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Amateur Radio

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COMMUNICATIONS & TECHNOLOGY

APRIL 2007

CQ

On the Cover: The monster moonbounce arrays of Lance Collister, W7GJ, of Frenchtown, Montana. Details on page 48.

KENWOOD

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Never before has a compact HT offered as many features, and such high powered performance as the TH-F6A. Arm yourself with one today and gain your own airwave superiority.

- Triband (144/220/440 MHz)
- Receives 2 frequencies simultaneously even on the same band
- 0.1~1300MHz high-frequency range RX (B band)[1]
- FM/FM-W/FM-N/AM plus SSB/CW receive
- Bar antenna for receiving AM broadcasts
- Special weather channel RX mode
- 435 memory channels, multiple scan functions
- 7.4V 1550mAh lithium-ion battery (std.) for high output[2] and extended operation
- 16-key pad plus multi-scroll key for easy operation
- Built-in charging circuitry for battery recharge while the unit operates from a DC supply
- Tough construction: meets MIL-STD 810 C/D/E standards for resistance to vibration, shock, humidity and light rain
- Large frequency display for single-band use
- Automatic simplex checker
- Wireless remote control function
- Battery indicator • Internal VOX • MCP software

[1]Note that certain frequencies are unavailable. [2]5W output

TH-F6A

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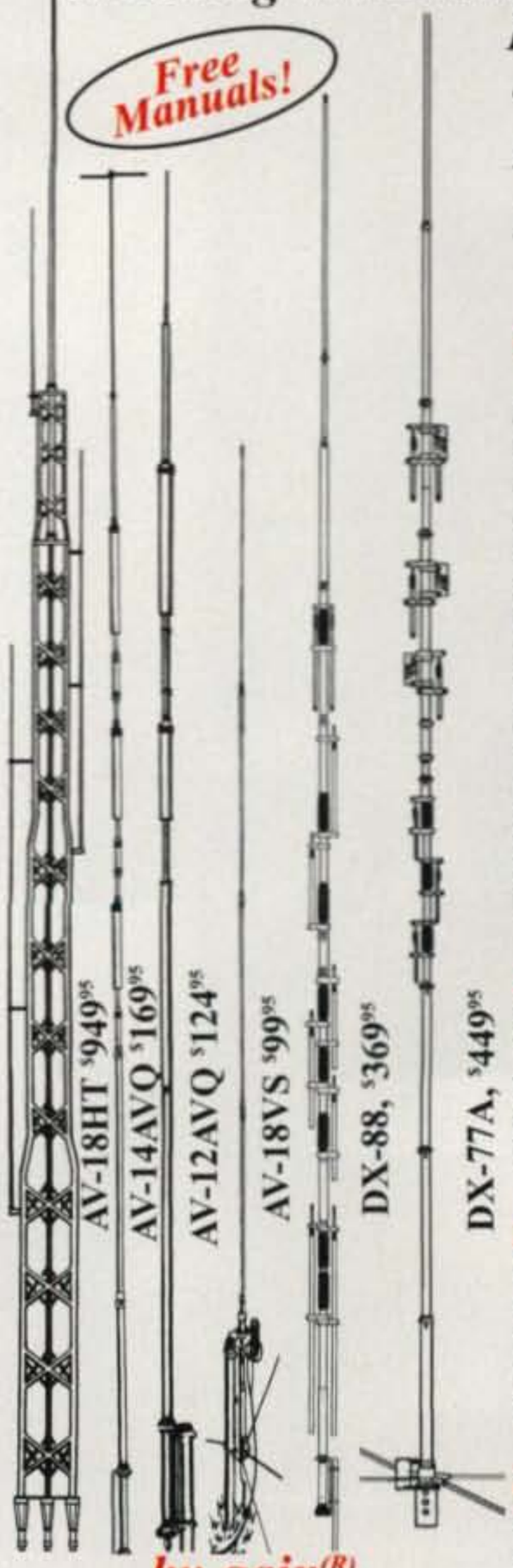
Self-supporting -- no guys required . . . Remarkable DX performance -- low angle radiation, omnidirectional . . . Handles 1500 Watts . . . Low SWR . . . Automatic band switching . . . Aircraft quality aluminum tubing . . . Stainless steel hardware . . . Recessed SO-239 connector . . . Two year limited Warranty . . .



hy-gain(R) Classics

***All** hy-gain multi-band vertical antennas are entirely self supporting -- no guys required.*

They offer remarkable DX performance with their extremely low angle of radiation and omnidirectional pattern.

All handle 1500 Watts PEP SSB, have low SWR, automatic bandswitching (except AV-18VS) and include a 12-inch heavy duty mast support bracket (except AV-18HT).

Heavy duty, slotted, tapered swaged, aircraft quality aluminum tubing with full circumference compression clamps is used for radiators. Includes all stainless steel hardware. Recessed SO-239 prevents moisture damage. Hy-gain verticals go up easily with just hand tools and their cost is surprisingly low. Two year limited warranty.

AV-18HT, $949.95. (10,12,15,20,40,80 M, 160, 17 Meters optional). 53 ft., 114 lbs.

Standing 53 feet tall, the famous *Hy-Gain HyTower* is the world's best performing vertical! The AV-18HT features automatic band selection achieved through a unique stub-decoupling system which effectively isolates various sections of the antenna so that an electrical 1/4 wavelength (or odd multiple of a 1/4 wavelength) exists on all bands. Approximately 250 kHz bandwidth at 2:1 VSWR on 80 Meters. The addition of a base loading coil (**LC-160Q, $109.95**), provides exceptional 160 Meter performance. **MK-17, $89.95**. Add-on 17 Meter kit. 24 foot tower is all rugged, hot-dip galvanized steel and all hardware is iridited for corrosion resistance. Special tilt-over hinged base for easy raising & lowering.

AV-14AVQ, $169.95. (10,15,20,40 Meters). 18 ft., 9 lbs. **The** Hy-Gain AV-14AVQ uses the same trap design as the famous Hy-Gain Thunderbird beams. Three separate air dielectric Hy-Q traps with oversize coils give superb stability and 1/4 wave resonance on all bands. Roof mount with Hy-Gain AV-14RMQ kit, $89.95.

AV-12AVQ, $124.95. (10, 15, 20 Meters). 13 ft., 9 lbs. **AV-12AVQ** also uses Thunderbird beam design air dielectric traps for extremely Hy-Q performance. This is the way to go for inexpensive tri-band performance in limited space. Roof mount with AV-14RMQ kit, $89.95.

AV-18VS, $99.95. (10,12,15,17,20,30,40,80 Meters). 18 ft., 4 lbs. **High** quality construction and low cost make the AV-18VS an exceptional value. Easily tuned to any band by adjusting feed point at the base loading coil. Roof mount with Hy-Gain AV-14RMQ kit, $89.95.

DX-88, $369.95. (10, 12, 15,17,20,30,40,80 Meters, 160 Meters optional). 25 ft., 18 lbs.

All bands are *easily* tuned with the DX-88's *exclusive* adjustable capacitors. 80 and 40 Meters can even be tuned from the ground without having to lower the antenna. Super heavy-duty construction. DX-88 OPTIONS: 160 Meter add-on kit, KIT-160-88, $199.95. Ground Radial System, GRK-88, $99.95. Roof Radial System, RRK-88, $99.95.

DX-77A, $449.95. (10, 12, 15, 17, 20, 30, 40 Meters). 29 ft., 25 lbs.

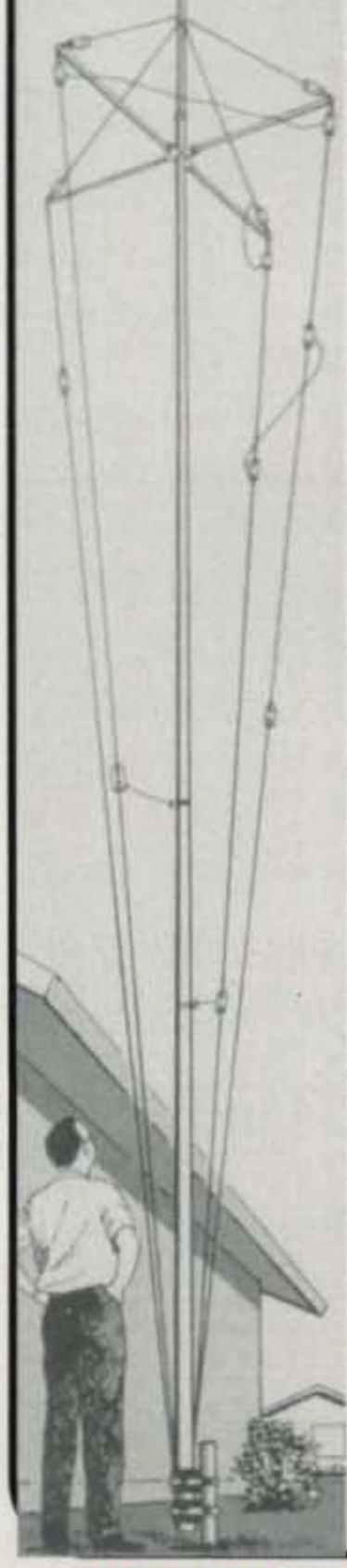
No ground radials required! Off-center-fed Windom has 55% greater bandwidth than competitive verticals. Heavy-duty tiltable base. Each band independently tunable.

Model #	Price	Bands	Max Power	Height	Weight	Wind Surv.	Rec. Mast
AV-18HT	$949.95	10,15,20,40,80	1500 W PEP	53 feet	114 pounds	75 MPH	------
AV-14AVQ	**$169.95**	**10,15,20,40**	**1500 W PEP**	**18 feet**	**9 pounds**	**80 MPH**	**1.5-1.625"**
AV-12AVQ	$124.95	10,15,20 M	1500 W PEP	13 feet	9 pounds	80 MPH	1.5-1.625"
AV-18VS	**$99.95**	**10 - 80 M**	**1500 W PEP**	**18 feet**	**4 pounds**	**80 MPH**	**1.5-1.625"**
DX-88	$369.95	10 - 40 M	1500 W PEP	25 feet	18 pounds	75 mph w/o guy	1.5-1.625"
DX-77A	**$449.95**	**10 - 80 M**	**1500 W PEP**	**29 feet**	**25 pounds**	**60 mph w/ guy**	**1.5-1.625"**

Hy-Gain HyTower-Jr™

Stands 39 feet tall . . . Full 1/4 Wave on 40, 20, 15, 10 Meters . . . Cage loading on 80 Meters

New!



AV-18HT-Jr. **$349.95**

Standing a tall 39 feet with *full-size* elements and rated at 5 KW, the AV-18JR *Hy-gain HyTower-Jr.*™ is the world's *second best** performing vertical!

Stub-decoupling is used to give *full-size* quarter wave radiators on 40, 20, 15, 10 Meters with super efficient cage loading on 80 Meters.

The *HyTower-Jr*™ has almost no losses -- your ground system determines your efficiency.

It is automatic bandswitching, fed with 50 Ohm coax and has low SWR over an exceptionally wide bandwidth. SWR is less than 1.2 at resonance on all bands.

The main radiator is aircraft high-strength, heavy walled, 2-inch aluminum tubing swedged at the top. Self-supporting in winds up to 40 MPH (use guy wires for higher winds). Mounts on 1¼ inch plumber's pipe. Heavy duty components will give you years of trouble-free operating pleasure. UPS Shippable.

Requires good ground system for optimum performance.

***The** famous 53 foot *Hy-gain HyTower*™ is legendary. It's the premier, best performing vertical in the world -- bar none! At less than half the price with nearly the *same* performance and based on the *same* principles, the *HyTower-Jr*™ is the poor man's version of its father *HyTower*. Of course, *Junior*™ doesn't have its father's rugged hot-dipped galvanized steel tower and construction!

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BY JEFF REINHARDT,* AA6JR

A Eulogy . . .

Friends, Amateurs, countrymen, lend me your keys;
I come not to bury code, but to praise it.
The Morse that hams sent lives after them;
The good is off, traveling forever through the ether;
So let it be with code testing. The noble FCC
Hath told you Morse was ambitious;
If it were so, it was for the good of the hobby;
And faithfully hath thousands of hams answered the call.
Here, under leave of the FCC and the rest . . .
For the FCC is an honorable body.

So are they all, all honorable to our calling . . .
Come I to speak at code testing's funeral.
It was my friend, faithful and just to me.
But the FCC says it was ambitious;
And the FCC is an honorable body.

Code brought much rapture to Amateur homes
Whose ears the dots and dashes filled;
Did this learning of Morse seem ambitious?
When the code testing died, Morse hath wept;
Ambition to learn code should be made of sterner stuff;
Yet the FCC said it was ambitious
And the FCC is an honorable body.

You all did see on the Extra license.
I was thrice presented 5, 13, and 20 wpm crowns,
Which now the FCC refuses to acknowledge; was this ambition?
Yet the FCC now says it was ambitious;
And sure, it is an honorable body.

I speak not to disprove of what the FCC spoke,
But here I am to speak what I do know.
Many of you did love code once, not without cause;
What cause withholds you then, to mourn for it?
O code testing! Thou art fled to obscurity,
And some amateurs have lost their reason. Bear with me;
My heart is in the coffin there with Element One,
And I must pause till it come back to me.

—with apologies to William Shakespeare (silent pen).

And to all who ever studied for, and passed or failed, a code test, you have honored yourself and amateur radio well. You're the last of a breed, and you have upheld the traditions that make up the "Magic in the Sky."

–––... ...––– –.. . .– .– –.... .––– .–.

(Download this month's "Magic in the Sky" column, transcribed entirely into Morse code by Taka Nakayama, KW6I, from the CQ website at <www.cq-amateur-radio.com>. Click on the April cover, then click on the link in the "Magic in the Sky" section of the issue highlights page.)

*5904 Lake Lindero Drive, Agoura Hills, CA 91301
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TOKYO HY-POWER

Complies with New FCC Rules.

Available Now with 12m and 10m Built-in!

HL-1.5KFX

HF/50MHz Linear Power Amplifier

NEW!

Auto Band Set

This compact and lightweight 1kW desktop HF/50MHz linear power amplifier has a maximum input power of 1.75kW. Our solid-state broadband power amp technology makes it **the smallest and lightest self-contained amplifier in the industry**.

Typical output power is 1kW PEP/SSB on HF and 650W on 6m band with the drive power of 85-90W. Bands set automatically with the **built-in band decoder**. You can forget about the band setting when the amplifier is connected to your modern radio through **supplied band data cables for ICOM CI-V, DC voltage (ICOM, Yaesu), and RS-232C (Kenwood)**. Manual band setting selectable as well.

All these data cables are included with the amplifier.

Features

- Lightest and most compact 1kW HF amplifier in the industry.
- The amplifier's decoder changes bands automatically with most ICOM, Kenwood, Yaesu.
- The amp utilizes an advanced 16 bit MPU (microprocessor) to run the various high speed protection circuits such as overdrive, high antenna SWR, DC overvoltage, band miss-set etc.
- Built in power supply.
- AC 230V (200/220/240V) default and AC 115V, (100/110/120V) (selectable).
- Equipped with a control cable connection socket, for the HC-1.5KAT, auto antenna tuner by Tokyo Hy-Power Labs.
- Two antenna ports selectable from front panel.
- Great for desktop or DXpedition!

Watch for our **NEW PRODUCTS** to be announced soon!

Specifications

Frequency:
1.8 ~ 28MHz all amateur bands including WARC bands and 50MHz

Mode:
SSB, CW, RTTY

RF Drive:
85W typ. (100W max.)

Output Power:
HF 1kW PEP max.
50MHz 650W PEP max.

Matching Transceivers for Auto Band Decoder:
Most modern ICOM, Yaesu, Kenwood

Drain Voltage:
53V (when no RF drive)

Drain Current:
40A max.

Input Impedance:
50 OHM (unbalanced)

Output Impedance:
50 OHM (unbalanced)

Final Transistor:
SD2933 x 4 (MOS FET by ST micro)

Circuit:
Class AB parallel push-pull

Cooling Method:
Forced Air Cooling

MPU:
PIC 18F452 x 2

Multi-Meter:
Output Power – Pf 1Kw
Drain Voltage – Vd 60V
Drain Current – Id 50A

Input/Output Connectors:
UHF SO-239

AC Power:
AC 230V (200/220/240V) – 10A max. (default)
AC 115V (100/110/124V) – 20A max.

AC Consumption:
1.9kVA max. when TX

Dimension:
10.7 x 5.6 x 14.3 inches (WxHxD)/272 x 142 x 363 mm

Weight:
Approx. 20kgs. or 45.5lbs.

Accessories Included:
AC Power Cord
Band Decoder Cables included for Kenwood, ICOM and Yaesu
Spare Fuses and Plugs
User Manual

Optional Items:
Auto Antenna Tuner (HC-1.5KAT)
External Cooling Fan (HXT-1.5KF for high duty cycle RTTY)

TOKYO HY-POWER

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departments

hy-gain® ROTATORS

. . . the first choice of hams around the world!

HAM-IV

HAM-IV
$559.95

The most popular rotator in the world! For medium communications arrays up to 15 square feet wind load area. *New* 5-second brake delay! *New* Test/Calibrate function. *New* low temperature grease permits normal operation down to -30 degrees F. *New* alloy ring gear gives extra strength up to 100,000 PSI for maximum reliability. *New* indicator potentiometer. *New* ferrite beads reduce RF susceptibility. *New* Cinch plug plus 8-pin plug at control box. Dual 98 ball bearing race for load bearing strength and electric locking steel wedge brake prevents wind induced antenna movement. North or South center of rotation scale on meter, low voltage control, max mast size of 2 1/16 inches.

HAM IV and HAM V Rotator Specifications	
Wind Load capacity (inside tower)	15 square feet
Wind Load (w/mast adapter)	**7.5 square feet**
Turning Power	800 in.-lbs.
Brake Power	**5000 in.-lbs.**
Brake Construction	Electric Wedge
Bearing Assembly	**dual race/96 ball bearings**
Mounting Hardware	Clamp plate/steel U-bolts
Control Cable Conductors	**8**
Shipping Weight	26 lbs.
Effective Moment (in tower)	**2800 ft.-lbs.**

TAILTWISTER SERIES II

T-2X
$649.95

T-2XD
$1079.95
with DCU-1

For large medium antenna arrays up to 20 sq. ft. wind load. Available with *DCU-1 Pathfinder* digital control (T2XD) or standard analog control box (T2X) with *new* 5-second brake delay and *new* Test/Calibrate function. Low temperature grease, alloy ring gear, indicator potentiometer, ferrite beads on potentiometer wires, *new* weatherproof AMP connectors plus 8-pin plug at control box, triple bearing race with 138 ball bearings for large load bearing strength, electric locking steel wedge brake, North or South center of rotation scale on meter, low voltage control, 2 1/16 inch max. mast.

TAILTWISTER Rotator Specifications	
Wind load capacity (inside tower)	20 square feet
Wind Load (w/ mast adapter)	**10 square feet**
Turning Power	1000 in.-lbs.
Brake Power	**9000** in.-lbs.
Brake Construction	Electric Wedge
Bearing Assembly	**Triple race/138 ball brngs**
Mounting Hardware	Clamp plate/steel U-bolts
Control Cable Conductors	**8**
Shipping Weight	31 lbs.
Effective Moment (in tower)	**3400 ft.-lbs.**

CD-45II

CD-45II
$389.95

For antenna arrays up to 8.5 sq. feet mounted inside tower or 5 sq. ft. with mast adapter. Low temperature grease good to -30 F degrees. *New* Test/Calibrate function. Bell rotator design gives total weather protection, dual 58 ball bearing race gives proven support. Die-cast ring gear, stamped steel gear drive, heavy duty, trouble free gear train, North center scale, lighted directional indicator, 8-pin plug/socket on control unit, snap-action control switches, low voltage control, safe operation, takes maximum mast size to 2 1/16 inches. MSLD light duty lower mast support included.

CD-45II Rotator Specifications	
Wind load capacity (inside tower)	8.5 square feet
Wind Load (w/ mast adapter)	**5.0 square feet**
Turning Power	600 in.-lbs.
Brake Power	**800 in.-lbs.**
Brake Construction	Disc Brake
Bearing Assembly	**Dual race/48 ball brings**
Mounting Hardware	Clamp plate/steel U-bolts
Control Cable Conductors	**8**
Shipping Weight	22 lbs.
Effective Moment (in tower)	**1200 ft.-lbs.**

HAM-V

HAM-V
$949.95
with DCU-1

For medium antenna arrays up to 15 square feet wind load area. Similar to the HAM IV, but includes *DCU-1 Pathfinder* digital control unit with gas plasma display. Provides automatic operation of brake and rotor, compatible with many logging/contest programs, 6 presets for beam headings, 1 degree accuracy, auto 8-second brake delay, 360 degree choice for center location, *more!*

ROTATOR OPTIONS

MSHD, $99.95. Heavy duty mast support for T2X, HAM-IV and HAM-V.
MSLD, $39.95. Light duty mast support for CD-45II and AR-40.
TSP-1, $34.95. Lower spacer plate for HAM-IV and HAM-V.

AR-40

AR-40
$289.95

For compact antenna arrays and large FM/TV up to 3.0 square feet wind load area. Dual 12 ball bearing race. Automatic position sensor never needs resetting. Fully automatic control -- just dial and touch for any desired location. Solid state, low voltage control, safe and silent operation. 2 1/16 inch maximum mast size. MSLD light duty lower mast support included.

AR-40 Rotator Specifications	
Wind load capacity (inside tower)	3.0 square feet
Wind Load (w/ mast adapter)	**1.5 square feet**
Turning Power	350 in.-lbs.
Brake Power	**450 in.-lbs.**
Brake Construction	Disc Brake
Bearing Assembly	**Dual race/12 ball bearings**
Mounting Hardware	Clamp plate/steel bolts
Control Cable Conductors	**5**
Shipping Weight	14 lbs.
Effective Moment (in tower)	**300 ft.-lbs.**

HDR-300A

HDR-300A
$1379.95

For ***king-sized*** antenna arrays up to 25 sq.ft. wind load area. Control cable connector, *new* hardened stainless steel output shaft, *new* North or South centered calibration, *new* ferrite beads on potentiometer wires reduce RF susceptibility, *new* longer output shaft keyway adds reliability. Heavy-duty self-centering steel clamp and hardware. Display accurate to 1°. Machined steel output.

HDR-300A Rotator Specifications	
Wind load capacity (inside tower)	25 square feet
Wind Load (w/ mast adapter)	**not applicable**
Turning Power	5000 in.-lbs.
Brake Power	**7500 in.-lbs.**
Brake Construction	solenoid operated locking
Bearing Assembly	**bronze sleeve w/rollers**
Mounting Hardware	stainless steel bolts
Control Cable Conductors	**7**
Shipping Weight	61 lbs.
Effective Moment (in tower)	**5000 ft.-lbs.**

Digital Automatic Controller

DCU-1
$699.95

Automatically controls T2X, HAM-IV, V rotators. 6 presets for favorite headings, 1° accuracy, 8-sec. brake delay, choice for center of rotation, crisp *plasma* display. Computer controlled with many logging/contest programs.

AR-35 Rotator/Controller

AR-35
$79.95

For UHF, VHF, 6-Meter, TV/FM antennas. Includes automatic controller, rotator, mounting clamps, mounting hardware. 110 VAC. One Year Warranty.

RBD-5
$34.95

NEW! Automatic Rotator Brake Delay

Provides automatic 5-second brake delay -- insures your rotator is fully stopped before brake is engaged. Prevents accidentally engaging brake while rotator is moving. Use with HAM II, III, IV, V, T2Xs. Easy-to-install. Includes pre-assembled PCB, hardware.

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The radio... FT DX 9000

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Photograph depicts after-market keyboard, keyer paddle, and monitor, not supplied with transceiver. Display image simulated and may differ in actual use.

The FT DX 9000MP's Power Amplifier stage utilizes SD2931 MOS FET devices in a parallel, push-pull configuration, a conservative design that permits ultra-clean Class-A operation at a full 100 Watts of output, with continuous bias adjustment between Classes A and AB available on the front panel. If you have a professional microphone with a balanced "Cannon" (XLR) connector, you may connect it directly to the matching connector on the front panel, then use our exclusive three-band Parametric Microphone Equalizer to adjust the center frequency, bandwidth, and equalizer gain in the bass, mid-range, and treble frequency ranges.

YAESU engineers take signal quality seriously, because we know you do, too!

HF/50 MHz Transceiver

FT DX 9000MP

400 W Special Order Version

Two Pairs of Meters, plus LCD Window; Data Management Unit and Flash Memory Slot Built In. Main/Sub Receiver VRF, plus Full Dual Receive Capability, External 50 V/24 A Switching Regulator Power Supply and Speaker with Audio Filters

Display color (Umber or Light Blue) may be selected at the time of purchase. Modification from 400 to 200 W not possible.

HF/50 MHz Transceiver

FT DX 9000D 200 W Version

Large TFT, Data Management Unit and Flash Memory Slot Built In,
Main/Sub Receiver VRF, plus Full Dual Receive Capability,
Three μ-Tuning Modules for 160 - 20 M,
50 V/12 A Internal Switching Regulator Power Supply

HF/50 MHz Transceiver

FT DX 9000 Contest 200 W Custom-Configurable Version

Two Pairs of Meters, plus LCD Window, VRF Input
Preselector Filter,Three Key Jacks, and Dual Headphone Jacks,
50 V/12 A Internal Switching Regulator Power Supply

Display color (Umber or Light Blue) may be selected at the time of purchase. Modification from 200- to 400-Watt version not available.

For the latest Yaesu news, visit us on the Internet:
http://www.vertexstandard.com

Specifications subject to change without notice. Some accessories and/or options may be standard in certain areas. Frequency coverage may differ in some countries. Check with your local Yaesu Dealer for specific details.

