

# ***Parma Radio Club*** Newsletter



## February 2007

**Meetings** are held on the first and third Mondays of each month at 7:00 p.m. at the Busch Community Room, 7501 Ridge Rd. in Parma.

**Coming meetings:** Feb 5, Feb 19, Mar 5

### **Elected Officers**

President: Gene Mayler, K8EE  
Vice President: Jim Tiegiser, K8JT  
Secretary: John Malloy, KA8VTV  
Treasurer: Richard Nagel, KC8NRU

### **Nets**

Tuesdays, 9 p.m., 146.46 MHz, FM simplex  
Thursdays, 9 p.m., 28.460 MHz, USB

### **Newsletter**

<http://www.qsl.net/prc/archives.html>  
Editor: Gene Mayler, K8EE

### **WEB Site**

<http://www.qsl.net/prc>

### **E-mail address**

w8prc@qsl.net

### **Membership**

Dues are \$15.00 per year, including a subscription to the Parma Radio Club Newsletter. Application at <http://www.qsl.net/prc/appl.PDF>. Make checks payable to the Parma Radio Club, Inc., 4207 Woodrow Ave., Parma, OH 44134.

# **W8PRC**

## It's Official!

### **Morse Code Requirement Ends Friday, February 23**

Circle Friday, February 23, on your calendar. That's when the current 5 WPM Morse code requirement will officially disappear from the Amateur Radio Service. Beginning at 12:00 AM local time on February 23 (ie, after midnight Thursday), applicants for a General or Amateur Extra class Amateur Radio license no longer will have to demonstrate proficiency in Morse code. They'll just have to pass the applicable written examination.

The new rules also put all Technician licensees on an equal footing, whether or not they've passed a Morse code examination. Starting February 23, Technicians will gain CW privileges on 80, 40, 15 meters and CW, RTTY, data and SSB privileges on 10 meters. When the new rules go into effect Technicians may begin using their new privileges without any further action.

On or after February 23, an applicant holding a valid *Certificate of Successful Completion of Examination (CSCE)* for Element 3 (General) or Element 4 (Amateur Extra) credit may redeem it for an upgrade at a Volunteer Examiner Coordinator (VEC) exam session. A *CSCE* is good for 365 days from the date of issuance, *no exceptions*. For example, a Technician licensee holding a valid *CSCE* for Element 3 credit would have to apply at a VEC test session and pay the application fee, which most VECs charge, in order to receive an instant upgrade to General.

ARRL Regulatory Information Specialist Dan Henderson, N1ND, cautions that a license upgrade is *not* automatic for those holding valid *CSCEs* for element credit. "You must apply for the upgrade at a VEC test session, and you may *not* operate as /AG or /AE *until* you have upgraded and have been issued a *CSCE* marked for upgrade," he stresses. "A valid *CSCE* for element credit only does not confer any operating privileges."

<http://www.arrl.org/news/stories/2007/01/24/100/?nc=1> ■

## Henry (Red) Kearns, WA8ROK, SK

I'm sorry to report that Red became a silent key at Christmas time. Red joined the club in the early sixties and has held just about every club office and chairmanship there is. Probably his favorite activity was Field Day. Yes, he was chairman of Field Day a couple of times too. We will all miss his friendship.

*Gene Mayler, K8EE* ■

## New DXPORTAL Search Engine

Alex Savenok, 4Z5LZ has announced a new search engine designed specifically for Amateur Radio called DXPORTAL.

Savenok says that DXPORTAL was built using the famed Google core search technology. In this case, it prioritizes search results based on Amateur Radio websites. This way you get useful Amateur Radio web information without the non topical results that general search engines tend to return.

Give it a try yourself. Again its in cyberspace at <http://beta.dxportal.com>.

*4Z5LZ, Amateur Radio Newslite* ■

## It's Back

Some good news for satellite users. As of January 14th, AMSAT OSCAR 27 is back in operation. This, thanks to the dedicated work of the satellites Command Team.

Michael Wyrick, N3UC, reports that after working on several problems with the A-F-S-K modem on board AO-27, the controllers were able to upload the flight code. As a result, AO-27 is now running the E-O-S software and sending good back telemetry and the analog repeater has been turned back on.

