

Spring 2013 Newsletter

in this issue

- Pg 2 **UZ7HO Sound Modem: Giving New Life to a "Dinosaur"**
- Pg 4 **CBA IV Goes Eco - Competitive Racing with a Flair for the "Eco Green"**
- Pg 8 **RIGrunners Solve Scout Ham Station Problems**
- Pg 10 **The Antenna - Part 3 of Series**

HamFests

- **Hamvention** - Dayton , OH
May 17-19, 2013
- **Sea-Pac** - Seaside, OR
May 31 - June 2, 2013
- **Ham Com** - Plano, TX
June 7-8, 2013

WEST MOUNTAIN
RADIO



UZ7HO Sound Modem: Giving New Life To A “Dinosaur”

by Sholto Fisher – K7TMG

This article is not really about Dinosaurs but it is about HF Packet-Radio which has been described by some as a “Dinosaur” digital mode. Far from being buried in the late Jurassic period HF Packet-Radio is prospering I’m happy to report. I should know as I have been involved with this form of communication for many years. The network I belong to has been in continuous operation since 1986 and has actually increased in size over the last two years as new technologies become available.

Back in its heyday, HF Packet-Radio was almost entirely done with a TNC (Terminal Node Controller). Typically they were a single ported or if you could afford one, a dual ported modem which would operate 300 baud on the HF port and 1200 baud on the VHF port. These modems were expensive but at the time were the only way to connect to, and become part of, a Packet-Radio network.

When PSK31 was first implemented on a computer sound card, perhaps around 1998 or so, it started a revolution in Amateur digital mode operating. No longer was it necessary to have a dedicated hardware box – you could just use what you already had – your computer sound card. From that time we got a plethora of new digital modes as people pushed the envelope on what was possible. Many people formerly involved with HF Packet-Radio got interested in these new modes and we saw activity drop on the network dramatically.

Until recently, HF Packet-Radio had been more or less overlooked by the sound card developers. We did get

The screenshot shows the Soundmodem software interface. At the top, there are controls for Ch A (1500) and Ch B (1700), a DCD threshold slider, and a Hold point checkbox. The main text window displays the following text:

```
AG0S-1/B AG0S-7/N K-Net CDVHF:AG0S-3 George Aurora, CO (ag0s@arrl.net)
1:Fm KB8TLU To BEACON <UI F/R Pid=F0 Len=83> [19:06:37R]
"PACKET RADIO" The original "TEXTING" GDRCH/DVHF MI105/DHF -1/PBBS -7/Node EN82GV
1:Fm N4ATA-7 To BEACON Via DRL*,W0TX-2*,KB9KC,KC60AR,WA3WNB <UI F/C Pid=F0 Len=115>
[19:07:01R]
BPQ32 Network Node, DVRCO:N4ATA-7, Denver, CO DM79lq
DVRCO:N4ATA-7
DVRRBS:N4ATA-1
DVRRMS:N4ATA-10
ATACHT:N4ATA-11
```

Below the text window is a table with the following columns: MyCall, DestCall, Status, Sent pkts, Sent bytes, Rcvd pkts, Rcvd bytes, Rcvd FC, and CPS. The table is currently empty.

At the bottom of the interface is a waterfall display showing a signal between 1000 and 2000 Hz. The signal is represented by a blue and green area with a red double-headed arrow indicating its frequency range.



Look for Special Deals at Hamvention in Dayton and on Facebook!

the AGWPE software, and full credit to SV1AGW for making a free version available, but while it worked very well for VHF Packet-Radio it was never a stellar performer with 300 baud HF packet. There was also the “Soundmodem” software written by HB9JNX but this was really intended for Linux platforms. It wasn’t easy to use on a Windows computer.

Fairly recently, UZ7HO released his “Sound Modem” program for Windows. He made it AGW compatible (i.e., it communicates with other software on tcp/ip port 8000) and it was optimized for HF 300 baud packet. It also includes a “frame collector”. This is a method of adding multiple decoders all slightly offset in frequency that act together. The result is, even a mis-tuned packet signal will get correctly decoded. Compared to traditional TNCs’ or the AGW software it is light-years ahead in performance and rivals the best of the expensive dedicated modems produced by a well-known German company.

UZ7HO Sound Modem In Operation

The screen capture shown is UZ7HO sound modem running on 14101.8 MHz (USB) with a RIG-blaster Advantage. It is decoding packets from “Network 105”. This network is built upon many stations around the country and abroad. Everyone is welcome to join in and give it a try. It is primarily a chatting and personal mail network.

The UZ7HO software gives you the ability to decode and transmit raw packets – to actually communicate with someone on the network you also need to be running a terminal program which interfaces to UZ7HO. A good example of this would be the free Paxon software.

