	PAN
Connecticut	CT	1	EAN
Delaware	DE	3	EAN
District of Columbia	DC	3	EAN
Florida	FL	4	EAN
Georgia	GA	4	EAN
Guam	GU	6	PAN
Hawaii	HI	6	PAN
Idaho	ID	7	PAN
Illinois	IL	9	CAN
Indiana	IN	9	CAN
Iowa	IA	10	CAN
Kansas	KS	10	CAN
Kentucky	KY	9	CAN
Labrador	LB	11	EAN
Louisiana	LA	5	CAN
Maine	ME	1	EAN
Manitoba	MB	10	CAN
Maryland	MD	3	EAN
Massachusetts	MA	1	EAN
Michigan	MI	8	EAN
Minnesota	MN	10	CAN
Mississippi	MS	5	CAN
Missouri	MO	10	CAN
Montana	MT	7	PAN
Nebraska	NE	10	CAN
Nevada	NV	6	PAN
New Brunswick	NB	11	EAN
New Hampshire	NH	1	EAN
New Jersey	NJ	2	EAN
New Mexico	NM	12	PAN
New York	NY	2	EAN
Newfoundland	NF	11	EAN
North Carolina	NC	4	EAN
North Dakota	ND	10	CAN

Nova Scotia	NS	11	EAN
Ohio	OH	8	EAN
Oklahoma	OK	5	CAN
Ontario	ON	11	EAN
Oregon	OR	7	PAN
Pennsylvania	PA	3	EAN
Prince Edward Island	PE	11	EAN
Puerto Rico	PR	4	EAN
Quebec	PQ	11	EAN
Rhode Island	RI	1	EAN
Saskatchewan	SK	10	CAN
South Carolina	SC	4	EAN
South Dakota	SD	10	CAN
Tennessee	TN	5	CAN
Texas	TX	5	CAN
Utah	UT	12	PAN
Vermont	VT	1	EAN
Virginia	VA	4	EAN
Virgin Islands	VI	4	EAN
Washington	WA	7	PAN
West Virginia	WV	8	EAN
Wisconsin	WI	9	CAN
Wyoming	WY	12	PAN
APO New York	APO NY	2	EAN
APO San Francisco	APO SF	6	PAN

### 9.3 Message Routing in the Digital Station Network

In the HF system of NTS Digital Relay Stations, routings are more flexible, and are left to the discretion of the individual mailbox operators, under the general direction of the Area Digital Coordinators.

Routings should, of course, be planned with the goal of moving the traffic as close to its destination as quickly as possible, and/or to fill a liaison function that cannot be met in the traditional system. Routing should always be made with stations that can be relied upon to handle the traffic expeditiously and responsibly, under NTS official authority and direction.

The same principles apply to the VHF packet network of NTS nodes at the local and Section levels. It is the responsibility of the Section Traffic Manager and the Net (Node) Managers to ensure that NTS traffic is cleared, or otherwise forwarded or handled expeditiously, on a daily basis.

The following example shows how traffic is or can be routed through the National Traffic System. In each case, perfect (ideal) operating conditions and 100% adherence to system as previously outlined are assumed.

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N4GHI reports the message into EAN at 0130, gives it to W3PQ, who is TCC Station B.

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K6INK can telephone or otherwise deliver the message to the addressee upon receipt. The message originated in South Carolina at 0000, was delivered in LA at about 0630.

In addition to the NTS routing system, wide-coverage independent nets and direct connections to key cities in foreign countries are also available. These key cities, usually accessed through the independent nets, have been especially valuable in assisting with disaster communications in Central and South America. The independent nets take on a wide variety of types and forms with many of the most active heard daily on 40 and 20 meters. The 20-meter nets, particularly the International Assistance and Traffic Net, are especially important in covering the areas of the Caribbean, Central, North and South America.

