

**Mount Vernon  
Amateur Radio Club  
K4US**  
*"PUBLIC SERVICE WITH  
FUN AND FRIENDSHIP"*



Volume 18

AUGUST 2005

Number 08

## Ye Olde RF Output

### MEETING NOTICE

**AUGUST 11, 2005**

7:30 PM

**LOCATION CHANGE:**  
**INOVA MOUNT VERNON**  
**HOSPITAL**

2501 PARKERS LANE  
ALEXANDRIA, VA 22306

Second Floor Conference Room

MVARC MEETS ON THE SECOND  
THURSDAY OF EACH MONTH EXCEPT  
IN DECEMBER

## HAPPENINGS

**August 11** - MOUNT VERNON AMATEUR RADIO CLUB monthly meeting. Held at INOVA MOUNT VERNON HOSPITAL, 2511 Parker's Lane, Alexandria, VA 22306. 2nd floor Conference. Room 7:30 p.m. See you there!

**August 2,9,16,23,30** - MVARC ARES NET- 146.055/146.655-8:30 PM local time. The Ten Meter portion meets immediately following the Two Meter Net on 28.415 MHz. Come and join in!

**August 27** - MVARC Breakfast will be held at The Old Country Buffet on Route 1 at 8:30 a.m. Everyone's invited to join MVARC members for breakfast. They meet the 4th Saturday of every month.

**MVARC REPEATER: K4US/R**  
146.055 MHz INPUT/146.655 MHz  
OUTPUT  
PL TONE: 141.3 Hz

AUTOPATCH AVAILABLE TO  
MEMBERS

MVARC HOME PAGE:  
[WWW.MVARC.ORG](http://WWW.MVARC.ORG)

**NOTICE--VE EXAM LOCATION**  
**THE AUGUST 13, 2005 VE EXAM**  
**WILL BE HELD AT**

**The FIRST CHRISTIAN CHURCH**  
**2723 KING STREET**  
**ALEXANDRIA, VA**

**CALL JOHN, WZ4A AT 703-971-3905**  
**FOR MORE INFO.**

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### BACK TO MV HOSPITAL!

By Bob, KI3O  
MVARC Program Chair

Mark your calendars for Thursday, August 11th, 2005 at 7:30 p.m. for the monthly Mount Vernon ARC meeting. NOTE: We are back at the INOVA Mount Vernon Hospital, Second Floor Conference rooms, on Parkers Lane (Off Sherwood Hall Lane). Talk-in is still on the 146.655- PL 141.3 repeater, or alternatively, 146.655 simplex.

The program will be on transmission lines, and the speaker is Terry Hines, N4ZH. By profession, Terry is a communications engineer with a MSEE. (Terry is presently working on this second masters degree.) So find out everything you need to know about transmission lines but were afraid to ask! Hi Hi.

### EDITORIAL: MORSE CODE, 73

By DAVID, AI4FC  
YORFO Editor

We knew it was coming, All the signs were there, starting with the World Radiocommunication Conference 2003 decision to end in the future the Morse code requirement for amateur radio licensing. The future grows ever closer.

In a July 19 notice of proposed rule making, the Federal Communications Commission staff urges dropping the 5 wpm testing requirement for any and all licensing classes for

U.S. amateurs.

According to the proposal, now out for public comment, dropping the code requirement would "encourage individuals who are interested in communications technology, or who are able to contribute to the advancement of the radio art, to become amateur radio operators."

Of course, many others don't see it that way. It was Morse code that attracted me to the hobby when I was a teenager in California in the early 1960s, and it's Morse code that brought me back to the hobby nearly three years ago. For many hams, the microphone is something we read about but rarely push.

The club's 2 meter repeater has been abuzz in debate over the FCC proposal, which despite the doom and gloom of many brass pounders, is not yet a done deal. The full commission still must vote on the proposal after all the comments are taken in and reviewed.

