



# MINNESOTA MARSGRAM



Information for Minnesota Navy-Marine Corps. MARS Members

January, 2006

Volume 10, Number 1

## NNN0ALL Minnesota

by NNN0GAZ Tim

Greetings, Happy New Year to you and yours in 2006. Once again I ask myself where did the time go, seems like only yesterday the year 2005 arrived and here I am in 2006 already.

Each New Year arrives with many resolutions and goals to be accomplished. I've taken the time to write out a list of tasks and goals I would like to see us continue and strive toward in 2006.

### Recruit, from within, member stations to serve as substitute NECOS and/or TREP stations.

Yes, there are a group of "regular" NECOS and TREP stations that report for duty and they are to be commended for their commitment. We need others that are capable of filling these roles so when we need a substitute one is available, someone with a net already should not have to take another night of NECOS or TREP duties. Being a NECOS or a TREP is not something to fear, all the regulars have been in that seat – the first time running a net or the first time accessing the switch. Is it scary – kind of, do the members expect an error free net – no, even the "regulars" make mistakes, no one is perfect, we really need the help of all the members in creating a group of stations that are ready, willing and able to step

in as substitutes.

Continue to conduct a minimum of one emergency communication exercise per quarter. This year we actually met the goal. For 2006, let's try to get more than the regular group of call signs showing up in the after-action reports. If you haven't participated in an ecom exercise, you've missed some interesting messages, corrections, and practice. For the most part we've moved exercises to coincide with evening nets – we found that this works – more participation and we're using our net time. No member need be afraid to participate, no one expects an error free implementation, EEI, or SITREP message, heck even those of us that have been participating continue to find and make errors. This is why we have drills, to improve, find the weak spots and make improvements. Don't like the drills we've had – make some suggestions, we're all ears. In the next year, if you are not already participating, **take the time, put in some effort and get on the air during an exercise.**

Continue participation in the NECN quarterly exercises. Gentle-

men, this is an excellent way to make sure that others know we are here. What do you have to do – merely check-in to the evening net on the night of the NECN quarterly drill. The NECOS takes care of the rest by either communication directly with an NECN net control station or emailing the evening checkins to the NECN net. I don't know how much easier this can get.

Conduct at least **one mini-lesson per month** on the evening net – remember, training is not just the job of the training officer, each one of us can pass on our experience and expertise to our fellow members;

Conduct at least **one message handling exercise per quarter.** We've become accustomed to receiving our message traffic via email. While convenient, this doesn't help us with our traffic handling skills. As communicators we need to be able to format, pass and receive traffic – not just read it off our screen.

Improve our relations with various constituencies – such as the Association of Emergency Radio Operators (AERO)

GAZ Cont'd page 2

The MINNESOTA MARSGRAM is published for the benefit of Amateur Radio Operators in Minnesota and other interested individuals. The contents DO NOT reflect official Navy positions.

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Content Contributions Welcomed and Encouraged

### MINNESOTA TRAFFIC NETS

Designator	Frequency	Local Times
5G1B	Pri. NCE Sec. NBG Ter. NAR	18:30 Daily

### MINNESOTA ADMIN. NET

5G4A	Pri. NCE	19:00 2nd Sunday
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### MARS DATA SYSTEM

	Frequency
NN0DVD	NCO AFSK/USB
Intranet site	<a href="http://www.communityzero.com/mnmars">http://www.communityzero.com/mnmars</a>

**GAZ** *cont'd from pg. 1*

and possibly local Emergency Operation Centers in various counties and the Minnesota Department of Homeland Security and Emergency Management –only through the cooperative efforts of all agencies will the amateur community be able to prove their worth.

Recruit, train and pass to full membership a majority of those individuals expressing an interest in MARS through national web page information requests, requests received through hamfest and word-of-mouth efforts by current MARS members. This goal requires our presence at amateur radio functions – hamfests, club meetings, etc. If you are attending a hamfest, ask GAZ for brochures to leave on a table, if fellow hams are looking for ways to be of service – suggest MARS membership, there are a multitude of ways to encourage and motivate fellow hams to join our ranks;

Continue to meet on an annual basis at the Minnesota Area Conference with as many members as possible present to review and enhance our state program. Don't forget – Region Five hosts the Central Area Conference at Great Lakes this year – we're in need of program topics for the conference.