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Alabama	AL	5	CAN
Alberta	AB	7	PAN
Arizona	AZ	12	PAN
Arkansas	AR	5	CAN
British Columbia	BC	7	PAN
California	CA	6	PAN
Colorado	CO	12	PAN
Connecticut	CT	1	EAN
Delaware	DE	3	EAN
District of Columbia	DC	3	EAN
Florida	FL	4	EAN
Georgia	GA	4	EAN
Guam	GU	6	PAN
Hawaii	HI	6	PAN
Idaho	ID	7	PAN
Illinois	IL	9	CAN
Indiana	IN	9	CAN
Iowa	IA	10	CAN
Kansas	KS	10	CAN
Kentucky	KY	9	CAN
Labrador	LB	11	EAN
Louisiana	LA	5	CAN
Maine	ME	1	EAN
Manitoba	MB	10	CAN
Maryland	MD	3	EAN
Massachusetts	MA	1	EAN
Michigan	MI	8	EAN
Minnesota	MN	10	CAN
Mississippi	MS	5	CAN
Missouri	MO	10	CAN
Montana	MT	7	PAN
Nebraska	NE	10	CAN
Nevada	NV	6	PAN
New Brunswick	NB	11	EAN
New Hampshire	NH	1	EAN
New Jersey	NJ	2	EAN
New Mexico	NM	12	PAN
New York	NY	2	EAN
Newfoundland	NF	11	EAN
North Carolina	NC	4	EAN
North Dakota	ND	10	CAN
Nova Scotia	NS	11	EAN
Ohio	OH	8	EAN
Oklahoma	OK	5	CAN
Ontario	ON	11	EAN
Oregon	OR	7	PAN

Pennsylvania	PA	3	EAN
Prince Edward Island	PE	11	EAN
Puerto Rico	PR	4	EAN
Quebec	PQ	11	EAN
Rhode Island	RI	1	EAN
Saskatchewan	SK	10	CAN
South Carolina	SC	4	EAN
South Dakota	SD	10	CAN
Tennessee	TN	5	CAN
Texas	TX	5	CAN
Utah	UT	12	PAN
Vermont	VT	1	EAN
Virginia	VA	4	EAN
Virgin Islands	VI	4	EAN
Washington	WA	7	PAN
West Virginia	WV	8	EAN
Wisconsin	WI	9	CAN
Wyoming	WY	12	PAN
APO New York	APO NY	2	EAN
APO San Francisco	APO SF	6	PAN

### 9.3 Message Routing in the Digital Station Network

In the HF system of NTS Digital Relay Stations, routings are more flexible, and are left to the discretion of the individual mailbox operators, under the general direction of the Area Digital Coordinators.

Routings should, of course, be planned with the goal of moving the traffic as close to its destination as quickly as possible, and/or to fill a liaison function that cannot be met in the traditional system. Routing should always be made with stations that can be relied upon to handle the traffic expeditiously and responsibly, under NTS official authority and direction.

The same principles apply to the VHF packet network of NTS nodes at the local and Section levels. It is the responsibility of the Section Traffic Manager and the Net (Node) Managers to ensure that NTS traffic is cleared, or otherwise forwarded or handled expeditiously, on a daily basis.

## Chapter Ten: Counting Net Traffic

### 10.1 Net Traffic Count

The basic count for traffic handled in nets is one point for each time a message in

standard ARRL form is transmitted and received during a net session, at the direction of the net control station. This has nothing to do with the individual station traffic count. In a net count there is no breakdown of originated, received, sent and delivered traffic as there is for individual stations. The count is the number of message handlings accomplished during the net's directed sessions. This is simple enough, yet there seems to be considerable confusion about it.

A few examples may be helpful:

Upon conclusion of his directed net, an NCS operator finds that there were 23 messages reported into the net and that 20 of these were "cleared" -- that is, at his direction the messages were transmitted by the station holding them and receipted for by the station receiving them. The total traffic count for this net session was therefore 20. It makes no difference to the total count whether the messages were originals with the transmitting station, whether he is relaying them, whether they are addressed to the receiving station, delivered by the latter or relayed by him. All the net is concerned with is handling them, from one station to the other. Note that the net does not get credit for traffic reported, only for traffic cleared.

The net control must base his count on the figures reported to him by net stations. Thus, if a station reporting into the net says he has five messages and later succeeds in clearing them at net control's direction, the net gets credit for handling five messages. However, if the net control dispatches this station and the station to receive the messages to a side frequency to clear them, then closes the net five minutes later, the NCS won't know whether the traffic was successfully cleared, or how many were cleared. If he checks with the operators later, he can enter the exact count. Otherwise, knowing the ability of the two operators concerned, he can estimate what proportion of the traffic was cleared. It is not considered ethical to QNY large amounts of traffic just prior to closing a net and then count all such traffic as having been cleared during QND.

