CQ de WA2LQO

The official voice of the Grumman Amateur Radio Club

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COMMUNICATIONS SYSTEMS (continued from February 2011)

By Bob Wexelbaum, W2ILP

The modulation index *beta* for FM plays a role that is similar to a parameter for AM that is called *m.* For sinusoidal modulation of an AM transmitter *m* must not be greater than 1. If it is greater than unity there is more than 100 % modulation, which causes distortion. For AM we try to keep *beta* as large as possible in order for the audio to be as loud as possible in the received signal, but in FM there is really no distortion restraint on *beta*, except that *beta* must be limited for a different reason. That is because the bandwidth of the FM signal must be limited to 2 (beta + 1) f sub m. This means that the maximum allowable value for beta is determined by the bandwidth that the FCC allows and the highest audio modulation frequency that we intend to use. Asides from Morse telegraphy and AM, historically the next most popular mode that hams used was radio teletype (RTTY). Commercial applications of TTY and RTTY are now obsolete, but some hams continue to use RTTY, and can easily do so using computer sound card technology. This brings us to the subject of DATA TRANSMISSION, which can be defined as the communication of text rather than audio. Morse telegraphy was the first type of data transmission, but it is very slow compared to any other means of text communication now in use. Computers use binary pulse codes for both operating system software logic and for data. For example a "1" may be represented by a voltage V held for a time T, while a "zero" is represented by a voltage –V, held for an equal time. This resulting signal may be communicated directly by wire (transmission line) or wirelessly by radio. For radio transmission the data code pulses are modulated on an RF carrier. This may be done by Frequency Shift Keying FSK (RTTY is an example of FSK), or by Phase Shift Keying PSK (PSK-31 is a popular example of PSK). Mathematically FSK may be analyzed by the same equations that are used for FM, and PSK may be analyzed by the same equations that are used for PM. The only difference is that for data communication the modulation is limited to a limited number of possible frequencies or phases. The spacing between RTTY frequencies is fixed according to convention. The RTTY mode calls one frequency a "mark" and the other a "space". They represent "1" and "zero" in binary codes. Likewise BPSK has "1" referenced to a phase and "zero" is 180 degrees (inverted) from that phase. There are other possible modes such as QPSK where 4 possible phases may be utilized, and MFSK where more than two frequencies may be shifted to. There are modes which combine AM with FSK or PSK in order to make a single time, T, represent more than a single binary bit. In any case the resulting signal is decoded and converted to a binary code in the computer, which is finally converted to an 8 bit code, commonly used by computer displays.

The subject of communication leads us to basic concepts that began in the realm of philosophy. Initially all natural human communication was evolved to be implemented by sight and sound (via eyes and ears). The philosophers were always questioning DIFFERENCES. We have been asking what is the difference between AM and FM or FSK and PSK, but asking about differences started when the ancient philosophers asked what is the difference is between humans and animals. Humans are capable of speech transmission and reception. We can represent concepts, things and actions with spoken words. No animals can speak or comprehend our speech as well as we can. It remains a mystery as to how normal human babies learn to speak and to recognize human words because these processes are quite complex. It is understood that most animals do not "see" images in the same way that humans do, and no animal can be taught to read printed text as well as humans can. Modern philosophers continue asking about differences. What is the ultimate difference between computers and human brains? Computers have now successfully competed with human chess masters and quiz program wizards….but can computers, using artificial intelligence, compete with human innovation? Could a computer originate the works of Newton or Einstein? We do not now know if such limits may exist. Continuing with communication theory we again ask for differences. We must separate many signals by making them differ in some way from each other, by transmitting them on different RF frequencies for example. More importantly we must separate signals from the ever present noise. Communication theory is thus tasked in asking how a desired weak signal differs from noise. We have talked about the probability distribution of possible outcomes of throwing dice. The spectral distribution of noise is dealt with in an entire chapter of the communication text.

(to be continued)

PRESIDENT'S NOTE by ED GELLENDER, WB2EAV

I am really looking forward to this month's club meeting. We have a guest speaker discussing a subject that I have always been fond of. Club Member and Volunteer Examiner George Sullivan, WB2IKT, will be giving a talk on hidden transmitter hunting. George says that if he can locate the stuff he hid somewhere in his house, his talk will be illustrated with some equipment.

I have not gone hidden transmitter hunting in a long time. It was so long ago that it was called "bunny hunting". I am not sure what happened to the term; is it possible that it took on the wrong connotation with Playboy Clubs and their bunnies? In any event about that time some international ham events introduced a new term, "radio-sport" where they held fox hunts, which as far as I can see, are identical to bunny hunts except for being named for the predator rather than the prey.

