

IREDELL WIRELESS

Newsletter

W4SNC 146.685- Repeater

Published monthly as a service to the Iredell County Amateur Radio Community
By the Iredell County Amateur Radio Society (ICARS)
P.O. Box 142 Statesville NC 28687

www.w4snc.org
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President: Rick McClure, KE4TEP~~Vice-President, Dennis White N4WHK
Secretary: Greg Cason KJ4ENR~~Treasurer: John Lamson, WB4WRY
Members-at-Large: Tim Misenheimer, KC4MJC ~~Howard Hecht W1HO

Wireless Editor, Tim Misenheimer KC4MJC

MAY 2009

This month's Meeting will be held at Julia's Tally House. May 14, 2009. Come early (6:30PM) and eat or rag chew. The Meeting Starts at 7:00 PM. All ICARS members and Families are encouraged to attend!

Iredell County Amateur Radio Society
Meeting Minutes
April 9, 2009

The Iredell County Amateur Radio Society met at Julia's Tally House for the regular monthly meeting. President Rick McClure, KE4TEP, called the meeting to order at 7:02pm. There were thirteen (13) attending – ten (10) members and three (3) visitors. Rick asked everyone to introduce him or herself.

Minutes- A motion to approve the March 12, 2009 minutes, as published, was made and seconded. Motion carried.

Treasurer's Report – Don Summers, W4DON, presented and submitted a verbal report dated April 9, 2009. A written report was also later submitted.

ARES – Dennis, N4WHK, reported:

1. Iredell ARES was activated on Tuesday, April 7, in response to a staged emergency response exercise at Mooresville High School.
2. Typically the majority of people who check in to the Net can not immediately deploy.
3. Dick Williams, W3OA, deployed to Mooresville Middle School and was able to make contact through the ICARS repeater using a ground plane antenna installed on a 20' mast.
4. Emergency Lockdown exercises are staged twice a year at different schools across the county. EOC isn't necessarily activated each time.
5. Mike Bryan, WA6KWW, mentioned that there is another exercise scheduled for Tuesday, April 14.
6. Jim Kennedy, KD4IIQ, asked whether Lowes Corporate in Mooresville would allow a radio system to be set up on their property.
7. Rick, KE4TEP, reminded everyone that Iredell County has offered space on their tower located at Rhinehart Road in Mooresville. This site has emergency backup power. Rick priced a voting system that included a 70cm radio at both the southern and northern portion of the county at approximately \$1400.00.

Technical – Don, W4DON, reported:

1. New coax was installed on the repeater antenna on April 4th.
2. Based on the length of coax used, the base of the antenna is approximately 255' above ground level. Total coax length is approximately 342'.
3. Performance is still under investigation but results look promising.
4. If anyone is receiving a signal from the repeater in Greenville that operates on our same frequency they can set their rig to decode 77Hz (Tone Squelch) so that only our repeater will open their squelch.
5. Jim, KD4IIQ, mentioned a recent article in the newspaper regarding Broadband Over Power Lines (BPL). The ARRL is actively involved in this issue since BPL can interfere with Amateur Radio operations.

Website – Tim, KC4MJC, reports that the website is working properly.

OLD BUSINESS

Field Day –Dennis, N4WHK, reported:

1. Please sign up for Field Day as soon as possible. Dennis needs the hours and bands you wish to operate. This information will also be used to determine what Class we will be in.
2. Field Day will be celebrated from June 26 to June 28, at McClure Park.

3. Setup will begin on Friday morning, June 26. Operating will begin on Saturday, June 27.
4. We will set up a GOTA station this year. Howard, W1HO, will take charge of setting up this station and will be using his equipment and possibly his call sign.

Antenna Building – Rick, KE4TEP, invited all members to his home for an antenna building party on May 16th at 9:30 am. Feedline and other parts are available.

Walt Schwarzl has antennas down and needs help getting them back in the air. The club needs to help this member with his antennas.