Booked messages may be reported into the net as book traffic while indicating the necessary routing information to the net control station. The practice of counting book traffic as "3 for 1" has been discontinued for both net and individual traffic counts.

Don't waste valuable net time fussing about the count. The important thing is to get the traffic handled!

## 10.2 Individual Traffic Count

As already mentioned, the individual's traffic count does not have any correlation to the net's traffic count; it is a separate count that each traffic handler should report to his/her Section Traffic Manager or Section Manager each month. Traffic totals may be included in the SM's monthly report. Here are the definitions of each message category:

Originated -- One point for each message from a third party for sending via your station. This "extra" credit is given for an off-the-air function because of the value

of contact with the general public.

**Sent** -- Every message sent over the air from your station to another amateur receives a point in this category. Thus, a message that is eligible for an Originated point as above receives another point when it is sent on the air. Likewise, a message that is received on the air conveys a Sent point when it is relayed to another station. A message that you initiate yourself, while it gets no Originated point, gets a Sent point when cleared. All Sent points require on-the-air sending.

**Received** -- A message received over the air gets a Received point, whether received for relaying (sending) or for delivery to the addressee. Any message received which is not eligible for a Delivery point (such as one addressed to yourself) is nevertheless eligible for a Received point.

**Delivered** -- The act of delivery of a message to a third party receives a point in this category, in addition to a Received point. This is strictly an off-the-air function and must be coupled with receipt of the message at your station. Thus you can't get a Delivered point unless you first get a Received point.

## **Chapter Eleven: On Getting More Traffic**

A concern has been expressed that the addition of digital stations will "rob" traditional NTS nets of their lifeblood, traffic. A look at the current net statistics will show that many region nets are handling only a few messages per session. There is no question that without traffic, NTS nets will starve and die.

Each and every one of us, therefore, must do our part to support the origination of more traffic:

Each Section or Local NTS net in the section should sponsor a message fair at a public place or event once or more a year. Nets should coordinate their scheduling of events throughout the year. This may be a good project for even a Region Net, that could sponsor a message booth at a large, regional exposition, for example. Not only would this program of public contact generate more traffic, but it would also provide a great social event for Net members themselves, resulting in closer bonding and higher morale.

Each Official Relay Station appointee should be encouraged to originate a minimum of 10 messages per month.

Each traffic handler in the section should be encouraged to bring at least one message per Net check-in. Checking in QRU is to be frowned upon, akin to going to a pot-luck supper without your contribution of a dish! "Each one, bring one," should be every net's motto.

Section Traffic Managers should install Local NTS Nets on repeaters to gain access to new Technicians. New traffic handlers mean more traffic. A side-benefit is that there will be new candidates for upper level liaison and NCS functions following service of their apprenticeships at the Section level and below. Far too many Region Nets, for example, rely on one or two Net members to carry the workload over the majority of sessions per week.

PBBS software should be incorporated on NTS-cooperative boards to prompt/teach users on how to originate/send a message in radiogram format. A separate, stand-alone program should also be developed for use "off-line" to accomplish the same function.

Basic educational/motivational articles should appear more regularly in QST and other League publications. Send your contributions to HQ for use in QST.

The traffic handling community are encouraged to take advantage of the NTS awards program (PSHR, BPL, etc.) sponsored by ARRL.

NTS Officials are to be encouraged to put on traffic handling seminars for new hams at conventions, hamfests and club meetings to generate interest in our activity.

## **Appendix A: National Traffic System**

### Terms of Reference

The National Traffic System Terms of Reference provides official guidance to NTS officials above the section level -- such as Transcontinental Corps Directors, Area and Region Net Managers, Area Digital Coordinators and Area Staff Chairs.

The name of the particular area staff -- Eastern, Central, or Pacific -- should be inserted in each blank in this document.

### Article One: Name

The name of the organization shall be the \_\_\_\_\_ Area Staff. The \_\_\_\_\_ Area encompasses the \_\_\_\_\_ Regions of the National Traffic System.

### Article Two: Purpose and General Functions

The purpose of the \_\_\_\_\_ Area Staff is to implement the mission of the National Traffic System above the section level in the \_\_\_\_\_ Area as prescribed in the Public Service Communications Manual. The National Traffic System provides an integrated network structure to promote accurate and efficient movement of message traffic from origin to destination as a public service, and to train a cadre of amateur radio operators to handle message traffic in an organized, coordinated network environment.

