LETARC PROPAGATION

The official Newsletter of the Longview East Texas Amateur Radio Club

May 2018 Volume 2018-5

QRP – It's Not For Sissies

by
KG5LWD

When Guy Navarro offered to teach Morse code to LETARC members, this got me to thinking that I have only scratched the surface of Ham Radio. I asked myself what else is there I can do to learn more about the hobby that I have been involved with for nearly two years. Learning code and using QRP is the next goal on my bucket list.

I am sure there are others like me who are asking themselves what they can do once they get their license or after many years of operation, what other project can be undertaken?

After all, Ham Radio offers a plethora of activities that range from volunteering to contesting that one can participate. It is up to the individual to explore the many options available. For me, I feel the purest part of ham radio deals with the technical aspects of establishing radio communication with another individual some where in the world; whether locally or on the other side of the planet. The challenge is being able to do this on minimal power, lets say in the range of something less than 1 watt to 5 watts. In other words in ham radio lingo, it's call called QRP.

So What is QRP?

In the early days before radio as invented, telegraph operators used Morse code to send messages. They developed Q-codes as a shorthand to speed up communications. QRP was one of those shorthand codes which means "Shall I reduce power?". This eventually morphed into a term used by radio operators that means low power operation. And over the years, this term came to mean transmitting on any radio that is capable of transmitting on 5 watts or less power. Some folks would say 10 watts would be the maximum. But or the purpose of this article, I'll stick with 5 watts or less since that offers a greater challenge; particularly when a radio operator starts to send messages with less than 1 watt.

Now you are probably asking why in the world would someone want to hamstring themselves with using low power? After all, commercially made rigs like my Icom 718 are capable of putting out 100 watts, and with a mediocre antenna like my G5RV, I can pretty much reach around the world with a little effort. In fact, I was able to speak to a friend in South Africa and make contact in Antarctica on my 20 and 17 meter bands respectively. Heck, if I had a big linear amplifier of 1k to 1.5kW, it would be much easier to make contact with folks around the globe. But, anyone with the money and resources can accomplish this feat if they have a powerful station. The real challenge is making communication with minimal power; something the FCC encourages us to "use the minimum transmitter power to carry out desired communications". So, if you are using 100 watts of power to communicate with another person and 5 watts would do the job, you're technically breaking the law. And, you are not using best radio operation practices and contributing to QRM (interference) that seems to be so prevalent when we are on the air. By operating on minimal power, it makes one a better radio operator and reduces interference on bands that are becoming more crowded each day.

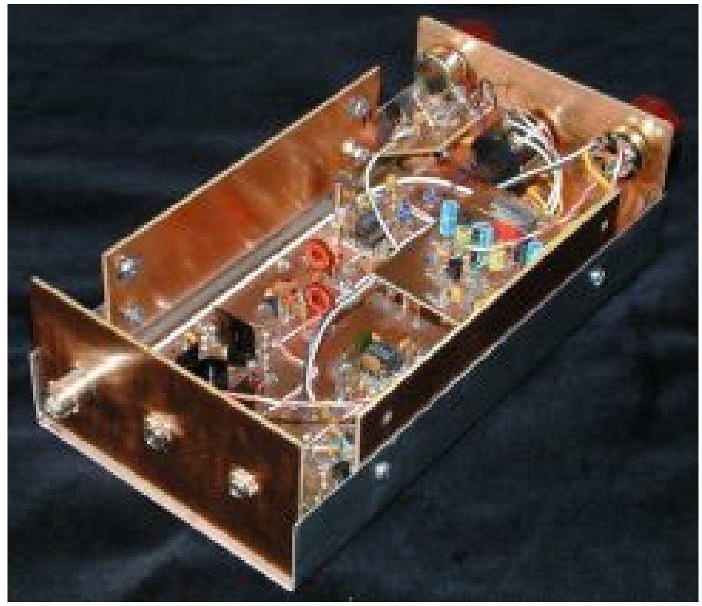
But underneath those reasons outlined above, what is the best reason for making QRP contacts: because you can! After all, any reasonably intelligent Bubba can get his ham license, hang it on the wall, spend hard earned money on a transceiver, string up a dipole antenna and start rag chewing on 100 watts. However, a QRPer who can make contact using a small fraction of the power, and do so with a radio in an Altoids tin powered by a 9 volt battery takes more skill and perseverance. In accomplishing this, it takes a deeper understanding of radio, which is the thing that attracts me.

QRP Gear Needed

If you have a modern day transceiver, most likely you already have the necessary equipment on hand to do QRP. The transceiver's power can be easily reduced to around 5 watts. And then there are those radios that are solely dedicated to QRP in the market place. Elecraft makes some really nice QRP radios that will do just about anything except for brushing your teeth or wash the dishes. And then there are those QRP radio kits that are very attractive to folks who like to build things. These kits offer an excellent way to learn about electronics. They offer a challenge to the builder and can be tons of fun to put together. But, more importantly, they provide the builder an education that commercially made units do not.

