

# Squelch Tales

A Publication of The San Diego Repeater Association, Inc.  
January/February 2013

## *Ahead in Squelch Tales*

**SANDRA's March 7, 2013 membership meeting** featured Bruce Kripton, KG6IYN, the ARRL San Diego Section Emergency Coordinator presenting *San Diego Section Emergency Communications*. Over the past several years, the Emergency Communications effort has been overhauled and expanded under the auspices of the Amateur Radio Emergency Service (ARES) to include volunteers from the cross section of emergency groups and hospitals.

**Since July 1, 1965 radio station WWVB** has been used to deliver a very accurate time standard by the National Bureau of Standards (NBS) and its successor organization the National Institute of Standards and Technology (NIST). However, there was a recent change to the transmission format of WWVB that leaves some of these devices non-functional.

**SANDRA will feature Dennis Vernacchia, N6KI**, will be speaking about MARS operations in Vietnam at the June 6, 2013 Membership Meeting. Don't miss this exciting meeting.

**The usual features** of Board Minutes, Errata and mail are included.

## San Diego Section Emergency Communications

### Bruce Kripton, KG6IYN

SANDRA's March 7, 2013 membership meeting featured Bruce Kripton, KG6IYN, the ARRL San Diego Section Emergency Coordinator presenting *San Diego Section Emergency Communications*. Over the past several years, the Emergency Communications effort has been overhauled and expanded under the auspices of the Amateur Radio Emergency Service (ARES) to include volunteers from the cross section of emergency groups and hospitals. ARES meetings typically have 25-40 people in attendance, a dramatic increase from years past.

Because the emergency communications effort is coordinated under ARES which is an American Radio Relay League (ARRL) function, Bruce started by giving a synopsis of ARRL activities. The ARRL has 120,000 members of which 1,500 are in the San Diego Section which covers San Diego and Imperial Counties. The ARRL field organization has a hierarchical structure of Divisions and Sections. The San Diego Section is part of the Southwestern Division along with the Arizona, Los Angeles, Orange and Santa Barbara Sections. ARRL programs include: spectrum protection, technical responses on local regulation, technical response to the FCC on rule making, spectrum management (band plans),

Volunteer Examiner Coordination, research, promotion of Amateur Radio nationwide, organization of events such as contests, training of amateurs and one of the largest programs ARES. A separate presentation could be done on any one of these functions but the subject of this meeting was ARES.

- Continued on Page 2 -



**Bruce Kripton, KG6IYN with XYL**

ARES – Cont'd.

Local situations that require emergency communications services in Southern California include: wild fires, floods, plane crashes, major power outages, train derailments, gas leaks, earthquakes and large public events such as the Mira Mar Airshow. ARES supports communication between hospitals, first responders in the field, Emergency Operations Centers, Medical Operation Centers and any other public safety agency requesting support. Currently ARES receives more communications support requests than it can manage at the current resource level. There is always room for additional trained volunteers.

The objective of ARES is to provide trained communicators when and where they are requested. ARES is a volunteer organization but they function at the request of hospital and public safety agencies, they do not show up uninvited. The key is to have well trained operators functioning in a professional manner. As a consequence, ARES members spend the largest part of their volunteer time training for communication emergencies, planning for training and assembling the appropriate equipment to provide the communications service. Volunteers train in message handling, both voice and digital and refine their “go kits” so that they have the appropriate equipment available when needed. ARES participates in state wide drills which can be heard on SANDRA repeaters as SANDRA donates repeater time to ARES when it is requested. Every drill generates an after action report which reviews what went right, what went wrong and what can be improved upon.

The key to an effective ARES operation is training. Each hospital has its own procedures and requirements which must be understood and followed by the volunteers providing the communications service. With the number of participating hospitals there are a lot of procedures to be learned and followed. Training is done on weekly nets in addition to monthly meetings. San Diego ARES hosts one net on Thursday, one on Saturday and four nets on Sunday. The nets are on both HF and VHF amateur bands and the schedule can be found at

<http://www.sdares.net/nets.php>.