Maybe, just maybe, we venture into ALE. This program shows great potential and allows us to add one more resource to our toolbox. It will most certainly be a learning experience.

Finally, over the past year many of you have probably noticed our ranks have thinned, the roster is smaller. You're right members who have not been participants in nets, exercises, etc. have been removed from the program. The

*cont'd col. 2*

**MN Navy-Marine Corps MARS Staff**

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If you are a Firefox browser user you can now have the current HF propagation conditions listed in your web browser status bar. If you haven't tried Firefox, the latest version, ver. 1.5, is available for download at <http://www.mozilla.com>. Firefox is a pleasant alternative to Internet Explorer with fewer security problems.

The browser extension that performs this bit of propagation information magic is called Propfire and is available for download at <http://www.n0hr.com/Propfire.htm>. The tiny window updates the propagation conditions with data that is retrieved from the NOAA website and is periodically updated in your browser as you surf the web. Additionally, by right-clicking on the Propfire values, a menu will appear. From the menu, you can display the latest full WWV report. Just like other Firefox extensions, it will NOT operate with Internet Explorer.

You can find out more information on propagation on the ARRL website at <http://www.arrl.org/tis/info/propagation.html>.

- BT OVER -

**GAZ** *cont'd*

members removed have been noticeably absent from our ranks for sometime, their participation has been sporadic at best and keeping them "in the count" just didn't make sense. This is not a task that I, as State Director, take lightly. Every attempt is made to contact the member to determine if they are still interested in MARS – sometimes I find that personal or professional commitments mean their participation will be on the low side, but the commitment is still there – I can accept that, we're all busy and I have no intention of penalizing someone in this situation. Other times, there is no answer to our query – in this case there is little choice but to move towards termination from the program. The message here is that we need *everyone* on the roster to participate – don't just be a placeholder on the roster. Overall, we're doing pretty well in Minnesota – but if you haven't been on a net for a while, join us – we need to know that you're still there and committed to the program.

Now you've seen the goals, I hope that all of you will help us achieve them this year. I look forward to a 2006 and the opportunities for Minnesota MARS. Together we can take advantage of the opportunities and meet the challenges. Enjoy this issue of the Minnesota MARSGRAM.

- BT OVER -

## The 5G1B Wants



# YOU!

### NECOS NEEDED

Thursdays 19 Jan. to 23 Mar.

Saturday 14 Jan. & 25 Feb.

These dates are open due to winter vacations.

Contact NNN0GAZ-3 / XYA to volunteer for one or more dates.

## Effective Chief MARS Broadcasts

RR NOALL

DE NNN0ASA 001

R 011900Z JAN 2006

FM CHNAVMARCORMARS WILLIAMSBURG VA

TO ALNAVMARCORMARS

BT

UNCLAS

SUBJ: CHNAVMARCORMARS BCST 01-06

1. THE ANNUAL RECAPITULATION OF EFFECTIVE CHIEF MARS BROADCASTS FOLLOWS. THE BROADCASTS BELOW REMAIN IN EFFECT:

1999: 4, 7A, 7B

2002: 2, 15

2003: 3, 7, 8, 16

2004: 2, 8, 11

2005: 5

2. ALL OTHER BROADCASTS MAY BE DESTROYED.

3. NAVMARCORMARS: PROUDLY SERVING THOSE WHO SERVE.

BT

NNNN

BT OVER

## Net Frequencies

R 242300Z DEC 05

FM NNN0GAZ MN

TO NNN0ALL MN

BT

UNCLAS

SUBJ: MN AREA BCST 01-05

1. IN VIEW OF THE CURRENT PROPAGATION CONDITIONS, IT IS IMPORTANT TO REVIEW PROCEDURES FOR FREQUENCY CHANGES FOR THE MN AREA NETS.

