CQ de WA2LQO

The official voice of the Grumman Amateur Radio Club

April 2011 VOLUME 84 NUMBER 4

A VIDEO OF THE NATIONAL USAF MUSEUM AT DAYTON WILL BE SHOWN AT THE GARC APRIL MEETING

(*See president's note for details*)

COMMUNICATIONS SYSTEMS (continued from March 2011)

By Bob Wexelbaum, W2ILP

It is possible to separate many signals by tuning frequency at the receiving end. The signals are separated because the tuning circuits act as filters that can selectively pass the desired signals and reject undesired ones. A second method of selecting desired signals is to tune time instead of frequency. We can then *sample* the time in which the desired signal will appear and reject times when there is no signal of interest being transmitted. The time based sampling of signals is called *multiplexing*, or to be more precise, time-division multiplexing. The sample is a pulse that is a function of time, which leads to systems called *pulse modulation systems.* The fundamental principle of time-division multiplexing is called the *sampling theorem*. Let m(t) be a signal which is transmitted such that its highest frequency spectral component is f sub M. Let the value of m(t) be determined by regular intervals separated by times so that *T sub* s is less than ½ f sub M, which means that the signal is sampled every *T* sub s seconds. Then the samples m (nT sub s), where n is an integer, uniquely determined by the signal, and the signals may be reconstructed from the samples with no distortion. The time T sub s is called the *sampling time.* Note that the theorem requires that the *sampling rate* be fast enough so that at least two samples are taken during the course of the period corresponding to the highest frequency spectral component. The theorem is proven mathematically by showing that the signal may be reconstructed from the samples. An example given shows an analog baseband signal *m*(t) which is to be sampled by a pulse train *S*(t) of unit amplitude and of period *T* sub s. The pulses are arbitrarily narrow, having a pulse width *dt.* The two signals *m*(*t*) and *S*(*t*) are applied to a multiplier, which then outputs the product *S*(*t*) *m*(*t*). This product is thus the signal *m*(*t*) *sampled* at the occurrence of each pulse. Thus when a pulse occurs, the multiplier output has the same value as does *m*(*t*), and at all other times the multiplier output is zero. The signal *S*(*t*) is periodic, with period which yields a Fourier expansion. I won't go on with the math involved except to explain that the first term of the Fourier expansion is the signal *m*(*t*) itself. The second term is a sine wave of frequency 2 *f* sub *m*, and then the product itself gives rise to a double-sideband suppressed carrier signal with carrier frequency 2 *f M.*. Succeeding terms yield DSB-SC signals with carrier frequencies 4*f* sub *M*, 6*f* sub *M*, etc. Let the signal *m*(*t)* have a spectral density *M (j omega)* = The Fourier transform of [*m(t)*]. It can then be shown that the spectrum of the first term extends from zero to *f* sub *m* The

second term is symmetrical around the frequency 2*f* sub *M* and extends from *2 f* sub *M* – *f* sub *M* = *f* sub *M* to 2 *f* sub *m* + *f* sub *M* = 3 *f* sub *m.* Does this make any difference? It does when we pass the signal through a low-pass filter with cutoff frequency at *f* sub *M.* Then if the filter transmission were constant in the passband and if the cutoff were infinitely sharp at *f* sub *M,* the filter would pass the signal m(t) and nothing else! This proves the sampling theory for this case. I won't try any other case because I fear that I may have lost some of my dear readers by now. Back to all practical cases we must concede that even when not ideal, the minimum sampling rate is the same as the more commonly accepted *Nyquist rate.* There is no need to be skeptical or cynical about such conclusions if you can scientifically follow the math or stoically swallow and ignore it. Digital modulation of pulse modulated signals leads to greater advantages than the pulse sampling of an analog signal that was just described. Digital modulated pulse systems enables encoding of the signal itself that can provide better results during noisy conditions or when bothered by nearby noisy communications channels.

- To be continued -

PRESIDENT'S NOTE by ED GELLENDER, WB2EAV
April 2011

At the April meeting (Wednesday, April 20th at 5:30 PM; Ellsworth Allen Town Park, Farmingdale) we will show a video presentation from a visit that Bob Christen, W2FPF, paid to the Dayton Air Force Museum – right outside of Wright Patterson AFB. This sounds quite interesting to me.