The functions of the \_\_\_\_\_ Area Staff are as follows:

- 1) Management of the daily operation of the Digital Relay Station, Transcontinental Corps (TCC), Area Net, and Region Net functions in the \_\_\_\_\_ Area in accordance with the policies and procedures prescribed in the Public Service Communications Manual. Temporary deviations from the standards are coordinated with and approved by the Area Staff Chair, in cooperation with other affected Areas.

2) Responsibility for administration of the National Traffic System at the Section level is vested in the office of the Section Manager, and under delegated authority of the Section Traffic Manager. The Area Staff shall cooperate with Section level officials to foster a harmonious relationship between the Section and higher levels of the System.

3) Study and make recommendations on System development issues. To meet this responsibility, the Staff may retain the services of expert advisors as Associate Members on an ad hoc basis. See Article Four: Membership. Recommendations for specific actions shall be delivered to the Chair for joint review and action by the three Area Staff Chairs and the Field Services and Radiosport Manager, as appropriate.

#### Article Three: Specific Responsibilities

##### TCC Directors:

1) Manage TCC scheduled functions. Appoint capable, experienced operators to the schedules assigned to related NTS cycles.

2) Maintain close association with the assigned TCC operators and with all other TCC Directors in the System. Represent the collective views of the operators to the Area Staff on questions involving NTS policies and procedures.

3) Provide leadership and work with other NTS Officials to establish additional schedules, links, hot lines, or gateways between Regions and Areas of the System when needed.

##### Area Digital Coordinators:

1) Establish digital communication standards for NTS applications in consultation with Digital Relay Station operators.

2) Integrate digital communications with other modes within the system.

3) Appoint and manage the Digital Relay Station roster within the area.

##### Area Net Managers:

1) Manage Net operation in general. Work with Region Net Managers for the provision of representatives from the Region Nets.

2) Maintain close association with Net appointees, and represent their collective views to the Area Staff on questions involving NTS policies and procedures.

#### Region Net Managers:

- 1) Manage Net operation in general. Appoint and train qualified net control stations. Appoint representatives to the Area Net. Work with Section-level officials for the provision of liaison stations from Section to Region Nets.
- 2) Maintain close association with Net appointees, and represent their collective views to the Area Staff on questions involving NTS policies and procedures.

#### All NTS Officials:

- 1) Nominate candidates for the position of TCC Director, Area Digital Coordinator, Region and Area Net Manager, and Member at Large when vacancies occur. Ensure that all candidates are current League members. Elect replacements by popular vote.
- 2) Resolve Net, TCC function and Digital Relay Station problems in cooperation with the Area Staff Chair and the Field Services and Radiosport Manager, as appropriate.
- 3) No action or recommendation of an Area Staff will usurp the broad prerogatives of individual TCC Directors, Area Digital Coordinators, Region and Area Net Managers in matters concerning the internal operation of the net, or function, except in those subject to review by the full Area Staff due to possible impact on the System external to the net.
- 4) Expand NTS capabilities, especially in the areas of system redundancy/reliability and emergency/disaster communications.
- 5) Issue certificates to Net or function operators as required.
- 6) Report monthly on Net/function activity to ARRL Headquarters.

#### Article Four: Membership

The \_\_\_\_\_ Area Staff shall consist of the following Full Members with voting privileges:

- 1) TCC Directors. Elected by plurality vote of the Staff. Term of appointment shall be indefinite subject to the maintenance of satisfactory performance.
- 2) Area Net Managers. Elected by plurality vote of the Staff. Term of appointment shall be indefinite subject to the maintenance of satisfactory performance.

3) Region Net Managers. Elected by plurality vote of the Staff. Term of appointment shall be indefinite subject to the maintenance of satisfactory performance.

4) Area Digital Coordinators. Elected by plurality vote of the Staff. Term of appointment shall be indefinite subject to the maintenance of satisfactory performance.

5) Members-at-Large. Elected by plurality vote of the Staff. Term of appointment shall be three calendar years. There shall be two MAL positions.

6) The Area Staff Chair may appoint additional advisors as Associate Members on an ad hoc basis during studies of specific development issues. Associates do not hold Area Staff voting privileges, and are not entitled to NTS funding.

#### Article Five: Area Staff Chair

The Chair shall be elected from the Staff membership by plurality vote of the Staff to serve a term of two years.

