

In the June 2016 issue of *QST* magazine, the official membership journal of the American Radio Relay League (ARRL), the National Traffic System (NTS) is described in the article “The Evolution of ARRL Traffic System” as a creation of the ARRL. This reference appears on page 102 under the subtitle “A New System and a New Name.” Issue cover and article included below.



# The Evolution of the ARRL Traffic System

**Amateur Radio traffic handling has a rich history of service.**

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When wireless was born at the beginning of the 20th century, operators communicated with each other utilizing the raspy notes generated by spark-gap transmitters. These communications were often in the form of third-party personal messages (known as "traffic") sent on the behalf of neighbors, friends, and anyone who knew that the local amateur was willing to perform this service.

However, the transmission range of the typical amateur at the time was frustratingly short. Being regulated to wavelengths of 200 meters and longer, and a maximum spark-gap power of one kilowatt, even a well-equipped station could only communicate reliably over a distance of about 50 to 100 miles.

Though Hiram Percy Maxim and Clarence Tuska were quite different in character, age, and worldly experience, they shared the goal of unifying the Amateur Radio community and creating an organization to facilitate the movement of traffic.

By early 1915, more than 200 stations had been appointed from an ARRL membership of over 600. The League published a map showing the locations of the ARRL Official Relay Stations (ORS) in 32 states and Canada.

## The First Traffic Network

A nationwide network was established consisting of six trunk lines, or *feeders* — three lines horizontally and three vertically across the continent. Branch lines were extended into Canada in the East and the West from the northernmost trunk line.

Trunk line managers were appointed to organize and conduct the activities on a local basis. The League's Operating Department established a field organization to support the key participants — the ORS stations and trunk line managers. Division managers (DMs), City Managers

(CMs), and assistants were appointed and these individuals reported traffic activity to ARRL Headquarters.

To further support the fledgling network, Maxim and Tuska created *QST* magazine to communicate with members of the rapidly growing organization. The League established and published elaborate rules and regulations for traffic handling, and also created a standard message format.

During the pre-World War I period, the system grew and the traffic counts mounted. In early 1917, the volunteers celebrated a milestone achievement: a message was started on the East Coast, relayed to the West Coast, and an answer was received back at the East Coast originator in the record time of 1 hour and 20 minutes.

## Difficult Times Ahead

On April 6, 1917, the United States entered the war in Europe. As a result, all amateur stations were silenced and many operators were called to war duty.

The military services immediately availed

themselves of the valuable skills of thousands of volunteer wireless operators, technicians, and trainers. The war ended on November 11, 1918, but the ban on amateur operations was not lifted until a year later, primarily due to internal governmental jurisdictional disputes.

After the armistice, the League faced financial difficulties. The war effort had depleted membership substantially. In addition, hams found themselves subjected to changes in wireless regulations that drove many off the air.

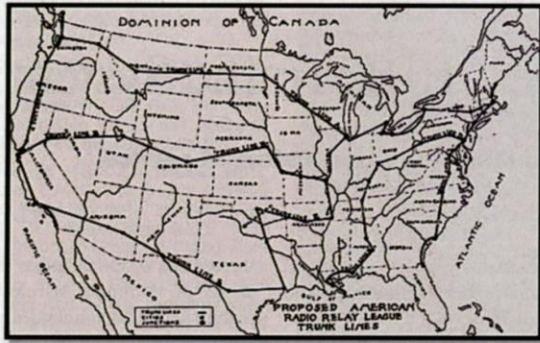
In response, the ARRL reorganized along broader lines with a new constitution, an appointed Board of Directors, and provisions for a Headquarters staff that included a Traffic Manager. The League was now structured for growth and expansion with particular emphasis on traffic handling, which resumed when the operating ban was lifted.

## Poised for Growth

From the onset it had been intended that the traffic system conduct periodic tests in

LIST OF STATIONS.											
Location	Owner	Address	Call Letters	Sending Power	Spark Gap	Maximum Range	Words per Min.	Listening Hours Local Time	License	Phone	
<b>ALABAMA</b>											
Mobile	R. W. Martin	438 Spring Hill Ave.	5AH	1/2 KW	R	U	25	7:00-10:00	1st Com.	Yes	
Montgomery	Alabama Nat. Guard	.....	8C	1/2 KW	..	..	..	8:00-11:00	....	..	
<b>ARIZONA</b>											
Phoenix	R. W. Deardorff	R. F. D. No. 5	CK	Call	..	L	25	6:00-10:00	1st Com.	No	
Warren	M. W. Powell	.....	6BF	1 KW	F	90	15	7:00-10:00	2nd Am.	..	
<b>CALIFORNIA</b>											
Alameda	*A. K. ASTER	1814 Alameda Ave.	GAA	1 KW	R	100	20	7:00-10:30	1st Am.	No	
Altadena	J. D. Lyon	Mendocino St.	GAAL	1/2 KW	R	50	15	7:00-10:00	2nd Am.	Yes	
Berkeley	W. H. Leland	912 Indian Rock Ave.	6WL	1/2 KW	R	50	25	7:30-8:30	1st Com.	Yes	
Berkeley	A. J. Skaele	2457 Martinez Ave.	6BK	1 KW	R	100	25	7:30-10:30	1st Com.	Yes	
Burlingame	H. Harringer	.....	6BT	1 KW	R	100	20	5:00-8:30	1st Am.	Yes	
Eureka	W. E. Donelson	1215 West Ave.	6WP	1/2 KW	R	40	30	7:00-10:00	1st Com.	Yes	
Fairport	H. F. Smith	.....	6RM	1/2 KW	R	75	15	7:00-10:00	2nd Am.	Yes	
Inglewood	L. F. Hunt	R. F. D. No. 359	6LH	1/2 KW	R	100	15	6:00-9:00	1st Am.	No	
Los Angeles	C. E. Everard	805 E. 50th St.	6TT	1/2 KW	R	50	15	6:00-10:00	1st Am.	Yes	
Los Angeles	M. McCreevy	70 W. 52d St.	6IX	1/2 KW	R	50	25	8:00-10:00	1st Am.	Yes	
Los Angeles	A. Ostrowsky	408 E. 61st St.	6ADQ	1/2 KW	R	50	15	6:00-10:30	1st Am.	Yes	
Los Angeles	Chas. Phillips	2847 E. 5th St.	6KH	1/2 KW	R	50	20	8:00-10:00	1st Am.	Yes	
Long Beach	R. Curtis	5101 S. Main St.	6MW	1/2 KW	R	25	22	7:30-10:00	1st Com.	Yes	
Long Beach	A. C. Fisk	60 Mermaid Place	6DE	1/2 KW	F	50	15	6:30-9:30	2nd Am.	Yes	
Oakland	F. B. Breck, Jr.	258 Mather St.	6KW	1/2 KW	R	50	22	6:30-9:00	2nd Am.	Yes	
Oakland			6ND	1/2 KW	F	75	25	9:00-11:00	1st Com.	Yes	