Recently, an IBM computer named Watson won a championship match on the TV show "Jeopardy". It is definitely a programming milestone if for no other reason than its ability to decipher the convoluted syntax Alex Trebek uses to deliver clues. Don't be fooled however – the little desktop computer on the table was only the "front man". It was backed up by a bank of servers literally filling a huge room. Besides, the computer did not have to listen to voices and decode them – it received the questions via digital data stream, so while Alex was still winding his way through the clue, Watson's backfield was already busily data-crunching away.

Watson – A proud name. I think of "Come here Mr. Watson; I need you" (Alexander Graham Bell, dripping with spilled battery acid), or the fictitious John N. Watson, MD (every bit Sherlock Holmes' equal). Alas, this one is only named after IBM's first CEO.

Way back in the '40s when the first digital computers like "Eniac" came out, they filled up entire rooms, and had to wait for all the tube filaments to heat up. Now, Watson, the latest and greatest computer of the day, fills up an entire room and takes forever to boot up. Yup, we sure have come a long way. Ed, WB2EAV

Editor's Note: The term "Bunny Hunting" is used for short-range direction finding, while "Fox Hunting" is used for long-range direction finding. These loose terms are believed to have been originated by British radio engineers. The term "radiosport" was translated from Russian and was used by the Soviets to categorize ham radio, when all ham radio in the USSR, like chess and athletics, had to be officially sponsored.

GRUMMAN AMATEUR RADIO CLUB
MINUTES OF GENERAL MEETING 2/16/2011

By Karen, W2ABK, Secretary

The meeting was called to order by Gordon at 5:25 PM.

TREASURER'S REPORT – Ed, WB2EAV

Finances continue to be in good shape.

REPEATER REPORT – Gordon, KB2UB

Both repeaters are working.

NET REPORT – Karen, W2ABK

Thursday night net at 8:30 PM on 145.330 MHz had 2 check-ins.

We plan to continue using 146.745 starting at 8:15 PM.

Sunday morning net at 7:30 AM on 7.289 MHz had a few check-ins.

VE REPORT – Bob, W2ILP

The applicants took Technician exams. Two passed. One failed.

6 VEs were present: AB2EF, AB2ZW, WB2EAV, W2ABK, W2IKT, W2ILP.

OLD BUSINESS

Reminder for those who have not yet paid 2011 dues; dues are due.

NEW BUSINESS

We filled out the annual Liability Forms for the club.

PROGRAM

-Discussed fractal geometric diminutions, lines and curves.

-Gordon, KB2UB brought in pictures of his boat and explained how GPS is utilized with his marine radio during emergencies.

The meeting was adjoined at 6:25 PM.

PROGRAM FOR THE MARCH GENERAL MEETING:

George, WB2IKT will speak about Fox Hunting (direction finding).

GARC NETS: 40 Meters: 7.289 MHz at 7:30 AM EST Sundays

Net Controller: Eugene, W4JMX

2 Meters (repeaters) Thursdays: 146.745 MHz (-600 kHz) at 8:15 PM
145.330 MHz (-600 kHz) at 8:30 PM. Tone for both repeaters: 136.5 Hz.

GARC Net Controller Karen, W2ABK

ARES/RACES NETS: Mondays.

MEETINGS General Meetings of the GARC are held on the third Wednesday of each month, starting at 5:30 PM, at the Ellsworth Allen Park in Farmingdale. Driving directions and map can be obtained from http://www.mapquest.com. It is suggested that the GARC web site be checked to be certain of meeting location, which may change after this newsletter is distributed. Board meetings are held a week before the General Meeting at the Bethpage Skating Rink.
WEBSITE The GARC web site can be found at http://www.qsl.net/wa2lqo . Webmaster is Pat Masterson, KE2LJ. Pictures of GARC activities, archives of newsletters, roster of members, and other information about the GARC may be found there.

INTERNET LINK OF THE MONTH FOR INTERNERDS

Using computers can put us in touch with lots of interesting people. Old friends can find us and we can find old friends, sometimes even when we don't expect to find them and are not actively looking for them. I don't pay to find people although that option is available as a last resort. I don't care much for Facebook but I keep getting invited to it by some of my relatives. On a recent look there, who do I find who is asking to be my friend? It is the famous Wayne Green, W2NSD/1. If you are not familiar with Wayne he was the owner and editor of several ham radio magazines which are no longer being printed. Unlike the editors of QST, Wayne had a sense of humor and he often saw ham radio from a uniquely different point of view. There are many people besides GARC members who read this newsletter on the GARC website and also many who read stuff that I post on QRZ.com and in other chat groups.