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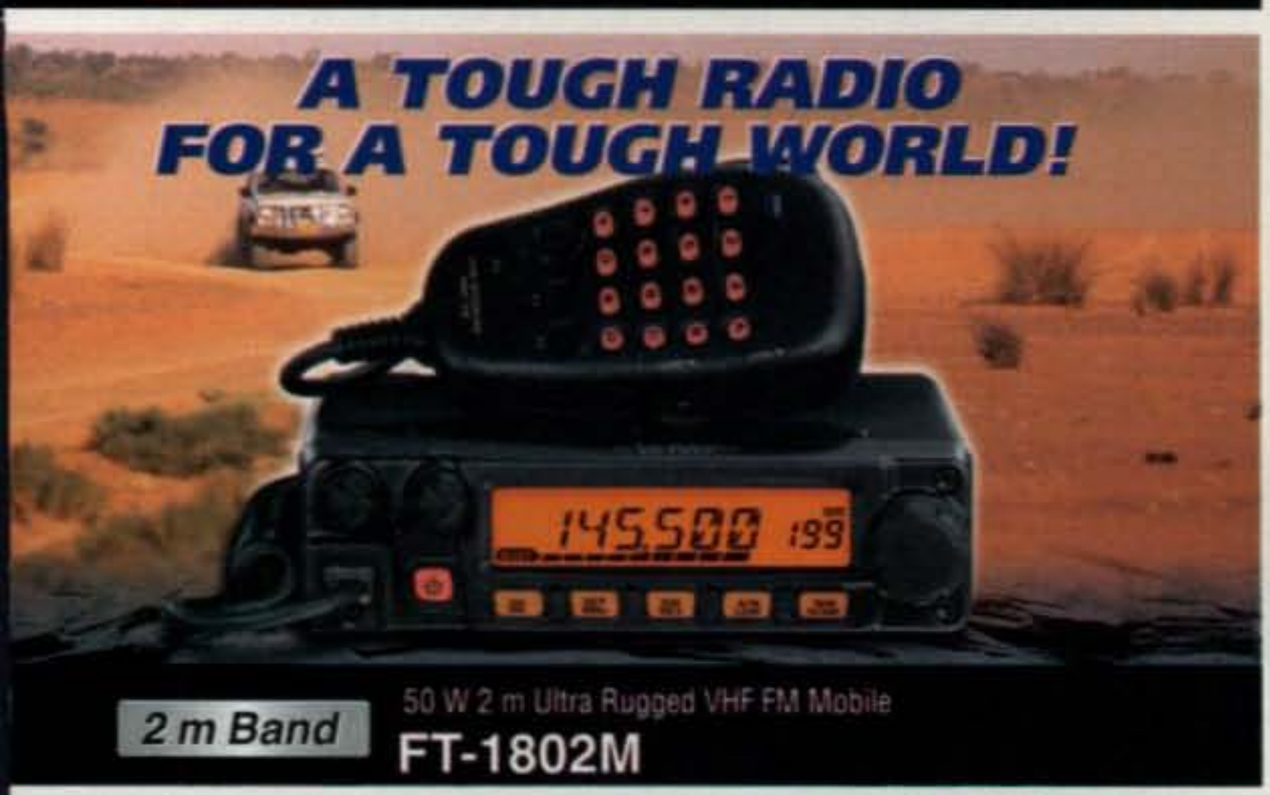
FT-8900R
*70 cm 35 W

50 W 2 m/70 cm* Dual Band FM Mobile
FT-8800R *70 cm 35 W



65 W 2 m Rugged FM Mobile
FT-2800M
2 m Band

5 W Heavy Duty 2 m/70 cm
Dual Band FM Hand held
FT-60R

1.5 W Ultra Compact 2 m/70 cm
Dual Band FM Hand held
VX-2R

5 W Ultra-Rugged,
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CQ editorial — zero bias – a CQ editorial

BY RICH MOSESON,* W2VU

On Ham Diplomacy and Fake QSLs

A few days ago, I read a fascinating article in the March/April issue of *AARP: The Magazine*, titled "Talking Can Stop Hate," by Dr. Akbar Ahmed, Chair of Islamic Studies at American University in Washington, DC. It was about a two-month trip that he and two of his students made last year to nine predominantly Muslim countries in the Middle East, South Asia and the Far East. They met with a wide variety of people, including politicians, scholars, clergymen, and others. Their goal, he wrote, was "*to change opinions and to better understand Muslim culture - and to show a side of the United States that Muslims rarely see.*"

"*Muslims often asked us why the West equates Islam with terrorism, yet these same people often equate Americans with warmongers*," Ahmed continued, noting the observation of one of the students that "*They stereotype us just as we stereotype them.*"

Why We Must Talk

The lesson from Professor Ahmed: "*This is why we must talk. To provide new perspectives. During our trip, Frankie and Hailey (the two students) were the first Americans that many people had ever met. The effect was often startling: the stereotypes about Americans were replaced by real people ... Once friendship develops, everything can change.*"

This is why we must talk. It's a lesson we hams have known for years, as we've sat in our basements or attics, quietly practicing one-on-one diplomacy with our fellow amateurs around the world. Believe it or not, it's important. Really. "Wait, let's think twice before we nuke that country. I have friends there..." *Once friendship develops, everything can change.*

This tradition of one-on-one diplomacy is so ingrained in the ham radio culture that it's part of our "basis and purpose" in the FCC rules, and many of us feel personally insulted when one country or another prohibits its amateurs from speaking to hams in certain other countries.

The Libya Connection

A few days later, I got a phone call from a ham with some questions regarding last November's 5A7A DXpedition in Libya. He was calling us, he said, because he'd heard "that CQ was involved in it" and that we might know if the photo on his computer screen was legitimate. The image, which I'd already seen, was quite disturbing. It purported to be a copy of the 5A7A QSL card, with a Nazi flag as the background and the words "Juden Verboten" (Jews Forbidden) printed on the front. What was going on here?

When the "card" was initially brought to my attention, I quickly went to the 5A7A DXpedition website, saw photos of the *real* QSL cards the group sent out, and did a bit of "Googling." It took me less than 10 minutes to find all of the bits and pieces which were used with a computer image editing program to produce this *fake* QSL card. I, for one, am far more upset at the person who created this false and defamatory picture than at the situation which led up to it.

What was the situation? Last November, a large group of mostly-German hams got permission to operate 5A7A from Libya, a country which has been less than supportive of amateur radio in the past. Part of the operation coincided with the CW weekend of the CQ World Wide DX Contest. The 5A7A group participated and submitted a log. (That, by the way, was the full extent of CQ's "involvement" in the DXpedition).

Apparently, one of the few conditions put on the operation by the Libyan government was that contacts with 4X (Israeli) stations were prohibited. This is disturbing to many us, present company included. It goes against the spirit of open communication and one-on-one diplomacy that, to many of us, *is* ham radio. But at the same time, it is hardly surprising considering the realities of world politics and is certainly nothing new. Not only have most Arab countries for decades prohibited their hams from contacting amateurs in Israel, but other countries—including the United States and Canada—have had their own "banned countries" lists as well. Such prohibitions are expressly permitted by the international radio rules.

In an effort to get around the restriction on contacts between 5A7A and 4X stations, certain Israeli amateurs apparently substituted a "UX" prefix for their assigned "4X" prefix (meaning they were operating illegally since the UX prefix is allocated to Ukraine), contacted the Libyan DXpedition, and then wrote to the QSL manager asking that their cards be made out to their correct 4X callsigns rather than their "substitute" UX calls. The QSL manager, appropriately in our view, declined.

A ham in the U.S. then interceded on their behalf and got the following polite reply: "I'm very sorry that we are not able to send QSL to 4X-stations, as we got our license with the restriction not to work with 4X. Because we like to keep in touch with our partners in 5A to support the growth of ham radio in Libya, we accepted this restriction, knowing that this is not hamlike! But one day—hopefully—(the) situation will change."

This is when things took an ugly turn. The U.S. ham responded by comparing the Germans on the team to Nazis ("...you were just as wrong as your grandfathers were back in the '30s...") and suggested they had done nothing to "change the situation" but rather reinforced it. And in case anyone didn't get his point, he made up the Nazi flag "QSL" and started sending it out to various DX reflectors. In case you missed this point earlier, THE CARD IS A FAKE. And the sender ought to be ashamed of himself for trying to enflame a situation with which it was obvious that no one was comfortable to begin with. It certainly doesn't do anything to "promote international goodwill," per the FCC's rules. All it does is make a bad situation worse. This, too, is not hamlike!

Diplomacy is the art of compromise, in which a good agreement is one in which nobody gets everything he wanted. Hams on DXpeditions are informal diplomats, subject to the same basic rules of reality. As to how the 5A7A operation might work to "change the situation" in the future, I will go back to Professor Ahmed, who wrote of his trip, "*We can see into the souls of others only if we take the trouble, and the risk, to visit one another. Only then can change occur.*"

73, W2VU

*e-mail: <w2vu@cq-amateur-radio.com>

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2007 Dayton Hamvention® 22nd Annual DX Dinner – Sponsored by the SouthWest Ohio DX Assn., this event will be held Friday evening, May 18, at the Crowne Plaza Hotel, Dayton city center. Tickets ($36 each) may be ordered from Jay Slough, K4ZLE, at his CBA (please include an SASE; U.S. funds only; PayPal and credit cards are *not* accepted). For further information go to <http:www.swodxa.com> or e-mail Jay at <k4zle@yahoo.com>.

The following special event stations are scheduled for April:

W1E, from the RF Wireless ARC of Burley Annual Friday the 13th QSO Party, Burley, Washington; 0000Z April 13 to 0400Z April 14 on SSB 7.213 and 14.313 MHz, CW 7.033 and 14.033 MHz. Send SASE and QSL for QSL or certificate to W7JQ, P.O. Box 639, Burley, WA 98322. For information e-mail: <tjsand@wavecable.com>.

K4S, from the Venice Sharks Tooth Festival, Venice, Florida; Tamiami ARC; 1300–2100Z April 20–22 on 21.313, 18.153, 14.272, 7.233 MHz. For QSL send QSL and SASE to Jack Sproat, W4JS, 1419 E. Manaspta Beach Rd., Englewood, FL 34223-6341.

Mobile Amateur Radio Club and ARES group (no call given), from 142nd anniversary of "Southern Appomattox, Magee Farm, Kushla, Alabama; ; 1400–2300Z April 28 on 7.260 and 14.260 MHz ±20 kHz, and SSB 50.125 MHz, 146.52 FM simplex. QSLs and certificates avaialble for hams and SWLs. Send QSL and SASE (#10 for QSL; 9×12 for certificate) to Gerald Jones, KD4DLJ, 7015 Victor Rd., Mobile, AL 36608 (e-mail: <bjones2@bellsouth.net>).

W7ZA, from 52nd anniversary of the Hoquiam Bowerman Airfield Control Tower, Aberdeen, Washington; GHARC; 0900–1600 Pacific Time April 28–29 on the lower portion of all bands, CW, SSB, SSTV, and PSK-31. For QSL send QSL and SASE to Grays Harbor ARC, P.O. Box 2250, Aberdeen, WA 98520.

The following hamfests, etc., are slated for late March and April:

March 25, **17th Annual Down East Hamfest**, Lenoir County Fairgrounds, Kinston, North Carolina. Contact Jean Dupree, KB4OHX, 252-523-2703. (Exams 11 AM, walk-ins only)

April 1, **Raleigh ARS 35th Hamfest, NCS Convention, & Electronic Fleamarket**, Expo Center Building, NCS Fairgrounds, Raleigh, North Carolina. Contact Steve Ferrarini, KJ4BX, 107 Thomas Place, Knightdale, NC 27545 (919-247-8690; e-mail: <steve.kj4bx@gmail.com>); <www.rars.org/hamfest>. (Exams contact WA4GIR, 919-387-9152)

April 20–22, **33rd Annual Eastern VHF/UHF Conference**, Crowne Plaza Hotel, Enfield, Connecticut. Contact Bruce Wood, N2LIV, Conference Chairman, e-mail: <n2liv@arrl.net>, phone 516-938-0698, ext. 210 (days); <www.newsvhf.com>.

April 21, **Catawba Valley Hamfest**, Burke County Fairgrounds,, Morganton, North Carolina. For information call 828-437-2787. (Talk-in 147.150+, 146.415 simplex; exams)

April 21, **Red River Radio Amateurs Hamfest**, Red River Valley Fairgrounds, West Fargo, North Dakota. For more information go to: <http://www.rrra.org>. (Talk-in 147.255+ MHz [82.5 Hz PL tone]; exams)

April 27–29, **2007 International DX Convention**, Holiday Inn Hotel & Conference Center, Visalia, California. Information and registration forms can be found at: <www.dxconvention.org>. For additional information, contact the convention Registration Chairman, Dick Letrich, W6KM, e-mail: <dlw6km@aol.com>.

April 28, **Southwestern Idaho Hamfest**, Vallivue Middle School, Caldwell, Idaho. Contact Don Lynn, ND7L, e-mail: <nd7l@arrl.net>; phone 208-465-6154; or on the web: <http://www.voiceofidaho.org>. (Talk-in 146.840– [PL 100]; exams)

April 28, **Valley of the Moon ARC ARRL Hamfest**, Sonoma Valley Veterans' Memorial Building, Sonoma, California. Contact Darrel, WD6BOR, e-mail: <wd6bor@vom.com>, phone 707-996-4494; <http://www.vomarc.org>. (Talk-in 145.35, –600, PL 88.5; exams, walk-ins, registration beginning at 9AM, exams 10 AM)

April 29, **Athens County ARA 28th Annual Hamfest**, Athens Community Recreation Center, Athens, Ohio. Contact Drew McDaniel, W8MHV, e-mail: <mcdanied@ohio.edu>, phone 740-592-2106. (Talk-in 145.15 MHz [–600 offset]; exams)

April 29, **Two Rivers ARC 35th Annual Hamfest & Computer Fair**, at the Spectrum, Boston, Pennsylvania. For more information, e-mail: <n3lqc@comcast.net>; phone 412-664-1683; <www.qsl.net/w3oc>. (Talk-in 146.730, 147.120; exams, 48-hour preregistration required, call 412-664-1682, e-mail: <w3oc@arrl.net>)

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Cellphone Bills Threaten Mobile Hamming

Bills currently before the legislatures of nine states aimed primarily at regulating handheld cellphone use while driving could also impact hams' ability to operate mobile radios while driving. According to the *ARRL Letter,* the focus of most of these bills has shifted to banning any activity that results in "distracted driving," rather than singling out the use of handheld cellphones. A bill in Georgia is so broadly worded that it would appear to make it illegal to change the station on your car's broadcast radio. Bills in Montana and New Mexico have been tabled after hearings, but legislation is still active in New Jersey, Texas, Vermont, Washington, Wyoming, and Oregon.

Oregon State Rep. Andy Olson told constituent Jerry Gaule, KE7GGV, that the bill he's sponsoring would not prohibit drivers from using cellphones, radios, etc., "but will put the responsibility on the driver to be prudent when using such a device." Olson told the Associated Press his bill would "focus on the driving behavior" and would not ban any distractions outright "as long as it does not interfere" with your driving.

Maine Considers Statewide Certification of Hams in Emcomm

A bill has been introduced in the Maine legislature that would require hams providing emergency communications for state and local emergency management agencies to be registered and certified and to carry a state-issued photo ID. The bill would also require the state emergency management agency to develop a state RACES (Radio Amateur Civil Emergency Service) plan and would provide registered volunteers with liability and workers' compensation protection during callups. However, *CQ* "Public Service" Editor Bob Josuweit, WA3PZO, reports that many Maine hams are not happy with the details of the bill and hope to work with the sponsor to get changes they can support.

Big Donation to Help Finish P3E Satellite

Amateur satellite groups in North America and the United Kingdom have decided to donate a total of 40,000 Euros (approximately $52,000 US) to their German counterpart, AMSAT-DL, to help make sure the next big international ham satellite project, Phase 3E, is completed. The AMSAT News Service says the donations from AMSAT-NA and AMSAT-UK will fund the continued operation of "the ZEL," the Zentrales Entwiciklungslabor for Electronik, or the Central Development Lab for Electronics, where the P3E satellite is being built. Many of its components are being assembled in different parts of the world, but everything is being put together on the satellite spaceframe at the ZEL. P3E, currently planned for launch late next year, will be a high-orbit satellite with extended availability that has not been available to hams since the re-entry of OSCAR-13 several years ago.

FCC Resumes Processing Vanity Call Applications

The FCC's vanity callsign program was reactivated on February 8 after a "hold" of several weeks while computer software was updated to implement new rules adopted by the Commission last December to limit individuals to filing only one vanity call application in a single day. The rules were changed in an effort to eliminate abuse of the vanity system. Some hams found they could increase their chances of receiving the call they wanted if they filed multiple applications for that call at the same time. Now, only the first-filed application will be processed and any additional applications will be dismissed.

Renewals of existing vanity calls were not affected by the shutdown.

Two Sign On to BPL Study Bill

Two members of Congress have joined Rep. Mike Ross (D-AR), WD5DVR, as co-sponsors of a bill to require the FCC to study the interference potential of broadband over power lines (BPL) and report its findings to Congress. According to the *ARRL Letter,* Reps. Steve Israel (D-NY)—a longtime supporter of amateur radio in Congress—and Ron Paul (R-TX) have signed on to HR 462, the "Emergency Amateur Radio Interference Protection Act of 2007."

Red Cross Backs Down on Background Checks

The American Red Cross has announced changes to its controversial policy requiring background checks of all volunteers, including, in many cases, hams working through the Amateur Radio Emergency Service. Many hams were concerned about invasion of privacy, as the standard consent form granted permission not only for criminal background checks but also for credit checks and "mode of living" checks. See this month's "Public Service" column on page 44 for details.

Political Tussle in Florida Leads to FCC Reversal

An apparent dispute between the current and former ARRL Section Managers for West Central Florida has been resolved by an FCC decision to reverse an earlier change to a club station license. In 1999, a group including then-WCF SM Dave Armbrust, AE4MR, formed the West Central Florida Group and received a club call of K4WCF, of which Armbrust was trustee. According to the FCC, in 2005, after Gerald "Dee" Turner, N4GD, became Section Manager, he applied to the FCC to be named trustee of K4WCF and then to change the club's name to West Central Florida Section. Both requests were routinely granted.

A month later, however, Paul Toth, NA4AR, the President of the West Central Florida Group (and an ally of Armbrust), challenged the changes, saying that the applications were filed without the knowledge or approval of the group's board of directors and that Turner was not a member of the West Central Florida Group.

It took the FCC a year and a half to respond, but when it did, it ruled that Turner had not been authorized to request changes to the WCFG license and therefore, that "grant of those applications is void." The FCC's database was then corrected "to reflect the trustee and club name information that was associated with the license prior to the filing of those applications."

OSCAR-1 Pioneer is Silent Key

Those of you who remember the first amateur satellite, OSCAR-1, launched in 1961, will remember that its transmissions consisted of the message HI, sent in Morse code, with the speed varying along with the satellite's temperature. OSCAR is an acronym for Orbiting Satellite Carrying Amateur Radio. The AMSAT News Service reports that the man who designed that temperature-controlled keyer for OSCAR-1, Harley Gabrielson, K6DS, became a Silent Key on January 14. During World War II, Gabrielson worked on the Manhattan Project at Los Alamos National Laboratory, developing the atomic bomb, then worked as an electrical engineer for Philco Corp. He was an active ham in the San Diego area for many years. Gabrielson was 83.

Additional and updated news is available on the Ham Radio News page of the CQ website at <http://www.cq-amateur-radio.com>. For breaking news stories, plus info on additional items of interest, sign up for CQ's free online newsletter service. Just click on "CQ Newsletter" on the home page of our website.

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A year ago, a group of hams from Spain (and one from Italy) traveled to Western Sahara, a troubled land with an uncertain future, and put up a station in hopes of bringing some attention to this place and its people. Perhaps you worked SØ1R. Here is their story

La Cuadrilla De Tifariti

The Tifariti Group (SØ1R)

BY FABRIZIO VEDOVELLI,* IN3ZNR/WH0Q

Partial view of "February 27th " refugee camp in Algeria. It is this image that will remain as the author's prime memory of the SØ1R DXpedition. (All photos courtesy of EA5RM)

As I walked the 100 meters (110 yards) down a rocky hill in western Algeria, I could see in front of me a row of tents and small shanties, a view that for a moment filled me with trepidation. From above, the view of the refugee camp seemed enormous. Here (and in the two or three camps close by) more than 200,000 Saharawi exiles, among them a multitude of children, eke out their poor existence as "visitors" in Algeria. The Saharawis, the people of the Western Sahara, remain firmly connected to the soil of their desert land and live in hope of achieving a referendum for which the United Nations is asking, but plans for such a vote have repeatedly been delayed. *(See sidebar "About Western Sahara" for more on the area's history and political status.—ed.)*

The 30,000 QSOs that we made from just 400 kilometers (250 miles) away have taken on a different meaning from what we are used to. Not only was it a "new one" (perhaps a new band?) for many DXers, but it also was something meaningful for those forced to live in exile far from their own homes.

For once, I am going to begin at the end with the images of the enormous camp at Rabuni, in the scorching stony desert zone among the southern foothills that mark the border of Algeria, Mauritania, and the former Spanish Sahara. That was the image implanted in my mind's eye, despite all of our difficulties, as we arrived at the Tindouf airport in Algeria for our flight home. The eight days we spent in the heart of the Sahara desert gave back to me an appreciation of all the simple things we take for granted in "our" western world: the turning on of a water tap, having a shower, a soft bed, a bearable climate. A touch on the arm from Tony, EA5RM, brought me back from my thoughts, and with the others I got out of the Jeep to go to the check-in desk at the airport for our return flight.

From India to Tifariti

Our trip began to come together only about three months beforehand, at the end of January 2006. It had been a long time since I found myself on the other end of a pile-up, apart from a few operations with the IH9 group (Pantelleria Is.) and from ISØ (Sardinia). I had decided to wait until 2006 to resume going on DXpeditions.

I contacted my friends from the Burma and Banaba groups with an ambitious plan. We spoke about the Andaman Islands and things that had already been started there some months

* *Loc. Prà della Fava, 38070 Sopramonte, Italy*
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[Translated from Italian to Spanish by Antonio Alcolado, EA1MV, and from Spanish to English by David Burt, GØDAX. Versions of this article have been previously published in Spanish and Italian.]

About Western Sahara

The area known as Western Sahara has endured a turbulent existence for more than a century. It became a colony of Spain in the late 1800s and remained so until 1976, when Spain withdrew under pressure from the surrounding countries of Morocco, Mauritania, and Algeria, as well as a nationalist group known as the Polisario Front. After Spain pulled out, Morocco occupied the northern two-thirds of the area, and Mauritania occupied the southern one-third. The Polisario Front proclaimed a government-in-exile in Algeria named the Saharawi Arab Democratic Republic and began guerrilla attacks on the forces of both countries. Mauritania agreed to a cease fire with the Polisario in 1979 and withdrew its troops. Morocco immediately occupied the area vacated by Mauritania.

Polisario and Moroccan forces continued battling until a UN-brokered cease fire was agreed to in 1991, under which the residents were to have a referendum to choose their future status. The UN created a peacekeeping force known as MINURSO, the UN Mission for the Referendum in Western Sahara, which has administered the cease fire. However, repeated attempts to hold a referendum have failed and each new proposal has been rejected by one side or the other. The status of the territory and its sovereignty remain unresolved. Morocco built a long security wall down the length of the territory, controlling the areas to the west of the wall and effectively ceding control of the areas east of the wall to the Polisario.

Tifariti, where the SØ1R group operated, is in the so-called "Free Zone" controlled by the Polisario. It is also the location of a UN MINURSO base. The SØ1R group's operation was authorized by the Telecommunications Ministry of the Saharawi Arab Democratic Republic, and was approved by the ARRL for DXCC credit. *(Information via CIA World Factbook, answers.com, informationplease.com, and the ARRL.)* —W2VU

The SØ1R team and Saharawi helpers. The black turban-scarves are traditional headgear of the desert people and each team member received one as a gift.

previously. Unfortunately, at the beginning of February I found out that the expedition to VU4 would be a hamfest, which would revolutionize our concept of a DXpedition, and (a lot worse) that I would only have time available for vacation during Holy Week (the week before Easter) in April.

I had resigned myself to continue in quiet expectation, when an e-mail from Tony, EA5RM, told me of the imminent expedition to Western Sahara. "We are ready," Tony wrote to me. "The 2006 Western Sahara expedition has been planned for Holy Week. Can you come this time?" Thinking that I had very few hours left and that I would never be in my wife's good graces again, I sent my e-mail of confirmation. In only one day I had become a part of the SØ1R group, Sierra-Zero-One-Romeo.

There were ten amateurs in the group: eight Spaniards—Antonio, EA5RM; Julio, EA5XX; Javier, EA5KM; Paco, EA5RD; Fernando, EA5FX; Pedro, EA5BJ; Roberto, EA2RY; and Javi, EC4DX—along with Dima, UY5CW, and me, IN3ZNR/WHØQ. Dima has lived and worked in Madrid for many years now, and therefore counts as a Spaniard by adoption. Thus, I was the only real non-Spaniard. The official language of the expedition could not be anything other than Spanish. I speak it a little, and with the aid of a small dictionary I was ready to take part.

Thanks to Oscar, EA4TD, we immediately organized a magnificent website, with our DXpedition's logo very much in evidence. To offer a better service to DXers, before we left on our trip we included a survey on the website through which all radio amateurs would be able to indicate (and it was good that they did!) the modes and bands on which they wished to work Western Sahara. This proved to have been a good idea, as there were numerous day-by-day on-line votes, which enabled us to orient our operations towards certain pre-determined areas of the world on certain frequencies and/or modes of emission.

Among the group we had a good assortment of operators to perform these operations. Our objective was to use all the modes that seemed to have been less used on previous expeditions, even digital modes. The ambitious plan was to maintain activity using between three and four stations simultaneously, possibly using three different modes. As a result of the retrieved data from our on-line questionnaire, we received a vast number of requests from DXers asking us for some serious activity on 160 meters. None of the members of the group had any specific experience on Top band, but with help from the specialists, I took responsibility for the antennas for this band.

As a result of all of these good intentions, the other side of the coin was that day by day our baggage increased both in quantity and weight. We were presented with the usual problem that faces any expedition: how to transport 400 kilograms (880 pounds) of material and equipment when limited to a maximum allowed weight per passenger of 20 kilograms (44 pounds). However, if you have EA5XX with you, it appears that all things can be fixed as if by magic!

The Plans

Our plan was to operate from Tifariti, a small town that is nonetheless the main town of the northern part of Western Sahara, also known as the Saharawi Arab Democratic Republic. Thanks to the support and help of Mahafud, SØ1MZ, of the Department of Telecommunications of the Saharawi Arab Dem-

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TEN-TEC

EC4DX , EA5RM, IN3ZNR, and EA5XX at MINURSO headquarters. The UN Mission for the Referendum in Western Sahara has been in place since 1991, although there has yet to be a referendum.