The responsibilities of the Chair are as follows:

1) The Chair shall hold full responsibility and authority for the management, control and direction of \_\_\_\_\_ Area Staff functions, in accordance with the policies and procedures specified in the Public Service Communications Manual.

2) The Chair shall represent the \_\_\_\_\_ Area Staff during deliberations of the three Area Staff Chairs. When a matter involves a major published policy or procedure, or affects the operations of the other NTS Areas, the matter shall be addressed jointly by the three Area Staff Chairs with recommendations to the Field Services and Radiosport Manager for appropriate action.

3) The Chair shall conduct Staff elections and notify the Field Services and Radiosport Manager of new appointments to the Staff.

4) The Chair shall plan and conduct periodic staff meetings. Rules of conduct of meetings are specified by the Chair.

5) The Chair shall prepare and submit periodic reports concerning the activities and procedures of his or her staff.

#### Article Six: Methods and Procedures

1) A majority of the Staff will serve as a quorum for official Staff actions. In order

for election results to be valid, a majority of the Staff must return completed ballots.

### Meetings

2) The Staff may meet periodically, informally, formally or on-the-air, to address Area Staff matters, problems and formulate policy recommendations to be submitted to the Area Staff Chair. Provided there are sufficient matters requiring in-person consideration, and a specific agenda is established, the Area Staff Chair may call an in-person meeting. (Travel and accommodation expenses may be borne by the League provided a sufficient appropriation is allocated by the Board of Directors. Such authorizations are addressed by the Area Staff Chair, and approved by the Field Services and Radiosport Manager.)

3) The Area Staff Chair shall attend the in-person meetings of the three Area Staff Chair when called by the Field Services and Radiosport Manager or by unanimous call of the three Chairs.

### General Procedures

4) The operations of the National Traffic System shall be conducted in accordance with the policies and procedures published in the Public Service Communications Manual.

5) Changes to the Public Service Communications Manual shall be recommended in writing to the three Area Staff Chairs with subsequent recommendations forwarded to the Field Services and Radiosport Manager for action.

6) The three Area Staff Chairs, and the additional staff members selected by each of the chairs, shall serve as a standing committee of the National Traffic System to study and make recommendations to the three chairs relating to current policies, standards and practices intended for the National Traffic System and third-party message traffic handling operations.

### Staff Vacancies

7) In the event a staff position is to become vacant, the Chair shall solicit nominations for the replacement. A nomination should be solicited from the outgoing NTS Official. The Chair shall state a reasonable closing date for nominations. Following the closing date, if more than one valid nomination has been received, an election shall be conducted by the Chair. If only one valid nomination is received by the closing date, the Chair will conduct a survey of the staff for approval of the candidate before notifying the Field Services and Radiosport Manager of the selection. Upon notification, the Field Services and Radiosport Manager will issue the appointment documentation.

8) Staff members not fulfilling basic performance standards will be subject to sanctions including possible appointment revocation by vote of the full staff. Staff members failing to report assigned net activity for a period of two months without a valid reason, as observed by the Field Services and Radiosport Manager and reported to the Area Staff Chair, will be subject to appointment termination.

9) Area, Region and Section Net Managers, Area Digital Coordinators and TCC Directors shall conform their nets and operations to the standards and procedures specified in the Public Service Communications Manual, unless otherwise expressly recommended, authorized or directed by the Area Staff Chair following consultation with Area Staff members, other Area Staff Chairs and/or the Field Services and Radiosport Manager, as required. A Net Manager at any level or NTS Official may be removed from the position for failure to comply with the provisions of this paragraph.

#### Travel and Administrative Expenses

10) All NTS Officials' travel is subject to the advance approval of the Field Services and Radiosport Manager. Authorized travel may include: attendance at Area Staff meetings, Region Net Manager-called meetings of Section and NTS Officials residing in the region and Division Director-called meetings.

11) Reimbursement for administrative expenses of NTS Officials is provided for under the NTS account, authorized annually by the ARRL Board of Directors, and managed and administered by the Field Services and Radiosport Manager. Reimbursable items include: postage, telephone, office supplies, and printing. ARRL Section and NTS Official spending guidelines are available from the Field Services and Radiosport Manager.

#### Amendment of Terms of Reference

12) These articles may be amended by a three-fourths vote of all \_\_\_\_\_ Area Staff voting members. Amendments are subject to the approval of the Field Services and Radiosport Manager.

