

January-Meeting: Friday, the **26th**, at 7:30 PM at the Perkins Restaurant at SR 73 and I-75.
Meeting Topic: **Laser Detection Devices and it's Uses in the Automobile After-Market**
Looking Ahead: **Sat 1 May, All Day Measurement Session, se "De N8AM" para 2**

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Upcoming Events

Cincinnati Winter **Great Lakes Division**
Communications & Computershow
Febr. 27 & 28 1999
at Cincinnati Gardens Exposition Center

Southeastern VHF Conference Apr. 9 & 10 1999
Atlanta, GA
www.akorn.net/~ ae6e/svhfs

Dayton Hamvention May 14, 15, 16 1999

Central States VHF Conference at Cedar Rapids Iowa July 22-25
www.csvhfs.org

Proeedings (you might have a contribution) WA0RJT@rf.org
Membership(\$5-):Denise Hagedorn, AJ0E, 2318 NE 37th St. Kansas City MO 64116

For Sale: 2m ICOM 71A, 2ea 13B2 2m beams, HAM M rotor & control box, 55' telescoping tower lowers to 28' (no tiltover), call for prices. Dick, N87YFU Dayton (937)275-5026

De N8ZM

Gerd reminded me the other day that MVUS is a very diverse group of individuals who bring a wide range of experience and knowledge together in one place. As we went around the room for introductions at the last meeting, Gerd took note of the different occupations and radio related interests that he heard. While there are several engineers in the group, many more are employed in (or retired from) jobs not related to radio technology. As the PC becomes more powerful and omnipresent every day, it is gratifying to see that radio still holds a fascination for people with a natural curiosity about the world around them. I like to believe that one of the most important accomplishments of MVUS is to bring all of you together to share your knowledge and learn from each other. Don't ever think that your particular knowledge and experience is not of interest or valuable to others. And don't be bashful about offering to take a few minutes at our meetings to share a little bit about what you've learned from your amateur radio activities. It is all about growth and learning....take advantage of the opportunity.

I've been working on getting our receiver testing session organized, and so far have determined that the best date is Saturday, May 1st. I haven't settled on the starting time or the location yet, as there are several options that have not yet been fully explored. **But**, what I do know is that to be properly prepared, I need to know what kinds of equipment you will be bringing. Mainly, this is geared to VHF/UHF equipment, but we plan to be able to check out HF radios used as IF's, transverters, mixers, preamps and filters are all fair game. But I need to know what you are going to bring so that I can try to have test equipment capable of the performing the tests. Call, write, or e-mail (Tom_Holmes@HP.com), to let me know what you need, but please do it soon as there is some lead time involved. Also, by stating your intentions, I'll have an idea of headcount, and can plan for adequate space for us to work and talk. March 15th is the deadline for signing up to be there. I would also appreciate two or three volunteers to help with the general logistics of pulling this together, also by 3/15. I think this will be a fun and useful get-together, and I am hoping you will bring your gear in for the test.

A reminder that if you haven't kept your dues paid up, this newsletter will cease to show up in your mailbox regularly, and you will miss out on a lot of good information covering a wide range of subjects, not to mention the insightful comments found on the first page. Check your mailing label for your expiration date, and get caught up NOW! Send your renewal to Gerd Schrick, WB8IFM, at the address shown on the cover page. Thanks for your support of MVUS!

I don't have a firm commitment yet, but I have invited a prominent Cincinnati area ham and business man to talk to us about the practical application of Laser detection devices in the automotive after-market (how many of you would be able to pull this signal out of THAT noise).

CU there, 73, Tom.

THE VHF WEAK SIGNAL GROUP

That meets Monday nights **at 0200 UTC. on 3.843 MHz**, would like to invite everyone that is coming to the Dayton **Hamvention** to our **annual banquet**. We have reserved a room, that will seat 125, on Friday night **May14 th.** from 6:30 PM until 11:00 PM at the **Holiday Inn North, Wagoner Ford Rd. Dayton, Ohio** . There will be a cash bar as well as plenty of seating to allow you to mix and mingle with other VHF's from all over the country and the world. There will be over 50 prizes with two grand prizes worth over \$300 each being drawn starting at 9:00 PM. Also, there will be a guest speaker who will provide a short talk on vhf activity. There will also be a noise figure measuring table so bring your preamps to tweak. The cost of a ticket to attend this function which includes the 2 entree banquet dinner, is only \$30.00 per person, and they are limited to 125. You may order your tickets by sending \$30.- plus an SASE to either Tony Emanuele, WA8RJF, 7156 Kory Court, Concord Township, Ohio 44077 or Tom Whitted, **WA8WZG, 4641 Port Clinton East Rd., Port Clinton, Ohio 43452**. Website info is **www.wa8wzg.com** this is one of the largest gathering of vhf weak signal enthusiasts in the US. So get your tickets early and join us for an enjoyable evening at the Dayton Hamvention!