When I first started out in ham radio, every issue of QST magazine had a minimum of three construction articles, and sometimes five or six. I would to open each copy with tremendous anticipation of a total immersion in ham radio. At the time I was in high school, and I was pleasantly surprised to learn that the school library had a subscription to QST and quite a collection available for borrowing. I had a long commute to school that year, but I hardly noticed it, as I was usually reading one of the library's magazines en route. Even when I had absolutely no expectation of ever building one of the projects, I still found them fascinating. I worshipped technical editor, Lew McCoy, W1ICP from afar.

Slowly, over the years the world changed. Most of the changes were for the better, such as improved civil rights and air-conditioned subway cars. Some changes were not as good, such as the disappearance of ice cream logs, my favorite desert. Another thing that changed was the field of electronics, with the move to ever smaller circuitry that required more specialized equipment. QST reflected that change, with fewer and fewer construction articles over the years. I found that there were still a few good construction articles coming out now and then, but they were few and far between.

Recently, QST has had a construction article in each of the last few issues. I hope the trend continues. However, I have read the articles in some detail and they all seemed to have left out some critical information – such as info about the PC boards that are clearly visible in the photos. I assume that if you check into the ARRL website, your persistence will soon be rewarded. However, I cannot help but wonder if maybe, just maybe, they don't expect that anyone will actually build one of those things and it is all for show. I am afraid to look onto it: I'm unsure if I could handle it if my fears turned out to be justified.

GRUMMAN AMATEUR RADIO CLUB
MINUTES OF GENERAL MEETING 3/16/2011

By Karen, W2ABK, Secretary

The meeting was called to order by Ed at 5:30 PM.

TREASURER'S REPORT – Ed, WB2EAV

Finances continue to be in good shape.

REPEATER REPORT – Gordon, KB2UB

Both repeaters are working. The Red Cross will use the 145.33 repeater for a practice drill from 7:00 AM – 12 noon.

NET REPORT – Karen, W2ABK

Thursday night net at 8:15 PM on 146.745 MHz had a few check-ins.

Thursday night net at 8;30 PM on 145.330 MHz was well attended.

Sunday morning net at 7:30 AM on 7.289 MHz had 4 check-ins.

VE REPORT – Bob, W2ILP

One applicant took General Class ham exam and passed.

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

NEW BUSINESS

The Ellsworth Park management, where our general meetings are now held, has invited our president or representative to a meeting on 3/21/11 at 7:00 PM, concerning plans to expand the park.

OLD BUSINESS

Bob, W2FPF has lent us a videotape of the Dayton Air Force Museum, which will be shown at our April meeting.

PROGRAM

George Sullivan, WB2IKT is a member of the L.I. Fox Hunting Club. He gave us a presentation about Fox Hunting, the radio version of Hide & Seek. A portable transmitter periodically sends out a beacon signal and the hunters try to locate the transmitter. A demonstration was given, explaining what you would need to hunt. A presentation is on the GARC website for those who missed the meeting.

PROGRAM FOR THE APRIL GENERAL MEETING:

A video of the Dayton Air Force Museum will be shown.

GARC NETS:

40 Meters: 7.289 MHz at 7:30 AM EST Sundays Net Controller: Eugene, W4JMX
2 Meter repeaters: Thursday, 146.745 MHz (-600 kHz) at 8:15 PM then 145.330 MHz (-600 kHz) at 8:30 PM. 136.5Hz tone for both repeaters. 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 meeting rooms.

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.

SILENT KEY

James F. Kearny, WB2QDT, a long time member and past Secretary of the GARC, passed away on March 8th, 2011. Jim had retired to Summit, NY. His death was reported by his son Glenn J. Kearney, WB2QDS, of Massapequa.

INTERNET LINK OF THE MONTH FOR INTERNERDS

When I was a kid, radio making was my prime hobby but I also was involved in model airplane building. I built both scale and flying models in the days when the inexpensive models were made with balsa wood and covered with tissue paper. Kits for the smaller models were sold in F.W. Woolworth stores. The largest model I built was a tow line glider with a 7 foot wing span which I never actually attempted to fly. I bought it in kit form by mail order from a hobby company in Cleveland, Ohio, then once completed I sold it to a friend for cash to buy radio parts. I did not have enough money to buy a gas engine, so that other than the glider, I planned to use rubber bands to power my flying models. I always wanted to build a radio control (RC) model but this too was beyond my economic means. RC methods in those days used RF in the 11 Meter band, which back was then was a ham band before it became CB land.