A. THE NECOS STATION FOR THE NET SHALL MAKE THE DECISION TO CHANGE NET FREQUENCIES TO CARRY ON MN AREA MARS BUSINESS.

B. THE FREQUENCY DESIGNATIONS FOR THE MN AREA NETS ARE AVAILABLE FROM THE REGION FIVE OPERATIONS GUIDE LOCATED AT THE REGION FIVE WEBSITE, (ALL LOWER CASE) <http://www.region-five.com>. THIS DOCUMENT IS CONSIDERED THE AUTHORITY ON NET FREQUENCIES FOR REGION FIVE. NET DESIGNATIONS AND FREQUENCIES CAN BE FOUND IN ANNEX B OF THE DOCUMENT.

C. THE NET WILL ALWAYS BE CALLED INITIALLY ON THE DESIGNATED PRIMARY FREQUENCY.

D. NET OPERATIONS ON THE PRIMARY FREQUENCY SHOULD BE A MINIMUM OF FIVE MINUTES BEFORE A DECISION IS MADE TO CHANGE FREQUENCY.

E. IF THE NECOS DETERMINES THAT CONDITIONS WARRANT A CHANGE IN FREQUENCY, THE NECOS WILL INDICATE THAT THE NET IS BEING SECURED ON THE PRIMARY FREQUENCY. THE NECOS WILL ALSO INDICATE WHAT FREQUENCY, SECONDARY OR TERTIARY, WHERE THE NET WILL BE CALLED. THE NET IS TO BE REFERENCED BY FREQUENCY DESIGNATOR ONLY.

F. AFTER SECURING THE NET ON THE PRIMARY FREQUENCY THE NECOS STATION AS WELL AS ALL STATIONS THAT ARE ABLE, WILL MOVE TO THE FREQUENCY DESIGNATED BY THE NECOS STATION. G. THE NECOS STATION WILL CALL THE APPROPRIATE NET ON THE FREQUENCY. THIS WILL COUNT AS A SECOND SESSION OF THE NET.

H. STATIONS ARRIVING ON THE PRIMARY FREQUENCY AT OR AFTER NET TIME SHOULD MONITOR THE FREQUENCY FOR ACTIVITY. SHOULD NOT NET OPERATIONS BE HEARD, THE STATION SHOULD PROCEED TO THE SECONDARY AND TERTIARY FREQUENCY, IN THAT ORDER, TO DETERMINE WHERE NET OPERATIONS ARE TAKING PLACE.

2. NECOS STATIONS SHOULD FEEL FREE TO USE ANY AND ALL NET PARTICIPANTS FOR RELAYS WHEN CONDITIONS WARRANT.

3. QUESTIONS REGARDING THIS ISSUE MAY BE DIRECTED TO NNN0GAZ.

4. TIM ISOM, MINNESOTA STATE DIRECTOR.

BT

BT OVER

## Automatic Link Establishment is Here to Stay

**GAZ note:** *This article is written by an Army MARS member. Chief Navy-Marine Corps MARS has issued broadcasts referencing the use of ALE in Navy-Marine Corps MARS. See Chief MARS Broadcast 03-05 and MARS ALE PROGRAM broadcast from NNN0ASL VA (DTG 211312Z DEC 2005) for additional information regarding the use of ALE in the Navy-Marine Corps MARS program.*

*Bill Sexton, N1N1AAA9PC, WorldRadio, December 2005*

ALE may mean different things to its different users, but one thing they should agree on; The technology has brought new life to HF radio just when many people thought satellite or the Internet were the ways to go.

To its original sponsors in government, Automatic Link Establishment was a no-brainer application using long-distance radio like a telephone. You pick up the microphone, punch in the station you want to contact, get an immediate link. No time lost checking propagation, searching, for an open frequency, switching antennas or manually tuning the transceiver. All that requires a trained radio operator, and in government, they've become an endangered species (if not extinct.)

To Amateur Radio, ALE showed an entirely different face - at least two different faces, in fact.

It provided a fascinating technology with exciting possibilities - new toy, if you will. But the government's specifications required specialized transceivers at a cost well beyond the means of most Hams, some in the five figures.

On the other hand, ALE promised an experimenter's dream. What an inviting challenge it posed to find a way around the out-of-sight hardware!