Thanks and 73's Tom Whitted WA8WZG

This and That 2-99

- **Thinking.** The most important thing is to think, regardless of whether you are right or wrong. The correct answer will come out eventually, provided you think. [Asimov]
- **The Quad Antenna and its Special Forms.** That's the title of a new book, Karl, DJ9HO, is working on. He sent me a three page table of contents to peruse. In typical German style, it starts with the fundamentals and seems very thorough. Towards the end, however, there are plenty of actual antennas which you can build. The book will be available later this year. Unfortunately, it is written in German, not the easiest science language to understand and difficult to translate.
- **No Electronics.** The Wright Brothers accomplished their powered flight (1903) without any electronics. In fact, the word "electronics" did not exist then. The only electrical device on the Wright Flyer was the "magneto" and the spark gaps in each cylinder.
- **Astronauts.** The first American astronauts (Project Mercury) were selected according to the following requirements: Age under 40, height under 5'11", excellent physical condition, bachelor's degree or the equivalent graduate of a test pilot school, 1500 hours of total flying time and a qualified jet pilot.
- **Saturn 5.** The launch of a Saturn 5 rocket for a flight to the moon during Project Apollo was one of the most moving experiences in writer and eyewitness Ray Bradbury's life: "It shakes the rust from your body and connects you at once with the glory of the universe."
- **The Three Stages of TV.** First intelligent people make TV for intelligent people. Then intelligent people make TV for stupid people. And now stupid people make TV for stupid people. [Dk3FF]
- **Year Two Thousand or Y2K.** A lot of people (bankers?) are worried about the year 2,000. Well, I have news for you. I tried to see what would happen with the computer timing 100 years from now. Here is what I got: ...2098, ...2099, ...1980! Try it sometime. The xyl says, I should not worry that far ahead.
- **Which End.** I worry that we'll grow up with a generation of software gurus who don't know how to grab the cool end of a soldering iron. [KQ4YA]
- **Ten Gig.** Are we getting excited about 10 GHz? There are now pockets in Europe and the US with activity on 24 GHz while NASA and the industry explores satellite communication between 20 and 30 GHz. This is the beginning of the mm range which extends all the way up to 100 GHz..
- **No More Twinkle.** In competition with the Hubble telescope which delivers "crystal clear" pictures, scientists subsequently have developed "adopted optics that adjust 100 times a second to remove the twinkle from the stars". [Boyd]
- **Do We All Have Computers Now?** As of January, QST no longer gives propagation predictions, assuming everybody by now got a computer and a prediction program. As reported, 50% of American households now have computers.
- **Helium.** The US has 32 billion cubic feet of helium stored in natural caverns. Three billion cubic feet are produced in the US every year. Helium constitutes .3% of natural gas and is separated from it by liquefying everything else. The price for a cubic foot is approximately a quarter. Think about it for field day!

24 GHz Meeting

by Ernst, DK 3 FF

During the weekend of 30/31 January 99 a group of microwave amateurs convened for a casual meeting with the sole purpose of discussing activities on 24 GHz. The group consisted of 20 hams from the northern part of the state of Northrhine- Westfalia and 7 amateurs from the Netherlands. (an area roughly the size of Indiana) All have been active on 24 GHz for several years.

Topics were

1. How to maintain and improve activity on 24 GHz
2. How to motivate newcomers and
3. Observations on phenomena/propagation

1. Everyone agreed that concerted activities should be limited to the 4 annual microwave contests (national and/or IARU). QTH-locators should be announced on 432.350 MHz SSB during the Friday evening preceding the contests (only 3 stations out of the 27 hams have so-called mast-stations at home; the rest is moving around with tripods). Individual activities outside contests should be announced to the groupmembers via packet radio and/or e-mail. Everyone will receive a list with the relevant information on each station.