But the ARRL recently reported what our repeater chatter spells out locally - that eliminating the code requirement is popular. The ARRL said that so far, comments received by the FCC are favoring the elimination of the requirement by 60-40 margin.

For those of us who studied hard to pass out code tests, and then stuck with it, there's a sense of resignation and maybe even deep regret over it being downgraded to just another form of digital communication, unworthy of the prominence our hobby has always given it.

But others take a different view, I among them. The code vs. no-code tension has been destructive. It certainly made me think hard about rejoining the hobby three years ago when I read the nasty exchanges on eHam or other websites between those who thought elimination of the code would further

cheapen the value of a license and others who regard code advocates as Neanderthals spelled with four-letter words.

Elimination of the code requirement might, as critics charge, relegate the once honorable hobby of amateur radio into another form of CB. But it might also bring new members into the hobby, without much effect at all on the numbers of us who like to communicate with a paddle or key.

Walking through the rows of tables at the Berryville Hamfest last weekend, I came upon a vendor who seemed, more than most, able to see the forest through the trees.

"Just look around here," he said to me for no particular reason. "There's hardly a person under the age of 55."

And so it was.

Blame it on the ARRL. Blame it on computers and the Internet. Blame it on cell phones. Or blame it on the 5 wpm code requirement. Our ranks our aging, folks, and if that trend isn't reversed, there won't be anyone to talk to on the bands.

For me, I'm hoping that the end of the code requirement might actually lead to a resurgence in its use. Let me cite another example, however imperfect. There is almost no need for women to quilt these days. It's an anachronism. Homes are heated and electric blankets cut whatever cold permeates through the night. Handmade quilts are a dime a dozen from overseas sweatshops. Machines can make them even more available at cheaper costs. And yet fabric stores catering to quilters are crowded with customers who spend months on a single quilt, often piecing and quilting by hand, because they can. It's not just a form of creativity and relaxation, but a step back in time to when

such work was precious and evocative in ways that machines can't duplicate.

That's what Morse code is to me. It's relaxing and gentlemanly. It's not bothersome, works great at low power, and is less a contest of egos. It's something I do because I want to. Maybe others will begin to see that way, too, if Morse code is simply another avenue to choose in our hobby, rather than a roadblock that divides and leaves some behind..

As if further proof of the point is needed, read on. John Riser is a brass pounder of great skill. The fine points he further dissects reflect the fascination with Morse code that won't end with the proposed elimination of Element 1.

## **CW SENDING RATE STANDARD**

By John, WQ4L

The International Morse Code operation by amateur radio operators received national attention on a recent segment of NBC's The Tonight Show with Jay Leno. Two amateur operators Chip Margelli, K7JA, and Ken Miller, K6CTW competed against speed champion cell phone instant message senders in transmitting a brief 11-word sentence. Jay commented on how the 168 year-old Morse Code technology was much faster than the modern instant messaging. The Morse Code was sent at a very modest rate about 30 WPM used every day by thousands of hams throughout the world and significantly slower than that used by the best contest operators.

But this brings up the question of how the actual rate of Morse Code transmission is defined. The FCC regulations for both amateur and commercial radiotelegraph operator license examinations specify the

applicant must successfully pass a code examination of a certain transmission rate in words per minute (WPM). The U.S. amateur tests have specified rates of 5, 13, and 20 WPM while commercial examinations required receiving plain text at 20 and 25 WPM and random letter/numeral/punctuation code groups at 16 and 20 WPM for the second and first class radiotelegraph licenses respectively. All code tests were sent for exactly five minutes at the required rate. I made a review of the ITU code standards, FCC Rules Part 13 (Commercial Radio Operators) and FCC Rules Part 97 for Amateur Radio Operators and an internet search but, I found no mention of an official calibration standard.