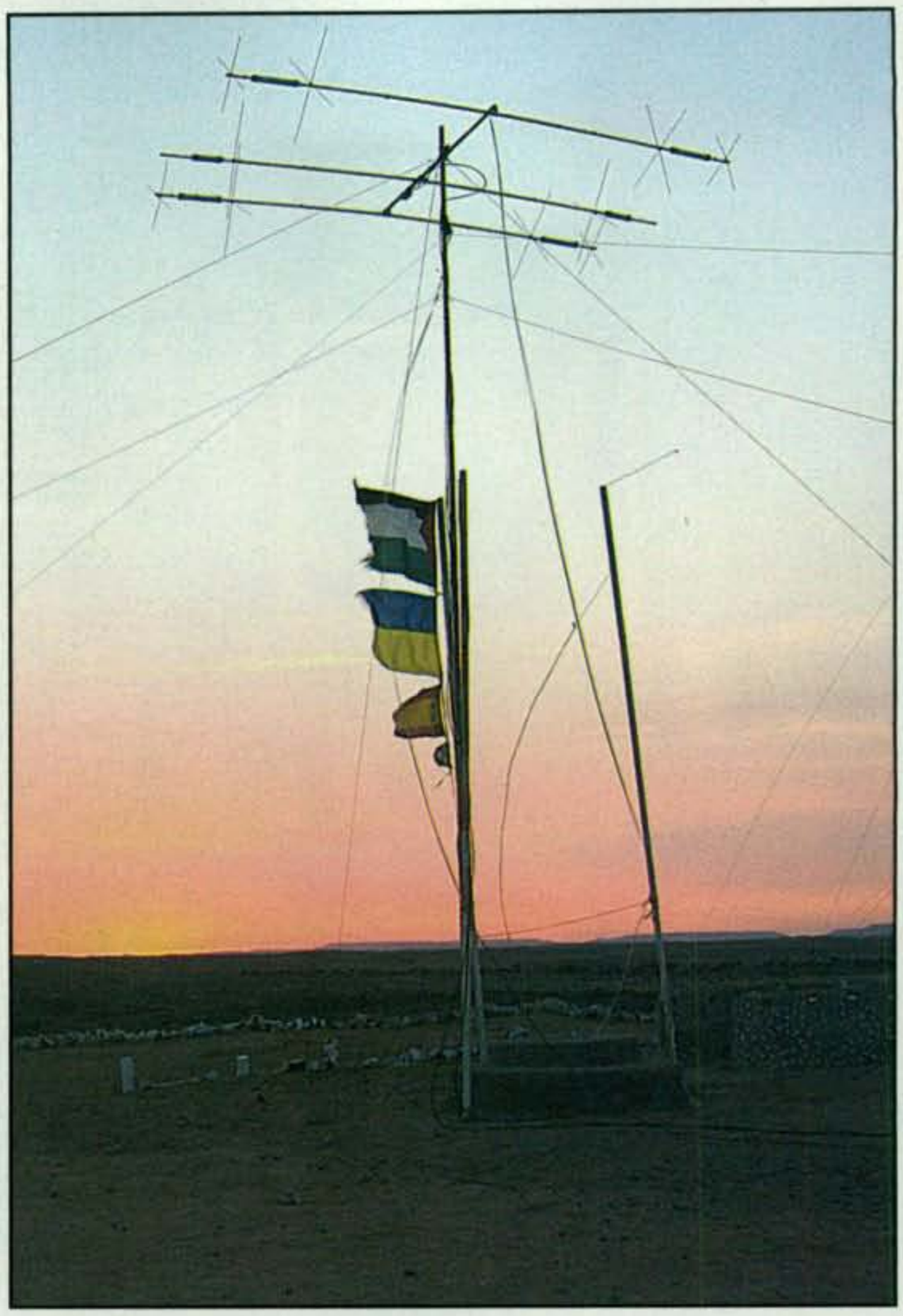
ocratic Republic, the bureaucracy and logistics were ironed out. The meeting place for the "team," immediately baptized "The Tifariti Group," was the city of Elche, near Alicante in southeastern Spain. From there we would leave on April 10th on a charter flight to Tindouf, in southern Algeria. From Tindouf, we would travel to the refugee camp at Rabuni, and from there 8 hours of stony desert and dusty trails aboard an all-terrain 4×4 still lay ahead of us. This part of the trip was going to put our delicate equipment and our not-so-delicate buttocks to the test.

Our goal (Tifariti) is in the "Free Zone" of the Saharawi Arab Democratic Republic. In the past it was an advance military position of the Spanish Legion, but now it is the headquarters of the government of the Saharawi Arab Democratic Republic. There is a "MINURSO" base (United Nations Mission for the Referendum in Western Sahara), mediating between the Saharawi Arab Democratic Republic and Morocco, which is on the outskirts of Tifariti. The mission ahead of us looked as though it could be very hard, but very fascinating.

The Trip

On the morning of April 9th I loaded the car and drove to Milano Malpensa airport. After a flight via Barcelona, I arrived at dusk at Alicante airport, where a meeting of all the members of the SØ1R team took place. We immediately got along well. On the morning of April 10th, all the remaining EA5s arrived and our group was complete.

We drove to the local headquarters of URE (the Spanish national ham radio association), the Elche Amateur Radio Club, where we checked out all of our equipment and apparatus. We had three directional antennas, one of which was a Spiderbeam for 10, 12, 15, 17, and 20 meters, very light, but very efficient. For the low bands we had dipoles for 80, 40, and 30 meters. For Top band there was an IN3QBR design inverted-L, and that just left a K9AY for reception purposes. It was not the best time of the year for Top band, but we hoped that at least by using CW it would be possible to satisfy the needs of the many 160-meter fans.



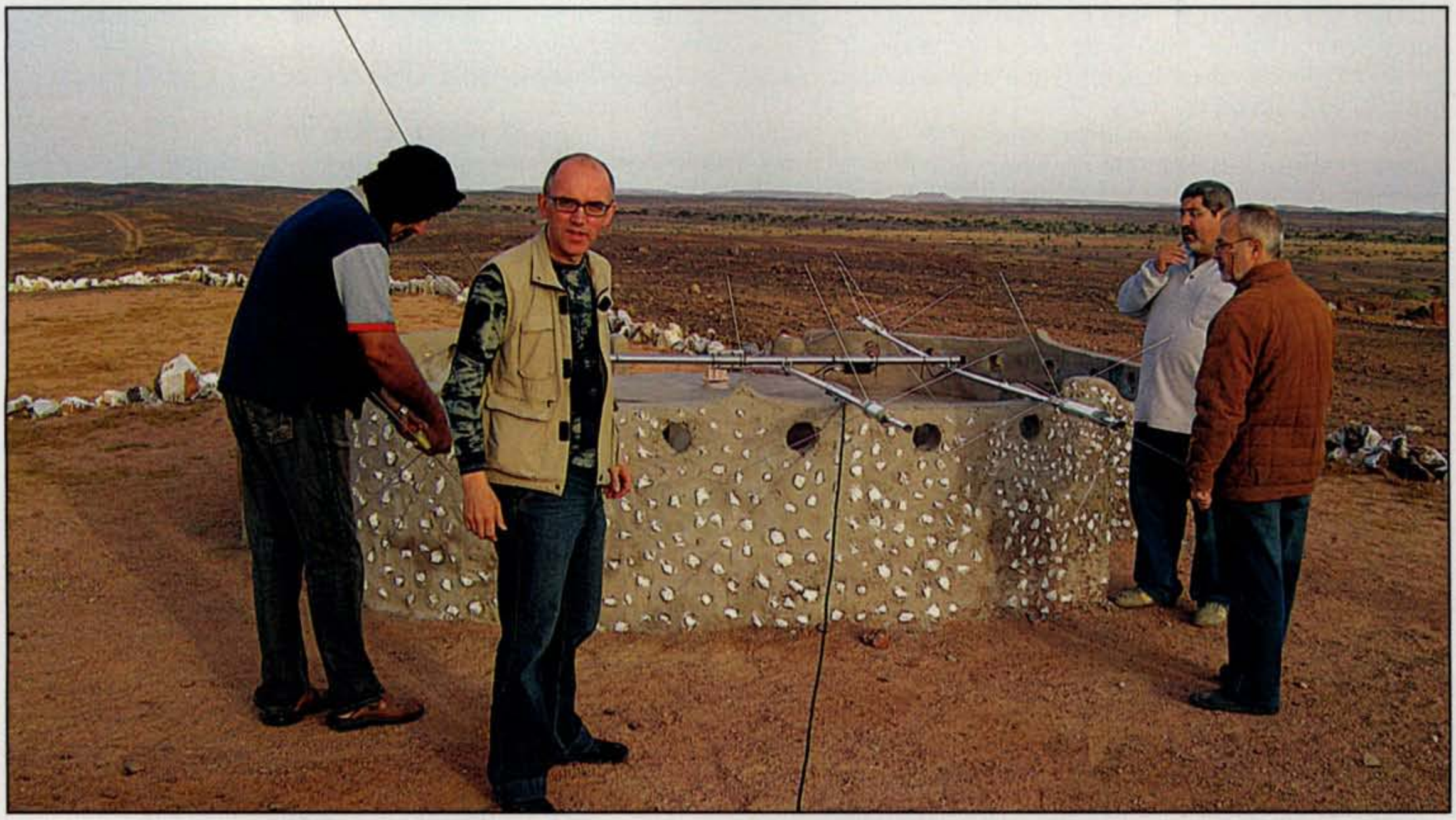
View of the MA5-B and dipoles at desert sunset. On the right there is the 22-meter high pole of the 160-meter inverted-L.

All transceivers were mobiles, a few being IC-706s, and there was also Dima's new IC-7000, which would be used for the very first time. There were three amplifiers, necessary to provide an adequate signal on the low bands. To help us keep the logs we took five laptops, and for electricity we were relying on generators that would be waiting for us on site.

Four cars were needed to transport all the operators and equipment. At 1 PM we left Elche and drove back to the Alicante airport. Due to last-minute difficulties, we had a considerable wait until our Air Algerie charter flight. This gave us some time to solve the problem of the excess luggage. As I said before, EA5XX fixed things and our luggage went through as humanitarian aid. If you look at it from one standpoint that was true, because a big part of our materials were donated to Saharawi people.

At 23:00 we took off for Algeria, and we arrived at Tindouf, via Oran, in the middle of the night. The customs officials were fast, and being a charter flight with humanitarian aid, no one questioned our strange baggage.

Waiting for us was Mahafud, SØ1MZ, along with some Democratic Saharan Arab Republic officials. We were quickly taken to the area where the refugee camp is, and we were soon taking advantage of the amiable Saharawi hospitality in the headquarters of the Department of Telecommunications. We had a quick breakfast and the time was just right for a cup of desert tea (as is traditional). By dawn we were ready to leave. We were tired but exhilarated, ready to under-



EA5XX, UY7CW, EA5RD, and EA5BJ mounting antennas.

take the most difficult part of the trip, the part that would take us to the moment of the true expedition!

In the Heart of the Sahara

On the terrace there were three all-terrain vehicles waiting for us, loaded with our luggage. Despite being very large, they were loaded beyond all belief. Tony, EA5RM, one of the veterans of the Sahara, took out of one of the bags a few somewhat unusual items to safeguard our poor backsides—inflatable rubber rings! We inflated them and climbed on board. I was one of the last ones to climb in, and I was pointed to a seat in the back of the Toyota Land Cruiser, right over the rear wheel and the rock-hard shock absorbers.

We headed into the middle of the desert on a dirt road that soon became no more than a track. Each time we drove over a pothole we were thrown into a panic. I am 1.9 meters (6 feet 3 inches) tall, and in spite of using the rubber ring to protect my head, after only ten minutes I had already almost dented the Toyota's roof. We stopped and I looked for a better seat in which I could protect my head. I found a seat next to two likeable Saharawis traveling ahead in one of the other all-terrain vehicles. I put on the precious black turban-scarf, the traditional headgear of the desert people, which Mahafud had given to each one of us as a gift. It is a protection against the sun, but mainly it protected us from the dust that we raised during the journey.

We traveled at the maximum speed allowed by the state of the track, because it is not a good idea to drive through the middle of the Sahara in the dark. I do not know how our drivers recognized the route among the labyrinth of pathways, footprints, and animal tracks. From time to time by the side of the track we saw tires standing up and marked with strange numbers and letters. In other places stones were piled up in a somewhat mysterious manner. The desert in this area reminded me of the type in Arizona and California. It was not how I had always imagined the Sahara would be, sandy and with dunes.

The journey continued with few stops, and in the all-terrain vehicle in which I was travelling I made friends with the two Saharawis. They had the stereo on at full volume, and for eight hours I listened to nothing but Arab songs. They spoke enough Spanish so that we were able to understand one another. What they couldn't understand was that we were there purely for our hobby. They thought that we had to be telecommunications technicians and that we were there to "work." I did not confirm or deny their idea, since in the past my Spanish friends had installed many telecommunications networks there for the Democratic Saharan Arab Republic.

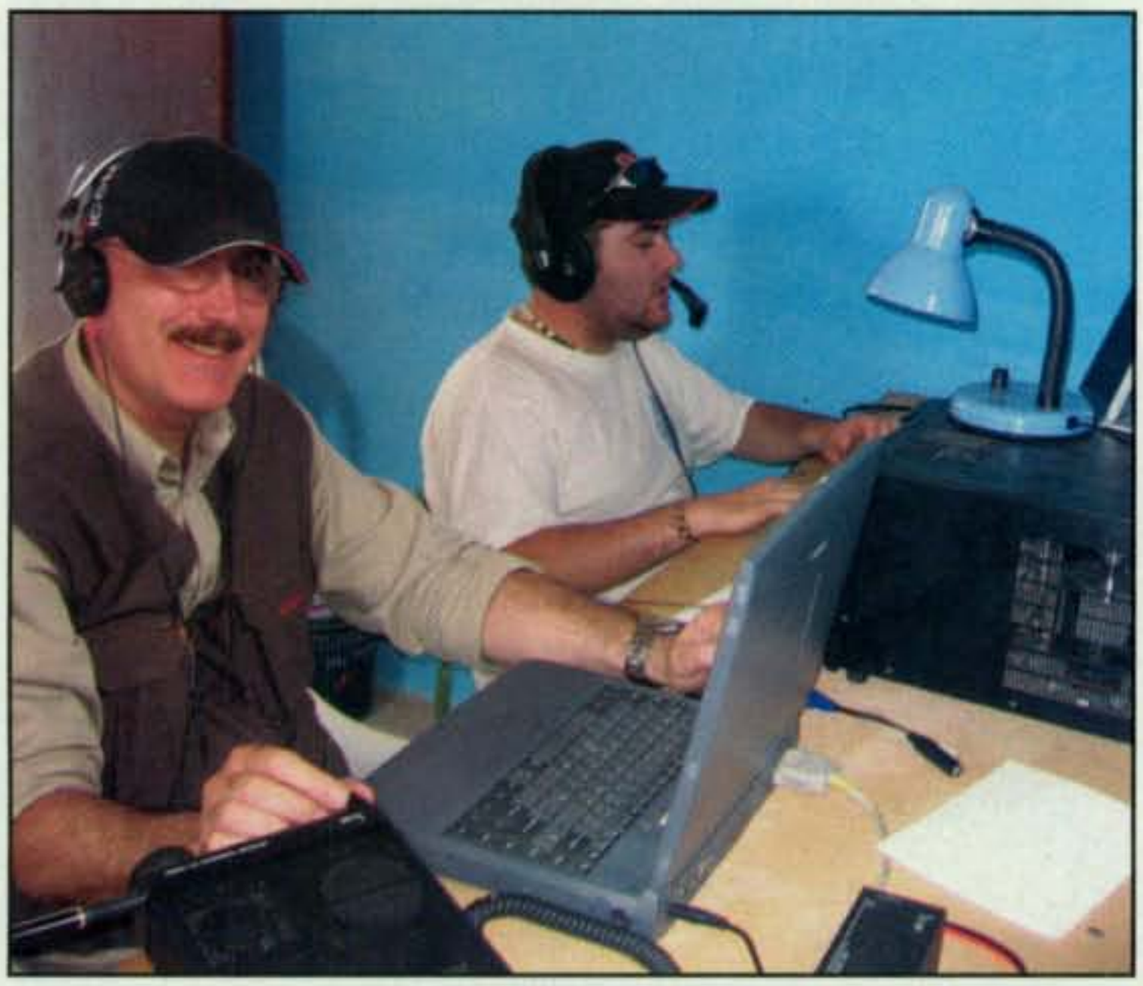
To avoid our swallowing dust, the ATVs travelled apart and out of view of one another. We did not bring any VHF equipment (we thought we would use the Saharawis' equipment), so when one of our front tires punctured, I thought myself we would be lost in the desert! However, Amhed and his friend did not waste any time. In no time at all they changed the tire, and 10 minutes later we were on the move again. Neither of them had a watch or a compass, but it seemed as though they both had GPS units built into their heads. After some hundreds of kilometers I asked, "Amhed, how many kilometers to go?" He answered, "What time is it?" I told him and he replied, "We still have another two hours to go." Believe me, exactly two hours later we were on the terrace in front of the Old Spanish Quarter!

To Work!

No time was lost. It was April 11th and in the evening we had to be on the air; that's how it had been planned. We began the assembly of the Butternut vertical that would allow to us to be on the air in a very short time. After half an hour we were ready, and at 1700Z operations in CW begin: "CQ CQ de SØ1R,

Western Sahara, QRZ?" Half an hour later our first phone station was on the air, with a dipole on 40 meters. The pile-ups on all modes and all bands never stopped during each day that we were on the air.

The stations were located in the same room, and by using suitable filters the lack of interference allowed us to work simultaneously. Outside, two teams of people began to assemble the directional antennas, taking advantage of the coolest part of the afternoon. The temperature during the day rises to more than 32° Celsius, roughly 90° Fahrenheit (luckily we were there in April), but during the night it falls so low that a wool blanket is needed in order to sleep comfortably. The 2003 expedition team (SØ5X) had left a tower erected, which luckily was still in wonderful condition. We mounted the Spiderbeam onto this tower, and we mounted the rest of the aluminum that we had brought onto other supports, as well as on the flagpole.



EA5FX operating the main CW station. Behind him EC4DX is operating the main SSB station.

EA5KM and EA5RM with our "shack" and antenna farm in the background. From left to right: Butternut HF9-V, 5-band Spiderbeam, 160-meter inverted-L, TH-3JR, and on the top of the flag pole, the MA5-B and dipoles for the low bands.

One of our main problems was electricity. On one hand, the main generator only operated during certain hours of the day, and it was used to power the Democratic Saharan Arab Republic offices for more important tasks. On the other hand, the generator that we had at our disposal was too small to use the amplifier with four stations on the air simultaneously. Without delay, the incomparable Mahafud obtained for us a higher-power generator and we could transmit with all stations putting out 100 watts. Luckily, on the following day we could count on at least 4 kilowatts, which allowed us to use two stations with 500 watts.

After one intense night of operations and good signals from the U.S., those not operating continued the assembly of the antennas. On the evening of the second day we finally had operative two directional beams, the Spiderbeam (excellent, as good as a monobander), the Cushcraft MA5-B, and dipoles for the low bands. The following morning the junior TH3 rose above the tile roof. The 160-meter antenna was mounted on top of 12 meters of fiberglass tube mounted above 10 meters of aluminum mast, with the horizontal wire "L" being attached to the flagpole.

Once the assembly was complete, we were able to run four stations—digital, phone, and CW—on the air simultaneously. This meant that all the operators had to carry out very exhausting turns at operating, and the fatigue soon became noticeable to us, especially at night. We slept in two rooms, where we had laid down mattresses. I always felt that very little time passed before it was dawn once more and someone was waking me up to take my turn on the radio while outside the sun had already started to burn. After the last day, the hardest day, once I finished my turn on radio I fell asleep straight away and slept like a log.

As you can imagine, we could hear Europe at all times and on all bands. We logged 2900 QSOs with Italy and about 2300 with Spain. We clearly knew from our on-line survey which bands and modes had been requested most. We therefore made every effort to use openings to Asia and to the Americas. While we were able to reach our expected numbers with almost 6000 QSOs logged to North America, unfortunately we were not able to reach our quota for Asia, Japan in particular. Despite our persistence in looking for openings, we were only able to log 200 QSOs with JA. The paths toward EU and North America were almost exclusively over the ocean, while the path toward JA had to cross the whole of the Sahara desert. On Top band we ended up with nearly 1200 QSOs in our log, both phone and CW.

A Visit from the UN and to Tifariti

All of our unusual and frenetic activity on the hill at Tifariti soon aroused the curiosity of the UN military, which came "to check us out" an hour or so before midday on day two. After plenty of rigorous explanation, a friendly atmosphere soon developed and we explained the reason for our presence. We asked if it would be possible to send our logs via the internet to Spain using their satellite telephone system, but unfortunately they did not agree to this.

During our free time away from the radios, we were able to take trips into the local area, for example to the caves at Rekeiz, near Tifariti, with their prehistoric cave paintings. We also were able to tour the perimeter of the nearby UN MINURSO base. We had no problems with food and the cuisine was excellent, although somewhat strange to our palates,

Five stations on the air at the same time. From left to right: EC4DX on SSB, EA5FX on CW, EA5KM on CW, EA2RY on RTTY, and UY7CW on SSB.

including goat and camel meat and a few other things the names of which I didn't know and didn't want to know! All in all, we lacked nothing.

On the third night, as in all good movies, we experienced a sandstorm. We sat huddled in our "fort" and worriedly listened to the wind as it whistled through our antenna array. Unfortunately, our Spiderbeam, lightweight and not built for the rigors of a sandstorm, lost an arm during the storm. The rest of our array, including the 22-meter long inverted-L for 160, held up well against the wind. In the morning, after the storm, we were able to get everything back up and running in just half an hour.

We had predicted 4 1/2 days of activity and had hoped to reach a total of 30,000 QSOs. I had the honor of having the very last QSO on the morning of April 16th at 10:00Z on 17 meters.

As usually happens, disassembling our equipment took only a quarter of the time that it took us to assemble it, so by 12:00Z we were already on our way back to the Algerian border. The return trip lasted only 6 hours for reasons I will never know or understand! We passed the night of April 16th on a base used by the voluntary organizations that were there to help the Saharawi refugees in Algeria.

The following day we relaxed and waited for the return charter Air Algerie flight to Alicante, where we landed at 4 AM. I had just enough time for a shower and a short nap at a nearby hotel before sharing a fond farewell embrace with the other members of The Tifariti Group before continuing my journey back to Italy.

Reflections

Every DXpedition is a different experience, but the last days in the heart of the Sahara desert will remain in my memory for at least two reasons. First, I have never experienced an expedition in which I shared so much mutual understanding with, or felt so in tune with, my Spanish colleagues. It was an experience that I hope to repeat in some other part of the world very soon. The second reason is the one I mentioned in my prologue: I sincerely hope that our 30,000 QSOs will serve to remind the world of the 200,000 Saharawi refugees who for the past 30 years have been living in Tindouf.

See you soon—*The Tifariti Group.*

Acknowledgments

The members of the SØ1R group want to thank the following for their help and support: ASTEC, PROYECTO4, the German DX Foundation, TECATEL, SDXRA (Shizuoka DX Radio Association), EASY QSLs, EA5ELX, EA5FJM, EA5JK, EA5BRE, EA8AUW, EB5GIN, JH2UVL, K5AB, and KO4RR.

To find out more you can visit our website, <www.s01r.com>, where you will find additional photos, videos, and an on-line log.

Results of the 2006 CQ WW VHF Contest

BY JOHN LINDHOLM,* W1XX

"Six meters sounded more like 20 meters on a Saturday night." — K3OO

"Best 6-meter E-skip contest ever!" — KN4SM

"Awesome double hop on 6 meters." — N7EPD

"This will be one for the record books. Six meters sounded like the CQ WW DX Contest." – W2MMD

What makes a good VHF contest? Answer: QSOs, QSOs, and more QSOs. Back in the good ole days of VHF contesting, it took a rather technically competent individual to even be able to get on any VHF bands. These folks were not usually the best operators, but they *won* the VHF contests because they had the best stations. That has not been so for many years now. Today, having 6- and 2- meter capability is no more challenging than putting together your typical HF station. In years past, such individuals were disparagingly referred to as *appliance operators.* With today's dearth of homebrew equipment, most of us are now in that category. Band capability above the "bottom two" does, however, require an increment of more know-how and a significantly larger dollar investment. Therefore, contesting on the two lower VHF bands is somewhat analogous to HF contesting. For most VHF contesters, that is just fine. Thus, we see the tremendous popularity of the CQ WW VHF Contest. It's a contest for contesters, attracting both the serious and the casual operators. Such went the dissertation of the "Old Timer" at the annual Contest Quahogs of Rhode Island (CQRI) meeting devoted to a review of the 2006 CQ WW VHF Contest. This time there was much to crow about!

To lend historical perspective to North American VHF contesting, Curt Roseman, K9AKS, cartographer for the very first and subsequent published grid locator maps in North America, was introduced as the newly appointed CQ VHF Contest *historian.* In this important capacity, Curt is now generating contest records for posting on the contest website: <www.cqww-vhf.com>. He had a great deal to say about the July 16–17, 2006 CQ WW VHF Contest.