2. There is no noticeable increase in the number of hams who are active on 24 GHz. Undoubtedly, potential operators are scared off by the high price for the semi-commercial modules. \$ 1200.- is a lot of money for a 60 mW station. Everyone agreed that this can be lowered to about \$ 500.- when homebrewing from scratch. A couple of amateurs offered to publish articles on homebrewing in magazines (CQ-DL, VHF-Com and DUBUS) in the future; others will give presentations during the two annual national VUSHF-meetings (Weinheim and Dorsten). There were also 4 hams who have the proper test equipment and offered to help with the alignment.

At this time the average station has 60 mW output and a noise figure of 2 to 2.5 dB; state-of-the-art stations produce about 120 mW. Assuming a RF-horizon of more than 5 miles an average distance of 40 miles can be covered. Moving to exposed locations like mountain tops will almost guarantee distances beyond 100 miles; a rainscatter qso between Northrhine-Westfalia and Bavaria was mentioned covering over 200 miles. Operators of duoband stations (one dish for 10 and 24 GHz) reported that they observed different centers of reflectivity during rainscatter, i.e. the dish had to be adjusted in elevation when changing from 10 to 24 GHz. One interesting last observation: **It is possible to track cumulus clouds on 24 GHz as they produce up to 3 dB in noise. *****

Venus

Earth's near twin in size has a dense atmosphere, whose greenhouse effect keeps the surface sizzling. Radar has penetrated the thick sulfuric acid clouds, revealing impact craters and many large volcanoes, some possibly active.

Distance from Sun: 108,200,000 km.

Revolution around Sun: 225 days. Rotation: 243 days.

Diameter: 12,100 km. Density: 5.2 x that of water. Mass: .8 x that of earth.

Surface Temperature: 480° C.

[National Geographic]

Mars

Colored by windblown iron-rich dust, the red planet has polar caps of water and carbon dioxide ice, an extinct volcano some 25 km high, a canon system 5,000 km long, dunes, and channels, probably carved by water in the past. Distance from Sun: 227,900,000 km. Revolution around Sun: 678 days. Rotation: 24.6 hours. Diameter: 6,787 km.

Density: 3.9 x that of water. Mass: .1 x that of Earth. Surface Temperature: variable, averages minus 50° C.

[National Geographic]

Tuning Filters in the Time Domain

By Tom, N8ZM & Daun, N8ASB (HP)

At a recent company sponsored training session, one of the R&D engineers passed along a new method he had developed for tuning bandpass filters by adjusting its characteristics in the time domain. The benefit of this method is that it significantly reduces the time it takes to tweak a multi-pole bandpass filter into alignment. If you have ever tried to tune up a multiple stage filter or IF strip, you know how tedious, time consuming, and frustrating that can be! The time domain technique can reduce all of those aggravations to tolerable levels.

Granted, this approach takes some high-tech equipment to accomplish, at this point, but a little amateur ingenuity applied here could make this a practical method for a motivated ham to implement in the shack.

Fundamentally, the TD method simply involves taking the Fourier transform of the frequency response data from the filter, which gives a response curve in the time domain. This is very much like the response you would see if you launched a pulse down a transmission line, and watched the reflections coming back on an oscilloscope, which is the same way a Time Domain Reflectometer (TDR) works. If you know what the TD response of the filter should look like, either by computer modeling or comparison to a known good device, it is very easy to tune your filter to get the same response. What is really cool about this is that as you tune any one adjustment, only one peak or null moves significantly on the TD response curve. Thus it is very easy to adjust each stage without being thrown off track by the interactions between the stages.

As an example, we watched several teams struggle for over 15 minutes each to unsuccessfully tune a 400 MHz bandpass filter. The instructor walked over to one lab setup, flipped the network analyzer to TD mode, and had the filter tuned up in about 2 minutes, from a random starting point. Once he showed us how he did it, everyone in the class was able to get their filters aligned successfully, and quickly.

So why does this work? Well, a multi stage filter is essentially a series of impedance bumps spaced out on a signal path. Each bump reflects some energy back to the input, and these reflections are separated in time by their relative distance from the input. Thus, when looking at the TD trace, the adjustment of each filter section only modifies the characteristics of its own reflected energy. Each filter section characteristic can be adjusted essentially independently of the others.