San Diego ARES participates in the statewide drills that occur at least annually. Seventy-five to eighty-five volunteers turned out for Golden Guardian last November, which was a large statewide drill. The turnout was remarkable considering that it was held during normal working hours. Another statewide drill is the Great California Shake Out which simulates a large earthquake. The next drill will take place on May 30, 2013.

ARES has been adding equipment to its inventory. A few years ago they acquired a communications trailer from a government agency which had been used one time and put into storage for ten years. The trailer was devoid of communications equipment and needed restoration from the tires up but did have equipment racks inside and two power operated towers, one that would extend to 52 feet and hold 300 pounds at the top and one extendable to 56 feet that could support 225 pounds. ARES restored the trailer, removing a lot of old wiring and installed two Yaesu 8900 quad band transceivers, an LCD television for digital radio, one VHF only transceiver, one Citizens Band radio and antennas on the towers. A refrigerator and microwave were installed for operator comfort. A four channel video recorder is installed to record operations and a computer and printer were installed for generating communications reports and directly scanning for digital transmission. The trailer was first deployed at the Mira Mar Airshow in 2010. A UPS was required to handle AC main failure – Mira Mar turns off the power at night to save money. Planned upgrades include adding HF capability.

San Diego ARES needs additional volunteers and equipment to meet communications requests. Any amateur that can donate his time on a regular basis and during emergencies is welcome, training will be provided. ARES also needs donations of money and equipment. If the equipment is not directly useful, it can be converted to money which is always useful. ARES is also looking for someone skilled in

**Continued on Page 5**

### **New WWVB Time Signal**

Since July 1, 1965 the National Bureau of Standards (NBS) and its successor organization the National Institute of Standards and Technology (NIST) has used radio station WWVB to distribute a very accurate time signal. Most Amateurs and many calibration facilities have used WWVB as a timing standard since that date. There are many industrial and consumer devices built to use WWVB broadcasts for time synchronization which run the gamut from Wall Clocks and wrist watches to precision calibration equipment. However, there was a recent change to the transmission format of WWVB that leaves some devices non-functional.

Amateur Operators are more dependent on time and the measurement of time than any other physical property because frequency is defined as the number of 360 degree cycles in one second. Since 1967 the second has been defined as 9,192,631,770 cycles of electromagnetic radiation from an energy transition of the cesium 133 atom. Therefore, the second is defined by a specific electromagnetic wave and we measure every other electromagnetic wave with reference to the second.

**Background:** WWVB is located in Fort Collins Colorado which is on the plains of Colorado, north of Denver and east of the Rocky Mountains, with excellent propagation to the west and much of the east. However, the signal is the weakest along the population centers of the east coast and when combined with the high level of electromagnetic noise generated and the city canyons of the east, it can make reception problematic, particularly in the the eastern industrial and technical centers, i.e. the New York-Boston corridor. Even though transmitter power has been increased several times the problem has persisted. Several plans to alleviate the situation with additional transmitters and multiple frequencies have been met with objections and/or a lack of funding. In mid 2012 NIST began experimenting with an added phase modulation mode to improve the signal to noise ratio at the receiver. The test period for the new modulation began on October 29, 2012 which led to full implementation on March 21, 2013. During

the test period WWVB reverted to the legacy format for two half hour periods each day, one at midnight and one at noon Mountain Standard Time so that legacy devices could phase lock to the WWVB carrier twice each day. However, starting on March 21<sup>st</sup> legacy devices that phase lock to the carrier no longer function.

**Time codes:** The legacy time code is a very accurate 60 kilohertz carrier controlled by a cesium 133 clock which is amplitude modulated to form pulses of different widths which is referred to as AM/PW modulation in NIST documents. Using the AM/PW modulation the signal can define two digital bits, a “zero” and a “one” bit, which are used to send a BCD digital time signal. The date, time, daylight savings condition and other information are encoded in the digital transmission and decoded by the receiver. Most inexpensive devices such as Citizen watches, La Cross and other desk and wall clocks use the pulse width information only to synchronize their devices. These device still function with the new phase shift to the modulation. Other instruments that phase lock to the very accurate 60 Khz carrier can no longer lock because of the new phase shift in the modulation.