**48 Shannock Road, South Kingstown, RI 02879*
e-mail: <w1xx@cq-amateur-radio.com>

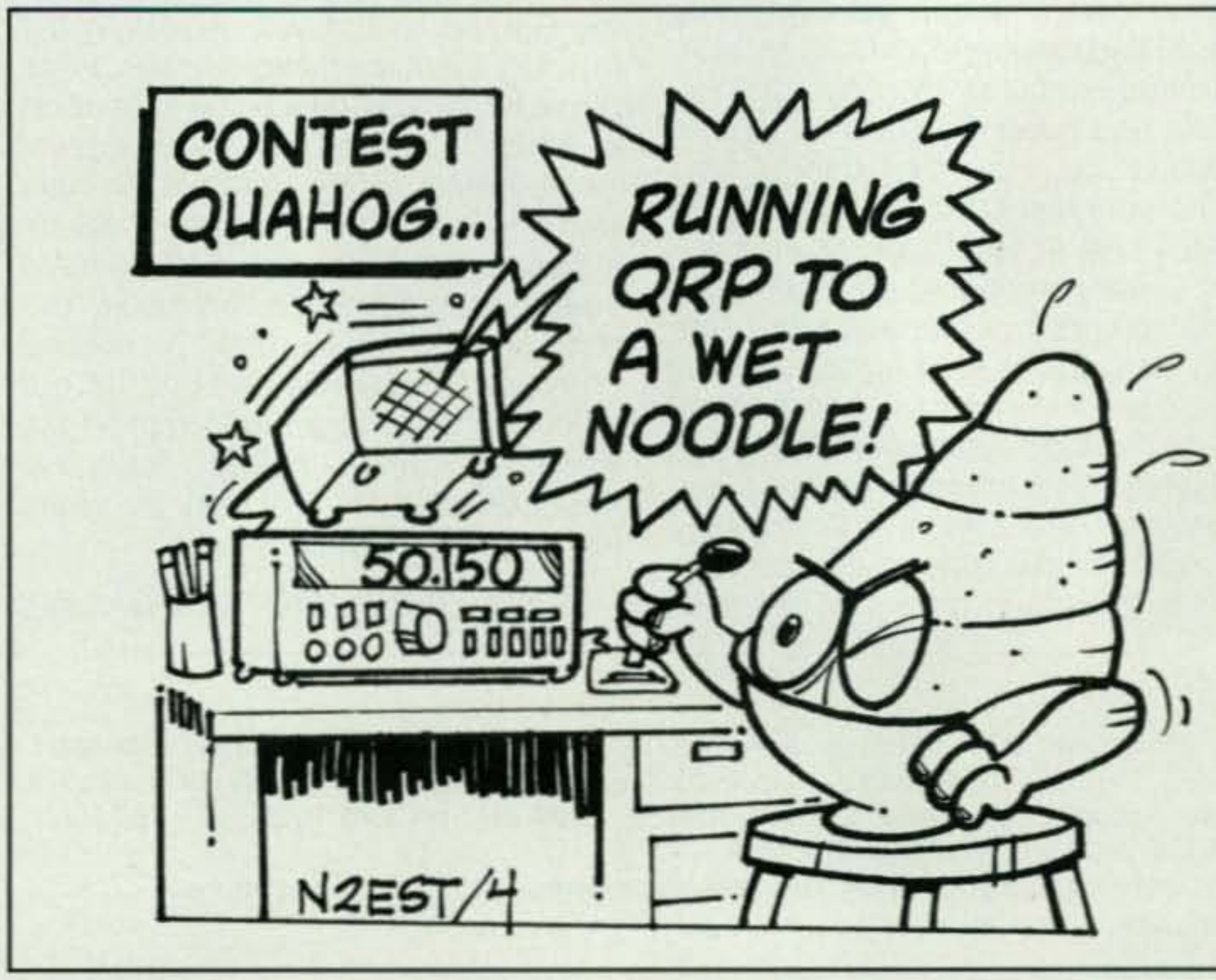
All North American VHF Contest Records Shattered

The big story of this contest was the widespread and long-lasting opening on 6 meters that produced record scores in many parts of North America, including most areas east of the Rockies.

A look at the top ten lists of scores, as well as 6-meter QSOs and grids worked, shows the widespread nature of the opening. In the Single Op All Band (SOAB) and Single Op Single Band 6-meter (SOSB6) categories, scores exceeding 198K were made in eight U.S. call areas, the exception being the 6th and 7th districts. The same pattern was true for stations working 220 or more grids on 6.

The big opening drove scores much higher than ever attained in this contest, which dates back to Y2K. Before 2006, the highest single operator score ever attained was 212,952 posted by K2DRH (IL) in 2003 during heightened conditions. This year, seven all-band entrants and two 6-meter-only stations exceeded that score. In the multi-op category, two scores exceed the previous massive 2003 score

The CQ WW VHF Contest continued its strong showing in Thailand with 43 log entries. Here 2005 single-op single-band 2-meter plaque winner for Asia, Nattida, E20YGG (right), receives the congratulations of the immediate past president of the Radio Society of Thailand, Mayuree, HS1YL (left).



KU4BP/4 used this effective antenna setup for his hilltopper station along the Blue Ridge Parkway in North Carolina, EM96kk. QRP portable for just six hours, Ed made 86 QSOs with a multiplier of 51 to earn a certificate.

TOP SCORES

WORLD

All Band

NP3CW	37,281
DL2OM	23,040

6 Meters

W4TAA/VE3	154,780
VP9GE	60,792
EA2ARD	39,501
CT1EGH	36,540
EB1EHT	33,750
EB1EWE	28,112
Z36W	19,698
EA1WX	13,708
G4DEZ	11,100
ZC4LI	10,624

2 Meters

DK5DQ	59,422
OK1WMR	25,760
DR2006E	18,330
HS6RMY	9,920
ON6NL	8,970

Hilltopper

HG2006GYR	1,938
HA5CQZ/P	1,560
HS9EOW	1,210
VA7MM	1,196

QRP

M3RCV	5,060
9A3TU	1,276
JA2MWV	1,104

Rover

VE3CRU	79,002
VE5UF	37,680

Multi-Op

OK1KIM	263,252
CQ3A	85,070
OK1KDO	20,520
TA3KC	17,388
GØBRC	13,640
HS3KUI	10,218
OK1KVK	10,218

USA

All Band

K2DRH	700,701
K1TEO	348,036
KB8U	299,766
W1XX	284,325
N3HBX	229,977
NØVZJ	229,360
WØEEA	219,072
K4EA	198,843
KC9BQA	163,737
NØURW	150,903

6 Meters

K1TOL	358,449
W6OAL	242,424
W2MMD	200,718
NW5E	199,888
W5PR	189,006
WD5K	180,544
NN1N	161,805
W1QK	155,036
N4MM	141,102
K7RE	104,664

2 Meters

W4WJF	16,974
W3ADC	10,152
N9TF	9,718

Hilltopper

KFØQ	18,180

KV1J	6,726
KU4BP/4	4,998
KØNR	3,078
K4JSI	2,160

QRP

KA1LMR	112,288
K9AKS	88,400
WVØH	31,644
KE2N	27,300
WB2SIH	15,925
N8XA	14,976
K5RX	11,310

Rover

NØDQS	219,324
K9JK	172,542
W4VHF	119,259
WB8BZK	115,434
N9TTX	103,452
N4DXY	75,684

Multi-Op

K3EAR	642,400
K8GP	531,508
K5QE	379,998
W3SO	375,240
N2BJ	133,015

of 459K by W3ZZ. K3EAR set the new mark at 642,400 points, followed by K8GP with 531,508.

The once elusive goal of working 1000 station on 6 meters in a North American VHF contest was first reached in 1996 by two stations in the ARRL June VHF QSO Party. The addition of 6 meters to numerous commercial HF rigs had given a boost to 6-meter activity. Presently, a total of 25 stations have exceeded that total, with *seven* of those in the 2006 CQ WW VHF Contest (and K8GP just missed the mark with 999 QSOs!). The highest previous 6-meter QSO total in the July *CQ* contest was 789, worked by multi-op W3ZZ (WV) in 2003.

Six-meter grid totals were equally, if not more, impressive. Prior to this contest, the highest grid total on 6 meters in a North American contest was achieved by K5JL (279) in the June 1987 ARRL contest. This July, the three highest totals *ever* were posted in the *CQ* contest: K3EAR (303), K8GP (295), and K2DRH (288). Also, five out of the eight highest totals ever were reached in this contest, including SOSB6 winner K1TOL at 273 and multi-op W3SO at 270.

The 1421 QSOs made by K2DRH and the 303 grids worked by K3EAR in the 2006 *CQ* contest both represent all-time highs for *any* North American contest. It is especially remarkable that these totals were made in a contest that lasts only 27 hours, compared to the longer 33-hour ARRL format. Imagine what kind of scores might have been reached had this July's contest continued for another six hours!

Some other notable accomplishments: The Single Op Single Band 2-meter (SOSB2) category was not heavily populated. No doubt the temptation to stay on 6 meters was too much to resist for most people. Nonetheless, the second highest score ever in this category (16,794) was posted by W4WJF in North Carolina. The record high remains 40,880, reached by his dad, W4GRW, in 2003. The previous QRP record score of 33,245 by NØURW, also in 2003, was obliterated by KA1LMR, who racked up 112,288 points operating portable from a 1000-ft. hilltop in New Hampshire (and putting modesty aside, by K9AKS who scored 88K from Illinois).

With all the attention being paid to 6 meters in North America, it is easy to overlook some good 2-meter conditions that prevailed in the upper Midwest Saturday evening and Sunday morning. Nine of the top ten stations on the list of 2-meter grids worked are in Minnesota, Wisconsin, Iowa, or Illinois. In spite of the 6-meter draw, score leader K2DRH still far outdistanced other 2-meter rivals with 260 Qs, while seven out of the top ten 2- meter Q totals were registered in the Great Lakes region. See the Hepburn index for Saturday, reproduced here, to see why this was so. Could it have been any better for K2DRH?

The statistics indicate that a strong case can be made for declaring the 2006 CQ WW VHF Contest to be the *greatest* North American VHF contest *ever*.

Hoopla ensued from the assembled quahog contesting contingent, as K9AKS concluded his remarks.

Was It Just Conditions?

Why were so many stations in North America worked? Was it just conditions? Surely many jumped in upon noting the superb and long-lasting propagation. However, that doesn't explain the *preparation* made *prior* to the contest by rover stations, which increased by 75% over the pervious year; by Hilltoppers who increased by 82%; the entries of mega-multis K3EAR, K8GP, K5QE, and W3SO; and the many stations operating portable at mountaintop and other better-than-home locations. These all require planning and commitment. Kudos to the big multis for sparking operating interest in passers-by stations. Could it be that the simple two-band format of *CQ* is being recognized by the vast majority of VHFers as a viable competitive alternative to DC-to-light affairs? These questions were presented for discussion by a long-time VHF contester, with the consensus being that with the 2006 running, the CQ WW VHF Contest had "arrived" in the eyes of a large segment of the normally silent VHF community.

Yaesu FT-857 and FT-897 Owners: We Took a Great Meter and Made It Better

NEW and IMPROVED

- **On/Off switch for the light**
- **LED *back*-illuminated in cool, high-visibility blue**
- **Calibration adjustment on the back of the unit; no need to take apart to calibrate**
- **Backlight brightness adjustment on the back so you can set the backlight to your desired level**

Still Only $49

Yaesu's popular FT-857(D) and FT-897(D) transceivers are wonders of compact efficiency. These do-anything, go-anywhere transceivers were science fiction just a few years ago, but hams today are using them in shacks, mobiles and on DXpeditions from the back yard to the top of the world.

A little known feature of these radios, noticed only by compulsive manual readers, is a meter jack on the bottom of the front panel. You have to figure that Yaesu knew they needed a bigger display all along, but just left it as an exercise for the user. Well, help is here! The LDG FT-Meter is a low-cost, plug-and-play solution to all of your metering needs.

LDG's *new* version of its popular FT-Meter presents a lush, highly readable 2.5" meter face with calibrated scales for signal strength and discriminator reading on receive, and power output, SWR, modulation, ALC action and supply voltage on transmit. Each function is selectable from the radio's menu.

Easily visible from anywhere on your desk or dash the FT-Meter face is now LED *back*-illuminated in cool, high-visibility blue by any external 12 vdc, 20-60 mA source; zero current draw with the light off. The calibration adjustment is now on the back of the unit; no need to take it apart to cal. There's now a backlight brightness adjustment on the back so you can set the backlight to any desired level, and an On/Off switch for the light. The provided cable now connects via a standard 1/8" jack for greater flexibility.

The new FT-Meter is better than ever and comes fully assembled and ready to go. In your home shack, or on that big DXpedition to Las Vegas you've been planning, just plug it into the radio and you're in the picture like never before. Contact your favorite dealer to purchase.

Specs:

- Receive: S-Meter, Discriminator or Voltage
- Transmit: RF Power, SWR, Modulation, ALC or Voltage
- Size: 3.5 x 3 x 2 inches
- Cable length 3 feet
- Externally powered cool blue backlighting
- On/Off switch for backlight.
- Backlighting is 12 volts, 100 mA max
- Weight: 0.5 lb.

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IC-7800 Owners Your Eye-Strain Problems Solved

Icom's magnificent IC-7800 transceiver is a quantum leap in amateur radio technology. Sure, it cost more than your first car but it offers features and performance unheard of in lesser rigs. Icom did a pretty good job on the make-believe LCD meters, but let's face it… sometimes nothing but a real, live meter will do.

NEW!

LDG's DM-7800 dual meter system provides two 4.5" meters, one for the Main receiver and one for the Sub. The lush meter faces are LED back-illuminated in cool, high-visibility blue, drawing only 20 – 60 ma (depending on brightness setting) with a brightness control on the back.

There are separate calibration adjustments for Main and Sub accessible from the back of the DM-7800; you don't have to take the meter apart to cal. A provided cable connects to your rig, and the radio menu lets you select functions for each meter. What's more, the DM-7800 and the virtual meters on your radio can work together; for example, you can display SWR on the radio's meter and power output on the DM-7800. On receive, the S-meter reading is shown. The DM-7800 is 9.7 x 4 x 4 inches, and requires power only for the lights; the meters themselves are passive. The case is textured gray, a great match for the IC-7800. Your beautiful IC-7800 deserves the best; add LDG's new DM-7800 dual meter system, and you're in the picture like never before. The DM-7800 is made exclusively for the IC-7800. Order yours today.

List Price $179.

Contact your favorite dealer to purchase.

LDG ELECTRONICS

LDG Electronics, Inc.
1445 Parran Road,
St. Leonard, MD 20685
Phone: 410-586-2177
Fax: 410-586-8475

True Plug and Play Simplicity
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At LDG Electronics we have always been the innovators in the automatic tuner industry. We built the first desktop switched-L tuner, the first automatic tuner for QRP radios, the first automatic tuner with a remote control head, and the first automatic tuner with 3-D memories. We were also the first manufacturer with a two year warranty on all of our products. **Now we are including all of the necessary interface cables with every tuner we sell.** No more getting your new tuner home and not having the right interface cable—**everything you need is included in the box!**

LDG
Now Includes All Cables Ready to go!

Z-11Pro

The Return of a Legend.

The original portable Z-11 was one of LDG's most popular tuners, accompanying adventurous hams to their backyards, or to the ends of the earth. Now meet the Z-11Pro, everything you always wanted in a small, portable tuner designed from the ground up for battery operation.

Only 5" x 7.7" x 1.5", and weighing only 1.5 pounds, it handles 0.1 to 125 watts, making it ideal for both QRP and standard 100 watt transceivers from 160 - 6 meters.

With 8,000 memories in LDG's exclusive "3-D Memory" array, the Z-11Pro uses LDG's state-of-the-art processor-controlled Switched-L tuning network. It will match dipoles, verticals, inverted-Vs or virtually any coax-fed antenna.

Ready to go right out of the box!
No extra cable to buy.

List Price $179

AT-200Pro

The first auto tuner specifically designed for today's high-powered transceivers.

The AT-200 features LDG's new "3-D memory system" allowing up to eight antenna settings to be stored for each frequency. Handles up to 250 watts SSB or CW on 1.8 – 30 MHz, and 100 watts on 54 MH **(including 6 meters)**.

Ready to go right out of the box!
No extra cable to buy.

List Price $249

Getting the Most Out of Your IC-7000

The AT-7000 is the ideal tuner for IC-7000 & other ICOM Radios: Covers all frequencies from 1.8–54 MHz **(including 6 meters),** and will automatically match your antenna in a flash. Requires just 0.1 W for operation, but will handle up to 125 W (100 W on 6 m), making it suitable for everything from QRP (IC- 703Plus) to a typical 100 W ICOM transceiver.

Ready to go right out of the box!
No extra cable to buy.

Tune with the AT-7000 or use your radio. Includes over 2,000 memories, uses latching relays, tuning range is 4-800 ohms, powered by your radio. Includes ICOM interface cable.

List Price $169

AT-1000

An Autotuner for use with your amplifier!

No more knob spinning or inductor rolling. Tunes your antenna in 1 to 8 seconds when you QSY either in the same band or to a different band! Easy installation and use make this the choice for any Amateur Radio Operator with an amplifier. Power rating HF (1.8 to 30 MHz): 1000 Watts Single Side Band, 750 Watts CW, 500 Watts Digital (RTTY, Packet, etc.) **including 6 meters**.

Ready to go right out of the box!
No extra cable to buy.

List Price $599

Z-100

The definitive low cost automatic antenna tuner!

Designed from the ground up to provide the 100 watt power handling you asked for, in a small, lightweight package, perfect for portable as well as sitting on your desk in your shack!

The Z-100 will tune with 0.1 to 125 watts (50 watts on 6 meters), making it an excellent choice for almost any radio or operating style. Backpackers and QRP operators will appreciate the latching relays. Power can be removed from the tuner once you have tuned. Additionally, when the tuner is not tuning, it draws nearly zero amps.

Ready to go right out of the box!
No extra cable to buy.

List Price $149

AT-100Pro

Automatic Antenna Tuner

This desktop tuner covers all frequencies from 1.8 – 54 MHz **(including 6 meters)**, and will automatically match your antenna in no time. It features a two-position antenna switch, allowing you to switch instantly between two antennas. The AT-100Pro requires just 1 watt for operation, but will handle up to 125 watts. The AT-100Pro includes over 2,000 memories for each antenna, automatically storing tuning configurations for each frequency and band as you use them.

List Price $219

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Hilltopper KFØQ

By Matt Burt, KFØQ

This year was my first attempt operating the QRP Hilltopper category. The CQ WW VHF test is always fun and the Hilltopper category sounded great to me. The 6-hour maximum operating time really adds a twist as well. So which 6-hour span is the best? With the heat and such I decided that setting up on Saturday night would be good and that way I could operate in the morning while it would be cool for at least a few hours. The Hepburn forecast also indicated that Sunday might favor better conditions, so Sunday it was.

I spent Saturday in preparation, but by afternoon reports were coming in about how great conditions were. Had I miscalculated? Rather than dwelling on missed-out fun, I remained focused on preparation. At 7 PM local I went up to a knoll in a hay field, which was the chosen operating location, to find a quite pleasant 82 degrees and a nice breeze. With the 5-element 6-meter and 12-element 2-meter Yagis up on a push-up mast, I returned home for a good night's sleep.

Sunday morning I returned with the rigs, deep-cycle batteries, and plenty of bottled water in my air-conditioned SUV, ready to go. It really didn't make a bit of difference when I started, as 6 meters was wide open and Qs were going in the log within seconds of turning on the rig.

I started slugging it out on 6 with other stations (some QRP as well), calling CQ and getting as many as four Qs per minute! While searching and pouncing, it was evident the band was open in all directions. Farthest grid was FK68! I jumped up to 144 MHz every time someone stole my frequency on 6 to log a few Qs there. There were some great 2-meter signals from ENs 37, 52, 63, 71 and EM39. Although conditions seemed pretty darn good on 2, I think most stations favored the mayhem on the Magic band.

The incredible conditions on 6 were almost unimaginable. Typically, I see the band open to the east or west, but I was able to work stations in almost any direction all the way up to 50.300 with QRP power! Results? On 6 meters I netted 78 grid multipliers and 12 on 144 with 35 states and provinces worked on 6 meters in 359 minutes of operating. The Hilltopper category is unique to the CQ VHF Contest and not hard to do. Try it…it's fun!

(Matt earned a plaque for his fine effort—ed.)

QSO LEADERS BY BAND

WORLD

Single-Op
50 MHz

W4TAA/VE3	710
VP9GE	447
CT1EGH	315
EA2ARD	297
NP3CW	285
EB1EHT	270
EB1EWE	251
Z36W	201

144 MHz

HS2ZMU	436
DK5DQ	407
E22TV	359
HS4DDQ	305
HS6RMY	248
HS9KSX	231
OK1WMR	230
DR2006E	195

Multi-Op
50 MHz

CQ3A	428
OK1KIM	188
TA3KC	113

144 MHz

OK1KIM	588
HS1ASC	395
HS3KUI	393
HS7ZWU	373
E21LYC	353
E21WRI	337
HS1LLT	322
HSØIAQ	308

USA

USA
Single-Op
50 MHz

K2DRH	1,421
K1TOL	1,313
K1TEO	1,085
W6OAL	1,036
W1XX	1,031
WØEEA	962
NW5E	961
WD5K	868
W5PR	867
N3HBX	865

144 MHz

K2DRH	260
W4WJF	207
KB8U	154
N9DG	145
W3ADC	141
N9TF	113
NØURW	110
KC9BQA	98
NØVZJ	92
K1TEO	88

Multi-Op
50 MHz

K3EAR	1,150
K5QE	1,042
K8GP	999
W3SO	858
N2BJ	495
K2AA	373
WA1Z	329

144 MHz

K3EAR	305
K8GP	247
W3SO	161
K5QE	160
N2BJ	112

Interestingly, NØURW offered some revealing commentary as to why 6 meters to some was a bottomless pit of QSOs. With a station that can easily be classified as a mega-station, Dan's big 6-meter antennas were stuck on west with a broken rotor. Thus, rather than push for a big score, he surveyed each station worked for a brief rundown of power and antennas. He found there was a huge number of HF stations that tuned up whatever antenna they had to work stations coast to coast. Everyone had conditions on 6 that supported long-distance contacts no matter what the power or antenna. For example, K5RX was "a 6 meters only operation with all contacts made with a borrowed FT-817 with just 2 watts output to an 80-meter inverted-V up 90 feet. Of course, lots of stations did not hear me, but 145 (!) did." It was Jim's "first time on 6 meters in 30 years." Generally, the HF + 6 radios really made their presence known, more so than ever before. Upon getting a taste of 6-meter magic, how many will now proceed to get more efficient antennas? Hopefully, many!

DX

The CQ WW VHF is *the* worldwide VHF contest activity. DX log entries show continued growth in activity, as noted by HA2MN: "Enjoyable contest with growing activity. CU next year." And QRP winner M3RCV: "My first participation in CQ WW VHF. Was pleased to make 83 QSOs. Best DX on 6 meters was CQ3A and worked an EA7 on 2-meter *Es*."

VHF contesting runs in this family. Eighteen-year-old Josh Fisher, W4WJF, successfully defended his USA SOSB2 title with a second-place all-time record of 207 Qs in 41 grids for 33K points, thus earning his second plaque. His dad Bill, W4GRW, still holds the record from 2003 at 40K points.

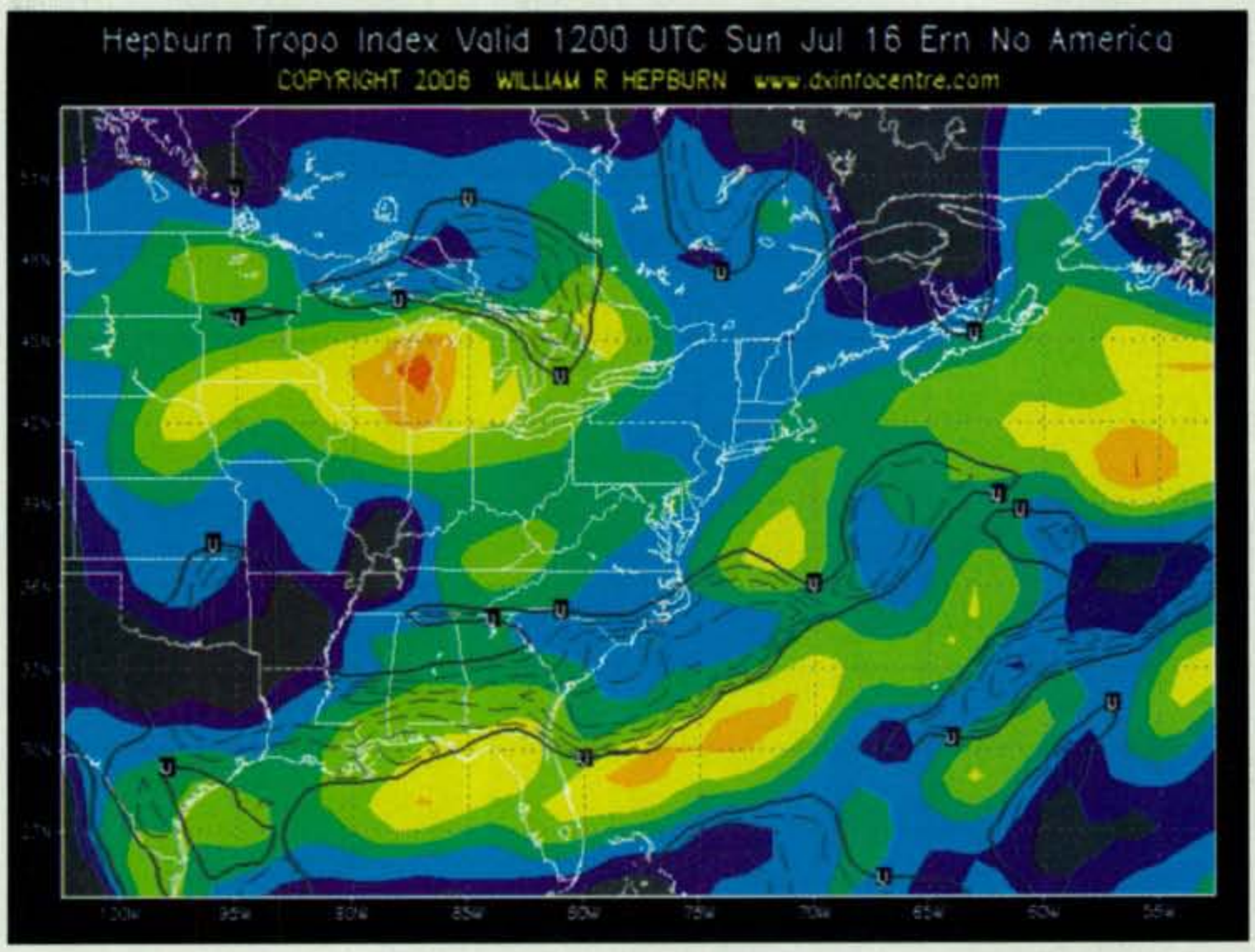
Six-meter propagation was not so kind to Europe, as noted by multi-op winner OK1KIM: "As the propagation gods were nice to NA, they almost omitted us. We rebuilt our monster 2-meter array, but activity was about as expected. Overall an 11% reduction in score, but we'll be in there again in 2007."

