

## OCTOBER 2016

El Paso, TX PO Box 3561

### Scanning the Spectrum of "Weird Wireless"

There are hundreds of different types of wireless applications. We all use the familiar mainstream wireless technologies like AM and FM radio, Wi-Fi, Bluetooth, and cellular. However, there are many other unusual and less-wellknown wireless types. I call them "weird wireless." I don't mean it in a derogatory way-just that these technologies are different and out of the ordinary. Maybe you have heard of some of these, and maybe not. Here is a short list for your distraction.

#### WWVB 60 kHz

WWVB is the National Institute of Standards and Technology's (NIST) time broadcasting station in Colorado. It transmits digital time signals based on atomic clock precision (<1 part in 10<sup>12</sup> error) to synchronize clocks across the U.S. Its carrier operating frequency is 60 kHz (yes, 60 kHz), using 70 kW of effective radiated power (ERP) from its huge antenna array. The digital time codes are sent at 1b/s (one bit per second) using a combination of amplitude and phase modulation. I have an "atomic" watch with a WWVB receiver, and the clock in my home weather station is synced to WWVB

#### **Digital Radio Mondiale**

Digital Radio Mondiale (DRM) is an effort to bring digital modulation to international shortwave broadcasting (5 to 26 MHz range), bringing Sep 27, 2016by Lou Frenzel in Communique

it into the 21st Century. The goal is to improve upon the quality and reliability offered by the standard AM broadcast methods still used today. DRM uses MPEG audio compression to squeeze more fidelity into the traditional narrow AM 9 kHz or 10 kHz channels. Modulation is coded OFDM with QAM. Bit rates are in the 6.1 kb/s to 38.4 kb/s range. A special DRM receiver is needed.

#### **HD Radio**

HD Radio is the U.S.'s digital broadcast radio standard. It transmits a compressed audio signal using OFDM that overlays the normal analog signal on the standard AM or FM frequencies. Most FM and some AM stations have implemented it. HD Radio has been around for over a decade, but few consumers seem to know about it. It does generally improve audio quality and mitigates noise and fading. A special receiver is needed. Some car radios incorporate it.

#### **Magnetic Induction**

Magnetic induction wireless is just transformer action. And I am not talking about wireless battery charging, here. The transmitter generates a magnetic field around a primary coil or antenna. The magnetic field is picked up by multiple secondary windings or receiving antennas.

KTSM-TV KVIA-TV KRWG-TV KBNA-AM/FM & KAMA-AM KHEY-AM/FM, KPRR-FM & KTSM-AM/FM KLAQ-FM, KISS-FM & KROD-AM KPAS-FM-ALGIE A. FELDER CSBE KTNT98.COM INTERNET RADIO NETWORK BURST COMMUNICATIONS INC.- KIRK BASEFSKY GIESLER BROADCASTING SUPPLY INC.

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MARSAND, INC.	
Consulting Engineer	AFCCE
ν	SBE-PBE
Matthew A. Sanderford, Jr., P.E. President	
tycowboy@marsand.com	www.marsand.com
PO Box 485 * 6100 IH-35W	Office: 817-783-5566
Alvarado, TX 76009	FAX: 817-783-5577

Audio can be transmitted directly like this without a carrier. Such techniques have been used to send audio into a theater to special receivers for the hearing-impaired. A version called near-field magnetic induction (NFMI) uses the 13.56 MHz ISM unlicensed frequency to transmit compressed audio for ear buds and hearing aids. The near field of a radio signal is mostly the magnetic field, whereas the far field is the electric and magnetic fields together. The near-field range is severely limited to dozens of feet, max. A popular version is near-field communications (NFC) that is now widely used in cell phones for making payments.

#### Impulse UWB

Ultrawideband (UWB) is generally well known in its multicarrier format that uses 528 MHz wide OFDM signals in the 3.1 to 10.7 GHz range. It is used in some PCs, laptops, docking stations, and cameras to transmit data at speeds to 480 Mb/s. Range is limited a few meters, so it is not widely used. Another version of UWB called impulse radio (IR-UWB) uses uniquely shaped short impulses and a form of PSK to transmit data. No carrier is used. The impulses create a very broad bandwidth signal (> 500 MHz). The very low power demanded by the FCC keeps the signal from interfering with other services, but a special coherent receiver can pick the signal out of the noise. Transmissions are very secure. IR-UWB is used for data transmission, ranging measurements, and location services.

#### SBE CHAPTER 38 OFFICERS

CHAIRMAN Antonio Castro SBE member # 11456. KFOX/COX retired Chief Eng. 800 Arredondo dr. El Paso. TX 79912 915-584-1220 home 915-525-8507 cell farahjac@sbcglobal.net

VICE CHAIRMAN

Carlos Sosa SBE member # 26533 801 N Oregon St. El Paso, TX 79902 915-496-4444 Office csosa@ktsm.com

TREASURER Walter Hanthorn SBE member # 18307 KSCE TV 4461 Gen. Maloney El Paso, TX. 79924 915-269-7583 home 915-532-8588 office

CERTIFICATION COMMITTEE: David Halperin.

MEMBERSHIP COMMITTEE: Antonio Castro Warren Reeves

FREQUENCY COORDITATION COMMITTEE: Warren Reeves Owen Smith

SCHOLARSHIP COMMITTEE: Rick Vilardell

> WB SITE COMMITTEE: Norbert Miles

SUSTAINING MEMBERSHIP: Antonio Castro

PROGRAM CHAIRMAN: Warren Reeves

> NEWSLETTER: Antonio Castro

EAS CHAIRMAN: David Halpering

EXECUTIVE COMMITTEE: Antonio Castro Carlos Sosa Walter Hanthorn



#### EL PASO, TX SBE CHAPTER 38 MEETING MINUTE

DATE 09/13/2016 LOCATION: TAJIN RESTAURANT.