Coupled with UZ7HO Sound Modem, Paxon will allow you to connect to nodes, mailboxes, send a CQ and to chat with others on the network.

Why don't you try this old “Dinosaur” mode and see how far things have come since the 1980s?

Resources:

UZ7HO Sound Modem

<http://uz7ho.org.ua/packetradio.htm>

Paxon KISS Terminal

<http://www.paxon.de/download.html>

Network 105

<http://groups.yahoo.com/group/network105>

Competitive Racing With A Flair For The “Eco Green” Paris–West University & West Mountain Radio (CBA IV)

By: Professor Louis Fourdan

In a recent report from France, Professor Louis Fourdan describes an exciting eco-friendly racing competition that pits university students from across Europe against their peers in a quest to design, build, and race extreme mileage vehicles.

West Mountain Radio is pleased to be providing a technical support role with his eco-mileage race team, ADVEVA, and thought our readers might be interested in some background behind their international competition.

Team ADVEVA is a non-profit group of professors and students from the IUT-VA technical university (Institut Universitaire de Technologie de Ville d'Avray) located west of Paris. This educational institution is a department of Paris-West University (Nanterre, France).

This year, team ADVEVA has access to West Mountain Radio's Computerized Battery Analyzer (CBA IV) with Enhanced Software and Temperature measurement capability to assist with vehicle development efforts. The CBA IV will be used for storage battery evaluation, solar panel power measurements and experimental data collection.

In addition to the EducEco Challenge being held this year in the city of Toulouse in southwestern France, the Team is again looking forward to the Shell Eco Marathon on the streets of Rotterdam (Netherlands) on May 15 - 19. Shell sponsors Eco Marathons in Europe, Asia, and the USA, so it's certainly possible one of the schools near you is also involved in this international competition. It is a large event - last year's European Eco Marathon drew 3000 students from 24 countries. Across all classes, Shell's 2012 Eco Marathon Europe included 200 competitors.

Team ADVEVA's prototypes are named EcoCar. During years 2009 to 2012, they campaigned Eco-Car 5E, shown in the photo as car 39. Car 5E was designed in accordance with rules for battery powered (only) electric prototypes and entered in the EducEco Challenge competition. For the past several years, this event was held at racetrack Circuit Paul Armagnac in Nogaro, France. Car 5E captured 5th place in 2012.

Last year, ADVEVA built a second vehicle EcoCar 7SE (car 27 in photo), which in addition to battery power, also utilizes solar power panels. To address new rule changes limiting solar panel area, an updated version of this same car will run again in 2013.

But the competition is fierce and technology moves fast, so construction has already started on an improved Ecocar 8SE for the 2014 season. Advancements in motor design, battery technology, motor controller capacities, and solar panel efficiencies demand constant team effort to maintain a competitive

2013 SSB Rookie Round-up

April 21, 2013

for info:

www.arri.org/rookie-roundup

edge. Not only is it fun, but students also benefit from first hand experience with cutting edge technology, taught by experienced advisors.

To succeed in competition, these ultra fuel efficient vehicles must be carefully designed to travel the farthest distance using the least amount of energy. They consist of a mechanical sub-assembly with rear drive power train which is covered by a custom, aerodynamic body utilizing high-tech carbon fiber composites. Cars are powered by brushless DC motors operated by solid state speed controllers and micro-computers to regulate energy consumption and monitor battery and solar panel condition.

Just how efficient is such a car? Well in the 2012 Shell Eco Marathon competition, EcoCar 5E placed a respectable 9th in class out of 21 competitors (from 11 countries), with a best efficiency of 270 miles (435.7 km) per kilowatt-hour (kWh) of energy consumed.

To put that in perspective, at West Mountain Radio we pay about \$0.125 (USD) for one kWh of electricity, and gasoline is presently \$3.75 USD per gallon. So for the cost equivalent of 1 gallon of gasoline (30 kWh), EcoCar 5E could go 8100 miles (13 035 km)!!

Now in truth, there are real-world energy conversion losses that come into play - the ride's not very comfortable, you can't listen to the radio or enjoy air conditioning - but this example does serve to illustrate the high level of technology and efficiency already in place.

Team ADVEVA <http://shell-eco-iut-va.voila.net/> is a group of about 20 students with different technical backgrounds, assisted by:

- Pierre Rochelle, professor specializing in Energy, Thermodynamics, & IC engines.
- Yann Leboulanger, Electronics Professor.
- Bernard Toupin, Mechanical Specialist and Webmaster
- Louis Fourdan, Retired EE and brushless DC Motor Expert

On a somewhat smaller scale, ADVEVA is also building a new Remote Control Solar Car to participate in the 2013 R/C Solar Event. Code named "2sun", it features front wheel steering with two direct-drive, rear wheel DC motors.