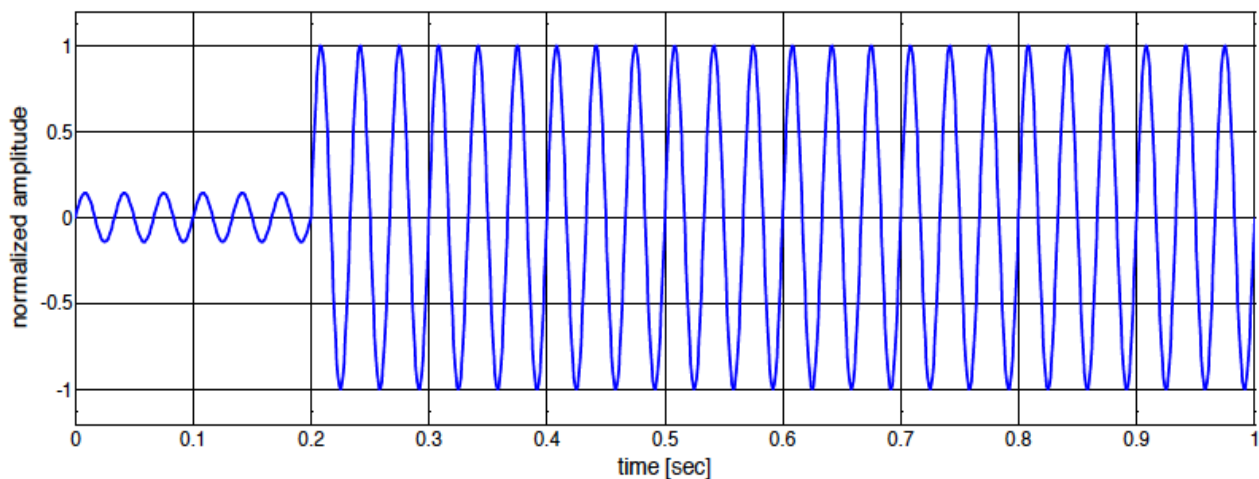
The change in modulation introduced a 180 degree phase shift to the carrier 100 milliseconds after the start of each “one” bit. Industrial timing equipment typically uses the encoded messages for the time message but also phase lock to the 60 Khz carrier for accuracy – the 180 degree phase shift prevents equipment from locking to the carrier.

The legacy protocol provides a 60 bit message frame at one bit per second. Each seconds starts with a drop to a low carrier level and finishes with the carrier at the high level. A “zero” bit consists of 200 milliseconds at the low level and 800 milliseconds at the high level. A “one” bit is 500 milliseconds at the low level and 500 milliseconds at the high level. The bits are synchronized with each second giving accurate timing. The bits are arranged in a 60 bit message (exactly one minute long) which gives the date,