That challenge has been met. The amateur community now has access to practical software substitutes for hardware ALE - one specifically developed for the Military Affiliate Radio System, a second for general use by adventuresome Hams. Let's take them one at a time.

After a year's hard work the Army MARS code-writing team this fall published MARS-ALE Standard Edition v1.01, a program that requires only a computer sound card costing under \$50 (and, of course, a computer). It's a sophisticated advance on the rudimentary PC-ALE utility contrived by British Ham Charles' Brain, G4GU0, in the 1990s.

Simultaneously, Brain has been tweaking his pioneering program for the Ham bands. FCC regulations prevent full utilization of the concept at least for now, but an ardent group of ALE fans is actively implementing the freeware nevertheless.

Amateurs can learn about Brain's PC-ALE v1.06+ (and its

FCC-mandated limitations) at <http://hfblink.com>. Bonnie Crystal, KQ6XA, of San Mateo CA, who has been a leader in ALE activity for the past five years, manages this site as well as an e-mail group. A Silicon Valley RF engineer and entrepreneur (and avid DXer), Crystal says the HFlink group has grown to more than 700 members.

"The number of active amateur ALE operators has reached 'critical mass,' she adds, "making ALE-initiated QSOs easy."

For the Hams in MARS, the first step to getting on the air with ALE is obtaining an ALE identifier and authorization by applying through their state MARS director to the appropriate MARS Area Coordinator or service representative.

All government ALE users and their ALE identifier must be registered with their sponsor organization (and ultimately with the NTIA). Once that is accomplished the MARS member may then apply for access to the ALE software download site through their service representative. With that accomplished the free software and license file may be downloaded from the Internet along with full documentation.

Applicants should be aware that while installation is simple, configuring the program can be a complex and ongoing process. Also; ALE is unlikely to become a universal tool in MARS operations. Its most promising application is in creating high-traffic emergency backup channels to official users like the National Guard or FEMA.

There's another caution: Use of MARS-ALE software is permitted only on government-authorized military frequencies.

It's important to note that ALE is not a communications mode comparable to, say, Pactor. Rather, it's a method of connecting two stations, which may then communicate by any mode whether voice or Pactor or even slow-scan TV.

Federal interest in ALE dates back to the 1990s when the National Telecommunications and Information Administration launched the writing of a government standard for its implementation.

For Hams, the story begins in West Sussex, England, where Charles Brain, a free-lance researcher in high-level communications technology, started work on ALE in his spare time. That was in 1996. By 1998 he was ready to post a very basic version for Ham use, PC-ALE v1.03, on the Internet. At that point he ran out of spare time; Brain's interest turned instead to digital voice communication. It's his technology that powers the commercially available AOR America modem.

## ALE *cont'd from pg. 4*

In the meantime, ALE had become a centerpiece for government and military radio communication; both in the U.S. and abroad. MARS members participating in SHARES, the SHARED RESources network linking federal agencies, suddenly had good reason to acquire the technology.

Brain agreed in August 2004 to share his still-unpolished PC-ALE code with the MARS ALE team headed by Carlos Santiago, AAM3SB, (amateur call WB2FOZ) of Naples, N.Y.

Steve Hajducek, AAR2EY, (N2CKH) of Lakewood, NY, took on the year-long task of adapting and expanding the code and then wrote a 109-page technical document on configuring dozens of models of amateur transceivers.

During this process Hajducek consulted with Brain and also helped out on the PC-ALE non-MARS application. Carver Washburn, W2TFM, (AAR2JQ) of Wayne NJ, who holds a Columbia MS in electrical engineering, was deputy team leader and wrote the basic users guide.

In October, Santiago, a retired AT&T telecommunications engineer, handed over the leadership role to Gray Reid, AAR3BB, who is the MARS eastern region training officer as well as an early member of the all-volunteer ALE team.

Reid has been a Ham for more than 40 years and currently holds the call W4NGR. A longtime resident of Newport News, VA, he retired this year after a long career in the plastics industry. He served two terms as Virginia state MARS director before taking on the Eastern Area training billet in 2004, an assignment he will retain.