To learn more about the upcoming Shell Eco Marathon Europe, visit their website at:
<http://www.shell.com/global/environment-society/ecomarathon/events/europe/highlights/speak-peek.html>

Better yet, if you just so happen to be in The Netherlands in mid-May, watch for the IUT-VA technical university vehicle and search out Louis Fourdan for the latest on how West Mountain Radio's

2013 ARRL June VHF Contest June 8-10

www.arrl.org/june-vhf

Computerized Battery Analyzer is being used.

For information on the other European extreme mileage competition mentioned in this article - 2013 EducEco Challenge in Toulouse, France - go to: <http://www.educeco.net/> (website in French).

West Mountain Radio is an official sponsor of ADVEVA EcoCars.

Oh, in case you're wondering how any of those big guys could ever fit into that tiny car -- well, to keep student driver weight under 110 lbs (50 kg) and height under 5 feet, 5 inches (1.65 m) -- the girls do most of the driving!

===== Author Credentials =====

Professor Louis Fourdan (Electrical Engineer) is an internationally recognized Radar expert, with 8 patents in the areas of Radar, microwave devices, and DSP. His teaching career covered areas of signal processing, DSP, and Radar, including Antenna arrays. Now in retirement, he focuses his permanent magnet brushless DC motor & controller expertise into the R/C hobby & solar markets, authoring several motor testing software programs, and mentoring one of France's student teams competing in the Shell Eco Marathon Europe and EducEco ultra high mileage electric vehicle competitions.



A multi-year effort, EcoCar 5E was designed in accordance with rules for the battery powered (only), all electric prototypes for the EducEco Challenge competition. It finished the 2012 competition in 5th place at Circuit Paul Armagnac in Nogaro, France. This body was originally constructed for different class, powered by an internal combustion engine.

2013 ARRL August UHF Contest August 4-5

www.arrl.org/august-uhf

In 2012, a new car was introduced into the Solar Powered, Battery class. It is now being updated with smaller solar panels to meet 2013 competition rules which limit the photo voltaic surface area.



EcoCar 7SE 2012



EcoCar 5E
Nogaro 2011

EcoCar 5E sporting a new paint scheme for the 2011 EducEco Challenge at Circuit Paul Armagnac in Nogaro, France. It finished 3rd in a field of 12 competitors.

RIGrunners Solve Scout Ham Station Problems

by Alan R. McDaniel – KD6ARM

Last August the newly licensed WD9BSA amateur radio station of the Crossroads of America Council Boy Scouts of America, Indianapolis, Indiana opened it's doors at historic Camp Belzer, ready to demonstrate the world of amateur radio to Scout age youth and adults, to assist Scouts in training and advancement and develop the next generation of amateur radio operators for the station and ham radio in general.

Built with volunteer time and donated equipment, the station has two operating positions each with HF and VHF/UHF multi-mode capability. A multi-band dipole and 144/220 MHz j-pole are mounted in the camp building's attic, while a G5RV dipole at 30 feet hangs in the nearby trees and a second dual band vhf/uhf j-pole is roof mounted.

With a sturdy steel console mounted on rollers, serving as mounting platforms and work areas, the donated radios and peripheral equipment placement makes it easy to run dual operations with space for two groups to observe and participate simultaneously. All of the enclosed operating and equipment areas have doors front and rear allowing for equipment security and safety and as needed, easy access to wiring and equipment.

Two issues regarding station power distribution and monitoring became evident as the station use went beyond the initial "shake down" stage. A need to shift radios and other equipment during demonstrations was noted but was time consuming and a matter of equipment safety. As the station did not have power distribution equipment, direct wiring with non-standard connections was the norm. When power had to be rewired as configurations changed -- sometimes on the fly -- shutting down equipment was inefficient and frustrating (especially for the younger audiences with short attention spans).

Additionally, monitoring the voltage to equipment was difficult at best. The donated conventional power supplies, each serving one of the two independent operating areas, were heavy and located on the back bottom shelves. No remote metering was available. We were flying blind.

When west Mountain Radio was approached with our needs they recommended their RIGrunner distribution panels with visual and audio alert. And to the station's delight West Mountain donated two RIGrunners. Problem solved. Now standardized wiring connections, multiple outputs and accessible power panels bring the station up another notch in ease of use and safety. On the first use of the RIGrunners we tripped the alarm, noting voltage was above the upper limit. We had saved our donated radios and peripheral equipment. Immediate payoff.

The station's education and training operations have served many Scouts and adult leaders, attracting growing interest as the station volunteer committee, station trustees and volunteer operators reach out to the Central Indiana youth. Providing Scouting awards and advancement, Merit Badge training opportunities ham licensing classes and testing opportunities, while spreading general education of the hobby, continues to be the driving force behind the volunteer operation. The station is grateful for West Mountain's partnership with the station in serving Central Indiana's youth.