So how might you do this at home? If you have a pulse generator with a fast rise time (this could be an IC driving an emitter follower), and an oscilloscope with decent frequency response, you should be able to see the characteristics of each stage change as you tune them. With a little practice, you could probably come pretty close to your desired bandpass characteristic.

Just think how many hours have been spent over the last several decades struggling to tune filters the hard way. Who'd have guessed there was a better way to do it?

VHF Newsletter List

Rocky Mountain VHF+, K6LS Webmaster. 12 issues are \$16.00 Samples \$1.00
Wayne Heinen (N0POH) Editor Joan Heinen (KB0YRX) Publisher
P.O. BOX 473411 Aurora, CO 80047-3411

6M DX Bulliten Victor Frank (K6FV) 12450 Skyline Blvd. Woodside CA 94062-4541 USA

WSWSS Wes Printz, (W3SE) PO Box 4895 Downey, CA 90241

The FeedPoint Newsletter for the North Texas Microwave Society, \$12 a year dues
Wes Atchison (WA5TKU) Rt 4 Box 565 Sanger, TX 76266

432+ EME Newsletter To receive the NL, just send an SASE for back issues
(include enough postage for each issue you want - 1 oz/NL) Or a set of SASEs to regularly receive the NL.
Allen Katz (K2UYH) 1621 Old Trenton Rd Rd 4 Trenton, NJ 08691-3204

Cheesebits (Mt Airy Contest Club) Cost is \$10.00 per year (US), \$12.00 (Canada) \$15.00 (DX rate)
Bob Fischer, (W2SJ) 7258 Walnut Ave Pennsauken, NJ 08110

S.W.O.T. (Sidewinders on Two) Weak Signal on 144 and up Howard Hallman, (WD5DJT)
3230 Springfield Lancaster, TX 75134-1214

Rochester VHF Group Jeff Luce, (KB2VGH) P.O. Box 92122 Rochester NY 14692

Great Lakes VHF Newsletter \$10.00 per year Dave Bostedor Jr.(N8NQS) 434 Pattie Ave. Jackson MI 49202

Upper Midwest VHF/UHF Newsletter Subscriptions are \$10/year (US) and \$12/year (Canada)
Rich Westerberg, (N0HJZ) 17500 Cherry Drive Eden Prairie. MN 55346

N.E.W.S. Del Schier (KD1DU) 126 Old West Mt. Road Ridgefield CT 06870

European Microwave Newsletter Email / WWW only Simon Lewis (GM4PLM) EMN Editor

West Coast VHFer Bob Cerasuolo, (WA6IJZ) Editor, P. O. Box 685, Holbrook, AZ 86025.

Midwest VHF/UHF Society Anomalous Propagation, \$8, subscription with annual dues.
Gerd Schrick, (WB8IFM) 4741 Harlou Dr. Dayton OH 45432

San Bernardino Microwave Society Newsletter (W6IFE) Cost is \$15/year, published monthly
Bill Burns, (WA6QYR) 247 Rebel Rd, Ridgecrest, CA 93555

Additions / Changes? email :VHF newsletter list www.umecut.maine.edu/~baack/vhfnewslst/index2.html

LISTENING FOR METEOR SCATTER SIGNALS

by Ed, K2VEE

Quite a bit of interest was stirred up last November about the Leonid Meteor Shower. It was touted as one of the all-time most visible showers and it gave pause to satellite users as meteors threatened many of our orbiting satellites. If you lived in an area like Ohio, where the November skies are often overcast or hazy at best, the viewing experience of the shower may have been somewhat disappointing. But there was another way of experiencing the Leonids, and other meteor showers, and that was with a radio receiver from the comfort of the hamshack.

The meteoroids themselves are really the debris of previous comet visits which have left behind a trail of particles cast off from their loosely bound mass of ice and rock as it warms nearing the sun. Each year, the earth's orbit sweeps through several of these patches of debris, and the grain sized particles which enter the earth's atmosphere generate plasma trails as they burn up at very high temperatures.

The meteor trails act somewhat analogous to the aircraft vapor trails one often sees in the sky in that they expand and disperse rather quickly, are broken and bent by the winds aloft, and usually occur within a banded range in altitude(40-80 miles). Of course, meteor trails last a far shorter time than their gaseous counterparts, and the effects on radio signals is much more pronounced than the effect seen visibly in the full spectrum of sunlight on these 'chaulkline-clouds'. Meteor trails can last only a few seconds or as much as a few minutes as multipath effects are created by the plasma movements. The actual density of the meteor-trail which determines its total reflectance depends primarily upon meteor size and its velocity and altitude at entry.