MARS-ALE SE v1.01 requires a computer equipped as a minimum with Windows ME, a Pentium 750 MHz CPU or equivalent, and 256 mb RAM plus a Creative Sound Blaster PCI or MP3 sound card and computer-radio interface (the last can be home-brewed.) Speedier CPUs, more memory and Windows XP are highly desirable.

For computers with less capacity than the listed minimums, the MARS-ALE website offers the option of a limited "Legacy Edition."

During the initial year a dozen or so active alpha testers worked patiently with the software writers - MARS members in New York, New Jersey, Virginia, Pennsylvania, Connecticut and Massachusetts. By early 2005 active ALE nets were on the air in Virginia, Michigan and Oregon in addition to the regional development net directed by Santiago: Navy-Marine Corps MARS recently designated its own array of ALE channels and a new net was getting underway in the Northeast. Meanwhile, a good number of MARS/SHARES member drill weekly on the SHARES

## More on Noise

*Carl Luetzelschwab, K9LA, WorldRadio, September 2005*

Last month we discussed receiver sensitivity internal noise), external noise (man-made, galactic, and atmospheric), and quality of service. We'll continue in this month's column with two examples of the impact of noise.

**An Example on a Low Band** Now we have everything we need. Let's work through an example on 75M SSB, using my OMNI VI, my QTH (quiet rural), and my quarter-wave vertical for receiving. We'll use a quiet rural environment in a winter month between 4 p.m. and 8 p.m.

As a refresher, my OMNI VI on 75M has an extrapolated MDS of -162 dBm in a 1Hz bandwidth. The man-made noise from Figure 1 for a quiet rural environment is -137 dBm in a 1 Hz bandwidth. The atmospheric noise (again from Figure 1 and from the earlier comment about atmospheric noise at my QTH being between the rural curve and the quiet rural curve) is -128 dBm in a 1Hz bandwidth. The first observation is that my ability to hear is limited by atmospheric noise at -128 dBm/Hz.

What signal level is required for 90% intelligibility for SSB? The signal level needs to be 48 dB above the limiting noise in a 1 Hz bandwidth, which works out to -128 dBm plus 48 dB = -80 dBm. Assuming S9 is 50 microvolts and an S-unit is 5 dB (see Table 1), the signal level from the station I'm trying to hear needs to be just under S8 for 90% intelligibility..

A second observation is that 90% intelligibility is essentially a conversational QSO. For a DX QSO, in which you only need to hear his call and your call and your signal report (theoretically, of course!), a lower intelligibility might be entirely satisfactory - which means a lower signal-to-noise ratio, resulting in a lower required signal level. If we arbitrarily pick 70% intelligibility, the signal-to-noise ratio decreases by about 8 dB. Thus the signal level now required is right around S6.

**NOISE** *cont'd on pg. 7*



## ALE *cont'd*

ALE channels.

For the Hams there is an irony here: ALE came into being as a replacement for trained human operators. ALE was supposed to be simpler than dialing a telephone.

By contrast, MARS-ALE is - so far, anyway - a finicky protocol that demands a good bit of TLC. A couple of dozen parameters need to be set and monitored on computer, sound card and transceiver. Not at all automatic - but a tool with tremendous potential for handling masses of traffic under difficult conditions, and a fresh opportunity for pioneering on the bands. It's been a long time a-comin.'