## **National Traffic System Methods and Practices Guidelines**

Link to Chapters in PDF. (Adobe Acrobat, Version 4.0 or higher is required to view these files.)

### INTRODUCTION

This document, NTS Methods and Practices Guidelines (NTS MPG), is attached to

the ARRL Public Service Communications Manual (PSCM) as Appendix B, and is the working reference manual on Traffic Net and Message Handling Procedures in the NTS. It shall be the uniform reference standard for STMs, Section/Local NMs and Area Staff members.

The NTS MPG document is maintained by the Standing Committee of the three NTS Area Chairs, and selected additional staff persons, under the General Procedures sections of the NTS Terms of Reference (NTS TOR), attached to the PSCM as Appendix A.

This manual will be a working reference document---subject to change as Amateur Radio continuously improves how the tasks are performed. The methods presented are a reasonably accurate snapshot of current practices. They are indeed practices, and not strict rules, but the beginner, Section, Region, Area, and TCC net operators and management alike will find it beneficial to have a uniform protocol reference to be used by operators.

It is further hoped that the wisdom of the founders of the ARRL and its NTS with respect to fundamental operating practices, along with new practices, will be preserved in tact in one collection of documentation as the NTS goes forward. Other essential references such as message Precedences, "Q signals", Handling Instructions, ARRL Numbered Radiograms, etc., are reproduced in this manual although available from ARRL in Newington, CT, in printed form or on the internet. You will need to update these from the ARRL primary source from time to time.

The ARRL NTS system operation is in accordance with the PSCM and NTS TOR. Such matters are left to those separate documents.

This manual deals with station and net operating practices and not with matters of net format or system management. Those issues are dealt with by Net Managers, Section Traffic Managers, and Area Staffs, etc., as appropriate. This manual is not intended to infringe on their discretion in such matters, nor with "job descriptions" imposed at any level.

Instructors may extract the information in the manual for use in their own training lesson plans provided full credit is given to the ARRL source. Some simplified overview tutorial documents may be made available through ARRL Field and Educational Services from time to time, particularly for the introduction of the NTS to newcomers to Amateur Radio.

Requests for further information, explanations, or suggested additions should be submitted to your Net Manager for consideration. After review, such input may be forwarded via either STM's or Area/TCC staff to the appropriate Area Chair for periodic consideration by the NTS standing committee on standards and practices.

FOREWORD

Handling communications for a third party has always been a technology and art form capturing the imagination of people throughout the history of civilization. Such communications have played an important role in the development of the world as we know it. It is no surprise that this fascination persisted and flourished with the introduction of the telegraph and radio.

From smoke signals to semaphore, telegraph to email, the art form has adapted to the prevailing technology of the time. Over the years the mechanism of getting the information from point A to point B may have changed, but the basic steps of creating the transmission-ready final form of the communication, the handling of it through the system, and the reception and delivery have remained essentially the same.

In Amateur Radio today we find many adaptations to the technology of the time and, in fact, are involved in developing new technologies as we go along. The basic underlying purpose and act of communicating for a third party, or for ourselves, is still fascinating and useful regardless whether we are using CW, Voice, RTTY, PSK-31, packet, or WinLink gateways. The use of today's modes has expanded our abilities far beyond the time when Hiram P. Maxim wanted to send his message on CW to order a new tube and seized upon the idea of having a system of scheduled and reliable nets to handle such message traffic.

We began this Amateur Radio journey in an organized way in 1914 when the American Radio Relay League was founded, and the NTS net system has developed and adapted over the years. Today the ARRL manages and operates the National Traffic System (NTS/NTSD) to assure a continuing and reliable structure to handle formal message traffic in the US. Many other countries participate in the system as permitted by treaty or convention. CW, Voice, and a variety of digital modes and structures are operating to assure the use of all Amateur Radio resources in the public service effort.

There is a large body of experience and literature available to guide amateur operators in using radio to establish contact. This experience is in many ways unique to Amateur Radio due to its flexibility and resourcefulness driven by personal interest and motivation. This manual will not deal with this art except where the specifics of radio operation are conducive to effective message transmission and reception.

The public and our served agencies appreciate our ability to send formal written message traffic efficiently and accurately. When we combine our traffic handling, radio and net operating skills to provide professional service we earn their trust.

