# The REPEATER

*The OFFICIAL newsletter of the Rogue Valley Amateur Radio Club*

**W7OEK**

**Volume 2010, Issue 4** **April 2010**



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|---|---|---|---|---|
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## *Next Club Meeting*

**Thursday, April 1, 2010, 7:00 PM**
**Red Cross Building, 60 Hawthorne St., Medford, OR**
**Across from Hawthorne Park**
**Program: Smith Charts and Impedance Matching, Tom McDermott, N5EG**

### President's Letter

Thanks to Bud Larson, W7LNG, for his presentation about practical ham-type test equipment at the March meeting.

The April 1 program will feature "Smith charts and impedance matching" by Tom McDermott, N5EG. Tom makes so many contributions to the Club, in addition to putting out the newsletter (in spite of working a demanding job). And he can explain complex subjects in understandable language.

For those who missed the March meeting, Bud, W7LNG, who is trustee of the Club's license, reported that an application has been submitted for a new, more friendly call. I hope that he will have a result to report in time for the April meeting.

It's not too early to start planning for Field

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### Secretary's Report

MINUTES OF THE 4 March 10 ROGUE VALLEY AMATEUR RADIO CLUB MEETING

The meeting was called to order by president Herb Grey W7MMI at 1905L in the Red Cross building in Medford, OR.

Herb had everyone introduce themselves. 21 people where in attendance. No guests were present.

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Herb said, " since the minutes are in the newsletter they will not be read."

Treasurer Lud Sibley, KB2EVN did not have a treasurer report ready.

OLD BUSINESS:

*(Continued on page 2)*

## President's Letter, Continued

Day the fourth weekend of June. There is always room for everyone to participate, both in operating and set-up. We start from scratch each year so don't let absence from previous events hold you back. Lack of equipment and/or experience is not a valid excuse to not join in the fun!

73, Herb W7MMI

## Two Meter Repeater Frequency

In order to provide a common place to find fellow RVARC club members on two meters, we recommend using the K7RPT 147.62 / 02 repeater as a calling and monitoring frequency. This is an open repeater (no tone or PL access required). The repeater listens on 147.62 MHz and transmits on 147.02 MHz.

## Secretary's Report, Continued

Bud Larson, W7LNG announced that 5 people showed up for his ham radio licensing classes.

Don Bennett, KG7BP announced that the VE testing session had eleven people who showed up for testing. Ellis Feinstein (who is well known in the electronics industry) finally got a ham license, it's KE7ICM.

NEW BUSINESS:

Bud W7LNG announced that ARRL sent him a Field Day packet and it's time to start thinking about this years event.

Van Sias, K7VS announced that Steve Chastain, N7SC is on the ARRL VHF contest committee.

At 1930L Herb put the meeting on hold for coffee and conversation.

At 2000L Herb called the meeting back into session and turned it over to Bud who gave us a very nice presentation on some test equipment he uses in ham radio.

Lud Sibley brought a cutaway of large, water cooled transmitting tube.

Herb adjourned the meeting at 2100.

Submitted by Jacob O. (Jack) Schock, WA7IHU secretary

## Member Biography: Herb Grey, W7MMI

This is the first of hopefully several biographies of RVARC club members. Herb Grey, W7MMI is the president of the RVARC, (and has been president many times). He's a long-time ham and has lived in the Rogue Valley for all but a few brief stints.

How did you get started in amateur radio? I began by listening on a crystal set. I later acquired some military gear and started listened to shortwave, where I discovered ham radio, and eventually got my ham license.

When and where were you first licensed? In Medford in 1948. I took the Class C license exam from a local ham (class C became what was later known as the Conditional license).

Did someone help or elmer you when you were getting started? How did they help you?
I learned it all on own, using the ARRL License Manual and Handbook ($1 back then!). I became active in the local radio club - then called the Rogue Valley Radio Club, and later became active in the Ashland Radio Club. I operated Field Day with the Rogue Valley RC in 1950 and 1951 on the top of mount Ashland, using the old forest service tower on 10 meters (the tower was well grounded due to being hit by lightning a lot). The tower was later removed, and we used a garage the second year.

