www.wvara.org March 2016

The Heterodyne

Newsletter of the West Valley Amateur Radio Association

March Meeting

Germany's Enigma Cipher Machine: Secret Wireless Communications During WWII
By Ralph Simpson

Wednesday March 9
Meeting Starts at 7pm

Meeting Location:
American Red Cross,
Silicon Valley Chapter
2731 N. First Street at Plumeria Dr
(southwest corner) in San Jose

Map at www.wvara.org/meetings.html

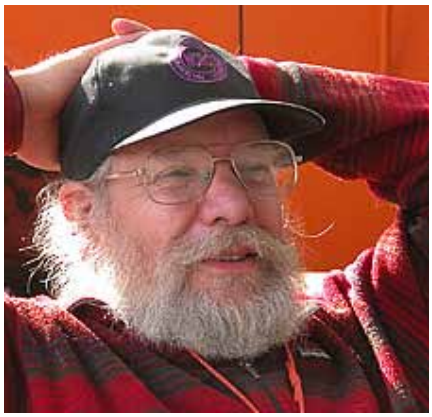
WVARA Repeaters (W6PIY)		
Band	**Frequency**	**PL**
6 Meters	52.580- MHz	151.4 Hz
2 Meters	147.39+ MHz	151.4 Hz
1.25 Meters	223.96- MHz	156.7 Hz
0.70 Meter	441.35+ MHz	88.5 Hz
0.23 Meter	1286.2- MHz	100 Hz

Club Net

WVARA's club net is on the W6PIY repeaters each Tuesday at 8:30 pm. All repeaters are linked together during the net. The net script can be found at www.wvara.org/net.html.

Visitors Are Welcome!

President's Letter



A Communications Emergency Scenario

Assume that a solar storm of the magnitude of the solar storm of 1859 hits the earth. During the 1859 event, "telegraph systems all over Europe and North America failed, in some cases giving telegraph operators electric shocks. ... Some telegraph operators could continue to send and receive messages despite having disconnected their power supplies."[1]

An event of this magnitude can take down electric power grids, and damage radio receivers. It is also likely to take down the wired telephone system. Much of the damage occurs to equipment connected to external wires.

Lets consider for our scenario that the local repeaters, both amateur and agency, have been damaged, the power gird is down, and the telephone network is down, either due to damage to equipment or cell tower overload or both.

The local ARES/RACES groups have plans to deal with communications emergencies. They have repeaters allocated for local use. (W6PIY 2 meter and 70 CM repeaters will be used by the Los Gatos/ Monte Sereno ARES/RACES group.) There are 4 mountain top repeaters set up for digital messaging of incident command data. Local groups practice simplex operations during events such as bicycle races and parades. Local groups have radio equipment setup in emergency operation centers (EOC) and cached in neighborhood incident command posts (NICP). There are backup generators available for most of these locations.

Lets see how these resources survive in our scenario. The local voice repeaters have significant damage to their receivers from the electrical pulse. The same is true for the 4 repeaters used for digital messaging. The radios in the EOCs which are connected to their antennas are damaged. The NICPs have radios and separately stored antennas which survive undamaged.

We still need to power the radios. We have lost the power grid, but almost all emergency communication scenarios involve losing the power grid. Solar power systems with long wires connecting the solar panels to the battery system are likely to have damaged solar panels. The EOCs and some repeaters have backup power systems which are tested regularly. On the other hand, the NICPs do not have fuel for their generators, so fuel will have to be located and brought in. To the extent that automobiles still work, they can provide backup power from their batteries, with occasional engine operation to recharge the batteries.

Possibly we would dispatch people on foot or by car with radios to high points around the valley to act as relay stations, performing the function of the damaged repeaters. There will be a premium on finding radios which still work. We can have communications with this scenario but it will be “Interesting times”.

How can we prepare ourselves for this and other scenarios? I have a couple of suggestions:

* Be prepared to sit at the radio for many hours. It’s not just checking into a practice net.
* Be able to operate the radio and copy messages alone, in case there aren’t enough people to have scribes.
* Be prepared to relay messages between stations that can’t go direct. Exact copies are necessary.