So, where does one begin with do-it-yourself QRP radio project? Well, all you need to do is cruise the internet and find a huge array of radio plans and kits. Some of these rigs are full-featured and have the ability to work single-sideband (SSB) and continuous wave (CW), while others just offer CW-only transmitters that can fit into an Altoids tin or a tuna fish can. And it you're ingenious enough, perhaps a [QRP radio can be built from the guts of a discarded CFL lamp].

QRP transceivers built into an Altoids tin are a specialty radio that allows it to be easily packed away into a suit case, backpack, brief case or your shirt pocket. This radio when combined with some batteries and a coil of wire to use as an antenna, one can communicate with the rest of the world where ever you decide to go. For instance, I have a friend who use to backpack on his own in the Pacific Northwest, the Rocky Mountains and in wilderness ares in New Mexico. On one excursion in the Gila Wilderness area of New Mexico, he suffered a fall and broke his leg. He managed to to string up his wire antenna and began sending out an SOS message. After a little while, he made contact with a radio operator in France and told him of his predicament. The Frenchman was able to contact authorities in Silver City, NM. To make a long story short, my friend was rescued and taken to a hospital for treatment. All of this was accomplished on about 5 watts of power and where a 2 meter radio or cell phone would not work.



Hopefully by now I have piqued your interest and will go shopping for a QRP rig. As you shop, you will notice there is an abundance of CW-only transceivers. CW is the purest and simplest mode of radio communication that uses a radio signal that is of a constant amplitude and frequency that is turned on or off via a key. These radios are easy to build and operate. And because of the low-bandwidth mode, CW is able to breakthrough when more complex modes of operation can not. This is a very distinct advantage when working on QRP. But, there is a downside to this. You must learn Morse code. That can be a challenge for many to learn and become proficient even though there are only about 40 symbols to memorize. But if it was easy to do, everyone one would be doing it. That's what sets ham radio operators from the rest of the population because they are up for the challenge. Yup, this type of radio operation will definitely open up many doors and is a worthwhile investment of time and money. All that you can do now is to try it. If you try it, you may like it. That's my goal.

The Newbie Corner – Principles of SkyWave Propagation – Lesson III

INTRODUCTION

Sky wave propagation is used to communicate over long distances. Sky wave propagation allows transmitted signals to be reflected (bounced) off a portion of the Earth's ionosphere and picked up at a receiver hundreds, or even thousands of miles away. A common example of this phenomenon is heard on the AM broadcast band, when many distant stations can be heard after sunset or in the evening hours. Radio operators must understand this propagation mode if they are to establish communications to another distant station. This is accomplished on the HF band via sky wave propagation.

Ionosphere. The ionosphere is the region (or layer) of the atmosphere that extends from 31 miles to about 250 miles above the Earth's surface. Its gets its name because it consists of several layers of electrically charged atoms called ions. Ions are formed by a process called ionization.

When high energy ultraviolet light waves from the sun enter the atmosphere's ionospheric region, they strike gas atoms, knocking negative electrons free. Normally, atoms are electrically neutral. When they lose an electron, atoms become positively charged and are called positive ions. This process of upsetting electrical neutrality is known as ionization. The rate at which ionization occurs depends on the density of atoms in the atmosphere and the intensity of the ultraviolet light waves, both of which vary with the activity of the sun. The ultraviolet waves striking the atmosphere are of different frequencies, causing several ionized layers to be formed at different altitudes. The density of ionized layers is partially attributed to the elevation angle of the sun, which changes constantly. Consequently, the altitude and thickness of the ionized layers vary, depending on the time of day and even the season of the year.

When free electrons and positive ions collide with each other, a reverse process called recombination occurs. This results in positive ions returning to their original neutral state. Recombination depends on the time of day. Between the hours of early morning and late afternoon, the rate of ionization exceeds the rate of recombination. It is during this period that the ionized layers reach their greatest density and exert maximum influence on radio waves. Conversely, during the late afternoon and early evening hours, the rate of recombination exceeds the rate of ionization, and the density of the ionized layers begins to decrease. This density decreases throughout the night, reaching a low point just before sunrise. You can better appreciate this phenomena by listening to a far away commercial AM radio station at night and at sunrise. As the ionization rate picks up, the reception grows fainter until you lose the station completely.

The ionosphere is composed of three regions (D, E, and F), as shown in **Figure 3-1.** The F region is further divided into two layers designated F1 (lower layer) and F2 (higher layer), which change with the position of the sun. The radiation in the ionosphere directly above a given point is greatest at noon, while it is least at night. When the radiation is not present, recombination sets in.

The D region ranges to 55 miles above the Earth's surface. This low region of the atmosphere has low ionization. It refracts low frequency signals, but high frequencies pass through it, with some attenuation that varies with frequency and region density. The D region disappears after sunset because of recombination.