Other top DX scores were made by NP3CW in SOAB, W4TAA/VE3 in SOSB6, and DK5DQ, four-time consecutive SOSB2 winner. Logs received showed a modest double-digit increase in the number of DX countries represented, including two countries in Africa, four in Asia, and two in South America. As a member of the CQ WW family of contests, the CQ VHF continues to gain recognition, with a prominent place on the operating calendar.

Hilltoppers

Hilltopper stations came into their own in this contest. For the uninitiated, a Hilltopper station operates portable away from home with QRP power for a maximum of 6 hours. This obviates the need for overnight provisions and generators (although they are permitted), and leaves time to observe nature at its finest. The entrants tell it best:

"The Hilltopper category was just what I needed this year, with a tight personal schedule. Operated from Mt. Evans (CO) at 14,2634 feet. Great 6-meter opening." —*KØNR.* "This 'hilltopper' operated from the flat lands of Texas in EL28 with a battery-operated K2 and XV50 transverter at 10 watts. Antenna was a homebrew dipole elevated to 24 feet on a DK9SQ fiberglass mast."—*KN5G.* "Operated from a Lake Michigan campground in EN76 using a Stressed Moxon on 6 meters on a push-up pole for about one hour using a 10 D-cell battery pack."—*N8ZLR.* There were even comments from DX stations: "Oper-



Great 2-meter enhancement was also experienced by many stations in the Midwest states of MI, WI, IL, and IN. The Hepburn Tropospheric Ducting Forecast for the Saturday of the contest showed an index of 7, "intense," over the Lake Michigan area. See <http://www.dxinfocentre.com/tropo.html>. (Printed with credit to the original source, William Hepburn)

ated portable in a tent from a Norwegian National Mountain Park at 1300 meters asl."—*LA3DV*. "High winds do not make it easy to stay a long time on a 2000-meter high mountain. But that's the way hilltoppers like it."—*OE1CWA/3 (That's priceless, Christian!—ed.)*.

Eighteen certificates were earned by hilltoppers worldwide, with KFØQ earning top USA honors with an impressive 18K points, and HG2006GYR top DX score with a shade under 2K points.

Rovers

With just two bands to operate (and many opted for just 6 meters), a competitive rover station does not have to be a replica of the "Batmobile." Simple Moxons and loops seem to be the antennas of choice, with traveling to rare grid squares a common theme. A GPS receiver is a must. Home stations need not obsess about shadowing rovers, as they often find you.

Rover activity mushroomed in the 2006 contest, as those with home operating restrictions or sub-par locations took to the open road. A surprising result was that six-time rover champion W4VHF was displaced by NØDQS with 219K points hitting five squares, and K9JK second with 172K.

Contest Management

CQRI members recognize the team effort it takes to bring this contest to you. The CQ VHF flies under the familiar banner of the CQ WW family of contests. Under the stewardship of NC1C, all logs submitted were processed by VHFSCAPE (VHF scores for Contest Adjudication, Post Entry) and produced these overall impressive numbers: Number of log entries 565, topping last year's record mark by 86%; 97,331 total claimed QSOs, up a whopping 216%; total number of stations active 13,465, up 35%; number of grids activated 888, up 34%. Error rates actually dropped over the previous year: invalid or "not in log" 0.9%; dupes (claimed as valid) 0.3%; "busted" calls 1.3%; overall error rate at just 2.7%. Kudos to entrants on keeping clean logs and submitting them in Cabrillo format.

GRID MULTIPLIER LEADERS BY BAND

WORLD

Single-Op 50 MHz

W4TAA/VE3	218
VP9GE	136
EA2ARD	133
NP3CW	128
EB1EHT	125
CT1EGH	116
EB1EWE	112

144 MHz

DK5DQ	73
OK1WMR	56
DR2006E	47
DL2OM	46
ON6NL	39

Multi-Op 50 MHz

CQ3A	165
OK1KIM	97
TA3KC	68

144 MHz

OK1KIM	96
OK1KDO	41
OK1KVK	39
GØBRC	35

USA

Single-Op 50 MHz

K2DRH	288
K1TOL	273
K1TEO	247
N3HBX	244
W2MMD	243
W1XX	237
W6OAL	234
N4MM	234
KB8U	228
WØEEA	220

144 MHz

K2DRH	73
N9DG	57
KB8U	54
NØURW	45
N9TF	43
W4WJF	41
NØVZJ	39
K9AKS	39
NØGZ	39
KC9BQA	36

Multi-Op 50 MHz

K3EAR	303
K8GP	295
W3SO	270
K5QE	237
N2BJ	145
K2AA	138
WA1Z	116
K2OAK	106
K2LDT	96
NN4RR	90

144 MHz

K3EAR	62
K8GP	61
W3SO	48
K5QE	42
N2BJ	40

Thanks also to WA7BNM for CabForms, which allows on-line post entry.

Other team members recognized for their valuable contributions include the following who assisted in international prepublicity of the contest dates and rules: UR5ECE, PY2ZX, OK1RI, OZ7IS, E21EIC, and others who did so unrecognized. For the 2007 contest, the publicity

2006 PLAQUE WINNERS

Single Operator

USA All Band: Bob Striegl, K2DRH. Donor: Ted & Itice Goldthorpe, W4VHF & K4LVV
USA 6 Meters: Lefty Clement, K1TOL. Donor: John Kitchens, NS6S
USA 2 Meters: Josh Fisher, W4WJF. Donor: Ariane Arrays, Inc.
USA QRP: Christopher M. Merchant, KA1LMR. Donor: Bob Witte, KØNR
USA Hilltopper: Matt Burt, KFØQ. Donor: anonymous, in memory of Edward P. Tilton, W1HDQ
World All Band: Julio Medina, NP3CW. Donor: The Badger Contesters
World 6 Meters: Bill Brown, W4TAA/VE3. Donor: Dennis Motschenbacher, K7BV/6
World 2 Meters: Nicolas Exner, DK5DQ. Donor: Bill Burgess, VE3CRU
Asia 2 Meters: Bunknite Tingitviboonkun, HS6RMY. Donor: Golden Kilowatt Council in memory of Hans D. Hollstein, HSØ/KA3TDZ

Multi-Operator

USA: South Mountain Contest Club, K3EAR. Donor: Bob Striegl, K2DRH
World: Radioklub OK1KIM. Donor: Grid Pirates, K8GP
Thailand: Kasetsart University ARC, HS3KUI. Donor: Siam DX Group

Rover

USA: Gene Mitchell, NØDQS. Donor: W3SO, Wopsononock Mountaintop Operators
World: Bill Burgess, VE3CRU. Donor: CT RI Contest Group

team expands to include EA7KW, GØLCS, G4DEZ, and HI3TEJ.

Auto log processing has developed under the expertise of NC1C, who now wishes to step back from these responsibilities. A tremendous debt of gratitude is owed to Dave for seeing us through the formative years of the CQ VHF Contest. Steve, N8BJQ, of CQ WW WPX Contest experience (and who now heads up CQ's WPX Award program), will be stepping into the breach with assistance from K9JK and NS6X.

2007 CQ VHF Contest

Nearing the close of the 2006 review and the CQRI meeting, contest director W1XX delivered some well-chosen words. The 2007 edition of CQ VHF Contest is scheduled for July 21–22. The full announcement will appear in the June issue of *CQ*, on the CQ website (www.cq-amateur-radio.com), and on the contest website (www.cqww-vhf.com).

The contest took a tremendous leap forward in recognition with the enhanced NA conditions experienced in 2006. We need to advance from that point in providing a fun, competitive VHF event, continuing to appeal to mainstream 6- and 2-meter operators. In Europe, we continue to face strong competition for room on the VHF operating calendar. With local publicists in place, the CQ VHF Contest can tap even further the vast resource of EU stations, especially on 2 meters. Inroads to further activity in Africa, Asia, and South America need to develop, as well as an initial step in Oceania.

An admonition to North American ops: We won't always see the widespread 6-meter enhancement of 2006. However, there continues to be a vast supply of often quiet 2-meter stations in most parts of North America that used to be contest active in the late 1980s. Make it happen again. Don't neglect 2 meters. Fill the ether with 144-MHz RF and we all shall be rewarded. Thanks to all for your support of this contest!

Thereupon the Contest Quahogs filed out to the parking lot for an antenna-gain measuring contest. 73, John, W1XX

QRM

Amazing 6-meter conditions and excellent operating made for a great event . . . **AD4IE.** Fine contest, the first for me on 6 meters. Will do more in the future . . . **CT1DRB.** This contest had the best 6-meter opening I've seen in many years. It was great! . . . **K2EVW.** It was great to see both 2 and 6 meters open. I had a lot of fun . . . .**KØRU.** What an exciting contest. With 100 watts and a loop at 30 feet for 6 meters, I worked 78 grids and even heard more but couldn't always break the pile-ups. Worked VE3CRU/R in three grids. The N1MM Logger rate summary showed one 60-minute run of 58 QSOs/hour—not bad for 100 watts and a loop . . . **K3IXD.** The single and double hop *E*-skip made this a great contest. My barefoot FT-817 and

small Yagis did just fine. I wish there had been more activity on 2 meters, as there was some sporadic-*E* there as well . . . **K4JSI.** Great contest, great opening. Don't you love it when the two coincide!? My first effort in this contest . . . **K5JMP.** A couple of good openings, although apparently not quite as long as some other parts of the country. Thanks to the California stations on 2 meters . . . **K7TOP.** I think I worked more W6/W7 stations on 6 on Saturday than in my previous 40+ years of operating . . . **K8MR.**

Wow, what a great contest! Most grids worked in a VHF contest . . . **K9GY.** One of the best openings on 6 meters I have worked in a contest . . . **KA1LMR.** This was my first VHF contest and I had a blast. I can't wait till the next one . . . **KB3NDS.** Fantastic! Wonderful condition on 6 meters. Best I've heard in years. Worked 114 grids running only 35 watts! . . . **KB8UUZ.** Was great fun. First contest operating QRP. Rig was a Yaesu FT-817 and 2.5 watts into a Par loop antenna . . . **KC9AXZ.** This was the first VHF contest I ever operated from my home QTH in DM12jt, 400 feet asl, about 7 miles from the Pacific Ocean and 35 miles north of the Mexican border. After picking up locals in and around southern California, started scanning up from 50.125 to discover there was long single- and even double-hop traffic to the northeast. There were only a few stations moving the S-meter, but they were perfectly readable. It sounded like the stations on the east coast were having a blast. If you didn't know you were on 6, you would have sworn you were on 20 instead. Ended up with fewer contacts than usual, but more grid squares due to the opening on 6, so the score was actually higher than in 2005. Thanks as always for hosting this, and we'll see you next year . . . **KG6IYN.** Great conditions on 6 meters to all over the USA and Caribbean. Working FM5JC was the highlight of the contest . . . **KI7JA.** Great pile-ups on 6 and 2 meters. It's great for everybody who have 6 and 2 meters and can join the fun . . . **NØDQS.** Signals on 6 meters were S9+60 all day Saturday. And 2 meters was open until at least midnight! . . . **NØEDV.** Great contest, lots of fun. Only got to activate three grids, but got my first inter-continental DX in the log, as well as my first contact with Puerto Rico . . . **N1KPW.**

One of the best ever VHF contests for me on 6 meters in 25 years of VHF contesting . . . **NØKE.** Ran 500 watts to a MonstIR at 60 feet on a West Virginia ridge-top. My first VHF contest ever . . . **N4TX.** My first contest ever! . . . **NH6VJ.** Ten watts to a dipole in the attic. When 6 meters is open, it works pretty well . . . **NJ1H.** With my 150 watts I did not run for a plaque, but still had fun. It was nice to hear all the DQ and DR stations on. Sunday afternoon a short 2-meter sporadic-*E* opening brought five QSOs of over 1800 km . . . **ON6NL.** VUCC on 6 meters in less than six hours with 100 watts and a 4-element Yagi . . . **VE3KZ.** Best conditions on 6 meters for any of the many VHF contests we have done over the past ten years. Largest grid total on 6 ever with Europe, Caribbean, West Coast, Western Canada, and everything in between for most of both days . . . **W3SO.** This log is QRPp 1watt output for all contacts from FM18hk in Virginia. Amazing conditions! . . . **W4SHG.** My first VHF contest in 52 years. Lots of fun. See ya'll next time . . . **W5KDJ.** My first 6-meter contacts since the days of my Heath Sixer in the mid-60s. Antenna was a 40-meter dipole! Will put up a J-pole and see if I can join in future fun on the Magic band . . . **W5TB.** What a wild ride this one was! . . . **W6OAL.** Fifty years on the air and I felt like a Novice all over again with the openings on 6 meters . . . **W8IQ.** Working Maine (K1TOL) with less than 10 watts from DM37 [UT] was biggest thrill . . . **WAØYPL.**

Once again ***CQ*** magazine picks out an unbelievable weekend for NA conditions. Last contact Sunday morning was Greece. Wow! . . . **WA2FGK.** Great contest with tremendous activity from all call districts. I think this contest will influence many new 6-meter ops as to how cool this band is . . . **WB2QLP.** I only wish that bad conditions could be this good for all contests. I may even be able to get VUCC 6M if I get a good response to QSL mailing. Even had a brief *E*-skip opening on 2 meters. Let's do it again. Replay please . . . **WF4R.** I operated on solar power and batteries from the top of a 5000-ft. mountain in the Sierras. Beautiful! . . . **K6XN.** What a neat way to end a vacation in the mountains of western NC. Heard things atop Mt. Mitchell at 6,684 ft. that I don't hear at home. Drove some roads moving between high points where I could see my taillights on the switchbacks. Six meters was hopping . . . **K8YC.** Great, great conditions. A pair of Par OA-50 loops and 100 watts was enough to get 595 Qs in 171 grids. Here in the Midwest, 144 MHz conditions were spectacular as well. Lots of ops got exposure to this contest and that's a real plus . . . **KC9BQA.** Operated Hilltopper category with an ICOM 703+ for 6 meters to a dipole and Ten-Tec 2-meter transverter to a 3-element Yagi at 10 feet on a hilltop overlooking San Juan Capistrano and Dana Point Harbor in southern CA. It was just a 30-minute hike from home . . . **KG6TGI.** I ran 10 watts to a whip on 6 meters as a Hilltopper. Was pleased to work Lefty, K1TOL in FN44, WAØMHJ/R in rare EN38, and VE4EAR in EN19 was very loud . . . **NØJK.**

Great 6-meter opening and was able to work RI for my 49th state towards WAS . . . **NØXLR.** Great surprise to have won 1st place in class in CT last year. Great fun this year with the band being wide open . . . **N1ZN.** First time submitting a log for this contest. Running 6-meter QRP a challenge even with the great band opening, but a lot of fun. A big thrill to snag some Caribbean QSOs on the first call. Great timing for CQ WW VHF! . . . **N2BEG.** First real time on the air since Hurricane Katrina caused substantial damage to my house. All ham gear except my Drake TR-7 survived . . . **N3AWS.** My 6th time in CQ-VHF with twice as many Qs and grids on 6 meters as my previous best. I worked 12 double-hop grids in fields DM and DN and an EH8 called me off the back of the beam. There were lots more ops on CW than usual with about 40% of my 6-meter QSOs on CW . . . **N3UM.** Best activity on 6 meters I've ever heard for a contest weekend . . . **N4XD.** First VHF contest. It was just as much fun as chasing new states on 40 meters as a Novice. Need a directional antenna for next year . . . **N7NT.** The contest coincided with the annual vacation to the outer banks of NC. A bit of a struggle to work stations with 50 watts to a Hamstick, but many appreciated the rare grids of FM25 and FM26 . . . **N8II.**

The contest started while returning home from vacation in Wyoming. I was able to operate from 11 grids on the way . . . **N9MYK.** Great contest without the upper bands. Not all of us can afford good stations through 10 GHz. This was a personal best for multipliers . . . **NN4RR.** NT5HS was a rather accidental rover entry in the contest. Returning home to Texas from a trip to South Dakota, all of a sudden there was a multitude of signals on 6 meters obviously operating a contest. After asking someone what contest, we were off to the races. The simple setup consisted of a Kenwood TS-480, Garmin GPS, and a Par OA-50 loop 3 feet above the van. The opening was superb working some fairly unusual grids . . . **NØRQ & KC5POV.** Operation from Hollyburn Ridge, BC at elevation 2000 feet . . . **VA7MM.** This contest was one of the best I have ever participated in as a rover. This was a very high-spirited event . . . **VE3CRU.** Six meters was fantastic with lots of CW activity. Those who do not use CW are missing multipliers . . . **W2UDT.** Rig was a borrowed TS-690 running 50 watts to a homebrew antenna consisting of solid aluminum wire and lots of electrical tape. Temperature was near 100° F roving just south of the Canadian border. The antenna looked pretty pitiful but the band really came through . . . **WAØMHJ.** Thanks to all concerned in running this contest . . . **ZC4LI.**

Number/letter groups after call letters denote the following: Class (A = all band, 6 = 6 meters, 2 = 2 meters, Q = QRP, Q* = QRP portable hilltopper, R = rover, M = multi-operator), Final Score, Number of QSOs, Number of grid locators, State/Province (USA/Canada only), Grid Locator or Number of grids activated (rover only). Rover scores for USA are listed separately. Certificate winners are listed in boldface.

2006 VHF RESULTS

NORTH AMERICA

UNITED STATES

K1TEO	**A**	**348,036**	**1,173**	**276**	**CT**	**FN31**
W1XX	**A**	**284,325**	**1,073**	**255**	**RI**	**FN41**
W1RZF	**A**	**60,006**	**382**	**146**	**MA**	**FN42**
K1EM	**A**	**58,520**	**404**	**140**	**CT**	**FN31**
NE1B	**A**	**31,979**	**278**	**113**	**NH**	**FN42**
KB1JDY	A	15,288	164	91	CT	FN41
KC1MA	A	13,200	150	80	MA	FN51
N1CJG	A	4,050	76	45	CT	FN31
N1ZMB	A	3,149	66	47	MA	FN42
W1CRK	A	3,008	63	47	MA	FN41
N1SXL	A	2,898	63	42	CT	FN41
WA2OQE	A	2,745	59	45	CT	FN31
KA1VMG	A	2,320	55	40	CT	FN41
KB1FVX	A	323	18	17	VT	FN34
K1TOL	**6**	**358,449**	**1,313**	**273**	**ME**	**FN44**
NN1N	**6**	**161,805**	**805**	**201**	**CT**	**FN31**
W1QK	**6**	**155,036**	**791**	**196**	**CT**	**FN31**
N4CW/1	**6**	**45,254**	**328**	**138**	**ME**	**FN53**
AD1C	**6**	**11,421**	**141**	**81**	**MA**	**FN42**
K1TR	**6**	**9,563**	**131**	**73**	**NH**	**FN32**
N1ZN	6	4,590	85	54	CT	FN31
KB1JCL	6	4,180	76	55	NH	FN43
N1BNC	6	2,990	65	46	NH	FN43
W1SD	6	2,816	64	44	NH	FN42
N1DG	6	2,684	61	44	MA	FN42
W1DMM	6	2,016	56	36	CT	FN31
K1VU	6	1,230	41	30	MA	FN42
K1EP	6	520	26	20	MA	FN42
KV1J	**Q***	**6,726**	**112**	**59**	**ME**	**FN44**
KA1LMR	**Q**	**112,288**	**624**	**176**	**NH**	**FN43**
NJ1H	**Q**	**6,612**	**114**	**58**	**NH**	**FN42**
WA1Z	**M**	**39,429**	**333**	**117**	**NH**	**FN42**
N1VMJ	**M**	**11,154**	**140**	**78**	**MA**	**FN32**
KB1HAR	**M**	**11,076**	**139**	**78**	**CT**	**FN41**
W2EV	**A**	**67,200**	**391**	**168**	**NY**	**FN03**
KV2M	**A**	**66,300**	**407**	**156**	**NJ**	**FM29**
KA2CYN	A	45,875	361	125	NY	FN31
W2UDT	A	21,280	210	95	NJ	FN20
K2QO	A	12,848	139	88	NY	FN03
K2KIB	A	12,816	134	89	NJ	FN21
WO9S	A	9,480	119	79	NY	FN12
W2VU	A	8,832	126	69	NJ	FN20
KD2MX	A	6,867	107	63	NJ	FN21
W2MMD	**6**	**200,718**	**826**	**243**	**NJ**	**FM29**
NS2P	**6**	**31,050**	**270**	**115**	**NY**	**FN24**
AG2A	6	25,404	219	116	NY	FN30
KC2HZW	6	20,900	220	95	NY	FN30
K2DBK	6	19,834	211	94	NJ	FN21
W2CCC	6	19,200	200	96	NY	FN23
NG2T	6	7,446	102	73	NY	FN23
K2YSY	6	7,100	100	71	NJ	FN20
W2FB	6	5,208	93	56	NJ	FN20
K2TV	6	3,978	78	51	NY	FN30
NA2X	6	3,328	64	52	NY	FN13
WB2TPS	6	2,948	67	44	NY	FN30
WA2BKN	6	2,655	59	45	NJ	FN21
N2SLN/M	6	1,504	47	32	NY	FN22
W2CVW	6	700	28	25	NJ	FN20
KC2LZF	6	621	27	23	NY	FN02
WB2AMU	6	504	24	21	NY	FN30
N2JTX	6	100	10	10	NY	FN30
KC2LYK	6	36	6	6	NJ	FN20
WB2SIH	**Q**	**15,925**	**159**	**91**	**NY**	**FN31**
N2BEG	**Q**	**7,104**	**96**	**74**	**NY**	**FN12**
W2JEK	**Q**	**1,040**	**40**	**26**	**NJ**	**FN20**
KC2NWV	Q	621	25	23	NJ	FN21
K2AA	**M**	**65,637**	**401**	**153**	**NJ**	**FM29**
K2OAK	**M**	**31,372**	**221**	**124**	**NJ**	**FN21**
K2LDT	**M**	**15,402**	**145**	**102**	**NY**	**FN12**
N3HBX	**A**	**229,977**	**887**	**253**	**MD**	**FM19**
W3ZZ	**A**	**119,196**	**568**	**198**	**MD**	**FM19**
K3TUF	**A**	**82,152**	**434**	**168**	**PA**	**FN10**
WA2FGK	A	51,072	307	152	PA	FN21
K3OO	A	49,280	344	140	PA	FN20
N3UM	A	21,420	200	102	MD	FM18
KB3NDS	A	12,354	136	87	MD	FM18
K1DS	A	12,118	133	83	PA	FN20
K3NG	A	10,472	135	77	PA	FN20
K3IISH	A	7,738	102	73	PA	FN21
AK3E	A	7,416	100	72	MD	FM28
N3FNE	A	4,028	72	53	MD	FM19
W3BBO	A	3,162	62	51	PA	FN02
KB3EXB	A	2,480	56	40	PA	FN10
N3CHX	A	2,379	59	39	PA	FN20
WA3PTV	A	777	28	21	PA	FM19
N3TEE	**6**	**7,597**	**107**	**71**	**DE**	**FM29**
K3MSB	**6**	**7,236**	**108**	**67**	**PA**	**FM19**
KW3F	6	4,960	80	62	PA	FN20
N3KN	6	4,081	77	53	PA	FN20
WA3KYY	**6**	**2,752**	**64**	**43**	**MD**	**FM19**
N3XLS	6	1,209	39	31	PA	FN21
KB3LZV	6	744	31	24	MD	FM28
W3BW	6	572	26	22	MD	FM29
N3GE	6	228	19	12	DC	FM18
N3TXH	6	132	12	11	PA	EN90
W3ADC	**2**	**10,152**	**141**	**36**	**MD**	**FM19**
WA3EOQ	2	1,872	39	24	MD	FM09
K3ZT	2	96	12	4	PA	FM29
K4JSI	**Q***	**2,160**	**48**	**36**	**MD**	**FM19**
K3TW	Q	273	20	13	MD	FM18
KI3G	Q	132	12	11	PA	FN10
K3EAR	**M**	**642,400**	**1,455**	**365**	**PA**	**FM19**
W3SO	**M**	**375,240**	**1,019**	**318**	**PA**	**FN00**
K3WW	M	76,557	453	169	PA	FN20
K4EA	**A**	**198,843**	**810**	**237**	**GA**	**EM74**
W4WA	**A**	**131,440**	**585**	**212**	**GA**	**EM84**
K4QI	**A**	**116,704**	**487**	**224**	**NC**	**FM06**
NJ2F	**A**	**83,160**	**515**	**154**	**FL**	**EL96**
K4XR	**A**	**80,618**	**440**	**173**	**AL**	**EM64**
KD4K	A	67,648	441	151	GA	EM74
N4XD	A	63,580	363	170	NC	FM05
KN4SM	**A**	**59,965**	**312**	**179**	**VA**	**FM16**
NG4C	A	53,404	334	158	NC	FM16
K5JMP	A	40,749	271	141	VA	FM18
K4TO	**A**	**22,454**	**161**	**109**	**KY**	**EM77**
KI4IMA	A	20,800	196	100	FL	EL96
K4FJW	A	19,620	204	90	VA	EM86
K3IXD	**A**	**14,823**	**180**	**81**	**SC**	**EM93**
K2EVW	A	14,500	138	100	VA	EM96
N4UFP	A	14,418	156	89	SC	EM94
KR1ST	A	10,934	134	77	SC	EM92
W4FRA	A	10,790	124	83	NC	FM15
KU4WD	**A**	**9,240**	**126**	**70**	**TN**	**EM76**
WF4R	A	9,176	109	74	VA	FM16
KA6AKH	A	8,268	99	78	VA	FM18
N4DWK	A	7,840	109	70	VA	FM17
K4ZDO	A	6,435	93	65	VA	FM08
WS4V	A	5,251	87	59	VA	EM96
AD4TJ	A	5,192	82	59	VA	FM08
KD4FR	A	4,187	78	53	VA	FM16
WB4CAT	A	4,080	79	51	NC	EM95
K4WYS	A	3,888	67	54	VA	FM16
AK4FL	A	3,652	75	44	AL	EM64
N1RIK	A	2,277	64	33	NC	FM05
AD4IE	A	2,128	54	38	NC	EM95
K4FTO	A	2,079	55	33	VA	FM18
W4KTF	A	1,855	51	35	VA	FM18
AC2N	A	910	33	26	FL	EL88
WA4EPI	A	480	23	20	VA	FM16
WF1L	A	176	15	11	VA	FM18
NWSE	**6**	**199,888**	**961**	**208**	**FL**	**EL98**