For information on WD9BSA check out it's Facebook group page and website at: WD9BSA.org.

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Alan R. McDaniel, KD6ARM, Committee member WD9BSA



The Antenna—Part 3 of Series

by W9TSQ – Michael Martin

Mobile Antenna Science

HF Mobile Antenna History:

The HF mobile radio antenna has evolved from the Single Band Whip Antenna in various lengths from 4' to 8' in length to the really nice antenna designs of today. As designs evolved, Base or Center Loading Coils were added to resonate the whip at the desired frequency. During WWII the Germans even developed a mobile NVIS Loop Antenna to take advantage of the minimal range ground wave and the short hop propagation characteristics of NVIS for stealthy operations. Today the same mix of polarization can be done by tying the whip back to have some horizontal polarization. You will see this common with military vehicles and law enforcement where long haul HF propagation is needed.

Commercial versions of what started out as military and amateur homebrew technology has produced many loaded antenna concepts for Mobile Amateur, Marine and HF Applications. From band specific coils to multi tapped coils, and some with inductance continuously wound as part of the antenna mast. Now day's there is quite the availability of product in the market place. Some of these require manual adjustment when changing bands or even frequencies within a band, so having an antenna analyzer handy really helps you to see how the antenna's match will look to your transmitter.

Center Loaded Antennas are the most forgiving in bumper mounted installations. They are better at controlling the detuning effects of the antenna by the proximity of the car body. Top Loaded antennas become rather sensitive to the proximity of objects around the top element. At lower HF bands overall antenna height limitations (...and to some appearance...) is a concern. (When I was a kid, I cleaned the florescent tubes out from under an early filling station canopy. The canopies are much higher now ...and my antennas are much shorter...)

Mobile Antennas Today:

The desire for multiband technology has evolved to produce the Continuously Tunable HF "Screwdriver Antenna" that can be remotely tuned for lowest SWR and best match. Screwdriver antennas are Center Loaded designs with a tolerable length "Stinger" element on the top. The mobile radios with Remote Tuners have also made multiband operation much more possible for mobile, camping and other portable locations.

The Installation:

At HF, Antenna Grounding is Job One. Dealing with the Road Salt Environments in the North and Salt Spray on the sea coasts is something else we in those environments have learned how to deal with.

In addition Hood and Trunk Lids all need to be tied into the body to control noise and grounding

2013 Field Day: June 22-23!

Head for the hills - or parks, beaches, mountaintops, or yes, even fields! The largest on-air amateur radio event in North America is not too far away. Use the links below to start planning your Field Day effort!



with ground braid taking care to remove a bit of paint under the bolts. A Ground Strap on the far end of the tail pipe to the car frame is also a good idea so that rubber strap hung pipe doesn't become a noise radiating antenna.

Along with all of the above, and with our computer controlled engine controls, Ground Straps for multipoint grounding the body of your pickup truck to the frame will also help in keeping our RF Energy out of The Vehicle Controls ...and their Digital RF Noises out of our receivers. The ground for the radio power is also of a concern to keep that as short as you can as well. I prefer to call the vehicle body Ground Reference for both RF and DC Power, making sure the negative battery lead is tied to the body as well as the engine block.

VHF and UHF Antennas: ...Much of the same technology ...but smaller.

For those that want to run a Horizontal Polarized Antenna in a mobile application, the Halo Antenna is a classic for the 6 Meter band. (I am working on other Square Loop Designs for the minivan or pickup truck for some of the higher HF Bands, but 15 meters may be about the limit.)

The standard $\frac{1}{4}$ Wave Whip Antenna becomes very manageable at VHF and UHF Frequencies. With higher frequencies come shorter wavelengths and we get the opportunity for stacking vertical elements for some Gain right in the antenna. Figures of +3 to +6 dB Gain at UHF is not uncommon. The same HF loading techniques can also be used to produce an antenna with a smaller stubby outlines as well.

The antenna's Ground Reference and elevation become more critical at VHF and UHF frequencies. The Roof Top vehicle antenna location becomes the ideal location, with the Trunk Lid a close second. I have even mounted UHF Antennas on a piece of screening cut to fit the inside rear deck of a car. A little flat black paint and mounting the antenna on the screen placed it in the rear window of the car made for very stealthy installations.

Antennas stuck to the inside glass can work too, but be careful ...Window Tinting and Low-E Glass products are not RF Friendly at all.

We will have more on Antennas, Antenna and Station Management Products in subsequent newsletters. Like all new things from the Hams at West Mountain Radio, they will be worth waiting for.

When you talk...we listen!
Make suggestions or comments on
proposed new products.

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