The E region ranges from about 55 to 90 miles in altitude. After sunset, recombination occurs rapidly, and this region is almost

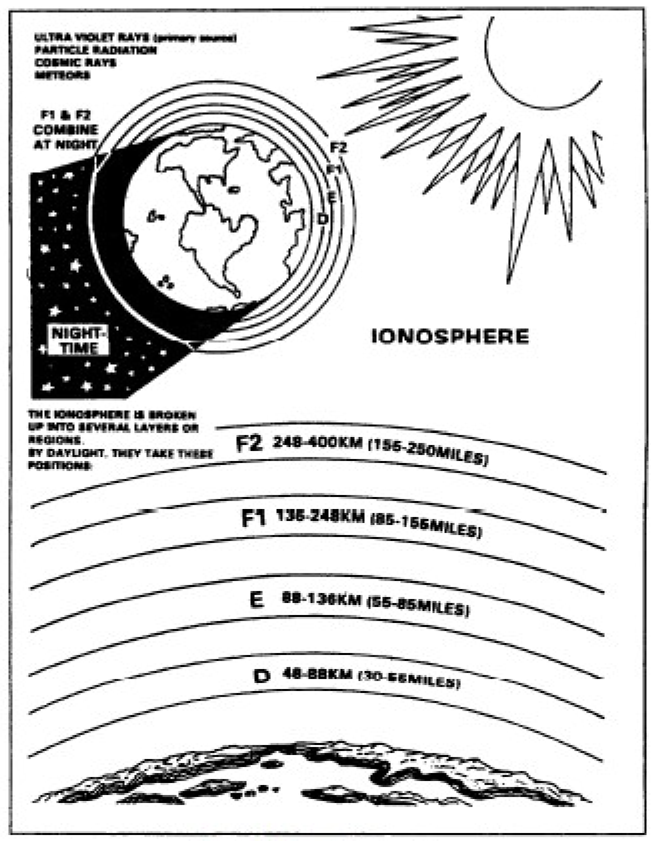


Figure 3-1. Layers of the ionosphere.

gone by midnight. The E region is used during the day for HF radio transmissions ranging up to about 1500 miles.

The F region ranges from about 90 to 240 miles high. During daylight hours, the F region separates into two layers-the F1 and F2 layers. At night these two layers combine. Recombination occurs slowly after sunset, so a fairly constant ionized layer is present at all times. The F layers are very useful for HF long-distance radio communications.

A radio wave transmitted into an ionized layer is refracted (bent) as it abruptly changes velocity while entering a new medium. The relationship between radio waves and ionization density is shown in **Figure 3-2**. Each layer has a central region of relatively dense ionization which tapers off in intensity both above and below the maximum region. As a radio wave strikes a region of increased ionization, its velocity increases, causing it to bend back toward the Earth. If a radio wave strikes a thin, very highly ionized layer, the wave may be bent back and appear to have been reflected, rather than refracted back to Earth. Ionospheric reflection is more likely to occur at long wavelengths (low frequencies). This is what occurs when you bounce an AM signal off the ionosphere and it is picked up many hundreds of miles away.

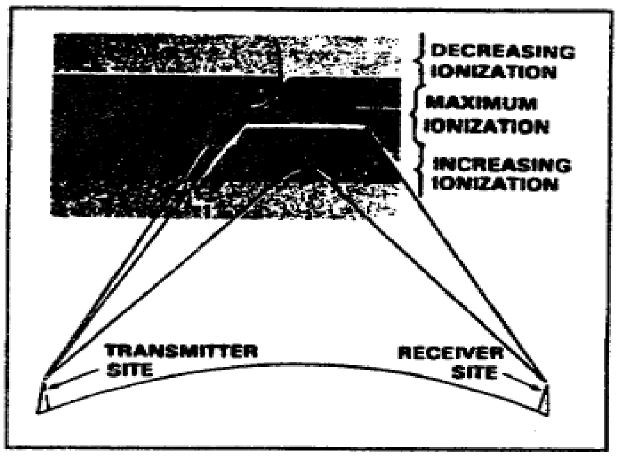


Figure 3-2. Effects of ionospheric density on radio waves.

For any given time, each ionospheric layer has a maximum frequency at which radio waves can be transmitted vertically and refracted back to Earth. This frequency is called the critical frequency. Radio waves transmitted at frequencies higher than the critical frequency of a given layer will pass through the layer and be lost in space. If this wave enters into an upper layer with a higher critical frequency, the wave will be refracted back to Earth. Radio waves of frequencies lower than the critical frequency will also be refracted back to Earth, unless they are absorbed or have been refracted from a lower layer. The lower the frequency of a radio wave, the more rapidly the wave is refracted by a given degree of ionization. Figure 3-3 shows three separate waves of different frequencies entering an ionospheric layer at the same angle. Notice that the 5-MHz wave is refracted quite sharply. The 20-MHz wave is refracted less sharply and returned to Earth at a greater distance. The 100-MHz wave is obviously greater than the critical frequency for that ionized layer. Therefore, it is not reacted but is lost in space.