BT OVER

### Abbreviated Message Texts

**Across**

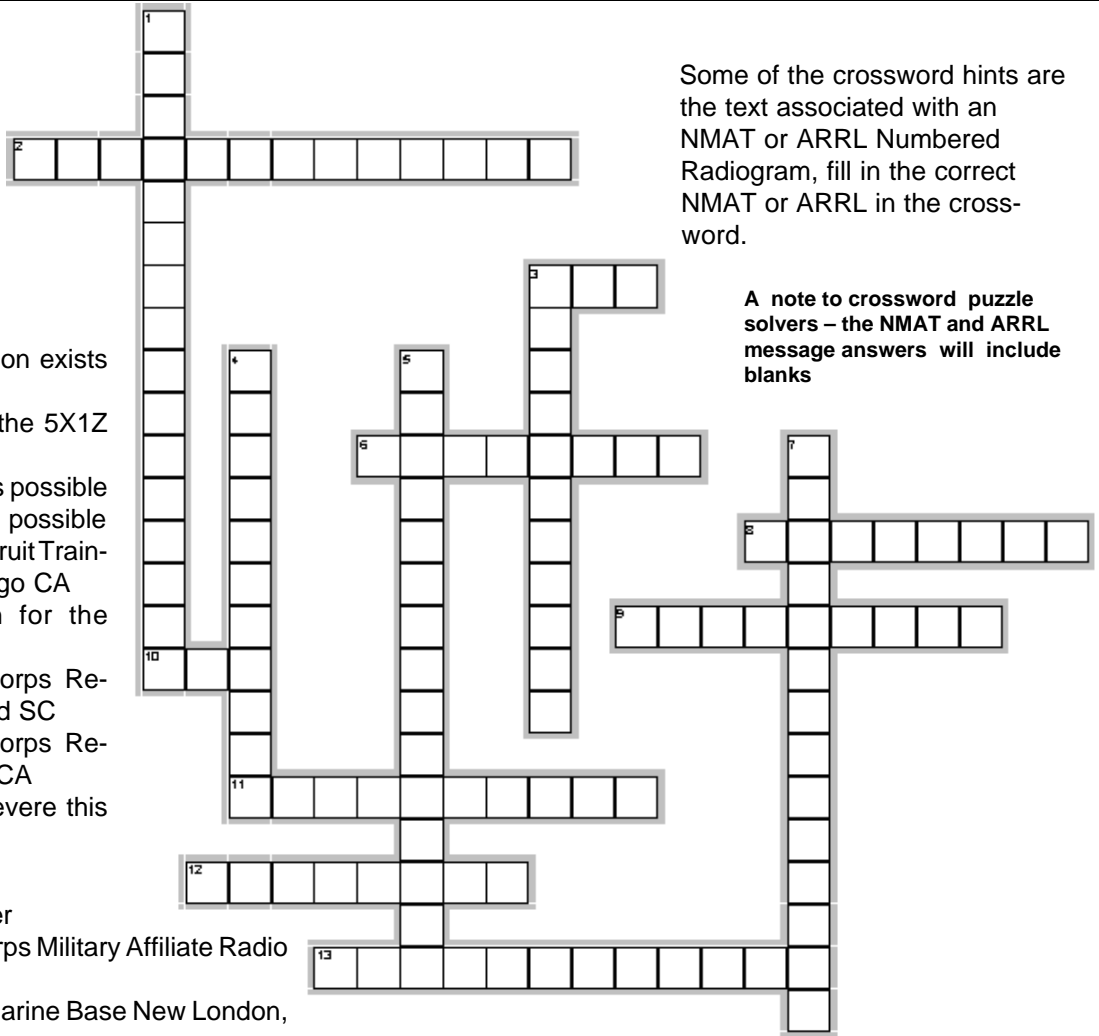
- 2. Medical Emergency situation exists here
- 3. Frequency designator for the 5X1Z net
- 6. Will contact you as soon as possible
- 8. Coming home as soon as possible
- 9. Arrived Safely at Naval Recruit Training Command San Diego CA
- 10. Frequency Designation for the 5G1B
- 11. Arrived Safely Marine Corps Recruit Depot Parris Island SC
- 12. Arrived Safely Marine Corps Recruit Depot San Diego CA
- 13. Property damage very severe this area

**Down**

- 1. Wish we could be together
- 3. Reply Via Navy Marine Corps Military Affiliate Radio System MARSGRAM
- 4. Arrived safely Naval Submarine Base New London, Gortem, CT
- 5. Many thanks for your good wishes
- 7. Wishing you a very Merry Christmas and Happy New Year

Some of the crossword hints are the text associated with an NMAT or ARRL Numbered Radiogram, fill in the correct NMAT or ARRL in the crossword.