Recently when I searched "W2ILP" with Google I found that a Russian student of English has taken on the task of posting some of my articles on his website. He is a 28 year old graphic web designer, who I never heard about, until I Googled up the name of his site "JEVUSKA". His name is Rachmanddin Yahya. An example of some of my posts from this newsletter that have found their way to Russia can be seen on the website of this month: http://www.jevuska.com/topic/w2ilp.html
I hope that you don't think that I'm an egotist. Now, anyone can become an international legend in his or her own time on the World Wide Web.

PUZZLE
Here is another cryptogram:

ERG DKQCC NJVL JEDCQ NCJDK, HJTQ JBN ETBUCQBJTXL ZRBDTBWC

DR UQRP YWD SKRBC ZJXXL DJSCQ REE. –HRKBBV ZJQLRB--

Solution to the February 2011 cryptogram:
THE ART OF LIVING LIES LESS IN ELIMINATING OUR TROUBLES THAN IN GROWING WITH THEM. --BERNARD M. BARUCH--

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1 Yr. Board Member: Bob Cristen, W2FPF

Newsletter CQ de WA2LQO is published monthly by the Grumman Amateur Radio Club for its members and friends. Editor, W2ILP 631-499-2214 w2ilp@optonline.net Contributing writers: All GARC members (we hope). To submit articles or ham equipment advertisements contact the editor. Articles will only be edited when permission is granted by the author.

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GARC VE Exams We normally proctor exams for all classes of ham licenses on the second Tuesday of each month, starting at 5:00 PM. The exams are given at Briarcliffe College, 1055 Stewart Avenue, Bethpage, NY in room: Long Beach #5.

Ham Exams are: Element 2 – Technician, Element 3 - General, Element 4 – Amateur Extra Class. All applicants must pre-register by contacting W2ILP (see above). Time and location of exams are subject to change. If there are no applicants VE sessions will be cancelled. The fee for 2011 is $14 for all exams taken at one sitting. New first time applicants should be aware that their Social Security Number will be required on the application form unless they register with the FCC for an FRN. Applicants for an upgrade should bring their present license, and a photocopy of it. All applicants should bring picture ID such as a driver's license. Study material may be bought from the ARRL-VEC or W5YI-VEC http://www.arrl.org or http://www.w5yi.org All VECs use the same Q & A pools.

Commercial FCC Radio Operator Exams We are certified by the National Radio Examiners to administer exams for all classes of FCC commercial radio operator and maintainer exams. All Commercial Operator License Examiner Managers (COLEMS) use the same commercial license pools. Administrating fees vary. For information or to register contact W2ILP.

Editorial

After all of my procrastinating I finally have sprung for MS Office Home and Student 2010. This software will update my Word program (I was using Word 2002). It will also give me the 2010 editions of Excel, PowerPoint and OneNote. I had been criticized for not using PowerPoint in the past, so I will be better prepared if I can manage to make any future presentations. I know that I will be able to prepare better newsletters with the new more flexible Word program but I am still learning to control its features.

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FIRST CLASS MAIL
Do Not Delay

LET THERE BE LIGHT

Greek mythology tells of a man named Diogenes, who was perpetually seeking an honest man. He carried a lantern in his search because the subject of honesty is indeed in the realm of darkness. The hidden secrets of dishonest schemes had to be brought to light. Light brings us out of darkness. Before the electric light was promoted by Thomas Edison, people in large cities with natural gas distribution had gas lights. Most other people used candles. Today, candles are still used for ceremonial purposes by people of all religions (and birthdays). At first many people did not want Edison's unfamiliar new electric lights. Even today they are not as warm and romantic as candles. Now we have Compact Fluorescent Lights (CFLs) which are far more efficient than Edison's incandescent light bulbs. Again, many people do not want to change to the newer light source. The governments of the UK and Australia have banned the sale of incandescent bulbs in order to conserve electrical energy. The US has already banned their future manufacture. Some people started hoarding old bulbs because they don't believe that they can be replaced aesthetically with CFLs, and the extra power consumption is justified. We now know that eventually CFLs will be replaced by high intensity Light Emitting Diode (LED) bulbs. LEDs are easier to make dimmable and they do not contain mercury, but they are presently much more expensive than CFLs. Early CFLs were expensive, slow starting and caused RFI. Recent CFLs are inexpensive, start in milliseconds, cause no RFI, and can provide exactly the same color light spectrum as the filament bulbs. Now, LED bulbs are being reported to cause RFI. This problem too will eventually be eliminated. When LEDs are mass-produced for a world market (likely in China), they will become cheaper, more reliable, and RFI free. Eventually the old lights will only be seen in museums and old movies. I dunno if we can ever find an honest man, even with bright new lights, but we should never give up trying. Let there be light!
--w2ilp (Incandescent Light Production) --will cease, as has vacuum radio tube making.