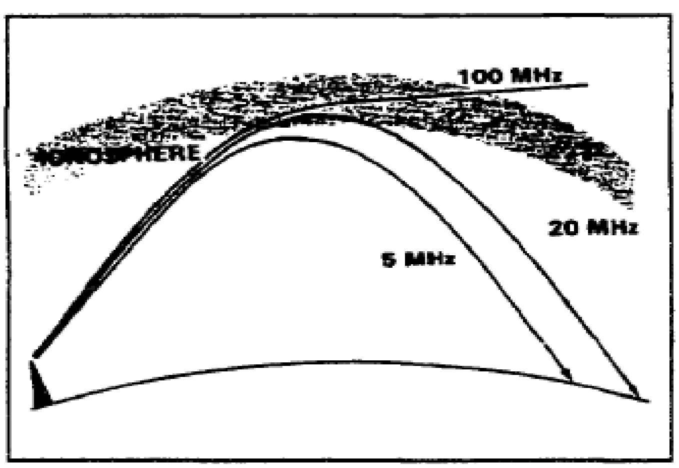


Figure 3-3. Frequency versus refraction and distance.

The rate at which a wave of a given frequency is refracted by an ionized layer depends on the angle at which the wave enters the layer. **Figure 3-4** shows three radio waves of the same frequency entering a layer at different angles. The angle at which wave A strikes the layer is too nearly vertical for the wave to be refracted to Earth. As the wave enters the layer, it is bent slightly but passes through the layer and is lost. When the wave is reduced to an angle that is less than vertical (wave B), it strikes the layer and is refracted back to Earth. The angle made by wave B is called the critical angle for that particular frequency. Any wave that leaves the antenna at an angle greater than the critical angle will penetrate the ionospheric layer for that frequency and will be lost in space. Wave C strikes the ionosphere at the smallest angle that can be refracted and still return to Earth. At any smaller angle, the wave will be refracted but will not return to Earth. As the radio wave's frequency is increased, the critical angle must be reduced for refraction to occur. This is illustrated in **Figure 3-5**. The 2-MHz wave strikes the layer at the critical angle for that frequency and is refracted

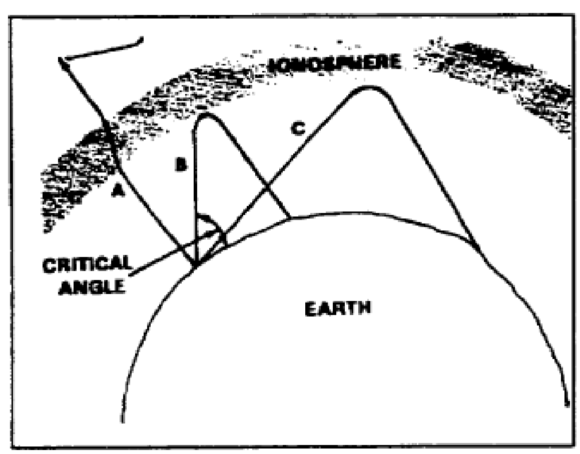


Figure 3-4. Different incident angles of radio waves.

back to Earth. Although the 5-MHz wave (broken line) strikes the ionosphere at a lesser angle, it nevertheless penetrates the layer and is lost. As the angle is lowered from the vertical, however, a critical angle for the 5-MHz wave is reached, and the wave is then refracted to Earth.

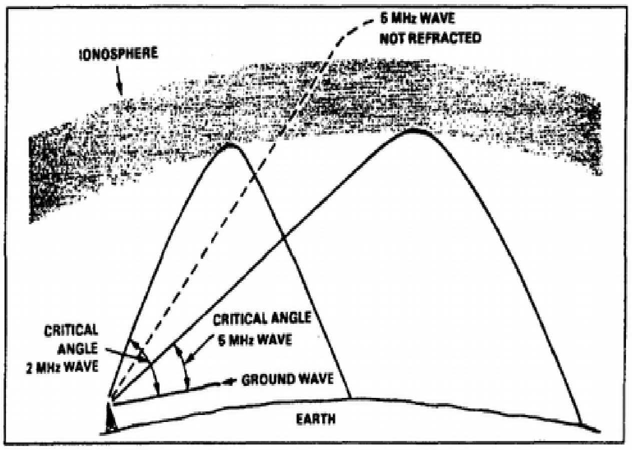


Figure 3-5. Effect of frequency on the critical angle.

The relationship between skip zone, skip distance, and ground wave coverage is shown in **Figure 3-6**. The skip distance is the distance from the transmitter to the point where the sky wave is first returned to Earth. The skip distance's size depends on the wave's frequency, the angle of incidence, and the degree of ionization present. Obviously, the skip distance will change through the day as the level of ionization changes.