The International Morse Code is comprised of a unique sequence of short and long tones or electric pulses and spaces representing each letter, numeral, and common punctuation mark used in transmitting telegraphic messages. These are termed dots and dashes. The structure of the code is defined in a Recommendation of the International Telecommunication Union. This code adopted as an international standard at the International Telegraphy Congress of 1865 held in Paris. (More about Paris later.) This code had significant changes from the original code. The main difference is that the ITU code has uniform defined lengths of each dot and dash making up each letter and the spacing between the dots and dashes, letters and words. The American Morse Code has different lengths of dashes and internal letter spacing for certain characters. The uniform length of dots, dashes and spaces facilitated automated transmission equipment using perforated paper tape. Several mechanical and electrical devices known as the Wheatstone tape perforators were used to prepare the punched tape for accurate machine sending.

The ITU standard for the spacing and length (duration) of Morse Code signals is as follows:

A dash is equal to three dots.

The space between the signals forming the same letter is equal to one dot.

The space between two letters is equal to three dots.

The space between two words is equal to seven dots.

For this paper, I will define the duration of one dot as a dot time unit (DTU). The character symbols have combinations of 1 to 6 dot and dash combination. The shortest is for the Letter E with one dot plus 3 space DTU for a total of 4 DTU. The numeral zero [0] with five dashes and several punctuation marks with up to 6 dot-dash combinations each have 22 DTU including the letter end spaces. This results in a transmitting time ratio of 5.5 to 1.

From the above table, the standard word space between words adds the equivalent of 4 DTU (one complete dash cycle) to the end of the normal 3 DTU following the last word letter. Although not specified, an additional space is frequently added between sentences for a total duration equal to 11 DTU. The shortest code letter is E, consisting of one dot followed by a 3 dot-length space for a total of 4 units. The longest code characters are the numeral zero [0] with five dashes and the several punctuation marks made up of four dashes and two dots. (These are the comma, apostrophe, and right-hand parenthesis.) These characters require 22 dot time units to transmit or 5.5 times that to send the letter E (22/4).

When I first started working for the FCC at the Detroit field office we used a Wheatstone perforated tape transmitting machine to conduct amateur and commercial operator code examinations. This device must have weighted at least 30

pounds with a 1/8 horsepower variable-speed motor and a meter calibrated in WPM. Before starting exams, particularly at field locations, we always used a "calibration" tape to check the accuracy of the WPM meter before each examination session. (Later, the FCC obtains a small light-weight perforated code tape readers about the size of a shoebox that used a synchronous clock motor and a set of changeable capstans of different diameters for each of the required code rates.)

The calibration tape consisted of the word PARIS repeated continuously 150 times. The machine code sending rate was checked by either timing the entire tape with a stopwatch, or counting the times the word PARIS heard during a 1-minute period. There are many internet references to PARIS as the code WPM rate standard, but I was unable to find any official documentation for this. I suspect it was because the code was officially adopted at the Paris Congress of 1865 and the French always wanted to have the last word when writing international conference documents. Perhaps long ago someone did determine that this word was equivalent to average word content by analyzing a sample of telegraphic message texts.

How representative is the word PARIS in code to the number of actual words of the English text that also includes representative numerals and punctuation marks? To find out I wrote a computer program in VisualBasic(r) that would count the number of words in a standard ASCII text file and then count the DTU for each character in the file. The number of code DTU divided by the total number of number of words gives the average DTU per word for that file.

The count of the dots, dashes, and spaces in the word PARIS equivalent to string of 25 continuous dots (50 DTU) as produced by an

electronic keyer. Sending PARIS exactly 10 times in one minute is the same as 250 dots (500 DTU) at an assumed 10-WPM code rate. Each dot cycle would be 0.24 seconds long. At 1 word per minute, each DTU would be 2.4 seconds long. With this information the standard transmission rate in words per minute would be 2.4 divided by the time duration of a dot cycle (two DTU). Because a dash cycle is 4 DTU in duration, alternatively, the rate is also given by dividing 9.6 by a dash cycle length.