What are the best ways to practice these skills?. Contesting is a wonderful way to get used to operating the radio for many hours. Generally, contesters don’t have scribes, so they are responsible for copying the exchange as well as operating the radio. Real messages will be a lot longer than contest exchanges, but at least it is a start.

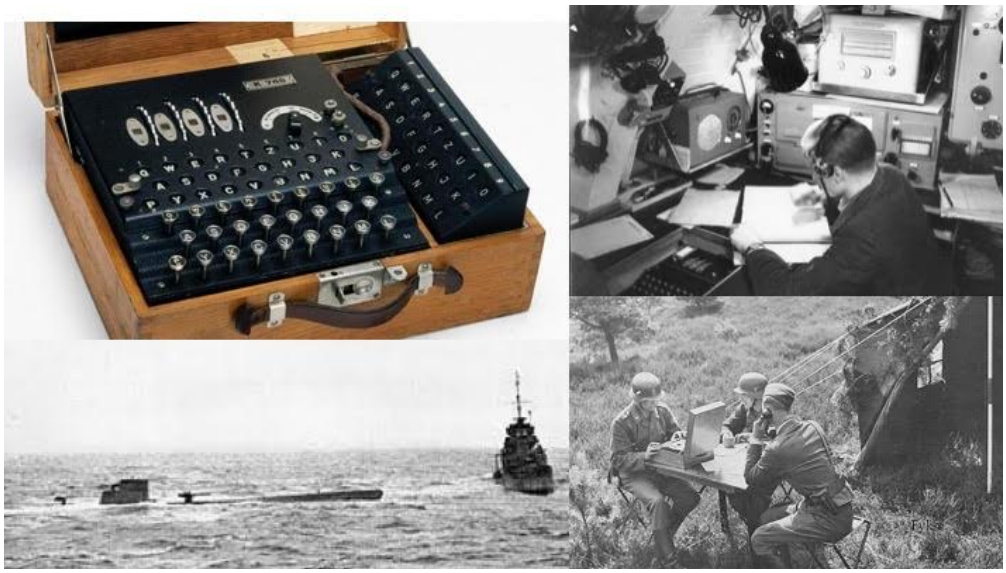
Chances to practice relaying are rarer. I find that checking into HF nets provides some opportunity. Because HF radio propagation has skip zones -- areas where the reception is very poor -- it is frequently necessary to have stations relay checkins to net control. This kind of relaying is why the American Radio Relay League was formed. The national traffic system is another result of the need to relay. To improve relaying skills, we can plan exercises without repeaters so people may need to relay messages using their VHF/UHF radios.

73 Bill AE6JV

[1] Also known as the Carrington Event https://en.wikipedia.org/wiki/Solar_storm_of_1859.

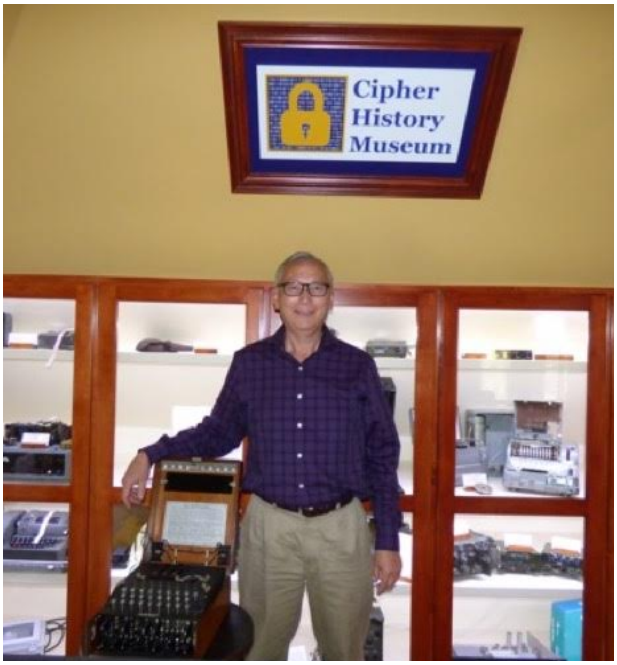
About the Meeting

"Germany's Enigma Cipher Machine: Secret Wireless Communications During WWII" by Ralph Simpson



If you saw last year's block-buster movie, The Imitation Game, then you've heard about the Enigma machine. This device was a cunning invention and major advance in cipher technology, which gave the Germans confidence in the secrecy of their messages during World War II. The confidence which the Germans put in Enigma proved to be wrong and eventually fatal. The story of the Allies conquering the overwhelming odds against breaking the code is a story of ingenuity and intrigue. Alan Turing led the Allies efforts to break the Enigma, which significantly shorten the war and ushered in the age of computers.