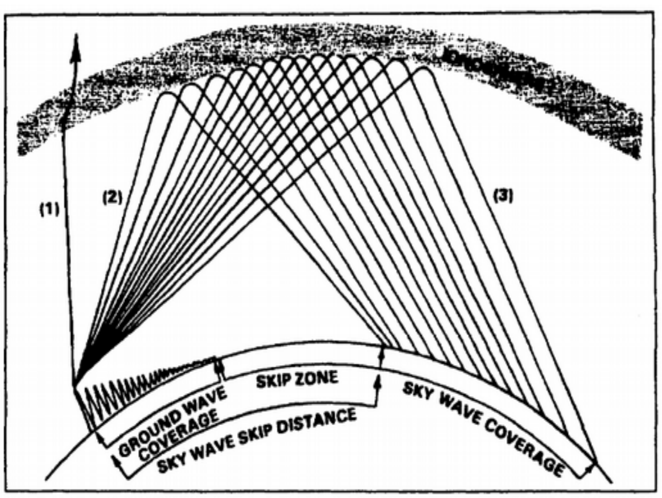


Figure 3-6. Relationship between skip zone, skip distance, and ground wave.

The skip zone is a zone of silence between the point where the ground wave becomes too weak for reception and the point where the sky wave is first returned to Earth. The skip zone's size depends on the extent of ground wave coverage and the skip distance. When the ground wave coverage is great enough or the skip distance is short enough that no zone of silence occurs, there is no skip zone. Occasionally, the first sky wave will return to Earth within range of the ground wave. If the sky and ground waves are nearly of equal intensity, the sky wave alternately reinforces and cancels the ground wave, causing severe fading. This is caused by the phase difference between the two waves, which is a result of the longer path traveled by the sky wave.

The relationship between frequency and angle of incidence can be seen in **Figure 3-7.** You can see how radio waves reach a receiveer via several paths through one layer. The various angles are represented by dark lines and designated as rays 1 through 6.

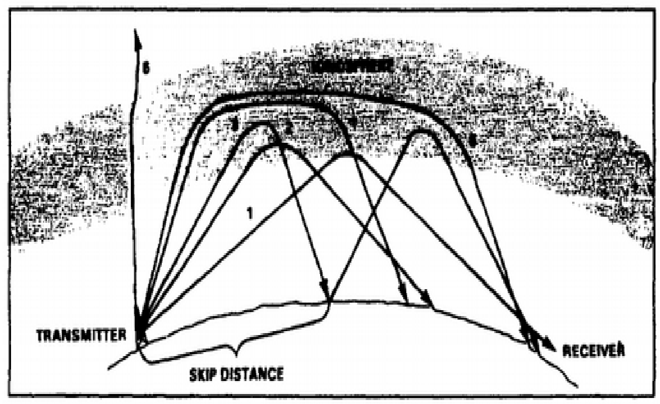


Figure 3-7. Ray paths for a fixed frequency with varying angles of incidence.

When the angle of incidence (ray 1) is relatively low with respect to the horizon, there is only slight penetration of the layer, and the propagation path is long. When the angle of incidence is increased (rays 2 and 3), the rays penetrate deeper into the layer, but the range decreases. Note that for rays 4 and 5, the angle is such that the RF energy penetrates into the central area of maximum ionization of the layer. These rays are refracted rather slowly and returned to the Earth at great distances. Finally, as the angle approaches vertical incidence (ray 6), the ray is not returned at all, but passes on through the layer into space.

Obstacles to propagation.

Absorption of RF energy in the ionosphere result in loss of signal strength and reduced transmission distances. Most ionospheric absorption occurs in the lower regions of the atmosphere where ionization density is greatest. As a radio wave passes into the ionosphere, it loses energy to the free electrons and ions. The highly dense D and E layers provide the greatest absorption of radio waves.

A radio signal will at times have variations in its strength. This is called fading. A radio wave refracted by the ionosphere or reflected from the Earth's surface may suffer changes in its polarization. This change in polarization results in weak signal reception. Fading is also caused by absorption of the RF energy in the ionosphere.

There are other losses which affect the ionospheric propagation of radio waves, besides energy losses in the atmosphere. These are ground-reflection loss and free space loss.

Ground-reflection loss occurs when a transmitted signal is refracted off the ionosphere, strikes the Earth, and is reflected back to the ionosphere. RF energy is lost each time the radio wave is reflected from the surface. The amount of energy lost depends on the frequency of the wave, the angle of incidence, ground irregularities, and the electrical conductivity of the point of reflection.

Free space loss occurs when a traveling radio wave spreads out,

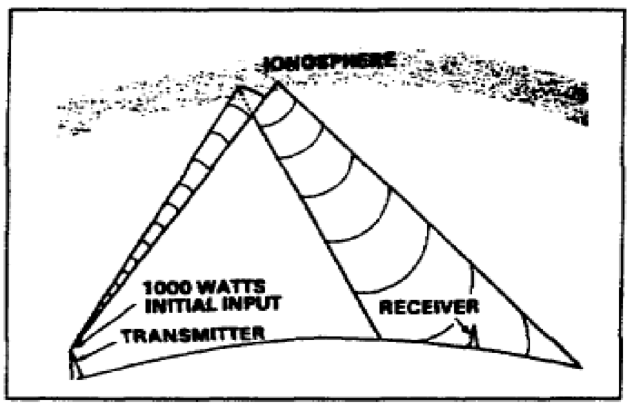


Figure 3-8. Free space loss principle.

much like a flashlight's beam. **Figure 3-8** shows the free space loss principle. As distance increases, the amount of energy contained in a wave front will decrease. By the time the energy is received at the antenna, the wave front is so spread out that the antenna extends into only a very small fraction of the wave front.

