EARS Newsletter

Welcome to the EARS, (Emerald Amateur Radio Society), newsletter. This newsletter is a collaborative on-line effort. Each area is updated by by the listed individual in real-time. All updates should be completed no later than a day or so prior to our meetings, which occur on the third Tuesday of each month. See our calendar for more information on meetings and club events.

Given this is an on-line newsletter, updates can come at any time! Just check back in and look for the last updated date in each section. We hope you enjoy this newsletter. If you have suggestions please send them to newsletter@emerald-ars.us.

President's Notes

by Jeff, NT7B.

Welcome to the Newsletter

I'm sure the club has produced a newsletter at some time in the past, but it's been long enough that it seems like an all-new venture for me. I hope to contribute something interesting to read in another issue, but for now I'm content with putting out a huge "**Thank You!**" to NK7Z for assembling the web page and the members contributing content for all to enjoy. We're fortunate to have club members with so much knowledge and experience with so many of the different niches within the Amateur Radio Service.

Meeting Agenda for June 21, 2002

EARS Meeting Agenda, June 21, 2022

Call to Order and President's Opening Comments.

Roll Call / Introductions.

Program: To be announced. Bob's Tower Project presentation has been postponed.

Announcements.

Minutes of May meeting.

Reports: Treasurer, Volunteer Examiners, EARS Net.

Membership Readings.

Old Business:

- Getting the shack EmComm ready: Where are we with computers and setting up HF packet? We have a VHF packet / WinLink setup with the old laptop and Kenwood, but does anyone remember how to run it?
- Repeater Update
- Memorandum of Understanding with the city
- Cascadia Rising 2022

New Business:

- Programs for future meetings
- Website
- Sea-Pac reports

Good of the Order, Brags, Etc.

Last Updated on June 23, 2022 by Web Manager

718 total views, 4 views today

Vice President's Notes

By Doc, W7DOK.

Fall is around the Corner

Greetings Friends;

Its been a long hot summer and it will soon be fall. Hopefully needed projects, Antenna repairs, Tower installations and all those things that pile up and need attention in nice weather are completed and you are readying for fall and winter operation.

Some of you have new radios to set up and get on the air, Others have obtained new gadgets and Gizmos to make operation easier in your shack. Others have some projects to work on through the fall and winter IE, improving station grounding, moving everything over to Power poles and cleaning up the maze of wires in your shack. There is always something that needs doing.

As a Club, we have our Club shack to work on and improve and clean up, we have a service project to be involved with and we are reaching out to other clubs by doing "Goodwill" visits, getting to know nearby club members we

may have talked with on the air or heard on Nets. As we grow, there will be other projects and learning opportunities.

I often hear, more often than I can believe, “I don’t want a position of responsibility or to hold an office, But I’ll support those who do.” As we grow, it might be a good time to dip your toe in the waters of leadership and offer your talents in a more active way. I am looking forward to a busy fall and winter, a time of personal growth in the hobby and a time of growth and expansion as a club. Hope to catch you on the Air, Maybe on a Thursday evening Session of the EARS NET!

73, Doc W7DOK

Last Updated on August 17, 2022 by Doc, W7DOK

Meeting Notes

By Ken, KG7QPL.

Looking for an Opportunity to Connect?

EARS has several regular meetings and other chances for you to join in and get connected!

- Monthly Club Meetings: 3rd Tuesday of each month, 7 PM, Springfield Justice Center

    - For a summary of our past meetings and links to some of the presentations, see our Past Meetings page.
- Weekly Nets: Weekly on Thursdays at 7 PM at 146.74 MHz (EARS repeater)
- Monthly VE sessions: see the VE section of the newsletter for details
- Monthly no-host Breakfast: 1st Saturday of each month, 10 am, Brail's Restaurant in Eugene

Check out the Calendar page for any changes to the meeting times or locations.