N4MM	6	141,102	603	234	VA	FM09	**W5PR**	6	189,006	867	218	TX	EL29	**WAØYPL**	Q	1,353	41	33	UT	DM37	WA9BFH	6	1,452	44	33	WI	EN52
WB2QLP	6	87,731	581	151	FL	EL96	**WD5K**	6	180,544	868	208	TX	EM12								KB9VQM	6	1,014	39	26	WI	EN53
N5BO	6	80,884	554	146	FL	EM60	**W5WVO**	6	49,912	367	136	NM	DM65	**KB8U**	A	299,766	909	282	MI	EN71	KB9VZL	6	693	33	21	IN	EM79
W4RM	6	34,432	269	128	VA	FM18	WØVX	6	41,076	326	126	TX	EM12	**K8MR**	A	86,464	403	193	OH	EN91	KG9N	6	612	34	18	IL	EN50
N4TX	6	31,964	244	131	VA	FM09	**N5ASA**	6	33,640	290	116	LA	EM42	NØFW	A	45,000	374	120	OH	EM79	KD4SIR	6	589	31	19	IN	EM79
W4GRW	6	27,108	251	108	NC	EM96	WA8ZBT	6	32,421	303	107	TX	EM12	K8ZIZ	A	45,188	296	143	OH	EN81	NØICV	6	432	24	18	IL	EN52
W4JJF	6	20,332	221	92	NC	EM95	**W5MPC**	6	25,186	257	98	MS	EM54	N8BJQ	A	28,392	270	104	OH	EN80	KC9GDL	6	425	25	17	IL	EN51
N4CAG	6	19,448	187	104	TN	EM86	WB5KIA	6	19,300	193	100	TX	EM13	K8KD	A	23,595	180	121	MI	EN82	KC9BBP	6	300	20	15	IL	EM57
K3KO	6	18,260	166	110	NC	FM06	W5GAI	6	18,156	178	102	TX	EM10	KF8QL	A	19,976	219	88	MI	EN72	W9JJC	6	240	16	15	WI	EN65
K4BAI	6	17,248	196	88	GA	EM72	KE5HLT	6	7,150	110	65	LA	EM42	N8IE	A	13,351	167	79	OH	EM79	W9LYA	6	154	14	11	IL	EN62
W9RVR	6	15,023	181	83	TN	EM56	KJ5RC	6	2,856	68	42	MS	EM42	W8KNO	A	10,836	117	84	OH	EN91	**N9TF**	2	9,718	113	43	IL	EN52
K4DLJ	6	14,875	175	85	GA	EM74	K7ICW	6	1,419	43	33	NM	DM62	K8DXR	A	9,672	117	78	OH	EN90	W9IIX	2	2,976	62	24	IL	EN61
WB4YDL	6	14,144	208	68	TN	EM56	WA5ZUP	6	1,178	38	31	NM	DM56	**WA8WV**	A	7,770	105	70	WV	EM98	**K9AKS**	Q	88,400	450	170	IL	EN41
KA4BNI	6	8,232	168	49	TN	EM56	KD5HTB	6	768	32	24	TX	EM13	KC8VPC	A	6,656	98	64	OH	EN91	**KC9ECI**	Q	9,983	124	67	WI	EN44
W2YE	6	7,866	114	69	VA	FM19	W5KI	6	713	31	23	AR	EM36	W8PAT	A	5,782	85	59	OH	EN81	**KC9AXZ**	Q	6,901	99	67	WI	EN63
N4NX	6	7,440	120	62	GA	EM84	KD5VGB	6	696	29	24	NM	DM65	K8AB	A	5,202	82	51	OH	EN91	**N2BJ**	M	133,015	607	185	IL	EN61
AB4GG	6	6,909	141	49	TN	EM75	W5KWB	6	475	25	19	MS	EM42	**KB8UUZ**	6	19,038	167	114	OH	EN91							
KI4HEE	6	5,510	95	58	SC	FM03	W5FIO	6	270	18	15	TX	EM22	**N8JI**	6	15,912	221	72	MI	EN72							
K9HUY	6	4,095	91	45	FL	EL86	K5CQB	6	224	16	14	TX	EM12	N8PVT	6	8,927	113	79	MI	EN64	**NØVZJ**	A	229,360	848	244	MN	EN35
N4WD	6	3,772	82	46	GA	EM74	W5TB	6	121	11	11	TX	EM23	W8UVZ	6	8,400	112	75	MI	EN72	**WØEEA**	A	219,072	970	224	CO	DM79
N4JRY	6	3,555	79	45	SC	FM04	N5DTT	6	96	12	8	TX	EL29	NO8R	6	7,665	105	73	MI	EN73	**NØURW**	A	150,903	619	207	IA	EN41
N2IXX	6	3,243	69	47	SC	EM93	KE5ELU	2	80	8	5	AR	EM34	AB8JR	6	5,428	92	59	MI	EN82	**NØKE**	A	114,885	617	185	CO	DM69
W2OO	6	2,660	70	38	TN	EM85	**KN5G**	Q*	475	25	19	TX	EL28	K8IR	6	4,888	104	47	MI	EN65	**KØAWU**	A	84,128	421	176	MN	EN37
W4AMP	6	2,200	55	40	GA	EM74	**K5RX**	Q	11,310	145	78	TX	EM13	W8IDM	6	4,218	74	57	OH	EN81	**NØUNL**	A	76,104	453	151	NE	EN10
K4SV	6	1,920	48	40	NC	EM85	**N6ZZ**	Q	4,644	86	54	NM	DM73	W8IQ	6	3,969	81	49	OH	EN81	**NØGZ**	A	69,230	351	161	IA	EN31
K8OSF	6	1,400	50	28	FL	EL98	**N5HMH**	Q	1,302	42	31	LA	EM32	KD8AX	6	2,394	57	42	OH	EM79	WØETT	A	61,350	402	150	CO	DM79
KD4EVB	6	1,026	38	27	KY	EM78	W5KDJ	Q	1,140	38	30	TX	EM20	NF8M	6	1,632	48	34	MI	EN82	W6GMT	A	24,940	213	116	MN	EN37
N1LHW	6	980	35	28	TN	EM65	N3AWS	Q	682	31	22	MS	EM50	K8KFJ	6	520	26	20	WV	EM98	KCØRAD	A	16,974	181	82	IA	EN32
N4AJF	6	897	39	23	NC	FM05	NI5W	Q	270	18	15	OK	EM04	N8PPF	6	56	8	7	OH	EN80	**KØRU**	A	15,921	162	87	KS	EM28
KF4OLO	6	884	34	26	GA	EM74	**K5QE**	M	379,998	1,202	279	TX	EM31	WO3X	2	20	5	2	OH	EN91	WAØVPJ	A	13,345	128	85	MN	EN35
KA4WTB	6	693	33	21	TN	EM75	W5SSV	M	1,450	43	29	TX	EL39	**N8ZLR**	Q*	16	4	4	MI	EN76	WØRT	A	9,815	128	65	KS	EM27
KC4LRY	6	224	16	14	NC	FM14								**N8XA**	Q	14,976	146	96	OH	EM89	KØUK	A	7,370	109	67	CO	DM59
KK4LH	6	156	13	12	NC	EM95	**KG6IYN**	A	6,384	146	28	CA	DM12	KD8CGE	Q	2,688	62	42	OH	EN91	**NTØV**	A	5,671	73	53	ND	EN08
KI4PWX	6	4	2	2	NC	FM15	KC6ZWT	A	4,095	74	39	CA	CM98	**W8TOM**	Q	1,457	47	31	MI	EN74	**WBØQIR**	A	4,312	76	56	MO	EM37
W4WJF	2	16,974	207	41	NC	EM96	KK6KE	A	3,636	74	36	CA	CM98	**K8GP**	M	531,508	1,246	356	WV	FM08	KØVG	A	2,808	58	39	MN	EN35
KU4BP/4	Q*	4,998	86	51	NC	EM96	K6XN	A	3,240	72	40	CA	CM99								KAØAIG	A	1,150	40	25	MO	EM29
N4ECW	Q*	1,504	47	32	TN	EM76	K6FV	A	1,682	48	29	CA	CM87	**K2DRH**	A	700,701	1,681	361	IL	EN41	KCØVGC	A	1,131	38	29	MO	EM37
WZ4C	Q*	1,365	55	21	NC	EM85	KF6YYV	A	1,170	56	15	CA	DM03	**KC9BQA**	A	163,737	693	207	WI	EN63	KRØVER	A	220	17	11	CO	DM79
KE2N	Q	27,300	225	105	VA	FM18	N6RZR	A	775	29	25	CA	CN80	**N9DG**	A	87,296	351	176	WI	EN53	**W6OAL**	6	242,424	1,036	234	CO	DM79
W4BCU	Q	8,646	114	66	TN	EM86	NC6P	A	140	13	7	CA	CM87	**K9ZO**	A	63,495	366	153	IL	EN50	**K7RE**	6	104,664	588	178	SD	DN84
W4SHG	Q	7,410	106	65	VA	FM18	WA6WON	2	378	21	9	CA	DM05	K9GY	A	60,450	357	155	IL	EN61	**NØUR**	6	34,034	286	119	MN	EN35
N4MJ	Q	5,400	100	54	TN	EM56	WB6TNF	2	360	30	6	CA	DM04	**W9THD**	A	23,976	196	108	IN	EN71	**KCØDEB**	6	29,484	252	117	KS	EM29
KG4IGC	Q	2,278	64	34	SC	EM93	**KG6TGI**	Q*	400	25	10	CA	DM13	NØEDV	A	20,274	171	93	WI	EN45	KØMPH	6	23,136	241	96	MN	EN35
NZ1D	Q	1,053	39	27	FL	EL98	KØOK	Q	21	7	3	CA	DM13	W9RAY	A	18,881	212	79	WI	EN44	**KEØA**	6	11,122	134	83	ND	EN17
W4UDX	Q	42	7	6	KY	EM78								KB9UMI	A	16,932	186	83	IN	EN70	KØSDW	6	4,617	81	57	CO	DM79
N4TUA	Q	32	4	4	GA	EM82	**W7CE**	A	22,523	199	101	WA	CN87	KI9A	A	14,938	185	77	IL	EM58	KØPC	6	4,116	84	49	MN	EN34
NN4RR	M	17,296	186	92	GA	EM73	**NJ7A**	A	11,778	148	78	UT	DN30	W9SE	A	10,106	122	62	IL	EN50	**KØVM**	6	3,120	65	48	IA	EN42
							N7EPD	A	10,650	135	71	WA	CN87	N9NDP	A	9,724	105	68	WI	EN62	KØSRL	6	2,860	65	44	IA	EN41
N5ITO	A	94,080	575	160	TX	EM23	**KI7JA**	A	5,928	88	52	OR	CN85	KB9IDT	A	7,497	110	63	IL	EN51	WØCEM	6	2,184	56	39	KS	EM19
KC5R	A	31,824	304	104	LA	EM40	N7DB	A	300	21	10	OR	CN85	WA8FIB	A	5,376	91	48	IN	EN61	NØUU	6	2,035	55	37	KS	EM18
WA5OK	A	28,231	252	109	OK	EM24	KG7P	A	290	23	10	WA	CN87	KB9YGD	A	5,346	98	54	IN	EN61	KCØQIE	6	1,813	49	37	KS	EM17
KD5ZVE	A	21,285	193	99	OK	EM26	N6KW	A	216	17	9	WA	CN87	K9VS	A	4,708	104	44	WI	EN52	WØCAR	6	816	34	24	CO	DM79
WA5LFD	A	14,861	175	77	TX	EM12	**K7BG**	6	56,400	376	150	MT	DN47	KC9EOQ	A	2,624	62	41	IL	EN51	WØJLF	6	570	30	19	MN	EN35
N5UM	A	12,798	150	81	OK	EM15	**K7TOP**	6	36,504	312	117	AZ	DM43	KE9LN	A	1,952	58	32	IL	EN52	WØVD	6	513	27	19	MO	EM27
WB5ZDP	A	9,815	137	65	TX	EM13	**K7CW**	6	26,741	221	121	WA	CN87	N9UX	A	72	8	8	WI	EN43	KAØEIC	6	96	12	8	KS	EM18
NM5M	A	6,625	108	53	TX	EM13	**WA7ADK**	6	2,090	55	38	UT	DN31	**N9AKR**	6	63,480	460	138	IL	EN61	KØVSC	6	42	7	6	MN	EN53
NØXLR	A	5,643	91	57	TX	EM13	N7YOQ	6	1,632	48	34	UT	DN41	**KE9I**	6	61,812	404	153	IN	EN61	NØUK	2	812	29	14	MN	EN34
KD5JGA	A	4,312	71	56	OK	EM16	K9WZB	6	1,620	45	36	AZ	DM24	W3HDH	6	37,518	338	111	IL	EN50	**KFØQ**	Q*	18,180	184	90	MN	EN43
KE5COS	A	2,596	52	44	OK	EM24	KM7DX	6	1,170	39	30	UT	DM37	**K9QVB/9**	6	35,868	294	122	WI	EN45	**KØNR**	Q*	3,078	75	38	CO	DM79
K5NZ	A	2,160	58	36	TX	EM20	N7NT	6	936	36	26	AZ	DM43	K9OR	6	23,028	202	114	IL	EN62	**NØYTR**	Q*	496	24	16	CO	DM78
WA5KBH	A	2,052	52	38	LA	EM30	W7TAX	6	300	20	15	WA	CN87	N9LF	6	6,200	100	62	IN	EN60	**KBØHNN**	Q*	192	12	12	MN	EN26
KD5YTU	A	456	20	19	TX	EM12	**N9ADG**	Q	2,688	64	42	WA	CN87	W9HR	6	3,650	73	50	WI	EN62	NØJK	Q*	9	3	3	KS	EM17
																					WVØH	Q	31,644	281	108	CO	DM79

KCØRQH	**Q**	**4,872**	**77**	**56**	**MN**	**EN35**
ACØAX	Q	64	8	8	NE	EN11
Rover						
N8DQS		**219,324**	**591**	**294**		**5**
K9JK		**172,542**	**464**	**298**		**10**
W4VHF		**119,259**	**476**	**189**		**4**
WB8BZK		**115,434**	**353**	**242**		**10**
N9TTX		**103,452**	**407**	**233**		**4**
N4DXY		**75,684**	**366**	**204**		**7**
W3DHJ		**44,800**	**252**	**175**		**5**
AF4OD		**30,820**	**262**	**115**		**5**
W4TXS		**26,035**	**186**	**127**		**4**
NT5HS		**21,844**	**172**	**127**		**8**
N9MYK		**21,248**	**166**	**128**		**11**
N8OC		**21,045**	**183**	**115**		**4**
AE5P		**16,848**	**130**	**117**		**10**
K9TMS		16,524	140	102		8
K8DOG		13,650	129	91		4
W5TD		**10,170**	**112**	**90**		**5**
N8II		**8,550**	**114**	**75**		**3**

WAØMHJ	**8,241**	**123**	**67**		**2**
N1KPW	**8,142**	**106**	**69**		**3**
W9SZ	7,434	93	63		4
NE9O	**5,428**	**92**	**59**		**3**
W6KA	**3,168**	**57**	**36**		**7**
W4WNT	1,872	45	39		2
N6TEB	1,869	54	21		4
K8YC	1,120	30	28		4
KB9KEG	475	25	19		2
KG4QEN	464	18	16		4
N6MOQ	420	19	14		5
N6ZE	416	21	13		2
NH6VJ	375	16	15		7
N3EMF	216	15	12		2
KA3KSP	2	1	1		2
CANADA					
VE1SKY	**6**	**49,952**	**446**	**112**	**NS**	**FN74**
VO1HE	**6**	**4,118**	**142**	**29**	**NL**	**GN37**
VE2DC	**A**	**4,452**	**78**	**53**	**QC**	**FN35**

VA2UK	A	3,484	65	52	QC	FN25
VE2TKH	**6**	**9,165**	**141**	**65**	**QC**	**FN36**
VA2SG	6	450	25	18	QC	FN48
VE3KZ	**A**	**89,600**	**424**	**200**	**ON**	**FN03**
W4TAA/VE3	**6**	**154,780**	**710**	**218**	**ON**	**FN14**
VE3VMP	6	7,104	96	74	ON	FN14
VE3VE	6	3,285	73	45	ON	FN03
VE3XD	6	180	15	12	ON	FN03
VE3MGY	6	49	7	7	ON	FN03
VE3HHT	**Q**	**3,366**	**60**	**51**	**ON**	**FN03**
VE3TLT	Q	3,128	58	46	ON	EN92
VE3CRU	**R**	**79,002**	**399**	**198**		**4**
VE3OIL	R	3,888	67	54		2
VE4EAR	**6**	**39,693**	**303**	**131**	**MB**	**EN19**
VE4GWN	6	4,452	84	53	MB	EN19
VE5SIX	6	957	33	29	SK	DO70
VE5UF	**R**	**37,680**	**240**	**157**		**6**
VA6AN	**A**	**29,636**	**235**	**124**	**AB**	**DO33**
VA7MM	**Q***	**1,196**	**43**	**23**	**BC**	**CN89**
BERMUDA						
VP9GE	**6**	**60,792**	**447**	**136**		**FM72**
GUATEMALA						
TG9ANF	**6**	**3,634**	**79**	**46**		**EK44**
MEXICO						
XE2MVS	**6**	**266**	**19**	**14**		**DL95**
XE2D	6	60	12	5		DM12
PUERTO RICO						
NP3CW	**A**	**37,281**	**287**	**129**		**FK68**
AFRICA						
CANARY IS.						
EH8BPX	**6**	**6,370**	**98**	**65**		**IL18**
EA8BPX	**2**	**600**	**20**	**15**		**IL18**
MADEIRA IS.						
CQ3A	**M**	**85,070**	**449**	**181**		**IM12**
ASIA						
CYPRUS - UK SOV. BASE AREAS						
ZC4LI	**6**	**10,624**	**128**	**83**		**KM64**
JAPAN						
JA2MWV	**Q**	**1,104**	**39**	**23**		**PM84**
JH3DMQ	**Q**	**672**	**40**	**16**		**PM74**
THAILAND						
HS6RMY	**2**	**9,920**	**248**	**20**		**OK06**
HS2ZMU	**2**	**6,976**	**436**	**8**		**OK03**
E22TV	**2**	**4,308**	**359**	**6**		**OJ07**
HS9KSX	**2**	**3,234**	**231**	**7**		**OJ06**
HS4DDQ	**2**	**3,050**	**305**	**5**		**OK03**
HS8LUR	**2**	**2,212**	**158**	**7**		**NJ99**
HS3PMT	**2**	**1,818**	**101**	**9**		**OK05**
HS4RDI	**2**	**1,620**	**90**	**9**		**OK17**
E20FVD	**2**	**1,430**	**143**	**5**		**OK03**
HS8LWQ	**2**	**1,290**	**129**	**5**		**NJ99**
HS6MCB	**2**	**1,134**	**63**	**9**		**OK05**
HS8VAY	**2**	**1,038**	**173**	**3**		**NJ99**
HS4FHT	**2**	**1,008**	**63**	**8**		**OK16**
E21EIC	2	606	101	3		OK03
HS4OUP	2	504	63	4		OK17
HS9EQY	**2**	**504**	**63**	**4**		**NJ97**
HS3NWD	**2**	**500**	**50**	**5**		**OK14**
E20TTJ	**2**	**496**	**62**	**4**		**OK04**
E22BPC	2	352	88	2		OK03
E20XMG/4	2	348	58	3		OK17
HS5XNL	**2**	**300**	**50**	**3**		**NK98**
E21YDP	2	186	31	3		OK03
E21QEB	2	156	26	3		OK03
HS1JNB	2	46	23	1		OK03
E20YRX	2	36	18	1		OK03
HS8KAY	2	32	8	2		NJ97
HS8KGG	2	20	10	1		OK03
HS9EOW	**Q***	**1,210**	**121**	**5**		**NJ97**
HS3KUI	**M**	**10,218**	**393**	**13**		**OK03**
HS7ZWU	**M**	**8,952**	**373**	**12**		**OK03**
HS1ASC	**M**	**6,320**	**395**	**8**		**OK03**
HSØIAQ	**M**	**6,160**	**308**	**10**		**OK03**
E21LYC	**M**	**5,648**	**353**	**8**		**OK03**
E21WRI	**M**	**5,392**	**337**	**8**		**OK03**
HS1LLT	**M**	**5,152**	**322**	**8**		**OK03**
HS6ULL	**M**	**3,344**	**152**	**11**		**OK04**
HS9PSU	**M**	**2,400**	**200**	**6**		**OJ07**
HS9KTY	**M**	**1,096**	**137**	**4**		**NJ97**
HS7ZSX	**M**	**1,010**	**101**	**5**		**NK92**
HS5IGY	**M**	**1,000**	**100**	**5**		**NK98**
HS8KFW	**M**	**992**	**124**	**4**		**NJ99**
HS8TRY	**M**	**970**	**97**	**5**		**NJ98**
HS9NPO	**M**	**588**	**147**	**2**		**OJ06**
TURKEY (ASIATIC)						
TA2RC/P	**6**	**3,484**	**67**	**52**		**KN50**
TA2RX	**Q**	**429**	**23**	**11**		**KN40**
TA3KC	**M**	**17,388**	**151**	**92**		**KM38**
TC7TA	**M**	**2,665**	**62**	**41**		**KN90**
EUROPE						
ALBANIA						
ZA/I2AZ	**M**	**988**	**28**	**26**		**JN91**

AUSTRIA					
OE1CWA/3	**Q***	**126**	**9**	**7**	**JN77**
BELGIUM					
ON6NL	**2**	**8,970**	**115**	**39**	**JO21**
BULGARIA					
LZ1ZF	**6**	**110**	**11**	**10**	**KN22**
LZ1MG	**Q**	**36**	**6**	**6**	**KN22**
LZ1MC	Q	1	1	1	KN22
CROATIA					
9A1DL	**2**	**1,494**	**83**	**9**	**JN95**
9A3TU	**Q**	**1,276**	**40**	**29**	**JN95**
CZECH REPUBLIC					
OK1KZ	**A**	**594**	**37**	**9**	**JO70**
OK1WMR	**2**	**25,760**	**230**	**56**	**JO60**
OK1KIM	**M**	**263,252**	**776**	**193**	**JO60**
OK1KDO	**M**	**20,520**	**184**	**60**	**JN69**
OK1KVK	**M**	**10,218**	**131**	**39**	**JO60**
ENGLAND					
G4DEZ	**6**	**11,100**	**150**	**74**	**JO03**
G3JJZ	6	100	10	10	JO01
MØWTD/M	6	36	6	6	IN79
MØMCX	**2**	**480**	**24**	**10**	**IO92**
M3RCV	**Q**	**5,060**	**81**	**46**	**JO01**
GØBRC	**M**	**13,640**	**134**	**62**	**JO01**
FRANCE					
F4DZF	**6**	**12**	**4**	**3**	**JN16**
GERMANY					
DL2OM	**A**	**23,040**	**157**	**90**	**JO30**
DL1ET	**6**	**210**	**15**	**14**	**JO31**
DK5DQ	**2**	**59,422**	**407**	**73**	**JO31**
DR2ØØ6E	**2**	**18,330**	**195**	**47**	**JO43**
DH8BQA/M	2	16	4	2	JO30
HUNGARY					
HG3IPD	**2**	**1,200**	**40**	**15**	**JN86**
HA2MN	2	10	5	1	JN97
HG2ØØ6GYR	**Q***	**1,938**	**57**	**17**	**JN87**
HA5CQZ/P	**Q***	**1,560**	**65**	**12**	**JN97**
HA4FY/P	**Q***	**168**	**21**	**4**	**JN97**
HG7DCD/P	Q*	126	21	3	JN97
HG2ECZ/P	Q*	24	4	3	JN86
IRELAND					
EI2JD	**6**	**9,450**	**135**	**70**	**IO63**
EI7IW	**2**	**864**	**36**	**12**	**IO63**
ITALY					
IZ3DBA	**6**	**56**	**8**	**7**	**JN55**
MACEDONIA					
Z36W	**6**	**19,698**	**201**	**98**	**KN11**
NORWAY					
LA3DV	**Q***	**180**	**15**	**12**	**JP30**
POLAND					
SP6MLK	**6**	**144**	**12**	**12**	**JO80**
SP3HTF	6	16	4	4	JO72
SQ6ELV	**Q**	**192**	**16**	**6**	**JO80**
PORTUGAL					
CT1EGH	**6**	**36,540**	**315**	**116**	**IM58**
CT1DRB	**Q**	**1,845**	**45**	**41**	**IM58**
SWITZERLAND					
HB9JAQ/P	**Q**	**2**	**2**	**1**	**JN36**
SPAIN					
EA2TO/1	**A**	**6,771**	**91**	**61**	**IN83**
EA2HB	A	24	4	4	IN93
EA2ARD	**6**	**39,501**	**297**	**133**	**IN93**
EB1EHT	**6**	**33,750**	**270**	**125**	**IN73**
EB1EWE	**6**	**28,112**	**251**	**112**	**IN53**
EA1WX	**6**	**13,708**	**149**	**92**	**IN63**
EH3FHP	6	1,440	40	36	JN11
TURKEY (EUROPEAN)					
TA1HZ	**2**	**48**	**6**	**4**	**KN41**
UKRAINE					
UR5DDX	**A**	**3,969**	**71**	**49**	**KN18**
UT5EU	**A**	**400**	**23**	**16**	**KN78**
UR5QU	**6**	**1,452**	**44**	**33**	**KN77**
UT2UB	**6**	**88**	**11**	**8**	**KO50**
UX8IR	6	6	3	2	KN87
UT5UKY	6	1	1	1	KO50
UT5DL	**2**	**2,106**	**39**	**27**	**KN18**
UT5ECZ	2	12	3	2	KN68
UZ5Q	**Q***	**35**	**7**	**5**	**KN77**
UW3E	**M**	**630**	**27**	**15**	**KN78**
SOUTH AMERICA					
BRAZIL					
PV8DX	**6**	**420**	**21**	**20**	**FJ92**
VENEZUELA					
YV4DDK	**6**	**806**	**31**	**25**	**FK60**

Expanded CQ WW VHF Results

For a listing of the ops and grids activated by the rover stations in the 2006 contest, plus the operators of the multi stations, go to <www.cq-amateur-radio.com>, to the Contests section, to "Expanded Results of the 2006 CQ WW VHF Contest."