Electromagnetic interference (EMI) can significantly reduce the quality of communications. This is because the radio receiver is picking up both the desired transmission and electromagnetic radiation from an undesired source.

Sources of EMI are man-made and natural. Examples of man-made EMI include assorted radio transmitters that can cause mutual interference, and various electrical devices that generate interfering signals, including ignition systems, generators, motors, and so forth. This is the reason you must never transmit a radio signal across a signal site, or position your communications systems near power lines. You can appreciate the severity of this type of interference the next time you listen to your car radio while driving under electrical power lines. The intensity of the radiation from the power lines overwhelms the signal (music) you have tuned in, resulting in a brief intolerable condition.

Many sources of man-made interference may cause intense disruption of communications during the day and drop off at night when they are not in use. Natural interference is generated by phenomena such as thunderstorms, cosmic sources, and the sun. This causes static that you often hear when listening to a radio.

Natural interference is disruptive, particularly in the HF band. Listening to your car radio on the AM band during a thunderstorm will reveal the impact of this interference; the intensity of the radiated energy from the lightning discharges interferes with the signal you have tuned in.

At night, there are increases in the noise levels. This is attributed to both man-made and natural interferences. Because of the change at night in the layers of the F region, many spurious signals can be tuned in. Because of an increase in the number of signals reflected off of the ionosphere, more than one station may be heard simultaneously, causing interference. Some stations change their power output. This can also affect the noise levels.

Variations in the ionosphere are caused by the Earth's position relative to the sun, and by the sun's activity. The two types of variations are regular and irregular. Regular variations occur in cycles. They can be predicted with reasonable accuracy. Irregular variations occur as a result of abnormal solar activities. They are not predictable.

Regular variations that affect the degree of ionization in the ionosphere are divided into four classes. These classes are daily, seasonal, 27-day sunspot cycle, and 11-year sunspot cycle.

- Daily variations are caused by the Earth's rotation.
- Seasonal variations are caused by the Earth revolving around the sun; the relative position of the sun moves from the upper hemisphere to the lower hemisphere with changes in seasons.
- The 27-day sunspot cycle is caused by the sun's rotation on its axis (one rotation each 27 days). As the sun rotates, sunspots are visible at 27-day intervals, causing variations in the ionization density of the

layers. Sunspots are believed to be caused by violent eruptions on the sun and are characterized by unusually strong magnetic fields.

- The 11-year sunspot cycle is caused by the sunspot activity going from maximum through minimum and back to maximum levels of intensity every 11 years. During periods of maximum sunspot activity, the ionization density of all layers increases. Because of this, absorption in the D layer increases, and the critical frequencies for the E, F1, and F2 layers are higher. At these times, higher operating frequencies must be used for long-distance communications.

Irregular variations in the ionosphere can adversely affect communications without any advance warning. Common irregular variations include sporadic E, sudden ionospheric disturbances, and ionospheric storms.

- Sporadic E variations occur when the excessively ionized E layer often blanks out the reflections back from the higher layers. It may also cause unexpected propagation of signals hundreds of miles beyond the normal range.
- Sudden ionospheric disturbance (SID) is attributed to a bright solar eruption and results in abnormal ionization of the D layer. SID causes total absorption of all frequencies above about 1 MHz. It occurs without warning and can last from a few minutes to several hours. The immediate effect is that radio receivers seem to "go dead."
- Ionospheric storms are caused by disturbances in the Earth's magnetic field as a result of solar eruptions. During ionospheric storms, sky wave reception above about 1 MHz shows low intensity and is subject to a type of rapid blasting and fading called "flutter fading." These storms may last from several hours to days, and usually extend over the entire Earth.

Summary

In this lesson, you learned about sky wave propagation and the effects of atmospheric conditions on radio communications.

- The ionosphere has three regions (D, E, and F). The F region is divided into two layers (F1 and F2). At night, these layers combine and are useful for HF long-distance radio communications.
- Sky wave refraction and reflection vary according to the layer density in the ionosphere.
- Each ionospheric layer has a maximum frequency (called the critical frequency) at which radio waves can be transmitted vertically and refracted back to Earth.
- The rate at which a wave of a given frequency is reacted by an ionized layer depends on the angle at which the wave enters the layer.
- Additional signal losses are due to ground-reflection loss and free space loss.
- EMI is derived from two sources – man-made and natural. Examples of man-made EMI include assorted radio transmitters that can cause mutual interference, and various electrical devices that generate interfering signals. Natural EMI sources include thunderstorms, cosmic sources, and the sun.
- Variations in the ionosphere are caused by the Earth's position in relation to the sun, and by the sun's activity.
    - Regular variations that affect the degree of ionization in the ionosphere are divided into four classes. These classes are daily, seasonal, 27-day sunspot cycle, and 11-year sunspot cycle.
    - Irregular variations in the ionosphere can adversely affect communications without any advance warning Common irregular variations include sporadic E, sudden ionospheric disturbances, and ionospheric storms.

