

## **Newcomers and Elmers Net: Traffic Nets: Who What and Why**

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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.

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.

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.

#### *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.

#### **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.



### *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.

### *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.

### *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:

1. A net control station, designated by the region net manager.
2. Representatives from each of the various sections in the region, designated by their section net managers.
3. One or more stations designated by the region net manager to handle traffic going to points outside the region.
4. One or more stations bringing traffic down from higher NTS echelons.
5. 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:

1. A net control station, designated by the area net manager.
2. One or more representatives from each region net in the area, designated by the region net managers.
3. TCC stations designated to handle traffic going to other areas.
4. TCC stations designated to bring traffic from other areas.
5. Any station with traffic.

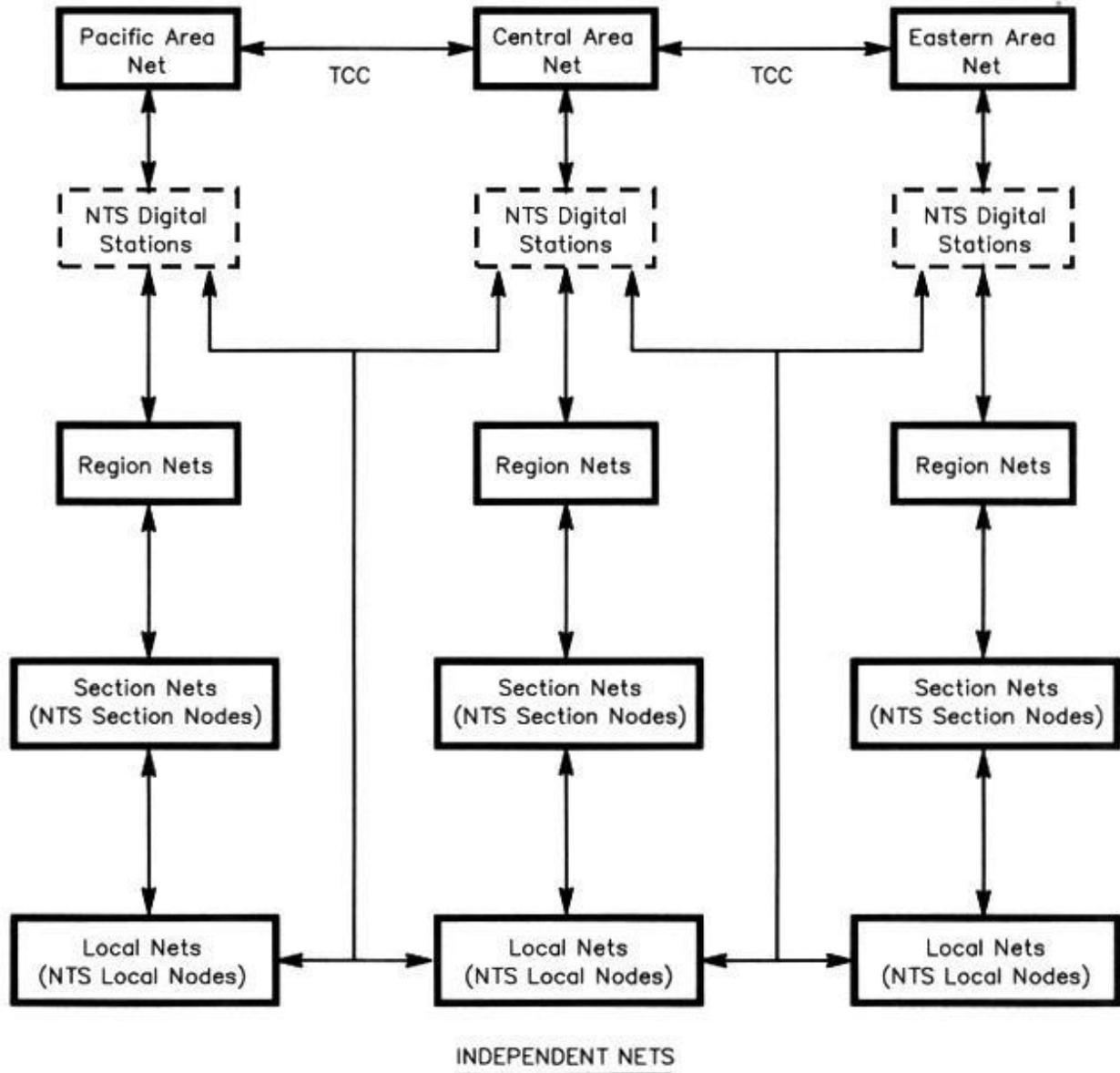
Points (3) and (4) are functions of the Transcontinental Corps. There are three areas, designated Eastern, Central and Pacific, the names roughly indicating their coverage of the U.S. and Canada, except that the Pacific Area includes the Mountain as well as the Pacific time zones. Area nets are administered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