Howard, W1HO, met with Don Daso, K4ZA, who donated a number of antennas for ARES (or ICARS) use. A Thank You letter needs to be sent to Don thanking him for the charitable donation. Per Jim, W4ONS, the club can accept and acknowledge donations up to \$25,000 per year. Howard will compose the letter and Greg will sign it and send it.

Jim, W4ONS, mentioned that Perry Taylor's (SK) wife called him and thanked the club for the flowers that were sent. Jim also mentioned a new promo for amateur radio that was played on WSIC and UNCTV.

NEW BUSINESS

Don, W4DON, mentioned that Jeff Watts, KC4DBZ was selected as one of RadioLinks 2009 Top 30 Engineering and Technician Professionals.

Don also mentioned that John Bullard, one our Honorary Members, has recently retired from his position in Statesville and moved to North Myrtle Beach to take another job.

Don made a motion to nominate Mark Sanger, the co-owner of WSIC, as an Honorary Member of ICARS. Motion carried.

We need a photo of Mark Sanger and Billy Blevins accepting their Honorary Memberships into ICARS.

A motion was made to adjourn at 7:51pm. Motion Carried.

Respectfully submitted,
Greg Cason, KJ4ENR
Secretary

Radio Propagation

Provided by our Creator, Almighty God, Himself.

First, HF radio (*referred to as shortwave*) is relied upon for "*passive*" **long distance communications** of hundreds of miles to thousands of miles on and around the Earth. *Passive* meaning no active man-made electronics, satellite, etc., between point of signal source and location of the signal receiving antenna.

Radio Propagation 101

Encircling the Earth, well above our atmosphere, are layers of different bands we call the ionosphere. It's sometimes referred to as the "ether". These layers or bands are at different altitudes above the Earth's surface. Primarily these are named D, E and F layers. See Table 1 below.

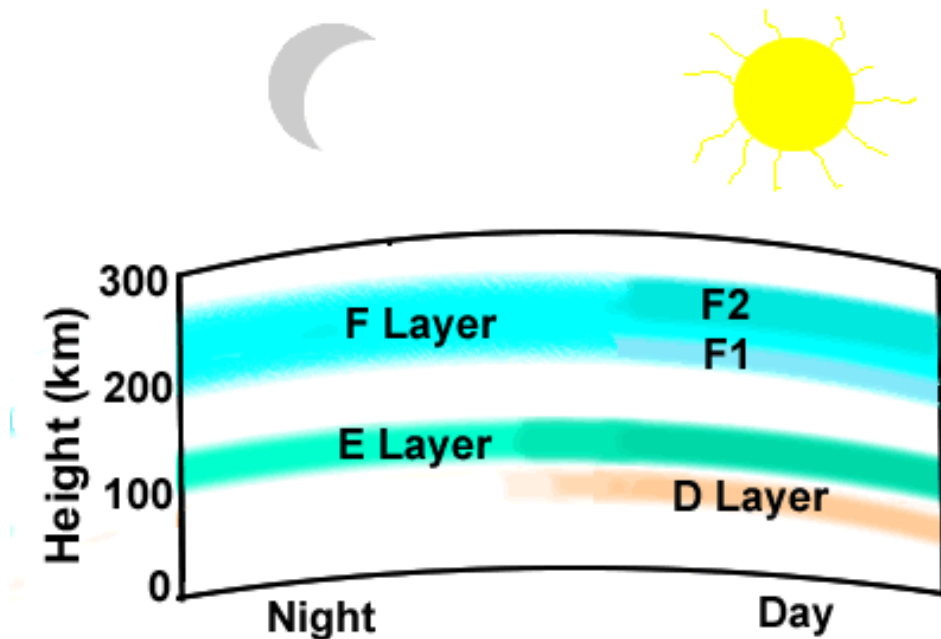


Table 1
Layers of the Ionosphere

| Layer | Approximate Elevation | Importance | When Present |
|-------|-----------------------|-------------------------------------|----------------------------------|
| F | 140 km - 400 km | Main "reflection" region | Always - stronger during daytime |
| E | 90 km - 140 km | Lower frequency "reflection" region | Always - but very weak at night |
| D | 50 km - 90 km | Main absorption region | Daytime only |