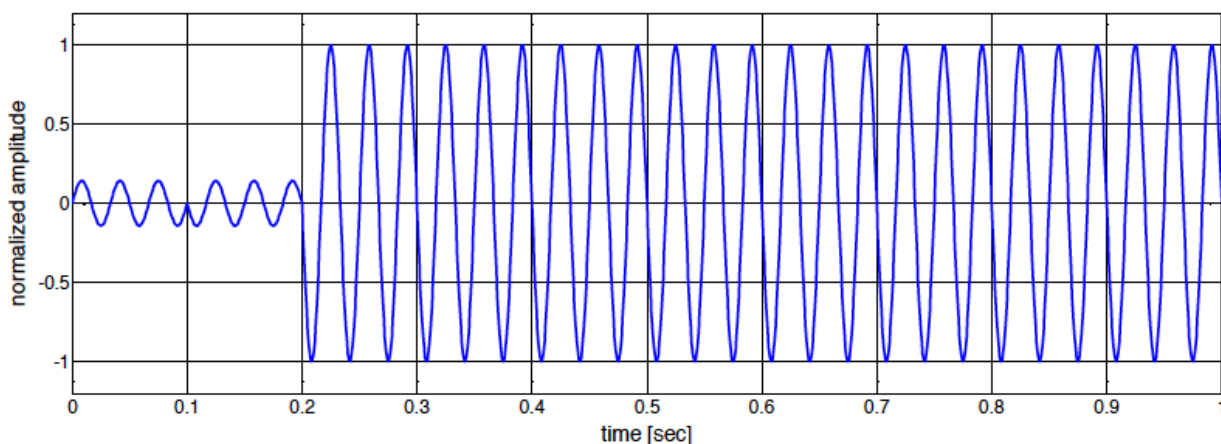
**Continued on Page 4**

**WWVB - contd.**

time, daylight savings status, leap second and some offsets. The new protocol has a different message with more information that can cross more than one 60 bit frame. The new protocol retains the old AM but adds a 180 degree phase reversal 100 milliseconds into a bit for a “one” bit in the phase modulation. The phase shift can be added to either a legacy “zero” or a legacy “one” bit to form a phase shift “one” bit for the new (and additional) phase shift message, any bit without a phase shift is a “zero” bit for the phase shift message. With this system both the legacy and phase shift messages are sent simultaneously allowing backward compatibility to devices using the encoded data without phase locking to the carrier signal. Figures 1 and 2 two legacy “zero” bits, one of which is has a phase shift and is a phase shift “one” bit. Figures 3 and 4 are legacy “one” bits, one with a phase shift.



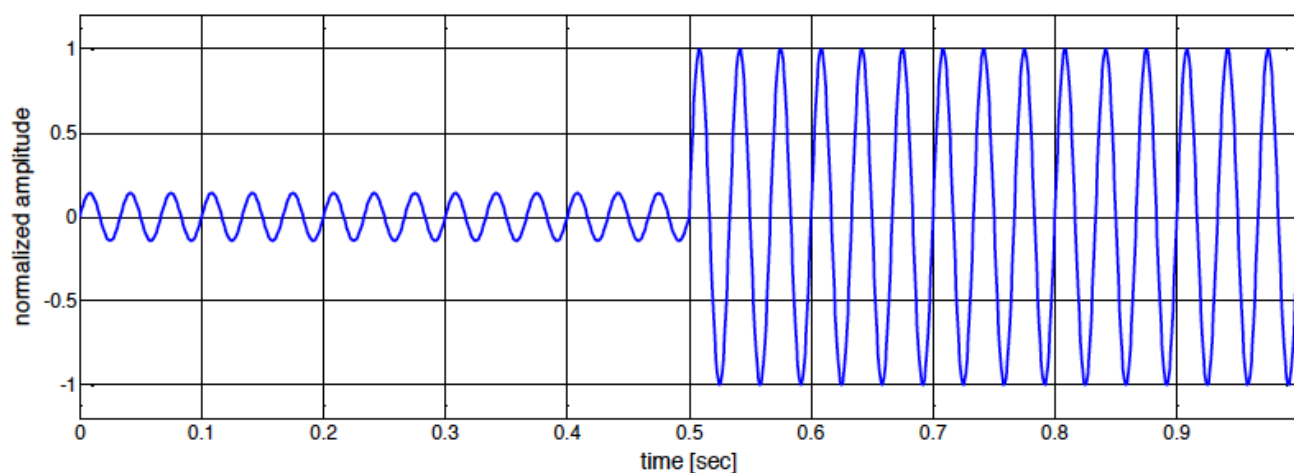
**Figure 1 – Legacy “zero” bit which is interpreted as “zero” in both legacy and phase modulated messages.**