What facet of ham radio do you enjoy the most? It's changed over the years. I like to operate HF SSB, and have started operating digital modes lately, RTTY and PSK31. Would like to operate HF digital voice one of these days.
What do you enjoy most about club meetings? Mostly the programs. I also enjoy the Tuesday morning ham breakfasts. Enjoy building ham equipment and experimenting.

How many different amateur radio call signs have you held? One call, W7MMI, still have it. I've kept that call through moves to several locations. When living outside Oregon, I always operated club stations so never had the need to change callsigns.

Do you do any Emcomm or Skywarn work?
Have operated on ARES briefly.
Have you taught any classes on amateur radio or the Boy Scouts Radio Merit Badge?
Currently helping with our club's general class. I enjoy teaching the classes and meeting new people.
What was your longest contact (distance)?
Off the East coast of Africa (can't remember the country). What was your longest contact (time)? 10 meter AM phone in the evening - probably 2-3 hours. That was back in 1950s.

Have you ever talked to a celebrity ham? In 1950 on 10m AM phone I talked with W2CKD/ mobile, Tex Beneke (who took over the Glenn Miller band after Glenn's death). He was in Medford for a band concert and invited me to the Medford Armory for the intermission where I got the chance to meet

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## Propagation—Ionograms

One of the powerful tools for examining HF propagation is the Ionosonde. The ionosonde is a system of equipment that measures the height of the various ionospheric layers (D, E, and F) at different frequencies.

The ionosonde produces a chart called an ionogram that visually depicts the HF ionosphere. In this article we will examine the iongram to see what it tells us about our ionosphere.

In the simplest case, the measurement consists of sending a brief pulse of HF radio signal at one frequency directly upwards and measuring the resultant signal reflected by the ionosphere back at the ground. The signal is thus at vertical incidence. It requires an HF antenna with a good 90-degree vertical pattern, even at low frequencies. The time-of-flight of the pulse allows us to compute the virtual height of the reflecting layer. We use the term 'virtual height' because the ionosphere is not actually a reflector, but rather it refracts our HF signals. Figure 1

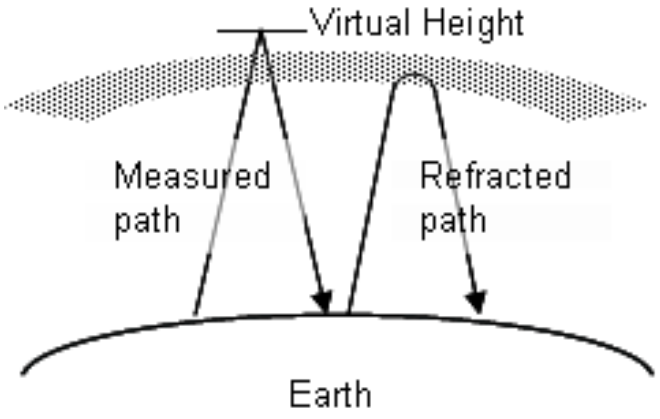


**Figure 1—Path Geometry**

shows a refracted (actual) path geometry versus a simple reflected path geometry and what the virtual height is. We compute a virtual ionospheric height that is higher than the real height (refracted signal) of the ionosphere because both geometries have the same time delay.

The ionosonde steps through the HF frequency range one frequency at a time measuring the time delay of the reflected signal. Normally the receiver uses the same antenna as the transmitter (to insure a completely vertical path), so the T/R switching needs to be completely electronic and rather fast—in essence a very good QSK system.

The data is the then displayed on a chart that shows the equivalent virtual height of the ionosphere at each measured frequency with a dot. The collection of dots are grouped into bands that are the different layers ( primarily E and F, sometimes F splits into F1 and F2).