LETARC MEETINGS

City of Longview Fire Training Facility, 411 American Legion Blvd, Longview, TX.

LETARC’s monthly meeting held the fourth Saturday of each month at 0900 at the Longview Fire Training Facility at 411 American Legion Boulevard. Talk-in on 147.34 (+136.5). Presentations, free coffee and donuts and friendship!

The VE Sessions have also been moved to the fourth Saturday of each month at LeTourneau University. The time of the day not not changed. It still takes place at 2:00PM.

Minutes of the March 2018 Monthly Meeting Of The Longview/East Texas Amateur Radio Club

The March 2018 monthly meeting of the Longview East Texas Amateur Radio Club was called to order at 8:55 am Saturday, March 17th by Vice President John Zenter, AE5OY. Introductions of members and guests were made. The minutes from the last meeting were read and approved after a motion was made by Jim Rogers, N5V6Q, and seconded by Zikie Graham, W5CSQ. Next the Treasurer's report for the current reporting period was read and approved after a motion to accept was made by Jim Rogers, N5V6Q, and seconded by Joe Gimbert, AG5FJ.

Dave Luchak, KL7BX, started off the meeting with a presentation on Radio Direction Finding. Afterwards the business portion of the meeting began after a short refreshment break.

John Zenter, AE5OY, filling in for Jim Quinn opened up the meeting.

1. Tailgate sale 2nd Saturday in May at Longview Trade Days. It was originally set to be held at the Broadcast Museum in Kilgore but there was a conflict. Sale tax collection was brought up and Richard Brown was thought that Billy Clay has waved the sale tax collection for us but he will double check on this.
2. Fox Hunt in April – date to follow
3. Technician license class – date to follow
4. Jim Perry stated that the MIMS VFD might be finished in time for Field Day
5. Jim Rogers – Reported that all repeaters are functioning properly. There is a new DMR repeater, 443.950, in Kilgore. He has checked on a new PA system at Sam's and they run anywhere from $500 - $700.

VE testing will be held next Saturday afternoon, March 24th, at 2:00 at LeTourneau University. The monthly informal dinner will be Sunday, April 8th at BJ's at 6:00. With no further business to conduct, the meeting was adjourned at 10:40 am.

Treasurer's Report for March 17, 2018 to April 26, 2018

Brought forth from the last reporting period: $12,042.68

Income for this period: $235.00

Membership Dues (Renewals):

Charles Fricks	$25.00
Leroy Stark	25.00
Alan Peterson	25.00
Richard Fleming	25.00
Jim Rogers	35.00
James Demp	25.00
Chris Howell	25.00
Jim Quinn	25.00
Richard Clower	25.00

Total Income: $235.00

Expenses for this period:

Donuts for monthly meeting (Adan's)	$34.00
American Radio (Training Material)	43.42
Intuit (Training Material)	30.71
Total Expenses	**$108.13**

Ending Balance (as of March 26, 2018): $12,169.55

EVENTS AND CONTESTS

April 2018

15 Rookie Roundup – Phone

http://www.arrl.org/contest-calendar

REGIONAL CLUBS

Click on underscored name to visit site.

Tyler http://www.tylerarc.org/
Nacogdoches http://w5nac.com/
Athens http://www.athensarc.org/
Cedar Creek https://k5ccl.wordpress.com/
Marshall http://marclub.net/
Minden http://www.n5rd.org/
Shreveport (ARCOS) http://www.qsl.net/nwlarn/arcos.htm
Shreveport (SARA) http://www.k5sar.com/
Rusk County (Henderson) http://www.ruskcountyarc.com/
Four States (Texarkana) http://www.4444sarc.org/
Palestine-Anderson County http://www.pacarc.org/
Navarro, Freestone, Limestone and Leon County
http://www.nflarc.com/
Panola County (no website)

LeTourneau University – LUARC (no website)

Other Ham Clubs

Fond du Lac Amateur Radio Club, Fond du Lac, WI

https://www.fdlhams.com/

ARES – RESCHEDULED TIME

Upshur County ARES net authorized by LETARC to begin on 30 Nov 2017 and on each Thursday thereafter at 8 PM on 147.34 repeater.

Useful Links

LETARC Web Site
http://www.letarc.org

Radio Tools and Utilities for amateur radio operators
http://www.dxzone.com/catalog/Software/Utilities/

eham.net – Product Reviews
http://www.eham.net/reviews/products/41

Android Apps – Tools
https://play.google.com/store/search?q=ham%20radio%20tools&c=apps

ARRL
http://www.arrl.org/

Freedom Link

http://www.freedom-link.org/

Testing – Get Upgraded

LETARC is working with LeTourneau University to help with facilities for VE testing. We would like to extend our sincere appreciation to the University for helping facilitate this endeavor.