The process is simple, yet there are details to learn about how to make it all

happen efficiently and with precision. We must interface with those we serve and gather the information required to prepare the message in the proper format. We must be skilled at exchanging the message with another station to pass it along, and be able to participate in and run organized nets to efficiently handle large amounts of message traffic. We must know how to deliver the message to the addressee, and create a reply or a service message back to the originator when required.

The manual, therefore, will deal with the methods used by effective communicators in transmitting and copying message traffic while dealing with language perception, format and protocols, net operating and net control, and managing the completion of the task through to delivery and servicing of messages. Soliciting messages from the public and brief discussions of public service and disaster operations are also presented.

#### OBJECTIVES:

The primary objective of these methods and protocols is to facilitate transmission of a properly formatted written formal message from point A to point B such that it arrives exactly as written on the original copy, group for group, character for character, space for space.

Messages filed in the NTS must be capable of being transmitted by any mode without message alteration being required.

Voice and CW nets must be run with methods and protocols to operate effectively and uniformly so that message traffic may be exchanged with efficiency.

Stations operating in the NTS have the responsibility to promptly relay messages along, deliver messages in a timely fashion, or service undeliverable messages back to the originator. Stations must honor this responsibility.

Stations operating in the NTS interface directly with the public and served agencies representing all of Amateur Radio. Stations must represent us all well.

The methods and protocols of the NTS MPG are intended to facilitate achieving these objectives.

CHAPTER 1, FORMAT: Chapter 1 presents the standard ARRL formal radiogram format used throughout Amateur Radio today for written message traffic. This format is the expected form of written messages, and is used everywhere except in a few specialized served agency applications where simplified incident reports

or customized RACES forms may be used. Other techniques used in some disaster efforts, such as taking lists of contact names for welfare inquiries, and other similar informal traffic handling methods, are beyond the scope of this manual.

CHAPTER 2, VOICE: Transmission of formal written traffic by voice confronts the amateur with the difficulties of voice perception when attempting to convey form and content with precision. The path of the manual temporarily splits accordingly, presenting voice message exchanging protocols in Chapter 2 separate from the CW protocols. The two station voice exchange is presented in this chapter.

CHAPTER 3, CW: Transmission of formal written traffic by CW is presented in Chapter 3. The technique is notably different than on voice. The two station CW exchange is presented in this chapter.

CHAPTER 4, NETS: Managing the voice and CW transmission of messages beyond the two station exchange is handled on nets. The manual paths again converge, presenting both CW and voice traffic net operating guidelines, for both the participating station and the net control, in Chapter 4.

CHAPTER 5, NCS: Additional topics unique to net control are expanded upon in Chapter 5.

CHAPTER 6, NTSD: Messages transmitted with the digital modes use the standard ARRL format for the entire message entered into the text field, thus enabling a message to move from one mode to another without modification. Chapter 6 presents the NTS Digital (NTSD) methods of handling the standard message including the routing information in the "To" and "Subject" blocks. The NTS Digital Guidelines for the system are included in this chapter.

CHAPTER 7, SAR/PSHR: Chapter 7 presents the methods used by stations participating in the National Traffic System for reporting their monthly activity--- the SAR and PSHR reports.

CHAPTER 8, PUBLIC INTERFACE: Chapter 8 presents guidelines for delivering messages to the addressees, sending service messages back to the station of origin to report on progress or problems, notes on originating messages from the public and mass mailings.

CHAPTER 9, PUBLIC SERVICE: Chapter 9 ends the manual with a discussion and examples of some tactical public service type operations. Section Emergency Coordinators and local EC's generally stipulate the methods used in this type operation, hence the examples given here are designed to show how the traffic net procedures can be useful in such nets.

GENERAL: Throughout this manual there are tasks presented which are, or may be, handled using various techniques. Different methods for doing the same task are either presented as alternate choices explained in full as separate cases, or included in notes within the chapter section. Often the order of preference is based upon the current "best Amateur Radio practice".

In some cases there are matters for which there is no customary method yet devised or widely used. A few suggestions are made, but plain English is always a default tool for accomplishing the tasks or issuing the commands in these cases.