EARS Net Reports (146.74 MHz):

- **8/4/2022, 1900**: Net control: KG7QPL; Check-ins (3): KJ7CNJ, NK7Z, AI7AD; Traffic: none.
- **8/11/2022, 1900**: Net control: KG7QPL; Check-ins (6): AD7Z mobile, KJ7CNJ, W7DOK, NK7Z, AI7AD, K7KRA; Traffic: Reminder: next Club meeting 8/23/22 @ 7 pm with David Kidd, ARRL Oregon Section Manager presenting; EARS Board Meeting 8/12/22 to work on draft MOU with City; Question from W7DOK RE ICOMM 7300 error message.
- **8/18/2022, 1900:** Net Control: KG7QPL; Check-ins (7): KJ7CNJ, KJ7MQA, KJ7MCN, AD7Z mobile, NK7Z mobile, WX7HS, W7CN; Traffic: Reminders for VE session, mini swap meet, and David Kidd presentation.
- **8/25/2022, 1900:** Net Control: KG7QPL; Check-ins (3): NT7B, W7DOK, AI7AD; Traffic: None.
- **9/1/2022, 1900:** Net Control: w7DOK; Check-ins (4): NK7Z, AD7Z mobile, KC7RJK, W7CN; Traffic: None.
- **9/8/2022, 1900:** Net Control: KG7QPL; Check-ins (7): KJ7CNJ, W7DOK, NK7Z, AD7Z, KC7RJK, AI7AD, K7OWW; Traffic: None.
- **9/15/2022, 1900:** Net Control: KG7QPL; Check-ins (9): NT7B mobile, KJ7CNJ, KJ7CWV, AD7Z, NK7Z, KC7RJK, AI7BQ, W7DOK, W7CN; Traffic: presenter at 9/20/22 meeting will be Dr. John Lebow regarding Camp Alma service project.

September 2022 EARS Breakfast:

We had another great breakfast this month and a great time was had by all! We hope to see you at the next breakfast on October 1!

Want to Join the EARS Club?

Click here to learn how to subscribe to our email list or to obtain a membership application.

Last Updated on September 19, 2022 by Club Secretary

671 total views, 4 views today

Volunteer Examiners Reports

By Bob, AD7Z, and Peter, N7IY.

Latest Exam Results:

Our July test session is now in the books. This month we tested three candidates and a total of five tests were given. Our candidates were from Eugene, Corvallis, and Albany.

Two candidates came to take their Technician class exams and the third the Extra class exam. All candidates passed the exam they came for. Both the Technician class attempts being successful, they opted to take the General exam as well. Unfortunately, they need to study a little more for that next upgrade. The good news... when they return to upgrade they won't be paying the FCC fee again!

We were well supported by our Volunteer Examiners and a great THANK YOU to all of them. Those of you who may be interested, here is a short list of some of our more active examiners and the number of exam sessions they have contributed to over the past few years:

Peter, N7IY – 216 Sessions; Bob, AD7Z – 144 sessions; Dave, NK7Z – 95 sessions; Howard, WX7HS – 78 sessions; Michael, W7CN – 69 sessions.

There are others but these are our most active members and examiners. If you are a General class, Advanced, or Extra class license holder you can receive accreditation from the ARRL by passing an open book exam. The service of providing examinations for aspiring Hams is very rewarding and well worth the effort. Nothing feels as good as seeing someone grinning as they are told they PASSED the test.

If you want to get your VE accreditation you can find out all about it here:https://www.arrl.org/become-an-arrl-ve , it is well worth it.

The ***NEXT*** test session is on Saturday, August 27th, 2022, 1pm (1300 hours), at the Justice Center, Springfied, OR.

That's it for this month. I hope you will join us at a meeting or exam. Be well.

73, Bob AD7Z

Last Updated on August 17, 2022 by Bob, AD7Z

Digital

By Howard, WX7HS.

WSJT-X and FT8: Timing is Everything

There is an old saying that many things in life are all about timing. When using WSJT-X and its digital modes such as FT8 and FT4, timing is critical. What is meant by timing is that the computer you are using for WSJT-X must be synchronized with Coordinated Universal Time (UTC).