The Command Team asks that all users keep in mind that AO-27 is 13 years old and that it takes some work to keep it going. More information is on-line at [www.ao27.org](http://www.ao27.org) (AMSAT)

*Amateur Radio Newslite* ■

## The Straight Key Century Club

SKCC is the fastest growing group of straight key, morse code operators in the world. First organized in January of 2006 our membership has rapidly grown to include thousands of members from all corners of the globe. Here's how it works:

- SKCC is open to any interested licensed radio amateur
- Membership is free, there are no dues (and it shall stay that way as long as practical)
- SKCC numbers are issued for life. Once you get it, it's yours.
- Take care of it, and above all, USE it!

The first day of each month, at 0000hrs Zulu, is designated as a monthly operating event that allows SKCC members or non-SKCC members to work each other for credit. Contact 100 SKCC members and qualify for a certificate of accomplishment!

<http://www.skccgroup.com/> ■

## Upcoming contests

### **10-10 Int. Winter Contest, SSB**

0001Z, Feb 3 to 2359Z, Feb 4

### **North American Sprint, SSB**

0000Z-0400Z, Feb 4

### **CQ WW RTTY WPX Contest**

0000Z, Feb 10 to 2400Z, Feb 11

### **North American Sprint, CW**

0000Z-0400Z, Feb 11

### **FISTS Winter Sprint**

1700Z-2100Z, Feb 10

### **ARRL Inter. DX Contest, CW**

0000Z, Feb 17 to 2400Z, Feb 18

### **CQ 160-Meter Contest, SSB**

0000Z, Feb 24 to 2359Z, Feb 25

### **North American QSO Party, RTTY**

1800Z, Feb 24 to 0600Z, Feb 25

### **ARRL Inter. DX Contest, SSB**

0000Z, Mar 3 to 2400Z, Mar 4

### **North American Sprint, RTTY**

0000Z-0400Z, Mar 11

# Introduction to HF Radio Propagation

## The Ionosphere

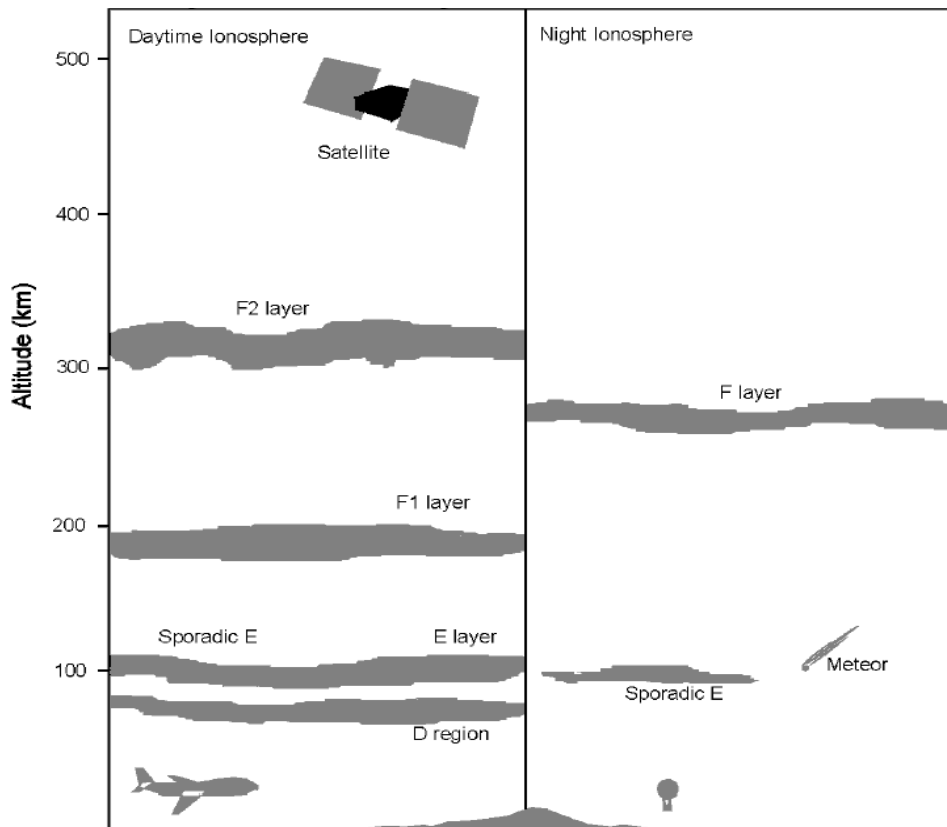
### The Regions of the Ionosphere

In a region extending from a height of about 50 km to over 500 km, some of the molecules of the atmosphere are ionised by radiation from the Sun to

(MHz) radio propagation. Generally, the greater the number of electrons, the higher the frequencies that can be used.