Figure 2 shows a representative plot produced by the Lowell Digisonde. This chart comes from K9LA's excellent propagation website http://mysite.verizon.net/k9la/ .

Let's start in the lower left of the chart. The red dots are frequency soundings starting at about 1.6 MHz. The first returned echoes are from the E-layer of the ionosphere at about 100 km height. As the frequency is increased, the signal is progressively slowed in the ionosphere, and the virtual height appears to increase. At about 2.9 MHz, the E-layer stops reflecting the signal, and the curve essentially goes vertical.

Next, at about 3.1 MHz, we see a red curve that shows the start of reflections from the F-layer of the ionosphere. At about 4 MHz, the signal reaches a local maximum height, this is considered the height of the F1 layer. As the sounder climbs to about 5.5 MHz, we see the F2 layer reflect and eventually stop reflecting the signal. This is the F2 Critical frequency—the maximum vertical-incidence reflection frequency. The Maximum Usable Frequency is higher than the critical frequency and depends on path geometry

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(sometimes called the slant range) because longer paths have a higher MUF.

An interesting observation is that there is a second F-layer trace that can be seen between 3.5 and 4 MHz (and a bit between 4.5 and 5 MHz) at a height of around 500 km. This is actually a double-transit reflection. There are several possible double-transit geometries, but the one in Figure 3 is typical. It shows the sounder signal re-reflecting from the ground and back up the to F-layer then back to the receiver. The ionogram shows this as a virtual height of 500+ kM but it's really just a spurious signal.

There is also a green trace, shifted to the right of the red trace. This is the reflection from the 'x' or eXtraordinary wave. The red traces are labeled 'o' and are the reflection from the Ordinary wave. The earth is a large permanent magnet, and it produces a DC-magnetic field bias of roughly 50 micro Tesla in the ionosphere. This magnetic bias causes the electrons in the ionosphere