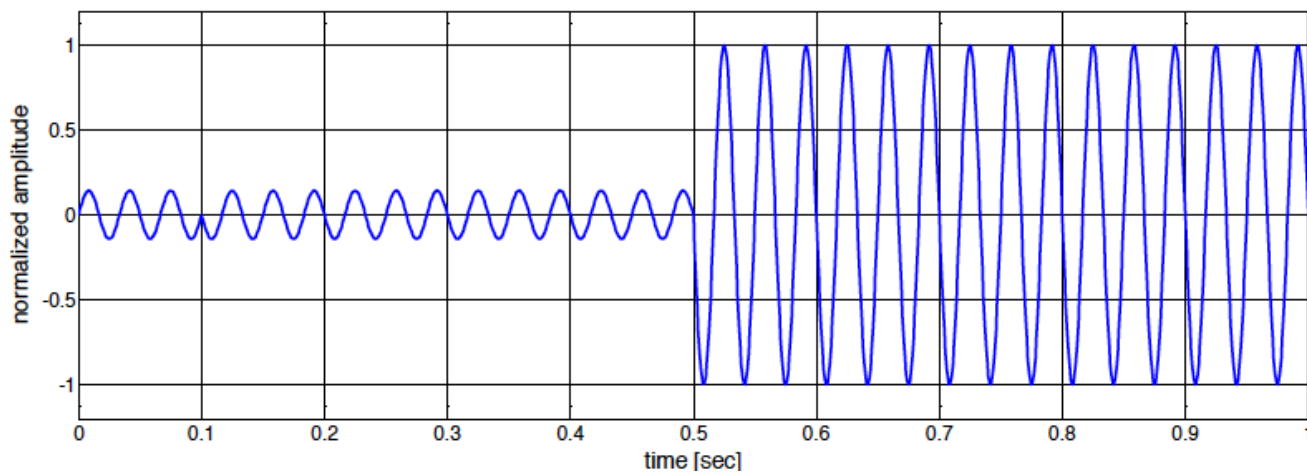
**Figure 2 – A 180 degree phase shift 100 milliseconds from the start is interpreted as a “zero” legacy bit and a “one” phase shifted bit.**

Continued on Page 5.

WWVB – continued.



**Figure 3 – A legacy “one” bit which would be interpreted as “zero” bit in the phase modulated protocol because it does not have a phase shift.**



**Figure 4 – A legacy “one” bit with a phase shift which is also interpreted as a “one” bit in the phase modulation protocol.**

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**ARES – continued.**

writing grants.

For further information about ARES email

can be sent to [sdgares@yahoogroups.com](mailto:sdgares@yahoogroups.com)

and the web site is <http://www.sdgares.net>.

– Consider Volunteering – {SQ}



## **ANNOUNCEMENT**

**Membership Meeting 7:00 pm JUNE 6, 2013**

**COUNTY DEPARTMENT OF EDUCATION**

**6401 Linda Vista Road, Room 306**

**Dennis Vernacchia – N6KI**

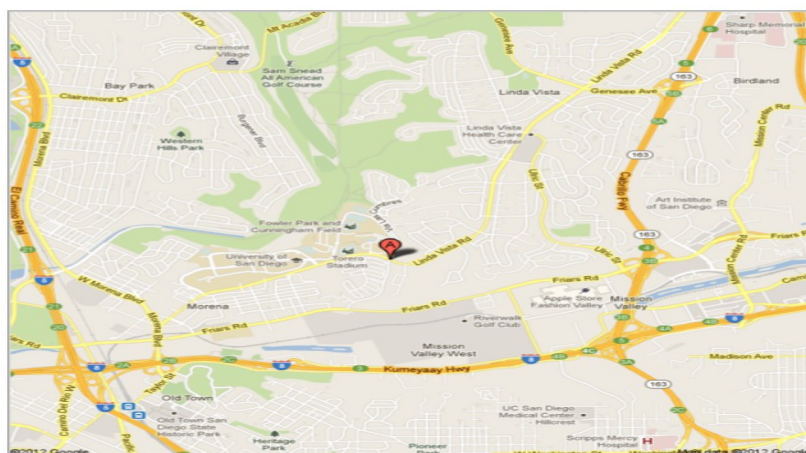
**Calling Home from the Vietnam War, Ham Radio's Role**

This is a first-hand story of how the building of a Ham Radio station inspired MARS operations during the Vietnam War, which played an important role for soldiers morale and kept Dennis, N6KI, mostly, out of harms way.