*MEETING CALLED TO ORDER*: 12:37 PM, BY ANTONIO CASTRO. THERE WERE 7 ATTENDANTS.

**REPORT OF THE SECRETARY**: MINUTES IN THE SEPTEMBER NEWS-LETTER. ACCEPTED BY GLENN LEFLER, SECONDED BY NORBERT MILES.

**REPORT OF THE TREASURER:** \$ 3,904.01 IN THE BANK. ACCEPTED BY CARLOS SOSA, SECONDED BY DAVID HALPERIN.

**REPORT OF THE CERTIFICATION COMMITTEE:** FOR NOVEMBER, SEVEN TO TEST FOR CTO (FROM KFOX14/CBS4).

**REPORT OF THE MEMBERSHIP COMMITTEE:** TO INVITE KURT SCHINI FROM HARMONIC/PEBBLE BEACH SYSTEMS.

**REPORT OF THE FREQUENCY COORDINATOR COMMITTEE:** NO RE-PORT .

**REPORT OF THE SCHOLARSHIP COMMITTEE: NO REPORT.** 

*REPORT OF THE WEBSITE COMMITTEE:* 2084 HITS LAST TIME, NOW 2098. (14).

**REPORT OF THE EAS CHAIRMAN:** TEXAS AND NEW MEXICO MONTHLY TEST WERE RECEIVED AND RE-BROADCASTED. FEMA TO RELAY FIRST TEST NOTIFICATION OF 911

**REPORT OF THE PROGRAM COMMITTEE:** JERRY DELGADO TO DO A PRESENTATION IN THE OCTOBER MEETING

**UNFINISHED BUSINESS:** WILL UPDATE THE LIST OF E-MAILS AND PHONE NUMBERS OF THE CHAPTER MEMBERS.

*NEW BUSINESS OR ANY ITEMS FOR THE CHAPTER INTERES:* NONE.

*NEXT MEETING DATE AND LOCATION*: OCTOBER 12, 2016. RIO CHINA BUFFET AT 12:00 PM..THIS IS WEDNESDAY !!

MEETING ADJOURNED: AT 12:58 PM.

NEXT MEETING TO BE NEXT WEEK ON WEDNESDAY 12TH. RIO CHINA BUFFET. INTRODUCING JIM GODFREY DO NOT MISS THIS !!!!





IN SEPTEMBER WE HAD OUR REGULAR MEETING AT THE MEXICAN RESTAURANT "TAJIN" THE ENCHILADA HOUSE, @ THE MESA INN.

FOR THIS MONTH OF OCTOBER, WE ARE INTRODUCING A NEW FRIEND, HE IS **JAMES D. GODFREY** (JIM) WHO HE IS REPRESENTING JAMPRO AND ALLAN DICK.

Your Partner for DVB-T / DTV & DAB - HD RADIO Solutions Experience you can count on for US Television Re-packing Solutions



THE PRESENTATION IS GOING TO BE AT THE PRIVATE ROOM OF THE RIO CHINA BUFFET, SUNLAND PARK.

WHEN? WEDNESDAY OCTOBER 12

TIME? SHARP AT 12:00 PM.

COME AND JOIN US FOR LUNCH !!!!



#### <u>PSK31</u>

PSK31 is a digital transmission mode used by amateur radio operators. It uses a PC keyboard that translates keystrokes into a unique binary code, which then uses binary phase shift keying to modulate the carrier. PSK31 uses the sound card capability of the PC and software to handle all of the translations for both sender and receiver. The data rate is 31.25 b/s. It is very slow but only uses 100 Hz of bandwidth, making it possible to transmit data in the high frequency (3-30 MHz) ham bands where channels are usually less than 4kHz. The signal is easily recovered in noise, making it great for low-power (QRP) operation.

#### <u>RFID Tags</u>

You have no doubt heard of radio frequency identification (RFID). Special coded radio tags are attached to items to identify, inventory, and locate them. What is unique is how the tags work. With no DC power of their own, the tags receive a strong RF signal from a device called a reader. That signal is then rectified and filtered inside that tag chip into a small DC that powers up the chip. The tag then transmits its internal code back to the reader using a form of AM. Range is less than a meter.

#### Single-Chip Radar

Yes, a whole radar system in one IC. Most are of the continuous-wave (CW) type, operating in the 24-GHz or 76-79 GHz bands. They are now widely used for distance sensing in automatic braking, cruise control, and blindspot detection in new vehicles. They play a major role in self-driving vehicles. One application is liquid-level detection in a tank. Low cost will allow these chips to find other uses. **Miscellaneous** 

Here are a few other oddball-but-patented schemes that have yet to be adopted for anything.

Ultranarrowband, also known as very minimum shift keying (VMSK), is an unusual technique that has been debated for years. It uses zero group delay filters to minimize bandwidth needs for high-speed data transmission. It has been said that the technique violates Shannon's channel capacity rules.

Sequential null wave is another modulation scheme that cancels sidebands to reduce the bandwidth for high-speed data transmission. Cambridge Consultants recently announced an all-digital radio transmitter that sends the serial data bit stream directly to the antenna. No details are available.

# You're invitedto the2016 SBE ENGINEERSCHRISTMASPARTYFor you and your better half

Monday, Dec 12, El Paso, TX Olive Garden, (7pm) 740 Sunland Park Drive 915-585-1097

Jay Brentlinger FROM ORBAN

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