Computers typically use "Network Time Protocol" (NTP), a networking protocol, for clock synchronization between computer systems over packet-switched, variable latency data networks. In operation since before 1985, NTP is one of the oldest Internet protocols in current use. NTP is intended to synchronize all participating computers to within a few milliseconds of UTC.

When using digital modes such as FT8, your signal is sending packets of information to a receiving station and the station you are having a QSO with is in turn sending information packets to your personal computer (PC). In order for each station to communicate with each other, each PC must be time-synchronized 2 seconds (plus or minus) of UTC.

So why is this issue being brought up since PCs are supposed to keep track of time? This issue is highlighted because PCs are notoriously bad at keeping the correct UTC and will not meet WSJT-X time synchronization requirements. Fortunately, there are several software solutions that will automatically update a PC's UTC. Most of these solutions require an active connection to the internet which allows the program to obtain the current UTC from a NTP server.

The most popular UTC time synchronization software programs for Windows operating systems include Meinberg and TimeSync and are "freeware." Meinberg is available at meinbergglobal.com and TimeSync can be downloaded at http://timesynctool.com. Both of these programs run in the background and will automatically update the PC's UTC.

For PCs running MacOS, TimeTools offer a freeware program downloadable at timetoolsltd.com/NTP/NTP-Client/. Installation instructions are available on each website.

As previously mentioned, these programs require an active internet connection. However, the software program JTSync allows the ability to synchronize a PC's UTC without an internet connection by using decoded WSJT-X QSO time stamps. This software is especially useful when operating remotely without an internet connection during Summits on the Air (SOTA) and Parks on the Air (POTA) activities. JTSync is available at http://dxshell.com/JTSync.html. This application only runs on Windows OS.

Next month's edition will discuss various QSO logging programs that are known to seamlessly integrate with WSJT-X and with on-line logging systems including ClubLog, Logbook of the World-LOTW, and QRZ.

Good DX de Howard WX7HS

Last Updated on July 11, 2022 by Howard, WX7HS

DX & Contesting

By Dave, NK7Z.

Propagation, part III

Changes across the day/night, and summer/winter, boundaries

Overview

In part III, I will look at the day to night, and summer to winter changes in each layer. I will first start with some acronyms, and abbreviations needed here:

MUF, or Maximum usable Frequency:

The canonic source for a definition of MUF is the International Telecommunications Union Recommendation, or ITU-R, P,373-7. It reads as follows:

1. Operational MUF (or just MUF) is the highest frequency that would permit acceptable operation of a radio service between given terminals at a given time under specific working conditions (antennas, power, emission type, required S/N ratio, and so forth), and,
2. Basic MUF, being the highest frequency by which a radio wave can propagate between given terminals by ionospheric propagation alone, independent of power.

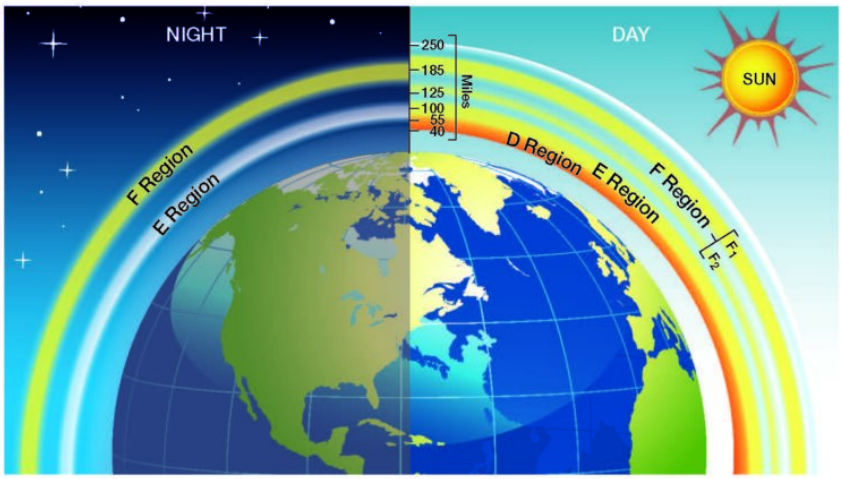
OWF, or Optimum Working Frequency:

1. The Optimum Working Frequency (OWF or FOT) is the lower decile of the daily values of operational MUF at a given time over a specified period, usually a month. That is, it is the frequency that is exceeded by the operational MUF during 90% of the specified period.
2. Where the basic MUF is restricted to a particular ionospheric propagation mode, the values may be quoted together with an indication of that mode (for example, 1E MUF, 2F2 MUF).
   If the extraordinary component of the wave is involved, then this is noted (for example, 1F2 MUF(X)). Absence of a specific response to the magnetoionic component implies that the quoted value relates to the ordinary wave. It is sometimes useful to quote the ground range for which the basic MUF applies. This is indicated in kilometres following the indication of the mode type (for example, 1F2 (4 000) MUF(X)).

Solar Flux Index:

Solar Flux, or the "F10.7 Index", (2800 MHz.), is an indicator of solar activity. The F10.7 Index, correlates well with sunspot numbers, and a number of UV and visible solar irradiance records. The F10.7 Index is reported in "Solar Flux Units", or SFU. The SFU can vary between 50 and 300 during the course of a full sunspot cycle. SFU is a reasonable proxy for DX conditions, higher is generally better, to a point...

Seasonal and day/night changes



Ionospheric layers, Credit-NASA's Goddard-Space-Flight-Center/Mary-Pat-Hrybyk-Keith

Daytime changes

With these caveats, location, time of day, time of year, and where we are in the current solar cycle, and during the local morning, the D, E, F1, and F2 layer forms up early on. These layers are supportable most of the local day, and only begin the recombination

process at local sunset. It all has to do with how much energy is delivered into the upper atmosphere, and hence how much ionization takes place over a given time period.

Nighttime changes

At local sunset, (with the inevitable loss of solar energy being injected into the upper atmosphere), the D, and E layers begin to recombine, and in most cases disappear. Also, at local sunset, as more and more energy leaves the upper atmosphere ,and the F1, and F2 layers may merge into a single layer, called the F layer.

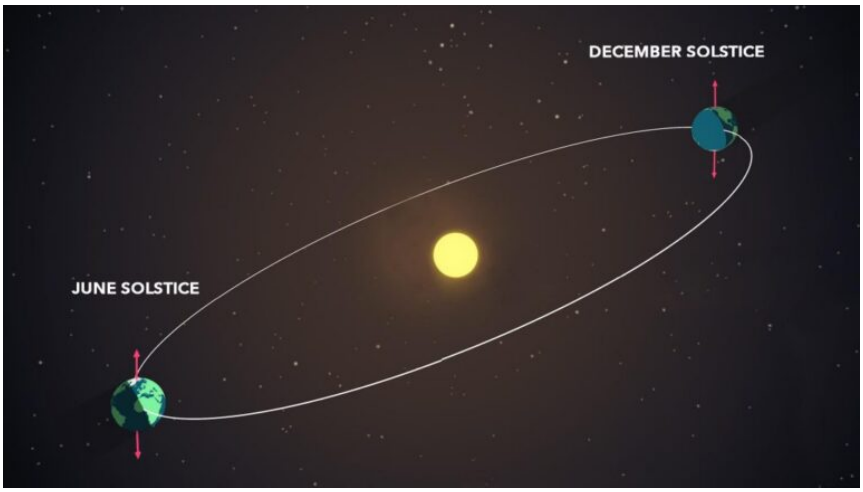
Once the D and E layers have recombined, the attenuation of low frequencies by those layers decreases as a function of total electron vertical density. This reduction of attenuation allows any low frequency radio waves, (80, and 40 meters), to pass on to the upper F layers of the ionosphere for refraction back to the surface of the earth. This higher refraction allows for longer distance communications.

