

CQ de WA2LQO

The official voice of the Grumman Amateur Radio Club

January 2011 VOLUME 85 NUMBER 1

COMMUNICATIONS SYSTEMS (continued from December 2010)

By Bob Wexelbaum, W2ILP

For decades, a type of AM has been used for analog TV video, only recently replaced by a digital modulating scheme. It has always been the policy of the FCC to legalize standards that can make TV, as well as radio, available to the most people at the lowest possible cost, and also to provide enough spectrum so that many broadcasts could be available in most areas of the USA. In 1949, the greater metropolitan area of NYC was to have seven TV stations (before UHF channels were available); the most TV channels available in any city of the world! This was of course before there was any cable, fiber or satellite dish TV distribution and all TV signals were received with VHF antennas. It was agreed that the bandwidth for TV (including FM audio and later chromatic sub carriers) in the US would be no more than 6 MHz wide per channel, and this limit still remains. It is interesting to study the compromises that were made when TV was first transmitted and how TV has evolved to be compatible within system limits. Analog TV video is SSB which differs from the SSB that hams use on HF phone bands. If TV was to use true SSB it would require all TV receivers to use costly filters, and thus would limit the initial market for TV sets. If TV were to use full AM the bandwidth would exceed 6 MHz. The modified SSB modulation technique used for analog TV video is called *vestigial-sideband modulation*. This scheme enables using video modulation up to 4.5 MHz. If AM were used this would require a 9 MHz bandwidth. That is 9 times the spectrum that is used for all standard radio broadcasting stations! True SSB cannot be used for TV because of the complexity and expense of demodulating it at the receiver. Thus a compromise is made by generating an AM signal and passing it through a filter at the transmitter. The filter response is a function of the deviation (Δf) from the carrier frequency. The FM sound is transmitted on a carrier located 4.5 MHz above the picture carrier. A frequency range of 100 kHz is allowed on each side of the sound carrier for the audio sidebands. The upper sideband of the picture carrier is transmitted without attenuation up to 4 MHz. Thereafter the sideband is attenuated so that it does not interfere with the lower sideband of the sound carrier. The lower sideband of the picture carrier is transmitted without attenuation over the range of 0.75 MHz and is completely attenuated at 1.25 MHz. Thus the picture signal is transmitted DSB over the range of 0 to 0.75 MHz, SSB over the range 1.25 and above, while in the intermediate range 0.75 to 1.25 MHz, the transition is made from one to the other. This allows the entire transmission to be confined to 6 MHz. When SSB is used the output of a demodulator at the receiver is half the output yielded when both sidebands are present. To prevent a lack of uniformity for a vestigial-sideband demodulator, the video signal is passed through a filter before demodulation, making the response vary linearly. Thus for

modulation up to 1.25 MHz the sum of the amplitude of the two sidebands and hence of the demodulating output, is the same as is yielded by the SSB above 1.25 MHz. This can be mathematically verified. This system does introduce some distortion to the demodulated signal, especially at high-percentage modulation. In actual use the distortion can be tolerated. You might wonder why the cutoff frequency of the filter which removes the lower sideband is not set to be even closer to the carrier frequency, thereby conserving even more bandwidth. This is because in real filters the spectral components which lie within the passband but close to the cutoff frequency suffer distortion producing phase shifts, even when the amplitude response is uniform. The picture signal is such that its waveform must suffer from relatively small phase shifts of its low components. Thus the decision to leave a *vestige* of the nominally suppressed sideband is an engineering compromise between bandwidth economy and picture fidelity. (To be continued)

PRESIDENT'S NOTE by ED GELLENDER, WB2EAV

Let me start by saying that I hope everyone had a good holiday season and an enjoyable New Year. The club's annual holiday dinner party on December 15th was, as usual, quite nice and enjoyed by all.

It is now time for 2011 dues. As a reminder, basic dues are \$20 per year. Family membership (2 members at the same mailing address) is \$25. For retirees, living outside the area, dues are \$10. Checks can be made payable and addressed to: Grumman ARC, P.O. Box 644, Bethpage, NY 11714-0644.