The success of cracking the Enigma was kept secret for 29 years, despite 13,000 people working on the effort. This secrecy is especially incredible for us living in the age of the internet, WikiLeaks and Edward Snowden. Over 40,000 Enigma machines were manufactured, but only 300 are known to exist today. You will see one of these rare machines demonstrated and have the chance to type in your own secret messages.



Ralph Simpson worked in the computer industry for 32 years, at IBM and Cisco Systems. He is now retired and is a volunteer at a local history museum. He is also an avid collector of cipher machines, which you can see on his website at: http://ciphermachines.com/enigma

Location: Meeting Room 5 at the Silicon Valley Chapter of the American Red Cross, 2731 N. First Street at Plumeria Drive (southwest corner) in San Jose. Most of us come in through the side entrance on the southwest side of the building — look for our red WVARA sign. And remember, visitors are welcome!

To learn more about the West Valley Amateur Radio Association, refer to http://www.wvara.org. If you haven't been to the Red Cross before, "talk-in" is usually available on WVARA's repeaters. Best choice would be 2m/220.

Dinner: For those who are hungry, several of us will be eating dinner at 6pm, just prior to the meeting, at The Habit at 2000 El Camino Real at the corner of Scott Blvd in Santa Clara — a ten minute drive from the Red Cross building.

Map of restaurant: https://goo.gl/maps/NipZ7c1jhUL2

Menu: https://www.habitburger.com/charburger/?MenuVersion=D&region=bay-area&regionDisplay=Bay Area

Hope to see you there!
Jim Peterson, K6EI

New Members

The following new members joined WVARA recently:

John Gates, AI6NR
Rex Vokey, K7RJV
Matt Yost, KM6AMQ
Andre Siska, N9CU
Bill Fehring, W9KKN

Welcome!!!

WVARA Net Check-Ins (W6PIY)					
Tuesday's at 8:30 PM					
Call Sign	**Name**	**02/9/16**	**02/16/16**	**02/23/16**	**03/01/16**
Total		11	12	18	8
AA6RB	Roy			X	
AB6XS	Kevin	X			
AE6JV	Bill	X	X	X	X
AF6AE	Bill		X	X	
K6BRF	Bert	X		X	
K7RJV	Rex	X	X		
KF6EMB	Svend	X	X	X	X
KG6UOF	Kyle		X	X	
KI6NVN	Ethan			X	
KI6SLX	Peri	X	X	X	X
KJ6CQJ	Dean			X	
KJ6GMO	Sue			X	
KJ6ZZI	Michael	X	X	X	X
KK6VF	Kevin	NET	NET	NET	NET
KK6WRP	James	X			
KX6B	Dick				X
W6ESL	Tom		X	X	
W6IA	Mark	X		X	
W6PK	Phil		X	X	
W7NFN	Jim			X	X
W9KKN	Bill		X	X	
WB6KHP	Dave	X	X	X	X

Treasurer's Report

I have begun tracking WVARA's finances in QuickBooks. Results for Jan-Feb follow. These reports look a little different than past reports because I shifted things into a more standard accounting format.

"Position" is accounting gobbledygook for a non-profit's Balance Sheet. The Assets show how much we've got, and the Equity shows how it's allocated. The distribution between the Association (i.e. the club) and the Repeater is as of the start of the year. At the end of the year, I'll distribute the final "Net Income" between the two.

"Activity is, likewise, gobbledygook for a non-profit's Profit and Loss (or Income Statement). At the moment it's negative for the year because we've already paid for our De Anza Flea Market Space, but not gotten any related income. This situation should correct itself after our June 11 Flea Market gig. There will be additional expenses before the market, but a big influence of cash afterwards.