During Solar Minimum, or with low SFI numbers, there may not be enough energy in the upper atmosphere to hold the F layer intact, recombination can begin, if this happens, the F layer might disappear as well...

As the ionization levels decrease so does the MUF, (Maximum Usable Frequency), and OWF, (Optimum Working Frequency). Assuming the F layer continues to exist, 40, and 80 meters comes alive with DX. In some cases, (depending on the ionization density level), 20, 17, and sometimes 15 meters may open up as well. On rare occasions with very high ionization levels, 10 meters can remain open all night.

Seasonal Changes

Summer:



During the solstices, Earth reaches a point where its tilt is at the greatest angle to the plane of its orbit, causing one hemisphere to receive more daylight than the other. Credits: NASA/Genna Duberstein

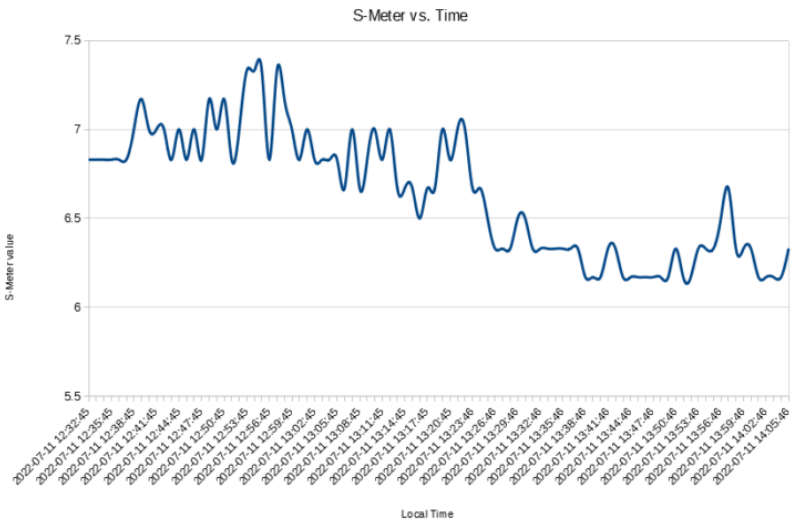
In the Summer, the sun is more overhead than in Winter, resulting in more energy being delivered to the upper atmosphere. This results in higher ionization levels than in Winter.

Winter:

In winter, the sun is lower on the horizon, so less energy is delivered into the upper atmosphere, resulting in lower ionization levels than in Summer.

Detailed layer by layer action

The D layer



D Layer recombination vs. time, transmitter 60 miles distant. ***Click to enlarge.***

The D layer is the first layer a radio signal encounters. The D layer can be thought of as a variable attenuator for low frequency radio waves. D layer attenuation varies as the inverse square of frequency. That is to say, if you double the frequency, the D layer attenuation drops by four times, thus, the higher in

frequency your signal is, the less the D layer attenuates your signal. This is why during the day, 40 and 80 meters seem to die out, (high attenuation of these frequencies), while 20 and above comes alive, (lower attenuation of these frequencies), with DX.

Looking at the graph above, you will see that the signal strength of a CODAR signal, (about 60 miles away, and being transported via F layer refraction), I am using as a test, drops as the sun rises. The recording started at 5:32 AM, during local dark, and runs for two and a half hours, until 7:45 AM, well after the sun has risen. As the D layer begins to form up, (a result of the energy being deposited into the upper atmosphere), the D layer absorption levels at lower frequencies begins to increase, (thus blocking the CODAR signal from the higher F layer), causing a reduction in the strength of the signal over time. The signal eventually disappears into the local noise as the D Layer is fully formed up.