A note to crossword puzzle solvers – the NMAT and ARRL message answers will include blanks



### December Crossword Solution



### Test Your MARS skills Dec. 2005 Answer

You receive a message addressed to you on a MARS voice net. The text begins with the following line: ZUI UR 231455Z SEP 02. What does this mean?  
C. I draw your attention to your message of 231455Z SEP 02.

**NOISE** *cont'd from pg. 5*

What if it's an especially quiet night with respect to QRN - in other words, atmospheric noise is non-existent and I'm limited by man-made noise at -137 dBm/ Hz? Then the

backwards to determine your man-made noise environment. For example, the noise on 80M on my full-size quarter-wave vertical on a QRN-free winter night in a 500 Hz bandwidth

is just under S3. That puts it at -105 dBm per my OMNI VI calibration table, and translates to about -132 dBm in a 1 Hz bandwidth. This performance is very close to the quiet rural D curve in Figure 1.

**Summary** This series covered the basics of noise. The two most important concepts to understand are that noise is a function of bandwidth and noise limits our ability to hear.

There are a couple issues that I didn't address here, and they could result in "your mileage may vary." One issue is that you may have one troublesome noise source that dominates your incoming noise: a near-by power line (been there, done that), a neighbor's

electric blanket for their cat (also been there, done that), etc. Until it gets fixed, the data in Figure 1 may be useless.

Another issue is that our filters do not have brick wall responses - this introduces a bit of error when using the 10

times the log of the bandwidth equation. talk at all directive example, for the lower Yagis for the bands) - as comes in directions, help due to tivity. Like- ignored the DSP (which is helpful on my OMNI VI).

Reading	power in dBm
S9 (50uv)	-73
S8	-78
S7	-83
S6	-88
S5	-93
S4	-98
S3	-103
S2	-108
S1	-113
S0	-118

Table 1 - Theoretical S-meter readings versus power

of the ratio widths? And I didn't about tenna (for Beverages bands and higher suming noise from all they can their direc- wise, I've benefits of extremely

Finally, a caveat about the data in Table 1 - from the receivers I've measured, most hold well to 5 dB per S-unit down to the S3 or so level. Below that they're more on the order of a couple dB per S-unit. Thus it's best to calibrate your receiver's S-meter (as I have done with my OMNI VI) before using it for purposes such as we've discussed in this month's column.

-BT OVER

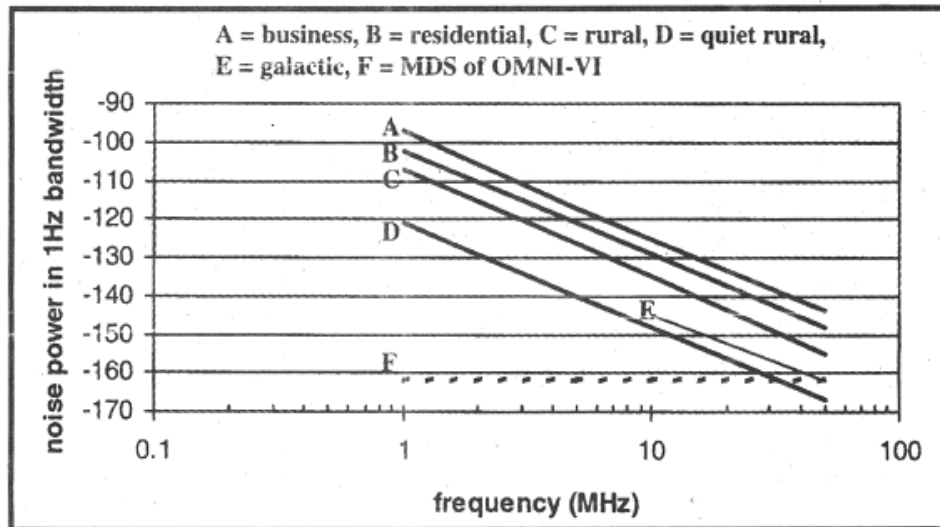


Figure 1 — Man-made noise and galactic noise versus frequency

other station would have to put a signal level of -89 dBm (-137dBm plus 48dB, which is about S6) into my QTH for 90% intelligibility. For the 70% intelligibility scenario, the signal level would need to be just above S4.