You see, it all started with a raccoon. The Bethpage 146.745 repeater antenna is mounted on top of a shack above the roof of the Northrop Grumman Building 14. One day in November, a raccoon was seen stuck and dangling from the top of the shack in a totally impossible position. It took most of the day for Maintenance to get things straightened out. The raccoon, once freed, immediately took off for parts unknown. That led the company to do a ruthless clean up of years of accumulated crud in the shack. Of course, our repeater coaxial line got cut, even though it is entirely outside the shack.

Antenna engineer and friend Tom and I went up to the roof and determined that the coax was still long enough to mount a new connector and use as-is. Soldering a new PL-259 in place was an issue, as electricity had been permanently cut off, and I did not want to play with a blow torch on the roof. We decided instead to use a type N connector and an adapter, as the braid is then clamped rather than soldered.

We still had to solder the center conductor to the pin, so I finally bought one of those little DC to AC inverters that I have been fascinated with for years. Luckily, Radio Shack had exactly what I wanted at a great sale price. I keep a portable automobile jump-starter in my car, so we took a 25 watt iron and the power source up to the roof and soldered the connector without a hitch.

We then saw that the old PL-259 was so stuck to the antenna SO-239 that we had to bring the antenna down, disassemble, and lengthwise cut open the outer sleeve (thank God for the ol' Bridgeport milling machine in the shop). I coated the threads with exhaust manifold bolt anti-seize, and we rushed to put everything back up before the company holiday shutdown...working, of course, in light snow.

If anybody ever invents an honorary ham license, I nominate Tom.

GRUMMAN AMATEUR RADIO CLUB
MINUTES OF GENERAL MEETING / HOLIDAY PARTY 12/15/2010

By Karen, W2ABK, Secretary

The meeting was called to order by Ed at 5:45 PM.

TREASURER'S REPORT – Ed, WB2EAV

Finances continue to be in good shape.

REPEATER REPORT – Gordon, KB2UB

Northrop Grumman was working on the roof and accidentally cut the coax cable for the Bethpage repeater antenna. *The cable has since been repaired; See president's message.* The Hauppauge repeater is working well.

NET REPORT – Karen, W2ABK

Thursday night net at 8:30 PM on 145.330 MHz had a few check ins.

Sunday morning net at 7:30 AM on 7.289 MHz suffered from poor conditions.

VE REPORT – Bob, W2ILP

One applicant upgraded to Amateur Extra Class. There were 4 VEs present: AB2ZW, W2ABK, WB2IKT and W2ILP.

OLD BUSINESS

We need programs and new ideas for our meetings.

NEW BUSINESS

HRU 2011 will be at Briarcliffe College on January 9th, 2011.

PROGRAM

Our meeting was our holiday party at Bertucci's restaurant. About 13 people braved the cold weather. There was plenty of food, delicious cakes and a good time for all.

The meeting was adjourned at 8:30 PM.

GARC NETS:

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

Net Controller: Eugene, W4JMX

2 Meters (via repeaters): 146.745 MHz (-600 kHz) at 8:15 PM EST Thursdays

145.330 MHz (-600 kHz) at 8:30 PM EXT Thursdays

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 maps 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.

WEB SITE

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

During the early days of aircraft development there were many amphibious aircraft. Grumman built seaplanes for the Navy, the Coast Guard and for civilian usage. The Grumman planes were named for birds. There was the JF Duck, the J2F Duck, the G-21 Goose, the G-44 Widgeon, the HU-16 Albatross, and the G-73 Mallard. I didn't know that Boeing also made sea planes when they started and they flew them from a lake in Washington state. The internet link for this month shows Lake Union where sea planes still fly. The lake is shared with sail boats; Don't know how they do that. The website is:- http://www.lakeunionhistory.org/museum/Seaplane_Intro.html

PUZZLE Here is another cryptogram:

QDF QWKAVTF LJQD QDF LKWTP JM QDZQ QDF MQABJP ZWF

YKYNMAWF ZCP QDF JCQWFTTJEFCQ GATT KG PKAVQ.