A bit more detail on the graph

If you expand the graph by clicking it, you can see the D layer starts to form up at around 6:02 AM local, (12:02 UTC), and has fully formed by around 7:41 AM local, (13:41 UTC), one hour and forty minutes later. This is why the signal drops from an average of S-7.25, to an average of S-6.25 across the night/day terminator. This is also why 80 meter, (3.5 MHz.), propagation ends as the sun rises, and begins at sunset, 80 is only about 1.5 MHz., from the 4.475 CODAR frequency, and behaves almost the same.

Why does the D layer absorb radio waves?

When a low frequency, (long wavelength), radio wave passes into the D layer the energy in that electromagnetic wave cause the free electrons encountered to vibrate, those free electrons in the D layer then collide with molecules around them, taking energy from the electromagnetic wave creating the vibration. This is the process that causes the

attenuation of low frequencies. Lower frequencies are attenuated more than higher frequencies, because they move the electrons further than higher frequencies, allowing for more collisions, and hence more attenuation.

Why not higher frequencies?

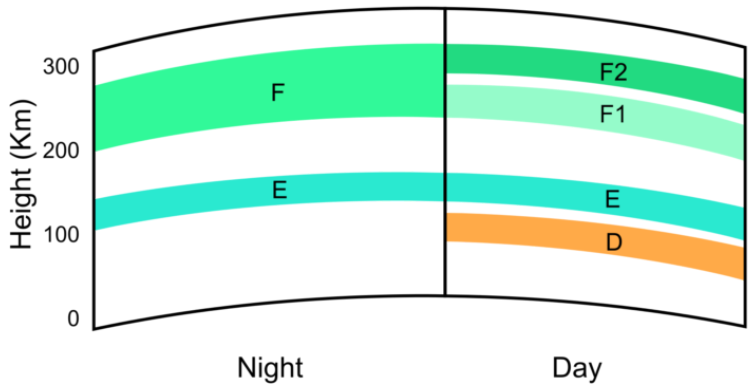
As the frequency increases, and wavelength becomes shorter, the free electrons involved move smaller distances, and hence have fewer collisions. Fewer collisions results in less energy being extracted from your signal, thus less attenuation.

The E layer

For the purposes of this discussion, the E layer behaves very much like the D layer, save the exception of Sporadic E layer refractions at VHF frequencies. Sporadic E refractions are caused by local clouds of highly ionized particles at E layer altitudes, refracting VHF signals. The why and how of Sporadic E is a subject in and of itself, and will not be covered here.

The F layers

During the transit from night to day, the single nighttime F layer becomes more ionized than at night, and splits into two layers, the F1 and F2 layers. The F1 layer the closer of the two, is the weaker of the two layers. It plays only a minor role in propagation. During local winter, in non-equatorial regions, the F layer typically does not split into F1, and F2 layers, due to lower energy being transported to the upper atmosphere. The



Day and night Ionospheric layers

F2 layer is the most resilient layer of them all, it is almost always present, and is almost always capable of refracting radio waves at some HF frequency. Because the F2 layer is exposed directly to space, ionization levels can increase after local sunset, due to cosmic ray bombardment. When this happens, and the D, and E layers have recombined, conditions on 30 meters and above become conducive for worldwide DX, as the only remaining layer, is the higher F layer. This accounts for nighttime DX conditions on 20 seen so often during Sunspot peaks.

Conclusion

So far I have covered the individual layers, the way they behave in high energy conditions, what happens to each layer during the day and night, Summer and Winter. As can be seen propagation conditions are affected by a myriad of things, not all of which are be discussed here.

Next Month

Next month I will look at some of the fast events that can affect propagation, X-Rays, Extreme Ultraviolet radiation, (EUV), and Relativistic Electrons.

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Last Updated on August 9, 2022 by Web Manager

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Thank you!

...for taking the time to read our newsletter. For more information on EARS, click this link. We hope you have enjoyed your stay with us, and please check this page often, it is updated in real-time, and articles, can come and go at a moments notice...

Last Updated on July 11, 2022 by Dave, NK7Z

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