Andrew Cinta® Cable Assemblies

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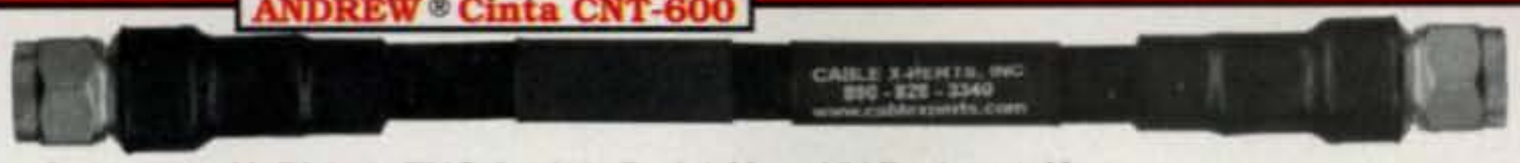
ANDREW® Cinta CNT-600



HALF INCH SIZE SHOWN

Connector: **N, PL259, TNC & 7/16,** Burial: **Yes**, UV Resistant: **Yes**.
Shields: **2** (100% bonded foil +90% TC Braid) **VP 87%,** Attenuation 3.9dB @ 2 GHz at 100ft.
Usage 450 MHz and Higher.

PL259 CONNECTORS EACH END

Part #	Footage	Price
600C125	125 ft	$235.95
600C100	100 ft	$205.95
600C75	75 ft	$175.95
600C50	50 ft	$145.95
600C25	25 ft	$115.95
600C3	3 ft	$ 88.95

PL259(UHF) TO "N" MALE CONNECTOR

Part #	Footage	Price
600CN100	100 ft	$187.95

"N" MALE CONNECTORS EACH END

Part #	Footage	Price
600N100	100 ft	$168.95
600N75	75 ft	$139.95
600N50	50 ft	$108.95
600N25	25 ft	$ 77.95
600N15	15 ft	$ 66.49
600N6	6 ft	$ 55.49

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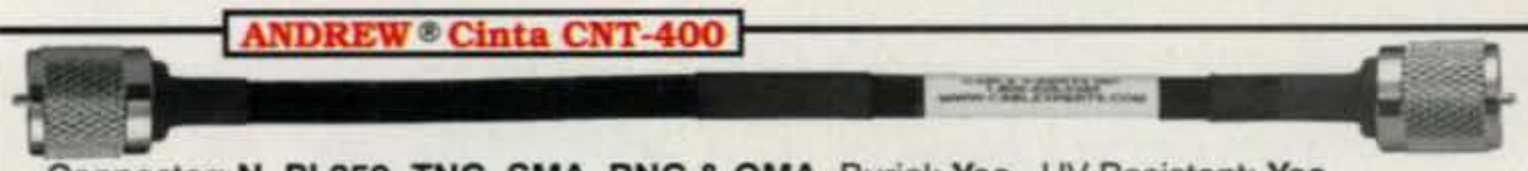
ANDREW® Cinta CNT-400



RG8U SIZE SHOWN

Connector: **N, PL259, TNC, SMA, BNC & QMA,** Burial: **Yes**, UV Resistant: **Yes**.
Shields: **2** (100% bonded foil +90% TC Braid) **VP 85%,** Attenuation 6.0dB @ 2 GHz at 100ft.
Usage 450 MHz and Higher.

PL259 CONNECTORS EACH END

Part #	Footage	Price
400C100	100 ft	$ 82.49
400C75	75 ft	$ 63.95
400C50	50 ft	$ 45.49
400C25	25 ft	$ 27.49
400C6	6 ft	$ 14.95
400C3	3 ft	$ 11.95

"N" MALE CONNECTORS EACH END

Part #	Footage	Price
400N50	50 ft	$ 54.95
400N6	6 ft	$ 22.95
400N3	3 ft	$ 20.95

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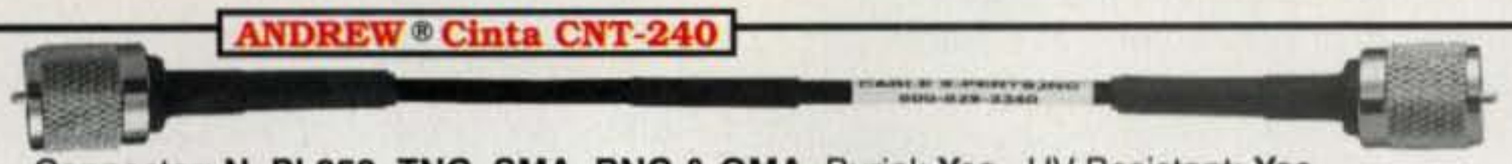
ANDREW® Cinta CNT-240



RG8X SIZE SHOWN

Connector: **N, PL259, TNC, SMA, BNC & QMA,** Burial: **Yes**, UV Resistant: **Yes**.
Shields: **2** (100% bonded foil +90% TC Braid) **VP 84%,** Attenuation 3.0dB @ 150 MHz at 100ft.
Usage 1 MHz and Higher.

PL259 CONNECTORS EACH END

Part #	Footage	Price
240C6	6 ft	$ 14.75
240C3	3 ft	$ 12.95

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Recently, declassified documents revealed how technology developed by the Lauton Institute in the 1990s can use digital music playback devices or pocket PCs together with Griffin technology to communicate in the infrared (IR) band. Now, any radio amateur can use this technology for line-of-sight communications, providing their playback system is loaded with a collection of canned songs for ham radio QSOs.

A CQ Exclusive:

Communications in the Infrared Band Using a Digital Music Playback Device, a Griffin Sound-to-IR Converter, and Today's Top Ham Radio Songs

BY PROFESSOR EMIL HEISSELUFT*
Lauton Institute, Grossmaul-an der Donau, Austria

Unbelievable! Just when you think you've heard and seen it all, along comes Professor Heisseluft to tell us about a recently declassified program that employed messages stored as songs for use in covert communications. Specifically, the program involved the use of encrypted messages that were stored digitally as songs, which, in turn, were converted to IR signals and used for line-of-sight communications in urban guerrilla warfare operations. The notion boggles the mind, and if it had not been for the development of even more robust communications modes, this unique communications technology might never have seen the light of day. We are humbled by the professor's choice of CQ as the venue in which to showcase this stunning achievement of the Lauton Institute, and commend this article to your immediate attention.—W2VU

Fig. 1– A key component of the system is the sound-to-IR converter. This is an early model produced by Griffin. Some readers even may want to build their own converter. (See the discussions in note 2.)

Readers of my many articles know that the Lauton Institute has had an intimate relationship with the intelligence community for more than 30 years. Under the leadership of notables such as Dr. Jerzy Ostermond-Tor (ex-YM4XR)[1] and others, our researchers have long made significant contributions to major defense and intelligence programs that once declassified, were described first in the pages of *CQ* magazine. For example, this magazine's readers have been privileged to see descriptions of our seminal work on topics such as stealth technology (1982), Star Wars (1983), ionospheric propagation on Mars (1994), interactions of high-energy solar particles with the North American power grid (2002), and the use of unique cavity resonators to sniff out holes in wireless network security (2004), among others.

Thus, dear readers, you should not be surprised to learn that in that mid-1990s, even before the iPod® was in its infancy, the Lauton Institute already was developing prototypes of similar devices and incorporating within them the capabilities needed to store and play back "songs" that basically were canned encrypted messages configured for specific tactical situations. Any given message could be called up and played in the same manner as one plays a song on a digital music player today. However, instead of listening to it using speakers, the digitized audio signal was converted to an IR signal that was transmitted via a line-of-sight path to an IR receiver/converter carried by another (friendly) combatant. Covert signals transmitted in this way allowed small military units to communicate in total silence under conditions in which the use of radio and other conventional communications modes might compromise a mission. Fortunately for the amateur radio community, this technology recently was declassified, and thus it is possible to describe how members of the amateur community now can build such IR communications systems on their own and enjoy the many benefits that can accrue from experimenting with these devices.

How to Build a Portable IR Transmission System

To build a portable IR transmission system of the type

**Professor Heisseluft is back in Austria, where he currently is recording a new CD for the CQ Bookstore: "Ham Radio's All-Time Top 100 QSOs for IR Communications," which should be out in the summer of 2007. Mail may conveniently be sent to the professor c/o CQ Magazine, 25 Newbridge Road, Hicksville, NY 11801. e-mail: <heisseluft.emil@mashuga.orf.ar>*

Top 25 Country & Western Ham Radio Songs (59.1 MB)

Title	Time (min)
QTH is the United States	1.01
Rig is an MP3 Music Player with a Homebrew IR Converter	1.78
WX is Clear and Temps are Moderate for This Time of Year	1.59
UR 599 and Clear as a Bell (The Speaker is A-Rattlin' Off the Wall)	1.27
I Worked DX All Night (She Cried Herself to Sleep)	2.57
Yes, It Was His Frequency (I Took It From Him Anyway)	2.13
160 Meters is for Gentlemen (I Worked Bouvet Three Times on Topband)	2.11
CW Is Forever, So Get Over It	1.14
BPL Is The Devil's Technology (It's Doomed To Hell and Good Riddance)	2.45
She Said If I Worked One More Country, I Was Sleepin' Alone Tonight	2.14
My Wife Took the "X" Out of XYL, and Now I'm Poor as a Church Mouse!	2.22
Bye Bye Opening (Why Oh Why Did The Sun Have To Come Up?!)	1.01
I Didn't Know Who She Was (She Lives Next Door and Said I Was Coming in on Her TV)	1.89
I'm Movin' On to 20 (It Looks Like 15 is Played Out)	1.43
Heading for the Last Hamfest	1.54
Red Hot Plates Light Up My Shack (Class C Modulation is the Only Way to Go)	2.13
The Pleasure and Pain of DX (Did You Hear Me Work Him?)	1.66
He's Comin' in Too Strong (My Receiver's in Overload)	1.78
High Steppin' Gal (She's Checking the Beverage in the Pasture for Me Now)	2.56
Rhythm of the Woodpecker (Haven't They Silenced the OTH Radars Yet?)	1.88
Hammin' All Day (I Wonder If I'll Have a Job Tomorrow)	2.54
I Need Someone To Cry To (My Amplifier Blew Just as the P5 Came on the Air)	2.45
The Wayward BFO (I Could Have Done Without that Pink Ticket!)	1.77
Time is Running Out (The Contest Ends in 4 Minutes)	2.23
Those Were the Good Old Days (A 6L6, S-38, and Dipole on 3718.2 kc)	2.78

Fig. 2– These 25 Top C&W (Country and Western) Ham Radio Songs now being recorded by The Lauton Institute are among the 100 that will be available this summer for use with your IR communications system.

described above, you will need three components:

- Digital music playback device or Pocket PC
- PC or Mac with sound recording hardware/software
- Griffin's sound-to-IR converter (see fig. 1, which shows an early model; some users have reported success in finding these devices by advertising for them on e-Bay).

Begin by recording a message in International Morse code on your desktop or portable computer. Save it as a .wav or an MP3 file (depending on the type of digital music player you are using), naming the file in a manner appropriate to the content. Transfer the file to your portable music playback device on which you have installed the Griffin sound-to-IR converter. Now you are ready to communicate. To transmit, simply select the "song" you wish to play (transmit), and key the PLAY button. At the other end of the link, you will need a pocket, portable, or desktop PC with Griffin's Total Remote Software and IR device[2] installed to receive and store the message for subsequent playback. Reference to other tutorials on the technologies employed will prove helpful.[3] Should you find it difficult to locate the Griffin device pictured in fig. 1, consider using Griffin Technology's 5001-RMT PDA Remote[4] with a Pocket PC at one or both ends of the link.

Top 25 Country and Western (C&W) Ham Radio Songs

If you do not wish to develop your own suite of digital music messages, it will not be long before the Lauton Institute issues an entire CD comprised of canned messages that you can use for your contacts or tests. We have worked with select amateur radio operators in Nashville, Tennessee and Ft. Worth, Texas to create a suite of 100 C&W "songs," each of which is recorded in CW at 10 wpm. The titles for the first 25 of these transmissions are shown together with other relevant data in fig. 2. You certainly should be able to understand the content of each message from the title, thereby allowing you to select a message appropriate to the QSO in which you are engaged.

Summary

Using the techniques described in this article, any experimenter should be able to rapidly construct an IR-based communications system for amateur communications. This system, together with the soon-to-be-released CD containing the top 100 C&W and western ham radio songs for amateur QSOs, will provide everything you need to enjoy this exciting mode with others who are on line-of-sight paths from your location.

Notes

1. The claims of former U.S. Vice President Gore notwithstanding, it is Dr. Ostermond-Tor who is recognized universally as the Father of the Internet. In his seminal article "Special Subscriber Service: The Telephone Company's Answer to Amateur Radio" (*CQ*, April 1967, pp. 24–26), Prof. Ostermond-Tor presented the essential elements for what we know today as the Internet.
2. <http://www.griffintechnology.com/griffinmobile/totalremote/>
3. Other applications of this technology involve using digital music playback devices as universal remotes. Readers are referred to the following URL for details: <http://features.engadget.com/2004/07/27/how-to-turn-your-ipod-in-to-a-universal-infrared-remote-control/>
4. <http://www.shentech.com/totalremote.html>

There's a hidden transmitter out there waiting for you to find it. It's time to gather the RDF gear and plan for the CQ Worldwide Foxhunting Weekend on May 12–13, 2007!

Take the Foxhunting Challenge

BY JOE MOELL,* KØOV

What kind of ham radio contest is this, anyway? It takes place all over the world, but not necessarily on the same date or time for everyone. All of the contestants are away from home, but some are mobile while others are on foot. The participants don't know where they will end up and sometimes they don't know exactly what they are looking for.

In ham radio foxhunting, the rule details vary from town to town. Competitors add wear and tear to their vehicles and some end up wet or muddy. However, everyone has a great time. They go home knowing who won and who lost without having to wait for the results on the internet or in a magazine. Usually the winner immediately begins to plan how he'll try to stump the group the next time.

Hidden transmitter hunting has been part of ham radio since before the World War II, and today it's done in two basic forms. Mobile "T-hunters" take to the streets and highways in all types of vehicles, equipped with a wide variety of radio-direction-finding (RDF) equipment.[1] They try to drive all the way to the signal source, or at least close to it. The winner does it first or does it with the lowest odometer mileage, depending on the rules.

On the flip side is all-on-foot transmitter hunting, also called *foxtailing* and *radio-orienteering*. What a great way to get exercise and enjoy ham radio at the same time! Events run the gamut from micro-transmitters in the park to formal radio runs in wilderness areas encompassing thousands of acres. Try it and maybe you'll become a national or world champion!

For the tenth year, *CQ* is promoting radio foxhunting of all kinds by sponsoring the CQ Worldwide Foxhunting Weekend, May 12–13, 2007. The name has changed from National Foxhunting Weekend, because in recent years activity reports have come in from all over the globe.

This is a time for hams all over the country, beginners and experts alike, to take part in this ham radio sport. Besides being excellent training for volunteer enforcement and search/rescue missions, it's a whole lot of fun!

A simple cubical quad on a window mount is an excellent way to get started in 2-meter mobile T-hunting. Crystal Melhorn, W9IOU, and Anthony Boudreau were the winning team at the Kankakee Amateur Radio Society's T-hunt in Illinois during the 2004 Foxhunting Weekend. (Photo by Clay Melhorn, N9IO)

Have It Your Way

CQ doesn't impose any rules or offer any certificates for its Worldwide Foxhunting Weekend. It's all up to you and the hams in your hometown. You don't even have to schedule your hunt on May 12–13. Any weekend in the spring will be fine! For many clubs, Foxhunting Weekend kicks off a season of regular transmitter hunts. For others, it's a special once-a-year event, like Field Day.

Some hams prefer formal transmitter hunts with carefully crafted boundaries, specifications for signal parameters, time limits, and so forth. Others are completely content just by having one or more signals to hunt—no need for any more regulations, they say.

If your club has never done mobile T-hunts before, it's easy to get started. All you really need is a willing volunteer with a 2-meter radio. Tell him or her to find an unusual location

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Full size performance is achieved using separate full size radiators for 2-20 Meters and highly efficient end loading for 30, 40, 75/80 Meters.

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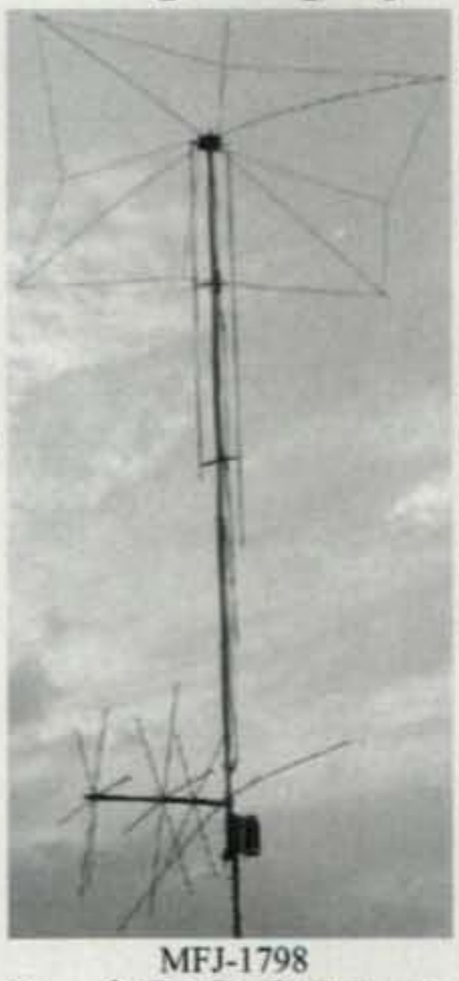
MFJ's unique *Elevated Top Feed*™ elevates the feedpoint *all the way to the top* of the antenna. It puts the maximum radiation point high up in the clear where it does the most good -- your signal gets out even if you're ground mounted.

It's easy to tune because adjusting one band has minimum effect on the resonant frequencies of other bands.



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Self-supporting and just 20 feet tall, the MFJ-1798 mounts easily from ground level to tower top -- small lots, backyards, apartments, condos, roofs, tower mounts.

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Separate *full size* quarter wave radiators are used on 20, 17, 15, 12, 10 and 2 Meters. On 6 Meters, the 17 Meter radiator becomes a 3/4 wave radiator.

The active radiator works as a stub to decouple everything beyond it. *In phase* antenna current flows in all parallel radiators.

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On 30, 40, 75/80 Meters, end loading -- the most efficient form of loading -- gives you highly efficient performance, excellent bandwidth, low angle radiation and automatic bandswitching.

MFJ's unique *Frequency Adaptive L-Network*™ provides automatic impedance matching for lowest SWR on these low bands.

Tuning to your favorite part of these bands is simple and is done at the *bottom* of the antenna.

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You don't need a ground or radials because an effective counterpoise that's 12 feet across gives you *excellent* ground isolation.

You can mount it from ground level to roof top and get awesome performance.

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The feedline is decoupled and isolated from the antenna with MFJ's exclusive *AirCore*™ high power current balun. It's wound with *Teflon*® coax and can't saturate, no matter how high your power.

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Incredibly strong solid fiberglass rod and large diameter 6061 T-6 aircraft strength aluminum tubing is in the main structure.

Efficient high-Q coils are wound on tough *low loss* fiberglass forms using highly weather resistant *Teflon*® covered wire.

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MFJ's *tiny* 36 inch diameter loop antenna lets you operate 10 through 30 MHz *continuously* -- including the WARC bands!

Ideal for limited space -- apartments, small lots, motor homes, attics, or mobile homes.

Enjoy both DX and local contacts mounted vertically. Get both low angle radiation for excellent DX and high angle radiation for local, close-in contacts. Handles 150 watts.

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Fast/slow tune buttons and built-in two range Cross-Needle SWR/Wattmeter lets you quickly tune to your exact frequency.

All welded construction, no mechanical joints, welded butterfly capacitor with no rotating contacts, large 1.050 inch diameter round radiator -- not a lossy thin flat-strip -- *gives you highest possible efficiency.*

Each plate in MFJ's tuning capacitor is welded for low loss and polished to prevent high voltage arcing, welded to the radiator, has nylon bearing, anti-backlash mechanism, limit switches, continuous no-step DC motor -- gives smooth precision tuning.

Heavy duty thick ABS plastic housing has ultraviolet inhibitor protection.

MFJ-1788, $449.95. Same as MFJ-1786 but covers 40 Meters-15 Meters continuous. Includes super remote control.

MFJ-1782, $359.95. Like MFJ-1786 but control has only fast/slow tune buttons.

MFJ-1780, $259.95. *Box Fan* Portable Loop is about the same size (2x2 foot) as a box fan, complete with handle. Covers 14-30 MHz. Control has fast/slow tunes.

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MFJ's G5RV Antenna

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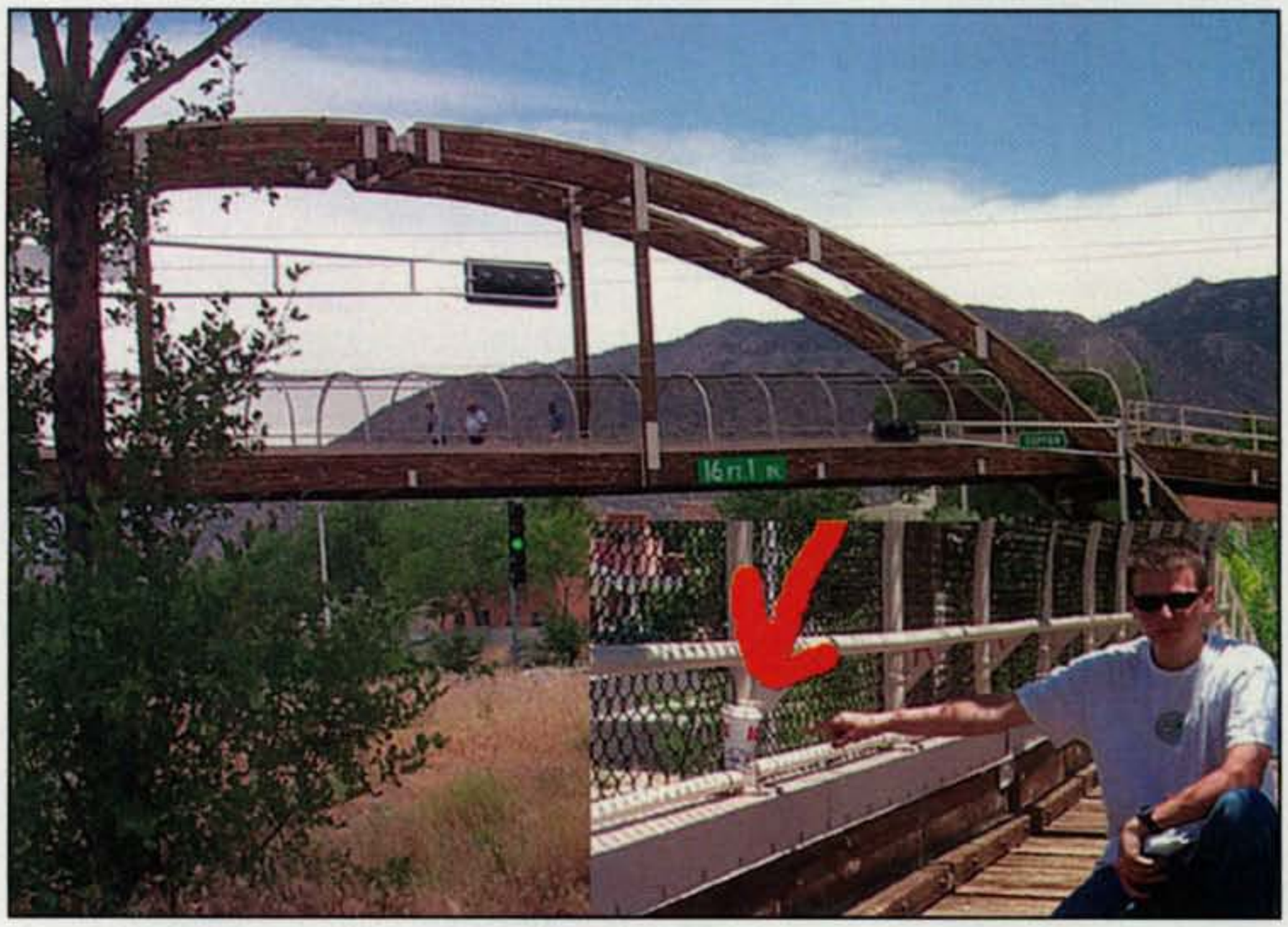
Postage-stamp-size hidden transmitters can go almost anywhere. Mel Parrish, K6UV, found this one under a traffic cone during the 2005 Foxhunting Weekend in Las Vegas, Nevada. (Photo by Lori Parrish, N6LKT)

and start transmitting at the appointed hour. A good time for your club's first hunt might be a weekday evening right after a net, when the local repeater has lots of listeners.

Automated foxboxes are nice, but not mandatory. From the hiding place, the designated fox can simply make frequent transmissions on the repeater input, urging every listener to get in the vehicle and participate. It's good to declare small boundaries, such as a county or part of it. After a while, help fledgling hunters by announcing smaller boundaries or giving other clues.

The first mobile T-hunts should be easy enough that everyone is successful and encouraged. The signal should

Surplus steel ammunition boxes are popular weatherproof containers for remote-controlled 2-meter transmitters. Be sure to label the box with your name and contact information to keep citizens from reporting a suspicious object to the authorities. (Photo by Randy Holland, KO6KC of Las Vegas, Nevada from Foxhunt Weekend 2004)



Camouflage and decoys are popular ways to spice up transmitter hunts in Albuquerque, New Mexico. In the summer of 2004, Mike Pendley K5ATM and his son Steve KD5TBX (pictured in the inset at lower right) put a tiny emitter inside an old styrofoam coffee cup with lid on a pedestrian overpass. A decoy ammunition box with antenna was at ground level, right below the real antenna in a bush. All but one of the hunting teams were fooled by the decoy. (Photos by Mike Pendley, K5ATM)

be strong and the transmitter should be in plain sight, perhaps in the parking lot of a restaurant or on a table in a city park. Give them a challenge, but don't make it "Mission Impossible." Some snacks for the fox finders would be nice, or everyone can get together for supper or dessert afterwards.

With a few short hunt successes, everyone will be eager to try longer range hunts. It's best to hold them on a simplex frequency, rather than tie up a repeater for long periods. Hiders will quickly learn to use tricks such as camouflage and controlled signal reflections.