Some new ice is broken in a few protocols presented in the manual. For example, the continuing problem of how best to handle voicing of different kinds of groups encountered in messages when on the phone nets has been consolidated into one set of guidelines. Although these matters are handled in a variety of ways throughout the system, the presented form will be of assistance in bringing some uniformity. To do otherwise would leave a large number of variable "rules" to use which can be confusing to the newcomer. A variety of rules can lead to misunderstandings and surprises when transmitting message traffic even among experienced operators. The voicing protocols presented here are designed to be mutually exclusive, assuring that every form of message syntax or encountered group will have a unique method applied. The experienced operator may then come to expect a unique meaning of the method in each situation.

Such license is taken only when the presented protocols have been subjected to extensive testing in typical amateur traffic handling situations. When choices were available, those presented first in order were chosen to attempt to optimize message transmission and reception accuracy, then efficiency.

In addition to the chapter texts, some additional attachments are included in both

textual and graphics form to aid in the fundamental purpose of the work, i.e., to provide a document for those wishing to have a ready reference for the current "best Amateur Radio traffic handling practices" of the day.

The overall NTS MPG table of contents is presented up front for printed version reference purposes. Each chapter has its own table of contents.

The future of the NTS is in the hands of those who understand the value of formal third party communication and the technology required to make it effective in today's environment. To assure opportunities for all amateurs to enjoy the rewards of public service traffic handling it is essential to pass along the knowledge developed over the years, and to introduce newcomers to this particular subset of Amateur Radio activity. Everyone can participate.

Formal traffic handling is an essential part of Amateur Radio emergency communications public service as well. Effective ARES/RACES operations need not invent a new wheel to accomplish this. Where formal traffic handling is required, cooperative effort and training between NTS operators and those of ARES/RACES will produce benefits for the overall effort. The distinction between the groups with respect to traffic handling can be made to vanish. ARES and RACES operators can become NTS operators within their domain.

It is worthwhile to reduce the number of amateurs encountered at hamfests who have been in the service for ten or twenty years or more who have never heard of the NTS! It is perhaps more important to be certain that newcomers, from the first day they enter the service, are aware of the NTS/ARES/RACES and the skill levels used in serving the public.

Pass the torch!

## ACKNOWLEDGMENTS

Many outstanding Amateur Radio operators have contributed to this manual--- some without even being aware of it at all. We are specifically referring to all the devoted NTS operators, net controls and managers encountered since way back in the United Trunk Line days. Those individuals were the mentors for all of us coming up through the ranks of the traffic handling community. They are the ones who pioneered the practices we use today, and to each and every one of them we owe our thanks for their devotion to the effectiveness of our traffic handling systems. Remember that H. P. Maxim was doing this at one time... with the same

intent as those of us who pound brass, voice messages, or type on keyboards today.

Particular thanks must be given to Bill Thompson, W2MTA, most recent past Eastern Area Chair, who shared a keen interest in this particular work, encouraged its progress, and made it possible to bring it to this level. It is hoped that the manual will satisfactorily justify his trust.

Thanks to Marcia, KW1U, current Eastern Area Chair, who helped carry the work forward, and to Jim, KB5W, Central Area Chair, and Rob, K6YR, Pacific Area Chair, for their assistance, guidance and suggestions in bringing this work of the Standing Committee to final form and submission.

Thanks also must be extended to Gary Ferdinand, W2CS, who likewise shared a keen interest in this effort. His considerable time and effort in precise and detailed review and criticism of the articulation of techniques helped capture in the written word efficient methods and syntax at all levels of operating activity. To a large extent the capturing of best current practice in this manual is due to his sharp eye and experience.

Thanks to Nick, N4SS, Eastern Area NTSD, and Cal, N3QA, former 3DC, who both made extensive contributions to Chapter 6 on the NTS Digital system.

Appreciation must also be extended to all the currently active net controls and operators who answered questions or set the example along the way. This was always done with the friendly spirit of cooperation in Amateur Radio that makes our service unique.

And thanks, too, to all the NTS operators in the MDC Section who put up with the constant experimentation with traffic handling quality control tests, training and exercises, SET workloads, and constant preaching. The MDC SEC, WA1QAA, was first in line insisting on having this kind of document, and spent untold hours helping to review content. Thanks also to John, KO4A, who invested his time and effort in early formatting of material which helped move the project forward.

All of those operators, Section and national, contributed a great deal to this manual by proving what works, and reminding us all daily why we do this.

73, AI, W3YVQ, EAS Associate Member, ORS, OES,  
MDC ASM RACES-ARES/NTS Coordinator.