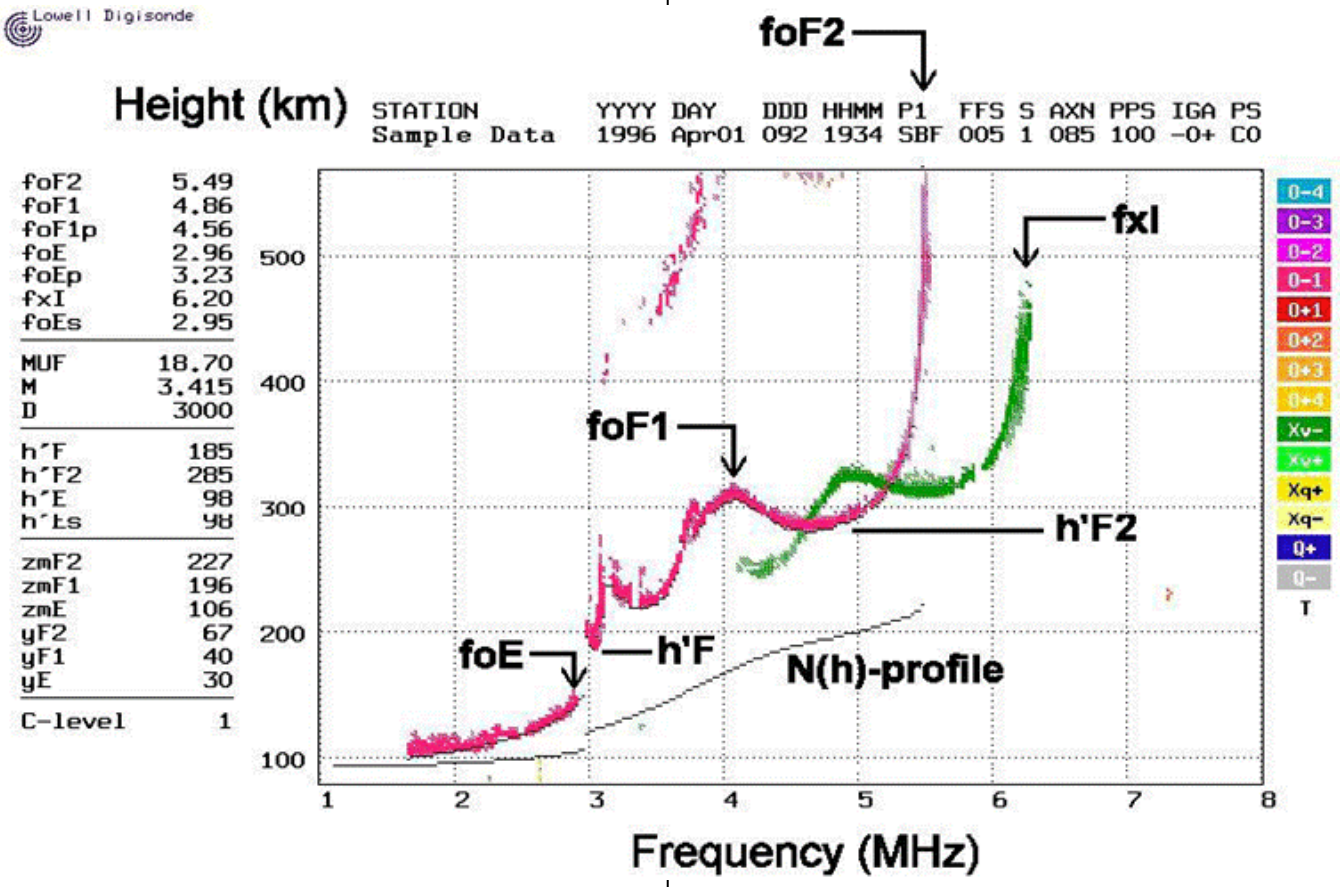


**Figure 2—Ionogram**

(which spin) to precess at what is called the 'gyro frequency' (roughly 1.8 MHz). The spin causes there to be what in optics would be

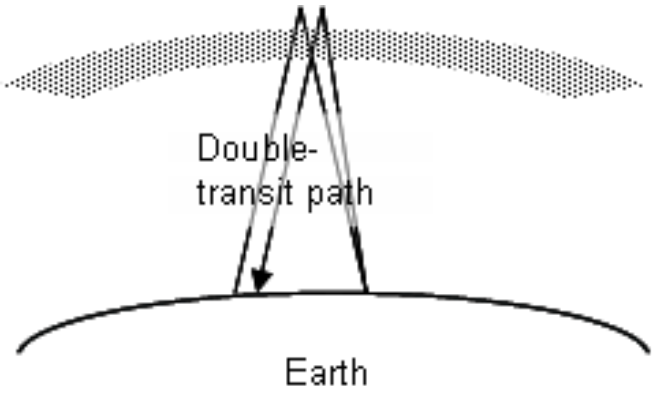


**Figure 3— Double Transit Path**

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## Propagation—Ionograms, Cont'd.

called a double refractive index (birefringence). This causes the transmitted signal to break into two rays, the o– and the x– waves which propagate differently.

The X-wave tends to refract in a manner that can provide a higher MUF.

Some real-time Ionograms from various locations in Europe are available from: http://www.dk5ya.de/iono.htm and it's interesting to look at when the band is open from Europe.

## Club Member Biography

him in person.

What's the tallest tower you have climbed? Near King Mountain I climbed a 150 foot tower to adjust a 6 GHz microwave dish and to just to look at the view.
Are there any special awards you are proud of? I got Worked All States in 1949 or 1950 on 10 meters. It took 48 states in those days (but I had also worked Alaska and Hawaii).

Are you a contester, have you won any? Field Day is my only serious effort, I have operated an occasional 10 meter contest and a DX contest or two for a couple hours.

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