Also note that dues to date ($689) are running well above what we budgeted ($450), so I expect the year to come out fine. My thanks to everyone who has paid dues, and a reminder to those who have not. You can pay your dues via PayPal, or send a check to the club PO Box (See http://www.wvara.org/membership.html for details). Or bring cash or a check to the meeting.

See you there, Peri KI6SLX

Statement of Activity
January through February 2016

	Jan '16	Feb '16	TOTAL
Income			
4200 — Misc. Income	0.04		0.04
4100 — Program Income			
4110 — Membership Dues			
4111 — Indiv. Assn. ($15)	60.00	225.00	285.00
4112 — Indiv. Repeater (12)	243.00	(87.00)	156.00
4113 — Fam. Assn. ($20)	20.00	120.00	140.00
4114 — Fam. Repeater ($18)	190.00	(82.00)	108.00
Total 4110 — Membership Dues	513.00	176.00	689.00
Total 4100 — Program Income	513.00	176.00	689.00
4800 — Donations	205.00		205.00
Total Income	718.04	176.00	894.04
Expense			
5300 — Flea Market Expenses		2,300.00	2,300.00
5100 — Administrative Expenses			
5110 — Finance Fees Paid (Paypal Char	9.16	7.20	16.36
5140 — Web Hosting Expense		59.40	59.40
Total 5100 — Administrative Expenses	9.16	66.60	75.76
5200 — Membership Expenses			
5210 — Badges	16.00		16.00
Total 5200 — Membership Expenses	16.00		16.00
Total Expense	25.16	2,366.60	2,391.76
Net Income	692.88	(2,190.60)	(1,497.72)

WVARA
Statement of Position
As of February 29, 2016

	Feb 29, '16
ASSETS	
Current Assets	
Checking/Savings	
1000 — Financial Accounts	
1100 — Checking	2,047.13
1200 — Savings	4,494.51
1300 — Paypal	2,625.06
1900 — Cash	100.00
Total 1000 — Financial Account	9,266.70
Total Checking/Savings	9,266.70
Total Current Assets	9,266.70
TOTAL ASSETS	9,266.70
LIABILITIES & EQUITY	
Equity	
3300 — Unrestricted Net Assets	
3310 — Associaton Balance	7,315.51
3320 — Repeater Balance	3,448.91
Total 3300 — Unrestricted Net Assets	10,764.42
Net Income	-1,497.72
Total Equity	9,266.70
TOTAL LIABILITIES & EQUITY	9,266.70

Membership Renewal Reminder

Don't forget to renew your WVARA membership. The fastest and easiest way to renew is with Paypal - go to http://www.wvara.org/membership.html and select a Pay Now button. After logging into Paypal, please open and fill in the box on the left titled "Name, Call Sign, Address, Phone, Email". Or bring a check or cash to the meeting. Checks can also be mailed to WVARA, P.O. Box 6544, San Jose, CA 95150-6544.

A Local HF/MF Interference Mystery Solved

By Jim Peterson, K6EI
Vice President, WVARA

For months, I have experienced periodic but truly terrible RFI (radio frequency interference) on the HF/MF bands here at my home in Sunnyvale – especially in the evenings and before sunrise. The noise level could be particularly severe on the lower bands making contacts on 160 meters almost impossible.

The noise coming out of my transceiver's speaker was akin to a modulated 60 Hz buzz and seemed to cover-up all but the strongest signals. This interference was especially bad on Top Band where I used a 55-foot vertical monopole. Using my upper HF tribander as a receive antenna on 160 meter seemed to improve the situation, but only marginally. Clearly, it was time to track down the source of this electrical noise.

A noise floor of S9 +25dB – bummer!

Step 1) Dear Diary . . . : My first step was to keep a "diary" of noise levels on 1.8 MHz for a couple days. Living on a small city lot, the noise level from local RFI has never been low. In the past, if I adjusted my receiver's bandwidth to its maximum, 12 kHz, and connected my Top Band vertical, I could expect a noise floor between S8 and S9. Since I normally operate CW with a receiver bandwidth of 500 Hz, the resulting noise level was generally manageable. But during recent evening and early morning hours, the noise floor with 12 kHz bandwidth was now an astounding S9 +25dB. The noise floor was roughly 30 dB higher than before and made Top Band and all but useless for contacts. Thirty, 40-, and 80-meters were almost as bad.