During the day there may be four regions present called the D, E, F1 and F2 regions. Their approximate height ranges are:

- D region 50 to 90 km;
- E region 90 to 140 km;
- F1 region 140 to 210 km;
- F2 region over 210 km.



**Figure 1 Day and Night Structure of the Ionosphere**

produce an ionised gas. This region is called the ionosphere, figure 1.

Ionisation is the process in which electrons, which are negatively charged, are removed from (or attached to) neutral atoms or molecules to form positively (or negatively) charged ions and free electrons. It is the ions that give their name to the ionosphere, but it is the much lighter and more freely moving electrons which are important in terms of high frequency (HF: 3 to 30

During the daytime, sporadic E is sometimes observed in the E region, and at certain times during the solar cycle the F1 region may not be distinct from the F2 region but merge to form an F region. At night the D, E and F1 regions become very much depleted of free electrons, leaving only the F2 region available for communications; however it is not uncommon for sporadic E to occur at night.

Only the E, F1, sporadic E when present, and F2 regions refract HF waves. The D region is important though, because while it does not refract HF radio waves, it does

absorb or attenuate them .

The F2 region is the most important region for high frequency radio propagation as:

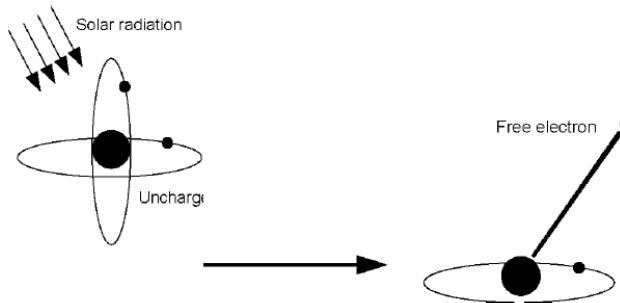
- it is present 24 hours of the day;
- its high altitude allows the longest communication paths;
- it usually refracts the highest frequencies in the HF range.

The lifetime of electrons is greatest in the F2 region which is one reason why it is present at night. Typical lifetimes of electrons in the E, F1 and F2 regions are 20 seconds, 1 minute and 20 minutes, respectively.

Because the F1 region is not always present and often merges with the F2 region, it is not normally considered when examining possible modes of propagation. Throughout this report, discussion of the F region refers to the F2 region.

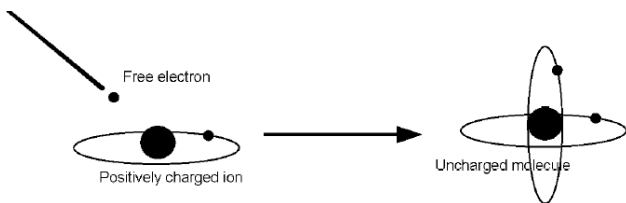
## Production and Loss of Electrons

Radiation from the Sun causes ionisation in the ionosphere. Electrons are produced when this radiation collides with uncharged atoms and molecules, figure 2. Since this process requires solar radiation, production of electrons only occurs in the daylight hemisphere of the ionosphere.



**Figure 2 Production**

When a free electron combines with a charged ion a neutral particle is usually formed, figure 3. Essentially, loss is the opposite process to production. Loss of electrons occurs continually, both day and night.