An excerpt from the first ARRL Station List.



An early "proposal map" of the trunk system in the United States.

the form of "drills," to assure that all participants were performing at optimum levels. The need for drills was supplanted by an activity that satisfied the requirement, but was not initially sanctioned by the League. The "relay" was an on-the-air operating event orchestrated to send prepared messages to and from city and government officials by Amateur Radio. Donated prizes and awards were given to the most successful participants.

The relay events proved quite popular as the League assumed a leadership role. They demonstrated the proficiency and value of Amateur Radio, and promoted the idea of extending amateur privileges to other wavelengths. The relays may be considered the first contests.

As with all aspects of Amateur Radio during these early years, traffic handling was affected by progress and growing allied interests. As the number of ORSs grew, broadening frequency allocations and vastly improving technology lengthened the attainable distances. At the same time, Amateur Radio was undergoing enormous change as amateurs adopted varied interests such as DXing, equipment construction, contests, and other activities.

In addition, public communications expanded tremendously. Telephones were fixtures in almost every household and long-distance calling was becoming increasingly common.

Even so, traffic handling activity continued at a vigorous pace through the 1930s. The system had grown to 13 trunk lines and a myriad of auxiliary independent nets re-

flecting operators' mode preferences. With ARRL guidance, the system rapidly adjusted to meet new demands.

Of course, everything came to a halt when the United States entered World War II in December 1941.

#### A New System and a New Name

Traffic handling quickly resumed when amateur privileges were restored after the war, but with the advances in ham technology, message relays were rarely necessary. Transcontinental communication between individual stations was commonplace. In addition, CW was no longer the only mode being utilized in the traffic world. Amateurs now used phone — initially AM, but increasingly SSB — and even RTTY.

The Cold War brought traffic demands from overseas military personnel, and it soon became apparent that the system needed to change. In 1949, ARRL responded by devising a new structure: the National Traffic System (NTS).

The basic component of the modern NTS is the network or "net," groups of traffic stations that replaced the old trunk line stations. The system consists of three tiers. The US and Canada are segmented into three major traffic *Areas*: Eastern, Central, and Pacific. Each Area in turn is divided into *Regions*, and each Region is divided into *Sections*. The Sections encompass local nets. Each level functions as a link in the system with incoming and outgoing relationships with the level just above and just below, or crosswise. Every net functions as an integral part of the system; no NTS net is an independent en-

ity and no NTS net can conduct its activities without concern or consideration of other NTS nets. To complete the system at the highest level, individual Transcontinental Corp stations handle traffic between Areas.

Timing of net meetings is essential for the conduct of traffic through the system, which in the US involves four time zones and in Canada six zones. Four system time brackets or "cycles" have been defined. Under normal load conditions, most Areas operate two cycles per day in an intricate pattern that varies from Area to Area. In this manner, a message originating for instance in one Section net is passed up the scale and introduced to the destination Area net smoothly without conflict or delay because the net times are staggered without overlap but with contiguity.

#### NTS and ARPSC

In 1963, the Amateur Radio Public Service Corps (ARPSC) was created to combine the facilities of the NTS and the Amateur Radio Emergency System (ARES). As a result, independent local emergency (ARES) nets were encouraged to liaise with the NTS structure at the Section level.

Throughout its history, the network has adapted to meet changing conditions. Today, CW and SSB net operations are augmented by digital relay stations and, on the local level, by VHF FM nets operating through repeaters.

#### Strays

##### QST Congratulates...

Ulrich Rohde, N1UL, for receiving the 2016 Microwave Application Award from the IEEE Microwave Theory and Techniques Society for "Significant contributions to the development of low-noise oscillators." The Microwave Application Award recognizes an individual, or a team, for an outstanding application of microwave theory and techniques, which has been reduced to practice nominally 10 years before the award.

##### In Search Of...

Any current or retired federal employees interested in forming an HF net. Interested parties may contact Fritz Tender, WD8E, at [wd8e@arrl.net](mailto:wd8e@arrl.net).