--VFWQWZCP WAMMFTT--

Solution to the December 2010 puzzle:

The December puzzle is known as the famous Monte Hall Problem: - There were 3 doors. Behind one of the doors was an automobile. Behind each of the other 2 doors was a goat. The contestant must select a door. He plans on picking door #1, but before he can open it, Monte opens door #2, exposing a goat. The contestant now has the opportunity to open up door #1 as planned, or to switch to door #3. Should he switch?

My first thought was to use Probability Theory. If there are only 2 possibilities, then the odds of either being the door with the car behind it would be 50:50 odds and thus there would be no advantage in switching from the preselected door. Probability Theory led me to believe that whatever transpired before the 2 remaining doors were left, would have no effect on the odds of the final outcome. But aside from Probability Theory, there is Information Theory. When Monte opened door #2 he gave us useful information, which changed the odds of doors #1 and #3, making it advantageous to switch. The explanations I were able to Google up confused me, so I put the puzzle into a QRZ thread and a ham named Dale, AB1GA explained the solution to me in the following clear way:-

- a. There are three doors, one with a car behind it, two with goats behind them.
- b. You choose a door at random. Your odds of picking the one with the car behind it are one in three. So far so good.
- c. Now, the probability of independent outcomes must total 1.0, or certainty. Here you have the car behind your door or Monte has it behind one of the other doors.
- d. Since you have the odds that you have the door with the car behind it are one in three, Monte's odds must be two in three in order for the sum to be one. (If you have the goat then he has the car and goat two different ways; if you have the car, then he has two goats.)
- e. Here is the kicker: Monte **MUST** open a door with a goat behind it. But now you know that Monte had two in three odds of exposing the car, and therefore it must be behind one of the doors he hasn't opened.
- f. Since the odds are two out of three that the car is behind Monte's remaining door, but only one in three that it's behind yours, you have a better opportunity of getting the car by swapping doors with him, i.e. changing your choice and picking his remaining door.

GARC Officers

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1 Yr. Board Member: Dave Ledo, AB2EF

1 Yr. Board Member: Bob Cristen, W2FPF

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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 preregister 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, plus 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 (www.arrl.org) or W5YI-VEC (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. Contact W2ILP.

Editorial

I'm still a little skeptical about the Monte Hall Puzzle (see page 4). It is my nature to be skeptical about anything except Ohm's Law. Can the puzzle be applied logically to a real world decision? Suppose a young man has been dating 3 girls. He gets engaged to one of them, but before he marries her, his friend exposes one of the other girls, who looks like a goat without her make-up. Should he dump the girl he is engaged to, and marry the remaining girl so as to have better odds of not getting a nanny? I dunno. Decision, decisions. As one grows older, one realizes: Of all sad words of tongue or pen; the saddest are "It might have been..."

Grumman Amateur Radio Club
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ARRL ADVERTISEMENT

As a Life Member of the IEEE, I can belong to one IEEE professional groups for free. I chose the IEEE Communications Group, and thus I receive a monthly magazine called "IEEE Communications" in addition to the "IEEE Spectrum" magazine which all IEEE members get. There are few advertisements in the communications magazine; mostly from manufacturers; but this month to my surprise there was a quarter page ARRL color advertisement in this professional publication! The ad offered any IEEE member a free Technician Exam study guide. It also advertised membership in the ARRL for the usual price of \$38 per year. The ARRL is hoping that communications professionals will become interested in amateur communicating and get ham radio licenses. I dunno if this will bring ARRL many new members. Years ago I went to an IEEE meeting at AIL in Deer Park, which was attended by student members from engineering colleges. I was given the opportunity of speaking about ham radio and I brought some ARRL and W5YI publications to show what was required to earn a ham license. A few of the senior IEEE members laughed at my suggestion that engineering students should become hams. They said that the technology that hams use was not as advanced as what it now took to be a communications engineer. Besides, why would a communications engineer want to spend their own free time and money doing simpler stuff than what they do every work day? It will be interesting to see how many IEEE members ask for the free study guide and how many of them actually become licensed hams and/or ARRL members. Obviously the new ARRL leadership is doing their best to advertise and promote our hobby. Perhaps it may work now, better than when I made my presentation. I admit that I am a poor salesman.

--73, w2ilp