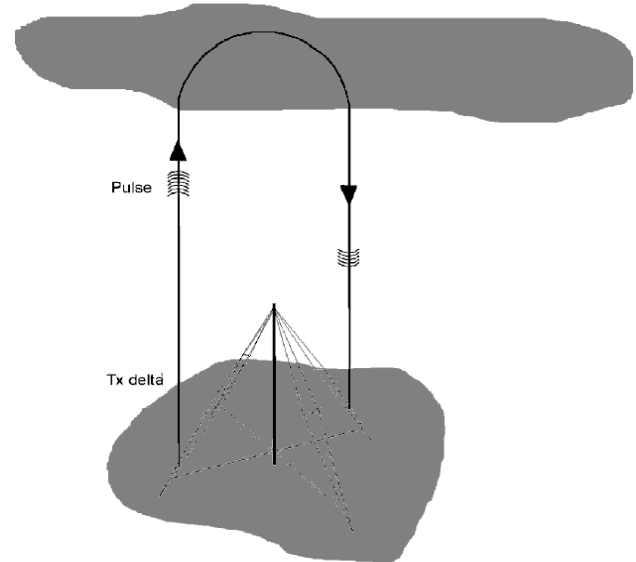


**Figure 3 Loss**

## Observing the Ionosphere

The most important feature of the ionosphere in terms of radio communications is its ability to refract radio waves. However, only those waves within a certain frequency range will be refracted. The range of frequencies refracted depends on a number of factors. Various methods have been used to investigate the

ionosphere, and the most widely used instrument for this purpose is the ionosonde, figure 4. Note that many references to ionospheric communications speak of reflection of the wave. It is, however, a refraction process.



**Figure 4 Ionosound**

An ionosonde is a high frequency radar which sends very short pulses of radio energy vertically into the ionosphere. If the radio frequency is not too high, the pulses are refracted back towards the ground. The ionosonde records the time delay between transmission and reception of the pulses. By varying the oscillation frequency of the pulses, a record is obtained of the time delay at different frequencies.

Frequencies less than about 1.6 MHz are interfered with by AM broadcast stations. As the frequency is increased, echoes appear first from the lower E region and subsequently, with greater time delay, from the F1 and F2 regions. Of course, at night echoes are returned only from the F2 region and possibly sporadic E since the other regions have lost most of their free electrons.

Today, the ionosphere is "sounded" not only by signals sent up at vertical incidence. Oblique sounders send pulses of radio energy obliquely into the ionosphere (the transmitter and receiver are separated by some distance). This type of sounder can monitor propagation on a particular circuit and observations of the various modes being supported by the ionosphere can be made. Backscatter ionosondes rely on echoes reflected from the ground and returned to the receiver, which may or may not be at the same site as the transmitter. This type of sounder is used for over-the-horizon radar. ■

# NVIS Antenna for Roadside Operating.

---

by: D. W. Thorne, K6SOJ

I recently purchased a second hand ICOM 706 Transceiver. What a great rig! A lot of radio neatly packed in a compact rugged case. But, that is another story. My primary set of wheels is a 1985 Toyota Land Cruiser Model FJ60. Another great rig with over 168K miles, but, that also is another story.

As most EMCOMM operators know, most of our communications are regional (in the 30 to 200 mile range). We also know that for this range, an NVIS (Near Vertical Incident Skywave) signal usually works best.

After installing the IC-706, and connecting it to my Outbacker Perth, 2M through 80M mobile vertical, I was anxious to make a few contacts. The Outbacker is an excellent antenna, but as with all verticals, the radiation angle is toward the horizon. For regional work it left much to be desired.

On 40 meters, initial signal reports were only poor to fair between my home location in Macdoel, CA and KA7RAM (Bill), in Klamath Falls, OR, (30 air miles) and N6SSQ (Fergy) in Alturas, CA, (80 air miles). At the same time of day (1500 local), and under the same conditions, good signals reports were received from Spokane, WA. It was nice to talk to the boys in the Evergreen State, but not necessarily useful for regional EMCOMM work.

I don't plan to do a lot of HF mobile operating while actually moving. In the past, for mobile at rest HF work, I have erected a 20 ft. (or so) portable mast, and hauled up a G5RV. This works well, but is a lot of hassle and takes more time than I wished. A dipole also requires more space, in two different directions, plus additional

support, an ATU (antenna tuning unit) of some sort is also required for non-resonant antennas.