**An Example on a High Bind** Now let's do an example on 15M SSB. The man-made noise in a quiet rural environment is -157 dBm in a 1 Hz bandwidth. The atmospheric noise is many dB below the man-made noise level. Thus on 15M, my ability to hear is limited only by man-made noise (unless the thunderstorm is really close!). Note that the -157 dBm value is only -5 dB above the extrapolated -162 dBm OMNI VI MDS in a 1 Hz bandwidth. My ability to hear is getting close to the limiting performance of the OMNI VI.

For 90% intelligibility, the signal level would have to be -109 dBm. That's about an S2 signal. For 70% intelligibility, the signal level would have to be -117 dBm. That's about an S-signal. This indicates that on the higher frequencies it's possible to have a QSO without moving the S-meter.

**Determining Your Receiver's MDS** The easiest way to determine your receiver's MDS is to dig out a product review on your rig. An alternative way is to actually measure it. I've successfully done this with several receivers using a homebrew crystal oscillator, a homebrew step attenuator, and a DVM. If you do it this way, make sure your crystal oscillator, step attenuator, and interconnecting coax cables are well shielded (to prevent leakage from messing up your reading) and are calibrated (to assure accurate results).

**Determining Your Man-Made Noise Environment**

With the data in Figure 1, you should be able to work

## 5G1B Net Schedule

6:30PM 4007 kHz USB

Day	NECOS	Tfc Rep
Sun.	XYA	XEE
Mon.	XEE	XEE
Tue.	KZC	KZC
Wed.	BQH	BQH
Thu.	Substitute Needed	
Fri.	ACY	OCF
Sat.	Rotating Duty (see below)	

Don't be bashful, if the net has not been called by the net control station within 2 minutes, jump in and start things rolling.

## Saturday NECOS / TREP Schedule

	NECOS	TREP
Jan 7	BQH	BQH
Jan 14	Substitute needed	
Jan 21	ACY	OCF
Jan 28	XYA	XEE
Feb 4	XEE	XEE
Feb 11	KZC	KZC

## Test Your Analytical Skills

### Attenuation of Harmonic Emission

A ship radiotelephone transmitter operates on 2738 kHz. At a certain point distant from the transmitter, the 2738kHz signal has a measured field of 147 millivolts per meter. The second harmonic field at the same point is measured at 405 microvolts per meter. To the nearest whole unit in decibels, how much has the harmonic emission been attenuated below the 2739 kHz fundamental?

*Answer in the next issue of the Minnesota MARSGRAM*

## December Skills Test Solution

### Power Supply

Courtesy of QST

Santa brought you a new rig that needs 14 A at 13.2 V. Your existing 13.2 V power supply also runs equipment that consumes 10, 25 and 55 W. Your existing supply is rated at 20 A. Can it handle the load or is it time for a trip to the store.

**Answer:** The existing gear requires a total current of  $(10 + 25 + 55)/13.2 = 6.8$  A. Adding in your new rig at 14 A, brings a total load of 20.8A. That's too much for the old supply. Looks like a trip to the store is in order.

## Service Recognition

NNN0SXU Robert King 6 yrs

Don't forget your paperwork!

## Test Your MARS skills January 2006

You are participating in a State voice net. Your call sign is NNN0WBTT. The NECOS has announced to the net that 'THE USE OF ABBREVIATED CALL SIGNS IS AUTHORIZED.' How do you identify yourself when transmitting under those circumstances?

A. You may either use your full call sign or just the suffix (the letters after the zero) when transmitting, i.e., 'THIS IS WHISKEY BRAVO TANGO TANGO'.

B. You must use an abbreviated call sign since the NECOS has authorized their use.

C. You must use your full call sign at all times.

D. You use your amateur call sign when transmitting.



## HELP WANTED NNN0GAZ NINE (LIBRARIAN)

This assistant to the State Director is responsible for maintaining an up-to-date list of broadcasts, Chief MARS, Region, and State broadcasts. The information can be maintained in hard copy or electronic format as long as it is available upon request. The Librarian also assists members in obtaining publications from Region and National MARS websites. Interested individuals contact Tim, NNN0GAZ / XEE.