The good news was the the noise floor on 160 meters dropped back down to its normal S8-9 range midday. The question was, what was the source of those extra 25-30 dB? Something was producing all this noise during the hours of darkness but not during daylight.

Step 2) Go Hunting: Sometimes the simplest tools are all that is needed to fix a persistent problem. I have an inexpensive, battery-powered AM/FM radio that I bought a few years ago at the De Anza Electronics Flea Market to ten dollars. Since the AM broadcast band is adjacent to the 160 meter ham band, an AM radio like this is ideal for sniffing-out Top Band RFI. Like most portable radios, this unit uses an internal loop antenna wound on a ferrite rod for reception on the AM broadcast band. One particular advantage of a ferrite-rod loop antenna is that it has a fairly sharp null off its ends. This meant that my cheap AM radio can serve as an effective RFI direction-finder.

My low-cost RFI direction finder

I went out to the sidewalk in front of my house and turned on the AM radio. Sure enough, the "buzz saw" RF noise was clearly present. I next spun 360 degrees while holding my AM radio in front of me. (Fortunately, none of my neighbors saw me doing this.) Presto -- the nulls in the radio's reception pattern enabled me to detect a clear line-of-bearing to the noise. Walking a short distance down the street and repeating my 360-degree pirouette enabled me to triangulate the noise source. The source appeared to be coming from my own house. This was great news since it meant that I wouldn't have to knock on doors and pester any of my neighbors in order eliminate the cause of the electrical noise, whatever the cause might eventually be. This was particularly fortunate, since many of my neighbors probably already think of me as "the crazy guy down the street with all the big, ugly antennas."

Not surprisingly, as I started walking home, I noticed the noise level on the AM radio was increasing. This reached what seemed like an ear-splitting level as I walked up to our front door. Hmm, very suspicious!

An LED-based porch light from Home Depot – the primary cause of my RFI headache

Step 3) Finding a Smoking Gun: One closer examination, I noticed that our porch light (which I had previously purchased at Home Depot) contained two LEDs. David Sumner, K1ZZ, had a recent editorial in QST on the RFI issues with LEDs, and there have been numerous discussions on the web about this same topic, so these LEDs by my front door naturally grabbed my attention. And the fact that our porch light is off during the day and on at night would certainly explain the after-dark nature of my noise problem observed during Step 1.

Sure enough, when I switched off the porch light, the noise on the portable AM radio largely vanished. And a quick check in the ham shack confirmed that the noise floor on 160 meters had now dropped much closer to its normal level.

Step 4) Yet another Smoking Gun: While my local noise environment was greatly improved, things still weren't totally back to normal. There seemed to be a secondary RFI source somewhere close by. So I walked through my house, swinging the portable AM radio left and right looking for RF "hot spots", the way a member of the National Guard might use a Geiger Counter looking for radioactive debris following a nuclear power plant malfunction.

A few years ago, we had replaced all of our home's incandescent bulbs with compact fluorescent lights. While most of these seemed to produce a nominal amount of RFI when the AM radio was held within a foot or so, there was one glaring exception. The compact fluorescent bulb in the corner of our living room generated RFI that could easily be detected from adjoining rooms. The house wiring on the same circuit as this bulb seemed to be functioning as an extended antenna for the RFI emissions. Flipping off the light's switch confirmed that the secondary RFI that I was observing was from this specific bulb. The culprit was a dimmable 15 watt compact fluorescent bulb made by the company ULA.

The next day, I went back to Home Depot and purchased a replacement compact fluorescent bulb for our living room as well as a new light fixture for our front porch – one without LEDs. Mission accomplished!

Bottom Line: Beware of LED-based lights and dimmable compact fluorescent bulbs. And never underestimate the value of cheap, simple diagnostic tools such as a battery-powered AM radio for locating an RFI source!

Ham Crams

Los Gatos/Monte Sereno ARES/RACES is planning on offering ham crams on April 30, August 6, November 12 this year. These classes run from 8:00 AM to 5:30 PM. Contact Peter Hertan, K6PLH <phertan at alum.mit.edu> for more information.