So how does one 'listen' to these events? In a word - briefly. But brief as they may seem, many hams in Europe and a growing number here in the Americas are listening and communicating quite successfully on these wisps of reflective plasma. The primary frequencies that reflect the most RF are in the 40-77 MHz bands (6m band) but very good results are also achieved at 144 MHz, and to a much lesser degree at 430MHz. Using a good VHF receiver (or down-converter/preamp and standard 30MHz receiver) plus a decent horizontal polarized 2m or 6m yagi will get you started. If you have a satellite antenna system with a bit of elevation tilt capability - all the better.

In the early morning hours during one of the major meteor showers, you can tune between 50.3-50.4 or at 144.1 MHz and hear the reflected signals of other hams who have made schedules to take advantage of these extra 'skyborne reflectors'. Some of the signals you will immediately recognize to be SSB and normal speed CW signals – transmitting repetitive information, at precise UTC time slots, in hope that the other stations will copy and return a confirmation. Because of the brief lifetime of these signals, the transmissions will often omit the 'de' between callsigns and the RST signal report preamble – they will simply send the alternating callsigns of the stations and a special 2 number signal report.

More often these days, you will hear what seems to be a high frequency coded signal, the content of which is not immediately obvious. Indeed it is a coded signal, but it turns out to be that of plain old CW – but this CW is run at higher speeds than is normally copied-by-ear. The users are sending full message sequences using high speed CW (HSCW) at rates between 500 and 2000 letters per minute. At 5 letters per word, that is 100 to 400 words per minute – a respectable communications speed in anyone's book. To copy this HSCW you will need a means to record the transmissions and then slow it down to speeds that you can easily copy. To do this some hams use modified tape recorders which have variable speed motor-drives, while others are putting their computer sound cards to use by recording the receiver audio and then using software programs to effectively slow down the CW speeds.

Like the 'standard' meteor scatter contacts, these fellows running HSCW use prearranged schedules to work their counterparts at distances of 350 to 1250+ mile separations. A time-sequencing of the contact info is scheduled via E-mail, and the data sequencing, based upon exact UTC times, is executed using 1 minute intervals for alternating transmit and receive operations.

On a good meteor scatter event, like those that occur periodically during the year, the activity will increase and it isn't too long before you might hear either just a short signal 'ping' or a full contact exchange. Since meteor scatter trails last a bit longer at 50MHz, 6m would be the band in which to begin listening for these MS contacts.

1999 meteor schedule

| | |
|---------------------|------------|
| Quadrantids | Jan. 3-4 |
| Lyrids | Apr. 21-22 |
| Eta Aquarids | May 5-6 |
| Delta/Iota Aquarids | July 29-30 |
| Perseids | Aug. 11-12 |
| Orionids | Oct. 21-22 |
| Taurids | Nov. 4-5 |
| Leonids | Nov. 16-17 |
| Geminids | Dec. 13-14 |
| Ursids | Dec. 22-23 |

However, you don't have to pack it up while you wait for such a meteor burst – for, as the military communications people know, there is a constant barrage of meteors hitting the earth on a daily basis. The military and power utility companies use MS communications daily to pass information from remote sites on a regular and reliable basis. Hams have finally caught on to this fact and are making schedules for MS contacts year 'round, not just at the peak times.

So turn on that VHF receiver and computer – give a listen for these signals and I suspect that you will want to give it a try once you're hooked on the listening phase. If you'd like to get more information on Meteor Scatter take your computer to these listed Web-sites where you can both read about and listen to the activity of this novel mode of communicating. The next time a major meteor scatter event occurs, you can always get out a blanket and lounge chair for a visual try or you can head down to the hamshack and listen to the very same events. The signals may be fleeting, but I assure you, the MS radio activity will give you pleasure for many years to come.

Some web sites with meteor scatter informatin:

www.qsl.net/kd5bur/HSCWURL.htm

www.nitehawk.com/rasmit/ws1_15.html

members.mint.net/n1bug/operate/hsms/html

www.qsl.net/kosm/