The ionosphere is the upper part of the atmosphere, extending from about 50 km to 2000 km above the Earth's surface. The part we are interested in for electro-magnetic (radio) transmission is the lower 500 kilometers. In the ionosphere, radiation from the sun (primarily X-rays, ultraviolet and particles) bombard gas molecules and cause them to release electrons. These are called "free electrons" and they are negatively charged. The molecules that lose the electrons become positively charged. The name for charged molecules or atoms is "ions" and these positive ions are what the ionosphere is named after. The free electrons and ions cause High Frequency (3 to 30 megahertz) radiation that is moving upward to bend back toward the earth, an effect called refraction. This bending allows the signals to travel back down to the surface at ranges well over the horizon, giving HF radiation its unique long range characteristics. When radiation from the sun is no longer present during nighttime, many of the electrons join back with the ions, but some remain free throughout the night. An important parameter for electro-magnetic propagation is the amount of free electrons that are present; this is called the "**electron density**". The higher the electron density, the more HF are bent toward the surface.

D Layer (closest to the Earth's surface)

This layer contains some free electrons and ions, but also many more normal (or neutral meaning uncharged) molecules and atoms. When radiation interacts with an electron it causes the electron to move. If the electron runs into a neutral molecule or atom, it is absorbed and so is the energy from the radiation. Therefore the primary effect of this layer is to absorb radiation. This is bad for transmissions because when the radiation is absorbed, the signal is lost. The lower the frequency of transmission the more the electron moves and the more likely it is to be absorbed. Therefore the lower the frequency the more the D layer absorbs the transmission energy.

The D layer will NOT reflect VHF and UHF signals . . . they simply pass through it into our solar system and into outer space

E layer (just above the D Layer)

This central part of the ionosphere represents another peak or maximum value in electron density. However there are fewer electrons in the E layer compared to the F layer and therefore it is not usually as important for bending of HF radiation as the F layer. Some lower HF frequencies, particularly during the day, will be "reflected" by this layer, which, because it is lower than the F layer, may result in reduced range. This layer is highly variable in space and time. Sometimes disturbances will cause abnormal reflections in parts of the E layer. When this occurs a **Sporadic E** layer is said to be present. Sporadic E propagation affects VHF (30 - 300 MHz) and UHF (300 - 3000 MHz) ranges. This is what caused TV channels to co-channel, causing Venetian blind effect on TV screen and or long distance TV such as receiving Cuba on a channel here in N.C. Sporadic E propagation cannot be relied on for long periods of time. It may last seconds, minutes, hour and sometimes a few days. Many hams take advantage of Sporadic E to get greater distance communications on the 6 meter band and 2 meter band. No Sporadic E? Then distance is limited to about 100 miles (antenna to antenna) normally, day after day 24/7 & 365 days per year.

F layer (farthest from the Earth surface)

The F layer is the highest significant layer in the ionosphere and the central part has the **greatest electron density** in the Earth's ionosphere. **This is the main region where HF radiation from below is bent back down.** We use the term "reflection" in the table because the bending is like a reflection. Technically, this bending process is called refraction, but we can think of it as a reflection from the F layer. During the day the F layer separates into two layers, called F1 and F2. The F2 is the stronger and more important layer.

"The F layer will NOT reflect VHF and UHF signals . . . they simply pass through it into our solar system and outer space."

How does Sunspots and the Solar Cycle fit in?

In addition to the changes in solar radiation due to the time of day, there are also changes in solar radiation due to changes in the sun itself. The sun undergoes an approximately 11 year cycle of changing radiation. The number of sunspots follows the same 11 year cycle, therefore the solar cycle is sometimes referred to as the sunspot cycle. **During periods of solar maximum (most sunspots) the ionosphere has a higher electron density** than other periods. So we need lots of sunspot activity to ionize the ionosphere for long distance radio communications.