To see how well PARIS compares with some text files, I first made a one line file with PARIS repeated 10 times with normal word spacing. Running my counting program with this file indicated exactly 500 BTU as expected. Then I then converted the draft copy of this article in Microsoft Word into a standard ASCII text file, used it with my test program. The program counted double spaces between words as DTU value of 8. All carriage returns and other characters not having a Morse Code symbol were skipped in the counting. The resulting statistics for the final version of this text will be added following the final draft. Initial test result was of 50.50328 DTU per word. Several runs with other ASCII text documents all resulted in average word lengths between 49 and 51 DTU, depending on the ratio of numbers in the text. So it appears that the word PARIS is indeed representative the average word length of text messages of letters, numbers and punctuation.

If you wish to calibrate the rate adjustment control of your electronic keyer or accuracy of your computer program, perhaps the easiest way would be to store the word PARIS repeatedly or by using the keyer store loop function. Then carefully count the time the word repeats in a one-minute period.

If you have any kind of computer audio waveform editing program

and can record a series of dots or dashes from your keyer, you could also measure the actual time duration of the DTU. Then calibrate your keyer WPM control using the 2.4 factor for dots and 9.6 for dashes. I use an audio editing program called "Cool Edit" that will for measuring segments to 0.00001 seconds. A trial version of this program (with limited editing functions) may still be available without charge for internet downloading without charge.

One final note. The FCC required correct copy of the code for one continuous period. This was based on counting 65 consecutive symbols for the 13-WPM and 100 characters for the 20-WPM tests. Each numeral and punctuation mark was given a two-letter credit. The 5-WPM novice and technician class code tests were transmitted with letters formed at the 13-WPM rate, but with only 25 letters per minute by extending the spacing between characters. This is called Farnsworth spacing. Numerous Internet sites have information on the history and on the additional Morse characters symbols used for non-English language CW radio communications.

The table below is the result of evaluating all text above this line:

Number of words:	1,541
Number of letters:	77,402
Number of numbers & punctuation:	325
Number is single spaces:	1,474
Number of double spaces:	67
Total number of DTU:	77,418
Ratio of letters/numbers/punctuation:	238.6100
Ratio of words to total spaces:	1.000
Ratio of words to DUT:	50.238806

Percentage variation from PARIS:  
0.477512%

## BERRYVILLE: FUN IN THE SUN

By DAVID, AI4FC

A dozen or so MVARCers made it west of the mountains to Berryville Sunday, Aug. 8, for a relaxing day at the annual Berryville Hamfest put on by the Shenandoah County Amateur Radio Club. It was not a day of great commerce, but a lot of fun was shared and, despite forecasts, it remained dry through the event.

Several club members carpooled. John, K2VPR, drove his van over with passengers Steve, K3IZ; Julie, KD4W; and Dave, KD4SV. Frank, AA4ZS, drove over with David, AI4FC. Upon arrival at the Berryville site following a 6:30 a.m. departure, the two tables were set up in front of the club banner and we were ready for business.

By the time the tent came down at 1 p.m., sales topping \$50 had been recorded. But the fun wasn't in what was sold, but all the folks who stopped by to chat. They included John, KI4HK, a steady voice from Point of Rocks, MD, in the Cherry Tree Net every Saturday and Sunday morning.

Buy stuff? "I come by to eat, and see who is here," said George, AF4JH.

But there were treasures as well.

When Glenn, W4OCC, the technician behind the monthly YORFO, and his wife Joan, KI4FYN, dropped by, Joan took an immediate fancy to a black purse Julie had thrown onto the sales table. With Julie off with John enjoying a barbecued chicken lunch, Frank cut a \$2 deal with Joan for the purse.

Good deal?

"Oh yeah, it sure was," Joan said.

Julie's pink purse found no takers,  
no matter how hard Frank tried to  
push it.



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