Directions to LeTourneau Campus

Upon entering the main entrance to the campus, turn right at the stop sign and follow the road around past the Solheim Center parking lot on the right to the first intersection. The building across the street and to your right is Glaske Center. Turn right and go to the parking lot at the rear of Glaske Center. Enter Glaske Center rear entrance and go to classroom 103.

Now that you know where the place is, why not study a little and upgrade your license. If you have a Technician's license, you can upgrade to the General. And if you pass the General exam, the VE Volunteers will offer you the opportunity on the day of your exam to test for the Extra at no additional cost.

Where: LeTourneau University Glaske Engineering Center – Classroom C103.

January is membership renewal month. Please complete the form on the following page to renew your membership and mail your check to the address shown at the top of the application. Application on last page.

LeTourneau University is located on 2100 S. Mobberly Avenue in Longview, TX.

Ark-La-Tex Amateur Radio Tailgate Sale – Longview Trade Days

The Tail Gate sale is co-sponsored by the Regional Amateur Radio Clubs and held in conjunction with the Longview Trade Days Event.

When: **Longview Trade Days, Saturday, May 12, 2018, 9:00 am. - 5:00 pm.**
What: Free tailgate sale. Bring all of your new, old, & used amateur radio equipment that you would like to sell. This is an outdoor event and will be held rain or shine. The Longview Trade Days events should draw several thousand people who will be going to this event. **This is an event for the entire family and there will be many different types vendors participating.**

Who: Anybody and everybody who has an interest in amateur radio and electronics, or anyone who just wants to come by, say hello, and just visit and browse.

Cost: Absolutely free to all. Just bring your ham radio sale items and any tables, chairs or other displays that you want to use. **Electricity will be available**. **Bring plenty of extension cords.** Ark-La-Tex Amateur Radio Tailgate Sale has been provided spaces for free to Amateur Radio Operators during this event. There should be enough space for radio operators to display things they are selling. **Amateur Radio Operators should set up along the SOUTH fence line at the Longview Fair Grounds near the entrance off Jaycee Drive unless instructed otherwise.** **Concessions will be available throughout the grounds.**

Where: **Longview Fair Grounds, 1123 Jaycee Dr, Longview, TX 75604**

Coordinates: N 32º 29' 24”   W94º 45' 46.08”

Talk- in Frequency: 147.34Mhz, +offset, tone 136.5	**Contact: Person:** John Armstrong, KG5LWD KG5LWD@yahoo.com 915-490-4277 cell

LETARC CALENDAR

May 2018

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2	3	4	5
6 Dinner	7	8	9	10	L11	12 TAIL GATE SALE
13	14	15	16	17	18	19
20	21	22	23	24	25	26 LETARC Meeting VE Session
27	28	29	30	31		

Calendar Detail

Sunday, May 6, 2018, 6:00 PM– Uncle Joe's Pizza & Pasta Subs – 411 TX-63 Spur, Longview, TX 75601

Saturday, May 12, 2018 – Ark La Tex Tail Gate Sale – Longview Fair Grounds, 1123 Jaycee Dr, Longview, TX 75604

Saturday, May 26, 2018, 9:00 AM – LETARC Monthly Meeting – City of Longview Fire Training Facility, 411 American Legion Blvd, Longview, TX. NEW MEETING DAY

Saturday, May 26, 2018, 2:00 PM – VE Testing LeTourneau University , Glaske Science and Engineering Building, Rm 103, 2100 S. Mobberly Avenue in Longview, TX. NEW VE DAY.

LETARC MEMBERSHIP APPLICATION
PO BOX 5613
LONGVIEW, TX 75608-5613

Membership: * New * Renew **Calendar Year: 2018**

Date: ____________________________

CALL SIGN: _______________________________________ LICENSE CLASS: ____________________

LAST NAME: __________________________ FIRST NAME: _______________ MI: ______

ADDRESS: ____

CITY: _______________________________ ZIP: _________________

TELEPHONE: __________________________ CELL PHONE (optional):___________________________

E-MAIL ADDRESS: ___________________________________ DATE OF BIRTH: ___________________

ARRL MEMBER? * YES * NO

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TYPE OF MEMBERSHIP (check one)

- **Full Membership: $25.00 per year. A full member shall be an FCC licensed Amateur Radio Operator**
- **Family Membership: $35.00 per year. A family membership is available to members of the same family, provided they reside at the same residence. Each member has the same privileges and same membership requirements as a full member.**

<u>Privacy: Member names, addresses, (including e-mail addresses and other personal information shall not be supplied to any third party without expressed consent of the individual.</u>

Signature: _______________________________________ Date:______________________

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Please list **<u>all</u>** of your Amateur Radio **<u>Interests</u>**: [Examples: Contesting, CW, 6 meter, 1.2 GHz, Kit building, ISS, AMSAT, Emergency Communications].

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Entered master database;__ Confirmation letter sent:__ Entered master email list:___
For use by LETARC