The slide/audio presentation shows how when drafted into the U.S. Army in 1967 and trained as a rear echelon radio-teletype operator, then shanghaied into an elite unit of the 101st Airborne Infantry Division, Dennis ingeniously worked to stay alive and preserve his mental sanity during his 12 month tour of duty, by keeping soldiers in touch with their loved ones using "Radio-telephone Phone Patches" on the 15 and 20 meter HF bands.

Dennis Vernacchia, N6KI was licensed in 1963 as WN2JDW in NJ and retired as an Electronics Research & Development Technologist after working 40 years in RF Communications and Manufacturing fields. He holds a B.S.E.T degree from Arizona State University.

Dennis has lived in San Diego since 1974 and is now involved in elmering new hams, can usually be found contesting on the HF Bands most weekends and also training aspiring contest operators.



County Department of Education, 6401 Linda Vista Road, San Diego

**Errata, Corrections, Amplification and Shorts:** This section acknowledges errors and omissions or allows additions to previous articles. We rely on reader feedback – please write.

**Repeater Status:** The technical Committee reports the following:

**OTAY:**

The packet equipment has been re-installed and is functioning normally.

**LYONS:**

No changes this past month.

**SHARP:**

Larry changed his call sign back to his original of WA6AIL. The repeater controller will need to be corrected and we will need to notify TASMA. The Auto-patch has been decommissioned.

**LAGUNA:**

No changes this past month

**HI-PASS:**

No changes this past month

**SOLAR:**

SOLAR repeater is working, but only in the immediate area of the plant. We are working with hams at the facility to get a repair trip organized.

**Submitted by:**

John Austin

K6RLV, SANDRA Technical Committee

<b>Callsign</b>	<b>Location</b>	<b>Input</b>	<b>Output</b>	<b>Callsign</b>	<b>Location</b>	<b>Input</b>	<b>Output</b>
WB6WLV	Mt. Otay	146.040	146.640	WB6WLV	Mt. Laguna	444.500	449.500
WB6WLV	Mt. Otay	222.460	224.060	K6GAO	Hi-Pass	144.680	145.280
WB6WLV	Mt. Otay	444.200	449.200	W6SS	Lyon's Peak	146.865	146.265
WB6WLV	Mt. Otay	1270.300	1282.300	K6AIL	Sharp Hospital	147.285	147.885
WB6WLV	Mt. Laguna	147.750	147.150	WB6WLV	San Diego	442.320	447.320
WB6WLV	Mt. Laguna	222.600	224.200				

**All SANDRA repeaters use PL 107.2**

**SANDRA NETS**

Sunday 8:00 P.M. Mt. Otay Repeater  
 Wednesday 7:30 P.M. Mt. Laguna Repeater

**GUIDELINES SUMMARY**

SANDRA, Inc. operates their repeaters for service in the San Diego area. The policy of the organization is that the repeaters are available for all licensed amateur radio operators to use so long as applicable rules and regulation are observed, whether members of SANDRA or not.

**SQUELCH TALES**

SQUELCH TALES is published bi-monthly by the San Diego Repeater Association (SANDRA, Inc.), a corporation dedicated to the promotion of amateur radio. Distribution is free to members.

Newsletter exchanges are desired with regard to format, suitability and style is reserved. Ads are \$50 per full page, \$27 per half page and \$15 per quarter page. Business cards are \$8. Artwork is due by the first week of the month to the P.O. Box. Liability for errors in copy is limited to the printing of a correction in the subsequent issue. Permission is hereby granted to reprint items from *SQUELCH TALES*. Opinions or editorials are not necessarily the position of the Board or the organization of SANDRA, Inc.

The SANDRA membership meets the first Thursday in the Months of March, June, September and December. Meetings start at 7:00 P.M. and are located at the San Diego County Education Center, 6401 Linda Vista Road, San Diego. Board meetings take place on the first Thursday of January, February, April, May, July, October and November. All SANDRA members are encouraged to attend.

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