73 Bill AE6JV

Brian Sholes, KK6IXU, SK

On Feb 9th my friend and WVARA member Brian Sholes passed away after a long illness. Brian's call was KK6IXU. He participated in the 2014 Field Day. Brian's interest in Amateur Radio was public service.

Roy Beck, AA6RB

Valley of the Moon Amateur Radio Club
presents

HAMFEST 2016

Saturday, April 30th,
8 am to 12 noon

Featuring

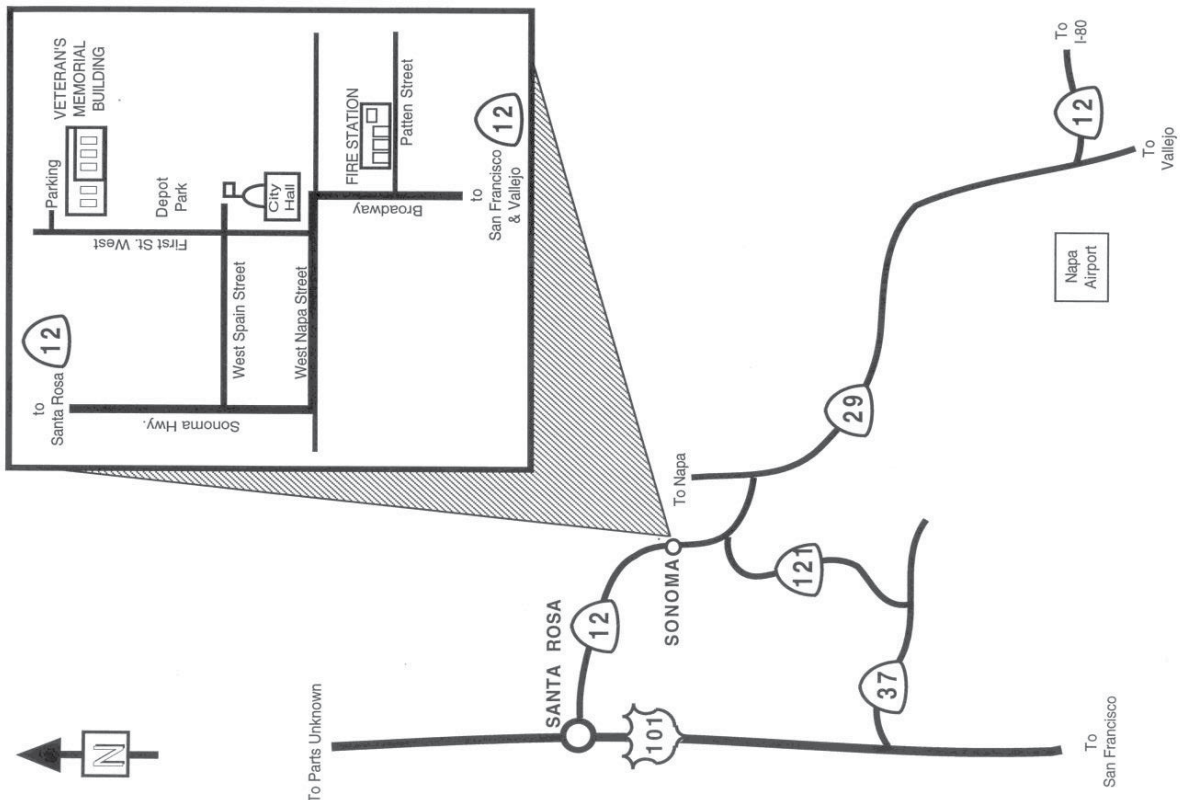
- Swap Meet (indoor and outdoor spaces)
- Breakfast
- VE Testing Session
- Station Demos
- Fox Hunt

PLUS: special exhibit of vehicles that support emergency communications
Radio Control helicopter using 70cm.
On the air demo of FreeDV digital voice on HF

Sonoma Veterans Memorial Building
126 First Street West
Sonoma
For info: 707-935-7441

Admission: FREE
Breakfast: $8.00
Talk-in on 145.350 MHz (88.5 pl)
for flyer and map: www.vomarc.org

Map to Sonoma Hamfest 2016



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