RC models have come a long way since I read about them in the '40s in a magazine called "Model Airplane News". Many hams are interested in building and flying radio controlled model airplanes that utilize the latest technological advances in solid state UHF/SHF RF channels, proportional servo controls and the more efficient digital servo motors that are now available. Designing and building models from scratch takes skill, and there is also a great deal of skill required to actually act as the remote pilot and fly the model planes. The models cannot be built exactly to scale if they are to be airworthy because critical aerodynamic balances must be maintained. This month's internet link shows a demonstration of a scale model of a B-29, plus its many additional features. I have seen many RC demonstrations…but this is the best I've ever seen. This you gotta see for yourselves! I won't attempt to explain any further details about it here.

The link is: http://users.skynet.be/fa926657/files/B29.wmv

PUZZLE

Here is another cryptogram:

YGK YVEW EOL LV LSOJJ CY GOM VWJQ VWK QKJJVE FOBK.

--VPLVW IKOW--

Solution to the March 2011 cryptogram: FOR THREE DAYS AFTER DEATH HAIR AND FINGERNAILS CONTINUE TO GROW BUT PHONE CALLS TAPER OFF.
--JOHNNY CARSON--

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1 Yr. Board Member: Dave Ledo, AB2EF
1 Yr. Board Member: Bob Christen, 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. 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 As I mentioned last month, I now have software for the latest version of Word and Power Point. Along with this came new software for e-mail. To get the new e-mail program working, I had to set up to use Microsoft Outlook. This required giving Microsoft access to my Cablevision e-mail server. That sounds simple enough, but Microsoft would not accept my Cablevision data. I contacted a Cablevision technician, who tried to help me but he too was unable to get my e-mail recognized by Microsoft. Microsoft says it is not their problem. So at the present time I have two e-mail buttons on my Start Menu; only one of which works, but I fear deleting the newer version because I don't want anything to get lost. Occasionally I get a pop-up window that asks me if I want to wait for a POP3 from my server. I usually opt to wait but nothing happens.

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DISASTER IN JAPAN

I am sure that everyone has read about the disastrous quakes and tsunami that have left radiation leaking into the Pacific from at least one damaged reactor. The death count and the complete destruction of homes, farms, and factories that are located in northern Japan has not yet been totaled. Workers at the nuclear plants have been exposed to lethal radiation and their probable deaths are yet to be included. The Japanese Amateur Radio League (JARL) is a carbon copy of our ARRL. Its members have drilled to provide communications assistance wherever possible. However, like the hams in the US, they can only be second responders. They, like all Japanese civilians, are banned from evacuated areas near the damaged nuclear plants. Now let us go back to the case of the Shoreham Nuclear Power Plant which was built by LILCO at a cost of $6 billion between 1973 and 1984. The reactors were made by GE and were similar to those in Japan. I followed the news about the LI plant opening. When it was completed, testing began at reduced energy output levels. At that time I was working for Grumman in Calverton, which is not far from Shoreham. Opinions pro and con were voiced by the Grumman employees there in Calverton. Opposition to the plant grew stronger after the Three Mile Island accident in 1979 and the Chernobyl disaster in 1986. Although the Shoreham plant had been approved for operation by the Nuclear Regulatory Commission (NRC), it was shut down by the state of NY in 1989, largely because of a decision by then governor, Mario Cuomo, based on the fact that the residents of Long Island would not be able to quickly evacuate the area in the event of a reactor accident. Now let us go back to Japan. Ever since the a-bombing of Nagasaki and Hiroshima there has been strong opposition among many Japanese groups to anything that is nuclear. Japanese had strongly protested against the docking of US nuclear submarines in Japan. In spite of this the power plants were built. The Japanese wanted to build everything the same way that Americans did, but unlike baseball gloves, musical instruments, and ham transceivers, nuclear plants have risks based on location. It is obvious now that the plants should not have been built in an area of probable tectonic activity. The population density of Japan is far greater than that of Long Island. –w2ilp (Inhibit Leaking Plutonium)—