Not mentioned in the above paragraphs is the effect we refer to as "skip". When an HF radio signal hits a dense ionized F layer the signal is refracted back to the Earth hundreds and thousands of miles away. (one bounce). Sometimes it will take two, three, or more bounces to reach a distant point. The takeoff angle of the HF radio signal from the antenna will affect that distance. Low angles such as 10 - 20 degrees are best for long distances whereas 90 degrees (straight up) will not give a strong signals long distances away. Height and type of an antenna affects the takeoff angle somewhat. When the F layer is dense that's when the CB'ers work "skip" (26 - 27 MHz) which was illegal until the FCC just give up trying to police the CB band. The amateur radio community tried to tell the FCC to not put the CB band on the 11 meter band, due to skip conditions, back in 1958. I was in France in 1958 - 1961 and I could hear those CB signals from their legal handheld portables and mobiles when they were running legal powers of 1 to 3 watts. That was during Cycle 11 and the F-layer was **very dense**.

Explanation and examples of wavelength

A radio signal is an alternating voltage going from 0 - 90 - 180 - 360 electrical degrees or back to zero again in repetition at a rate per second determined by its frequency. Example: 1 kHz = 1,000,000 hertz (cycles per second) .

Band = A group of frequencies such as 550 kHz to 1700 kHz is the AM broadcast **band**. 14.0 mHz to 14.350 mHz is the 20 meter ham **band**.

Meter = Unit of length or distance (linear in the explanation below).

Radio Wavelength is expressed in **meters** = Frequency in Hz / 300,000,000 **meters** (speed of light or radio signals in **meters** per second or 186,000 miles per second) or **mHz** / 300 by dropping off the six zeros. Therefore we can use the formula **Wavelength = megahertz / 300**.

The **Wavelength** of a radio signal is the distance the signal travels across the Earth or in space in the time it takes to complete one cycle.

Example1: WSIC on 1400 kHz or 1.4 MHz / 300 = **296 meters** wavelength. That's the distance that signal travels during one complete cycle.

Example2: 14 MHz / 300 = **21.428 meters** wavelength. We hams just refer to 14.0 to 14.350 MHz as the 20 meter ham band.

Example3: 27 MHz / 300 = **11 meters** wavelength. (the CB band)

Notice the wavelength is longer for lower radio frequencies. Likewise the wavelength gets shorter as the frequency of the radio signal is increased, hence the term "**shortwave**", meaning short wavelength.

Converting wavelength to **Frequency = 300 / wavelength = 300 / 11 meters = 27 megahertz.**

The military today is relying on satellite communications for the majority of their long distance communications. That's active, not passive, and it's man made, subject to failure or being destroyed.

Remember to that it's RF electro-magnetic radiation from an antenna creating a magnetic flux field that travels in space and induces a voltage into the receiving antenna. It's truly amazing. That's some knowledge on radio propagation.

Is God reducing the sunspot activity for a reason? He has many.

Edited by Don, W4DON

I C A R S

FM and HF Nets

2009

May

Net Manager: W4DON

| 2m FM NET 2100 L 146.685 | | 10m CW Net 2000 L 28.150 | | 10m SSB Net 2100 L 28.468 USB | |
|---|------------|---|------------|--|------------|
| Date | NCS | Date | NCS | Date | NCS |
| | | 2 | W4DON | 2 | W4DON |
| 6 | W4DON | 9 | WB4WRY | 9 | W4DON |
| 13 | KC4MJC | 16 | W4DON | 16 | KE4TEP |
| 20 | KJ4ENR | 23 | WB4WRY | 23 | WB4WRY |
| 27 | W1HO | 30 | N4WHK | 30 | |

Thanks for volunteering to be a NCS

Call your Net on time

If you're unable to call your Net find a replacement NCS
NCS please give a 5 minute notice before net time.

Don't forget to file your Net Report to N4WHK & W4DON

ARES Training Net each Monday at 2100 L

ICARS was organized on September 9, 1976
Nets have been running since 1977

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