#### *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.

#### *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.



### *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.

The cycles represent time slots for net operation to ensure a smooth and timely flow of traffic.

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.

### *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.

### *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. Also NTS nets should not operate beyond the time allotted to them.

### *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.

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You may wonder why such structure is necessary, or why not “cut corners” – in Emergencies operations should be second nature – there will be enough chaos added into the mix that various levels of the traffic handling system should not be confused or “out of practice” in doing things most efficiently.

Expedient is not always the most efficient way in the long run – the system is tried and true, and thus what seems like blind adherence to the rules is actually a means of assuring when the mother of all disasters comes traffic gets through.

Only when the system link is truly broken, and as a means of last resort, does the Marines motto of improvise, adapt, overcome come into play. The traffic system is no place for rugged individualism! This isn't a Die Hard movie!

### *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.

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### **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:

1. The net control station (NCS) transmits a net callup promptly at the pre-established net meeting time.
2. 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.
3. Time-consuming pleasantries and other superfluous matters are not to be a part of the procedure while the net is in session.
4. Net stations follow the direction of the NCS without question or comment if such directions are understood.
5. Explanations of any kind are not transmitted unless they are absolutely essential to the net's conduct.
6. 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.

Each net level follows this basic pattern for consistency among nets. This way everyone knows what to expect, and if there are exceptions to the rule for some reason, everyone knows it is an exception and that things will return to normal as soon as possible.

### **Traffic Handling**

As you might expect, messages are handled by their priority to ensure the most important messages get through first. There are emergency, priority, welfare and Routine messages.

### *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.

### *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.

### *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).

### *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.

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This process is best explained by an example. Let's say that someone in Minnesota wants to send a birthday greeting to Aunt Mary in California. They telephone their local ham friend and give him the message.

- At 6:30 local time, the Minnesota ham attends ("checks into") the Minnesota *Section* net. One station there has been designated to

accept all outgoing messages, and Aunt Mary's message is sent to that station.

- At 7:45, the station who received the message checks into the *Region* net. This net consists of representatives from all the section nets in the region, and one station has been designated to accept all traffic that flows out of the region. Aunt Mary's greeting will be sent to this station.
- At 8:30, the station from the region checks into the *Area* net and sends Aunt Mary's greeting to the designated representative from the Pacific area.
- At 8:30 Pacific Time, the Pacific Area net meets. (All the area nets meet at 8:30 local time; since they are in different time zones there is no overlap.) At this point the process is repeated in the opposite order
  - The area representative sends the message to the appropriate region representative,
  - The region representative meets a later session of the region net and sends the message to the appropriate section representative,
  - The section representative meets a later section net and sends the message to the closest operator to Aunt Mary's home
- The final recipient calls Aunt Mary on the telephone and delivers the greeting.

Perhaps this sounds rather complex, but it really isn't. Each *net* uses the same procedure and operating techniques, so as novice operators gain experience they can "graduate" from section to region to area nets. Every message is placed into the same format. The operation is disciplined but not unduly complex.

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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.

## Resources

<http://www.w7arc.com/nts/index.html>

<http://www.w7arc.com/files/psem.pdf>

NTS Manual (additional chapters listed on the left of web page)

<http://www.arrl.org/chapter-one-national-traffic-system>

Radiogram Form:

<http://www.arrl.org/files/file/Public%20Service/RADIOGRAM-2011.pdf>

Most of this material comes from the ARRL Website at:

<http://www.arrl.org/chapter-one-national-traffic-system>