I wanted a quick and easy to erect antenna that would allow me to pull to the side of the road, and quickly get on the air with an NVIS signal. The solution? Go to the shop junk box (or your local electronics supply house)! I found an old 3/8 x 24 antenna mount, and affixed it to the end of the steel light bar on the roof of the Land Cruiser, which is grounded well to the vehicle's body. Next, a 33 ft. long piece of #12 insulated wire was cut and a heavy duty lug (3/8" bore) was soldered to each end. Make sure the connections are mechanically strong as well as making a good electrical connection. Use a short 3/8x24 cap screw and a couple of jam nuts. One end of the 1/4 wave wire was attached to the center feed point and strung out just above head height using a length of parachute cord tied through the solder lug on the other end. The distant end can be secured to a tree, a post, a rock, or even a stake in the ground.

The wire can be strung out in any convenient direction. The initial meter readings by the antenna analyzer gave an SWR of 1.5:1, and an impedance of 40-60 ohms depending upon where in the 40 meter band I tuned. Close enough for government work!

I decided to give it a try on 7232 kHz. I heard a signal just below that frequency and tuned down to 7230. There was my old friend W6US (Howard) in McArthur, CA (about 60 air miles) calling CQ! I answered. Howard responded with, "Hello K6SOJ, you are 5 by 9 here." It turned out that he was also testing a new mobile installation. BINGO! We chatted for a while. Later K7DXV

(Ed) in Klamath Falls chimed in, “You’re 5 x 9 here Dave.” What a simple solution!

I am far from what you would call an expert on antenna theory. What I am mainly interested is being able to quickly communicate from a mobile location, not causing any interference and not damaging the transceiver.

From what little I know, the 1/4 wavelength wire element is one half of this type of antenna, and the 5000 lbs. of steel in the Land Cruiser (or your vehicle) is the other half. I now have a 40M NVIS antenna, with which I can pull off to the side of the road, and be operating in less than five minutes!

For longer distances, and if you can park close enough to a tree or other support that is high enough, and you have enough cord, and a rock and a good throwing arm, you can have a vertical or sloper on the air in just a few more minutes.

Since most of HF EMCOMM work is in the 40 and 80 meter bands, the next step was to cut another 33 ft. long wire, solder two more lugs, and use a machine screw, lock washer and wing nut to convert it quickly for 80M use. Or, install an insulator and a wire jumper with an alligator clip

and you have a quick and easy 40-80m antenna.

This antenna is basically nothing more than an unbalanced, 1/4 wavelength, horizontal wire, using a vehicle as the other half of the dipole. A longer than 1/4 wave random wire will also work well if an ATU is used. So, use your ingenuity and make a quickie, NVIS, roadside portable antenna for yourself! I’ll wager that just about anything could be used for a mounting terminal, and could be mounted to a truck mirror mount, a roof rack or a homebrew bracket secured to a metal camper, trailer or motor home. Feed with a piece of RG-58 coax and make sure the mount is grounded well to the vehicle’s body and frame. Be sure to check any antenna for SWR and impedance before transmitting. I use an MFJ-259 antenna analyzer.

NOTE: If you have a fiberglass or plastic car, this system will not work, unless you also add a 1/4 wave counterpoise that can be laid out on the earth. Oh yes, don’t forget to take down your roadside antenna before you drive away. And, be sure to park safely, where another vehicle can’t zoom by you and get snagged on the contraption! ■

## Solar Cycle 23/24 Update

We’re not at the bottom yet. A few months ago, it looked like the bottom of solar cycle 23 would occur at the end of February. From the data, it looks like the sunspot number will take a false dip in March, but the solar flux will reach bottom in July. The solar flux is what really counts. So, we’ll have to wait a little longer.

*Gene Mayler, K8EE* ■

YR/MO	Sunspot Number			Solar Flux		
	Pred	High	Low	Pred	High	Low
2007 01	10.2	20.2	0.2	74.8	87.8	61.8
2007 02	10.0	21.0	0.0	74.4	89.4	60.0
2007 03	9.9	21.9	0.0	74.0	91.0	60.0
2007 04	10.1	23.1	0.0	73.9	92.9	60.0
2007 05	10.1	24.1	0.0	73.6	94.6	60.0
2007 06	10.3	25.3	0.0	73.0	95.0	60.0
2007 07	9.5	24.5	0.0	72.0	95.0	60.0
2007 08	11.2	26.2	0.0	73.0	96.0	60.0
2007 09	13.3	28.3	0.0	74.3	97.3	60.0