A local park or school yard would be a good place for an all-on-foot foxhunt with some miniature transmitters of 100 milliwatts or less. Imagine the fun of a dozen club members spread out in search of a half-dozen mini-foxes, all on different frequencies. Be sure that the kids, grandkids, nieces, and nephews of all members are invited. They don't need driver's licenses or ham licenses to receive and to hunt. Their RDF gear can be very simple.[2]

Two meters is the most popular band for RDF contesting nowadays, but there are many other options. Loop or ferrite-

Be sure to include young people in your Foxhunting Weekend activities. They don't have to have ham radio licenses to track down your foxboxes in the park and learn about our hobby in the process. Tom Gaccione, WB2LRH, is showing a Cub Scout how to do RDF in Long Beach, California as Dad follows along. (Photo by Joe Moell, KØOV)

How about a picnic after the transmitter hunt? Matt Hodges, KØTEA, is serving hot dogs and bratwursts to hunters as they arrive at Pioneer Park in Lincoln, Nebraska, where he hid the last of four foxboxes on Foxhunting Weekend 2004. (Photo by Joe Moell, KØOV)

rod antennas are compact, lightweight performers on 80 meters, very easy for young people to carry. Kids can also tote a Yagi for the 440-MHz band more easily than one for 2 meters. Six meters or 10 meters might make a good change of pace for your next mobile hunt.

Whatever your club's RDF contesting style, be sure to keep safety in mind. Don't put transmitters where someone might get hurt getting to them. Always be mindful of your physical limitations as well, and never take chances behind the wheel.

Afterwards, write up the results and send them to me. The list of information in a complete CQ WW FW report is posted at my website: <www.homingin.com>. Besides the details of date, location, hiders, and winners, readers also want to know what was unique about your hunt and what lessons (positive and negative) you learned from it.

Take lots of photos for your club newsletter and please send some to me. Although digital files are best, sharp 5×7 prints might be usable. Resolution of 640×480 is the bare minimum, but a camera of at least four megapixels will do much better. Hint: Have the subject remove his or her baseball cap when the sun is overhead to prevent a dark oblong shadow on the face.

Plan Now for USA's National ARDF Championships

Santa Barbara Amateur Radio Club and Los Angeles Orienteering Club are joining forces to host the 2007 USA Championships of Amateur Radio Direction Finding (ARDF). It will be September 14–16, 2007 at South Lake Tahoe, in the Sierra Mountains near the border between California and Nevada. All competitions are on foot; no vehicular T-hunting is involved.

Friday will be a practice and equipment checkout day, followed by the 2-meter contest on Saturday and the 80-meter contest on Sunday. Event headquarters will be at Camp Concord in the El Dorado National Forest. An inexpensive package including two nights of lodging in the rustic cabins and five meals will be offered to event registrants. There are other lodging and dining options nearby.

National ARDF Championships are for individuals only. No teaming or assistance on the course is permitted. Participants are divided into five age categories for males and four age categories for females in accordance with standard IARU rules (see <http://members.aol.com/homingin/intlfox.html#rules>) Medals for first, second, and third place will be awarded in each category.

Even if you have never competed in an international-rules RDF event before, and even if you don't have a ham radio license, you will be welcomed at the USA Championships. The courses are open to all, beginner and expert alike. USA's best on-foot foxhunters will be present, and they love to help newcomers at the practice sessions. To provide even more learning opportunities, there are plans for an optional ARDF training camp during the two days just before the championships.

This year's course sites are so good that they will attract the attention of ARDF enthusiasts from around the globe as well as around the states. Inquiries about attending have already been received from Europe and Asia. As in recent odd-numbered years, the 2007 USA ARDF Championships will be combined with the ARDF championships for the International Amateur Radio Union (IARU) Region 2, encompassing North and South America. Previous IARU R2 championships in the USA have drawn competitors from Australia, Canada, the Czech Republic, Bulgaria, Hungary, Japan, Kazakhstan, Russia, and Sweden.

General chair of the organizing committee is Marvin Johnston, KE6HTS. More information, plus registration forms when available, can be found at <www.homingin.com>. There you will also find lots more about the international sport of ARDF.

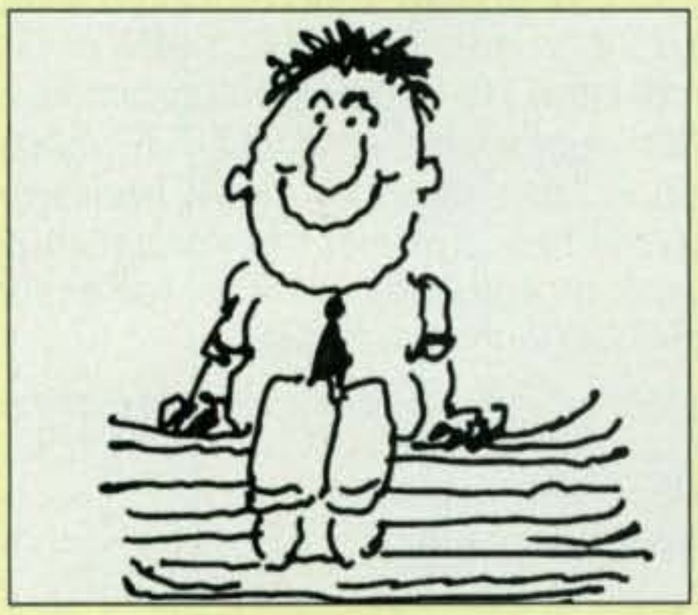
In next month's *CQ*, I'll be back with stories and photos from last year's Foxhunting Weekend, which will give you plenty of ideas for challenging and inventive hunts of your own. Start talking up the CQ WW FW and making plans for your club's participation.

Happy Hunting!

CQ WW FW Moderator Joe Moell, KØOV, is also the ARRL's ARDF Coordinator. His "Homing In" columns on RDF topics appear in CQ VHF *magazine. Joe's website, <www.homingin.com>, has a wealth of information on the technical side of RDF as well as current foxhunting activities.*

Notes

1. See <http://members.aol.com/homingin/SoCalStyle.html>
2. See <http://members.aol.com/homingin/equipment.html>



What You've Told Us...

Our January survey asked your opinions on the new policy of the American Red Cross to require background checks, including permission for credit checks, on all employees and volunteers **(Note: This policy has been modified; see this month's "Public Service" column).**

More than half of you who responded (56%) say you have at some point provided amateur radio communications services to the Red Cross. On the other hand, only 43% of you have ever been registered as a Red Cross volunteer (21% in connection with ARES deployment, 22% as general volunteers). More than half of you (54%) are registered with ARES (the Amateur Radio Emergency Service), while 46% belong to SKYWARN, 44% with your local emergency management agency, 6% SATERN and 21% another emergency communications group. The majority of you (55%) believes ARES volunteers should *not* have to register as Red Cross volunteers, while 23% say it depends on the situation, 11% say yes, and another 11% have no opinion.

Regarding the background check requirement, 34% of you say a criminal background check for employees and volunteers is OK, but a credit check goes too far; 23% believe the whole thing is unnecessary; 17% say a criminal check for all is OK, but only employees should be subject to credit checks; 14% agree with background checks for employees but not volunteers, and another 14% agree that it is necessary for everyone.

Two in five respondents said they would not agree to the background check, even if it meant not helping at a disaster; 20% would want assurances about what checks would be conducted before agreeing; 19% were OK with it, and 15% said they wouldn't be volunteering with the Red Cross regardless. More broadly, 82% felt the new rule would shrink the pool of potential Red Cross volunteers, while only 7% felt it would encourage more people to volunteer and 6% felt it would have no impact. Finally, 59% said they have not been required to have background checks for other ham radio volunteer roles, 19% said yes for emergency management, 24% said yes for other, 7% for scouting and 1% for Salvation Army.

This month's free subscription winner is Douglas Edwards, KB2RLO, of Arcade, New York.

Reader Survey April 2007

We'd like to know more about you—about who you are, where you live, what kind(s) of work you do, and of course, what kinds of amateur radio activities you enjoy. Why? To help us serve you better.

Each time we run one of these surveys, we'll ask a few different questions and ask you to indicate your answers by circling numbers on the Survey Card and returning it to us. As a bit of an incentive, we'll pick one respondent each month and give that person a complimentary one-year subscription (or subscription extension) to *CQ*.

This month, we'd like to know a little bit more about how you fit ham radio in the rest of your life.

Please answer by circling the appropriate numbers on the reply card.

1. About how frequently do you get on the air? (select one)
- Daily....29
- Several times a week....30
- Several times a month....31
- Several times a year....32
- Once or twice a year....33
- Less than once a year....34
- Not currently active....35

2. Do your operating times tend to be more scheduled or more random?
- Scheduled....36
- Random....37

3. What generally determines when you get on the air?
- A specific time, such as weekend mornings....38
- A specific event, such as a net or a contest....39
- Seeing something you need on the DX Cluster....40
- Having time while driving....41
- Having time while at home....42
- Other....43

4. When you get on the air, do you generally have a specific goal in mind?
- Working a specific band....44
- Working a specific part of the world....45
- Working a specific mode....46
- Working a particular station or group of stations....47
- Participating in a specific activity, such as a net or a contest....48
- Nothing specific, just tune around looking for activity....49
- Other....50

5. What is the rest of your family doing when you're on the air?
- At work or school....51
- Doing other things at home....52
- Doing other things away from home....53
- Sitting in the shack, listening or participating....54
- I live alone....55
- Other....56

6. Does your operating often conflict with other things you need or want to do?
- Yes, but operating usually wins out....57
- Yes, and the other things usually win out....58
- Yes, and my spouse always wins....59
- Generally no conflicts....60

Thank you very much for your replies. We wil be back next month with more questions.

Alinco delivers more operating fun for less.

Dual Band Dynamos for your pocket or your car!

DR-635T 2M/440MHZ Mobile/Base Transceiver

Dual Band Transceiver with Full Duplex Capability

Alinco's new DR-635T is an easy-to-use, high-quality transceiver for simplex and repeater operations on the VHF and UHF bands. With cross-band repeat, full duplex capability and a remote mountable control head, the DR-635T features newly designed RF circuitry that delivers increased resistance to interference from adjacent signals. Plus, a new protection circuit automatically lowers the power setting whenever the internal temperature rises. This protects the radio when used as a cross-band repeater. But, that's just the beginning:

- Large, 6 character alphanumeric display with freely and separately selectable three color display *illumination* in blue, violet or orange for TX/RX/stand-by
- TCXO that is stable to ±2.5 ppm
- Narrow FM mode
- Power supply voltage display
- Ignition key on/off feature & theft alarm feature
- CTCSS, DCS encode/decode and DTMF encode functions plus European Tone Bursts
- Multiple scan modes and extended receive capabilities including broadcast FM
- Backlit DTMF microphone allows direct frequency entry and more
- VHF: 50/20/5, UHF: 35/20/5 watt power output settings
- 200 Memory channels that can operate in splits of 80ch/VHF, 80ch/UHF and 40ch freely programmable with 1 call channel each for VHF and UHF operation
- Extended receive from 108.000 ~173.995MHz / 335.000 ~ 479.995MHz / 87.5 ~ 107.995MHz, transmits from 144.000 ~ 147.995MHz / 430.000 ~ 449.995MHz, plus reception on AM aircraft band and the ability to operate on MARS frequencies
- Can also operate with Alinco's optional EJ-50U digital data packet board that fits inside or the EJ-47U digital voice board

Thanks to Alinco, you can have a dual band dynamo in your pocket AND in your car!

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Hams are packing some serious radio power in their pockets with the DJ-C7T, the new dual band mini HT. Alinco led the way in breakthrough miniature electronics technology with its revolutionary "credit card" size transceivers. Now, the DJ-C7T offers a "pocket size" HT that's small in size but BIG in added memories and modes.

Check out the features of this "new generation" DJ-C7T

- Internal speaker with great audio!
- 200 Memories
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- SMA antenna port
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- Cloning feature
- Lithium-ion battery
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- Auto repeater setting

The DJ-C7T can fit in a pocket or purse, but it's a versatile dual band HT with an enhanced receiver. So, you can enjoy twice the operating fun in half the size.

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BY BOB JOSUWEIT,* WA3PZO

Red Cross Backs Down on Checks; ARRL Works on Emergency Response

Last month we reported on discussions taking place over the Red Cross mandatory background check. Rhode Island Red Cross CEO John Holt told the Kent County *Daily Times* that the credit check "caused some consternation amongst our volunteers, and rightly so." He said he was confident that changes will be made so volunteers will be OK with it.

In late December 2006 the American Red Cross extended the background check deadline until March 31, 2007 and said that a leadership team would examine specific aspects of the program so that they were better understood and accepted across the organization.

Now those changes have been announced. As first reported in *CQ* in February, the Red Cross approved key modifications to its background check program, specifically related to the consent form. These changes respond to concerns of the Red Cross field while maintaining an organization-wide background check program.

According to information received from a spokeswoman for the Southwest Service Area (Arkansas, Louisiana, New Mexico, Oklahoma, and Texas) of the American Red Cross, the following changes were made to the background check policy in early February.

• A new consent form that eliminates all references to credit checks and mode of living will be developed.

• The Red Cross will not run future credit checks or mode-of-living checks on anyone who has signed the previous consent form. The Red Cross will consider that consent form null and void as to the credit check and mode-of-living authorizations, and promises not to conduct a credit check on individuals unless they obtain a second consent form from them authorizing those checks. Mode-of-living checks will not be conducted under any circumstances.

• In an effort to establish and maintain consistency across the organization, Jane Gilbert, Senior Vice President, Service Area Support, will convene a working group to establish an ongoing credit-check policy that will define which positions require a credit check in the future and how to evaluate credit checks for those positions.

Jack McGuire, American Red Cross Interim President and CEO, and Kate Forbes, National Chair of Volunteers, issued a statement saying, "We believe these changes respond to legitimate concerns and still maintain a strong organization-wide background-check program.

The Red Cross has made some changes to its controversial policy requiringbackground checks on all employees and volunteers "to respond tolegitimate concerns." See text for details. (Photo: Peter Teahen, American Red Cross)

"We listened to your concerns and feedback and determined that adding another consent form in the event that a credit check is needed best met the needs of our volunteer force."

The statement continued, "All other aspects of the program remain unchanged, including the deadline of March 31, 2007, by which all employees and volunteers must undergo and clear a background check. Employees and volunteers who have not cleared a background check by this date will no longer be able to serve with the Red Cross until they do so."

A note from a Connecticut Red Cross Chapter added, "Thanks for all that ARRL members do for the Red Cross, both at the Chapters and across the Red Cross organization. I hope that this change to our program eases some of your concerns and that we'll continue to work together for the benefit of our neighbors."

One of the many concerns still to be worked out is to whom amateur radio emergency communication groups report. Are the amateur radio groups working alongside the Red Cross and providing a communication service to the Red Cross, or are they being asked to be Red Cross volunteers to provide communications? The answers from ham

*c/o CQ magazine
e-mail: <wa3pzo@cq-amateur-radio.com>

radio operators across the country vary from black to white and all shades in between. The ARRL/Red Cross Statement of Understanding is up for renewal in September. We'll continue to cover this important issue.

ARRL—"Could Have Done Better"

This past January the ARRL National Emergency Response Planning Committee submitted a final report to the ARRL Board of Directors. The plan covers many areas of interest and concerns of those involved with amateur radio emergency communications. This month we'll examine the report and look at possible changes in emergency communications.

Often when you read corporate reports, the committee reports indicate a pat on the back plus state that there's more that can be done. This one is no different. The NERPC report says the "achievement of volunteer Amateur Radio communicators in times of disaster cannot be commended too highly. . . . Amateurs have served in the extraordinary disasters of the 21st century with great personal courage, skill, and generosity." ARRL First Vice President Kay Craigie, NK3N, chairman of the committee wrote, "The ARRL as a national organization could have done better and must do better in the future."

While most disasters occur in a relatively small area, several disasters have occurred in the past ten years that required an unprecedented response at a national level. These include the terrorist attacks on September 11, 2001, the 2004 series of hurricanes in Florida, and the Gulf Coast hurricanes in 2005. The committee indicated that the ARRL must prepare to "respond to the requests of our national-level served agencies in a timely manner with a sufficient number of the best qualified communicators in the country."

The ARRL's National Emergency Response Planning Committee delivered a report praising the work of ham radio communications volunteers–such as Connecticut DEC David Hyatt, K1DAV, seen in this photo—but said much more needs to be done if ham radio is going to continue meeting the needs of served agencies. (Photo: Allen Pitts, W1AGP/ARRL)

Craigie wrote that it is "important for amateur radio to avoid being dazzled by our own press clippings into thinking that we are the big dog in emergency telecommunications. Here in the U.S., we see a post-Katrina emphasis on speeding up the deployment of sophisticated communications systems after disasters so that governmental and non-governmental

The ARRL's look at future emergency communications needs stressed the need for hams to learn to work within today's emergency response structures,such as the Unified Command System. Participation in drills, such as this one called Top off-3, helps build relationships between hams and other emergency responders. (Photo: Allen Pitts, W1AGP/ARRL)

organizations can get to work quickly. As the emergency telecomm world as a whole speeds up its reaction time, so must we hams be better organized, more capable, and be on the scene as quickly as possible after our help is requested, if we are not to arrive after our window of usefulness has closed. Given ham radio's dependence on emergency communications as a vital reason for its existence in this country, it would be suicidal to assume that what we have always been able to do, at the speed we have always been able to do it, will be just fine to maintain our relevance into the indefinite future."

Passing the Message

While many local emergencies rely on amateur radio to supply tactical communications on VHF/UHF FM, formal message handling is an important part of emergency communications. The report says, "Moving a large volume of messages quickly and accurately via Amateur Radio was a challenge twenty years ago when Amateurs were simply expected to back up telephone communications. Today, when Americans are accustomed to the rapid throughput and high accuracy of Internet communications, the challenge for Amateur Radio messaging is logarithmically greater."

The NERPC report discusses the importance of using all modes of communication to pass messages. It says, "The greatest value to the customer is provided when all available communications networks are used. "It also says that "Amateur Radio Emergency Communications Vehicles (ECVs) are valuable as self-contained, mobile communications centers. They serve as an ideal platform for a mobile gateway supporting local area and out-of-area high speed communications." Two of the best known systems for high-speed communication are NTS-Digital and Winlink 2000.

Digital Leadership Criticized

According to the report, a detailed plan to deploy a semi-automatic network to enhance ARES communications was developed and presented to the board of directors by the ARESCOM committee. An ARES Digital Network Management Team was created to oversee the implementation of that plan. The team members have expressed a great deal of frustration with the lack of progress by the team. In fact, ARRL Headquarters has to determine the future status of the team.

Several statements were made about handling inquiry messages into a disaster area. Today much of the information would be considered within the standard practice of placing at least a 72-hour moratorium on incoming messages. A recommendation was made to include a provision for an e-mail address on the existing ARRL Radiogram message to facilitate the use of semi-automatic message transport and delivery networks.

Concern was expressed about a person staying at an emergency shelter having permission to send a message to friends and family. These person-to-person messages provide great comfort to shelter residents.

Setting up systems to handle these messages is only part of the operation. The message must be passed accurately. The Committee said, "message accuracy was reported to be lacking during the acute phases of Hurricane Katrina, which

undermined response and relief activities." It was first identified in the 1980s that amateur radio message networks such as the National Traffic System failed when it came to passing messages with both speed and accuracy. A nationwide exercise called "Exercise Night Tango" tested several radio services on their ability to get a message across country in a short period of time. The test was conducted on a Saturday morning when NTS nets were not in session, and several wide-area coverage nets on 20 and 40 meters were not able to handle the traffic. The Committee encouraged "ARRL Headquarters to work with the Area Staff chairmen of the NTS to design and implement nation-wide messaging exercises, including unannounced drills that will challenge the system and evaluate both the speed and the accuracy of performance."

The Committee continued, "The day may come when every ARES operator deployed into the field is licensed and equipped to do portable voice and digital communications using the latest technologies, networks, and modes on all Amateur bands. Until that ideal situation comes about, we must be able to make good use of whatever equipment and operating capabilities our diverse population of volunteers is able to offer. Indeed, insofar as diversity of capabilities equals redundancy, not having ARES messaging capability locked into dependency on one or just a few techniques is an advantage for Amateur Radio, not a weakness."

Coordination of Resources

The Committee focused on ham radio's most important resource, that being the operators themselves. The NERPC recommended that a national database of trained operators be implemented. According to the Committee "this system will allow timely and orderly alerting and deployment of experienced, well-trained operators. It will enable the League to respond quickly to requests from national-level served agencies such as the American Red Cross for large numbers of qualified operators without the delay and confusion that has sometimes occurred in the past. It will eliminate the heavy 'make it up as you go along' burden on the Headquarters staff. It will eliminate asking national-level served agencies to contact and stay in touch with multiple Section Managers in order to fill their communications needs. It will eliminate reliance on databases that are maintained and controlled by individuals/entities other than the ARRL."

The report discusses mutual aid assistance teams for neighboring sections and states as well as support for areas of the United States that are beyond the boundaries of the 48 contiguous states. "While Amateurs in the USA view emergency communications as the principal reason for the service's existence, very different views prevail in some other parts of the world." According to the report, "American Amateurs have *much* to learn from the fresh perspectives of hams in countries where emergency communications is new, because those hams are not burdened by almost a century of organizational and conceptual *status quo* that may sometimes deter innovation and impede change in our own part of the world."

Working with Served Agencies

The ARRL has several Memoranda of Understanding with agencies that provide a service in times of disasters. These include the American Red Cross and the Salvation Army, as well as others. These organizational relationships with served agencies lie at the heart of Amateur Radio emergency communications today, at both the local or Section level and the national level. The report says, "the era when individual Amateurs

When Unified Command is used to respond to a disaster, many agencies —often including amateur radio - are represented around the table. Requests for ham assistance in these cases should come through the Unified Commander. (Photo courtesy Massachusetts Dept. of Environmental Protection)

could simply show up in a disaster zone and make themselves useful has been over a lot longer than some Amateurs accept. In the present climate of concerns about security and requirements for formal training, served agencies' expectations drive ARES emergency communications preparation more than ever before. In a disaster situation today, spontaneous volunteers may well find that they cannot just walk in."

Amateur Radio and Unified Command

The Unified Command system provides a spot for disaster relief organizations to be represented at the table to coordinate response efforts. The report explains that if these organizations need amateur radio support, the National Incident Management System (NIMS) model says that their requests should go through the Unified Commander rather than via separate relationships the organizations might have with the ARRL. The report says this is important to facilitate effective operational cooperation when disasters happen and to maintain amateur radio's credibility as a peer among entities active in disaster preparedness.

Final Thoughts

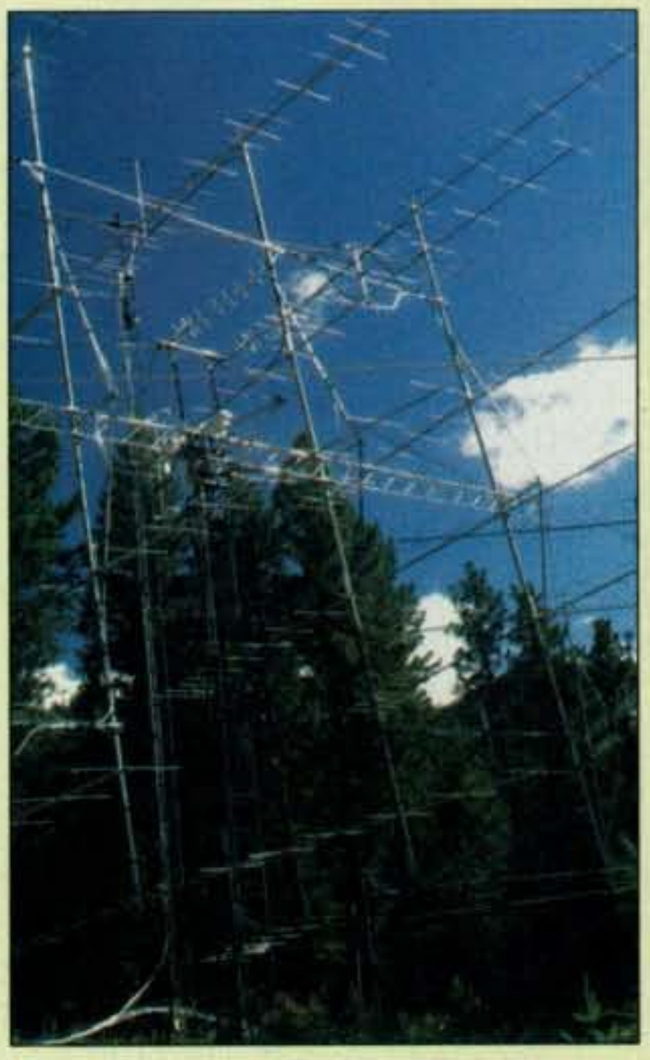
The NERPC report covers a lot of areas related to emergency communications. We have only touched on some of the highlights. The report took an important step in saying the ARRL could have done more. It acknowledges failures in meeting various needs to support amateurs in the field. More important is that many of the recommendations were being worked on with ARRL staff prior to the report being presented to the ARRL Board of Directors.

For many amateur radio operators who are involved with emergency communications, the ARRL leadership has not responded in a timely manner over the years. Whether or not the League will catch up in time is unknown, but it is working on it. The entire report can be found on the ARRL website at: <http://www.arrl.org/announce/reports-2007/january/NERPC-32aa.pdf>.

I've been involved with amateur radio emergency communications for over 30 years, and every day I think about how proud I am of the work that we do. As the report said, the "achievement of volunteer Amateur Radio communicators in times of disaster cannot be commended too highly." I agree completely and look forward to telling your stories each month. Until next time . . .

73, Bob, WA3PZO

On the Cover



On the cover this month is a shot from the antenna farm of Lance Collister, W7GJ. Lance's antennas are primarily geared toward VHF: for 6 meters, a pair of stacked loops, a 70-foot long Yagi, and an array of four 50-foot Yagis; and on 2 meters, an array of sixteen 33-foot long Yagis (front and center on the cover). All of the Yagis can be aimed in both azimuth (compass direction) and elevation for EME, or moonbounce.

Lance's first contact over 40 years ago was on 2-meter AM as WN3GPL, and he has been chasing DX on VHF ever since! Starting with meteor-scatter and tropo contacts during the 1960s only whetted his appetite, and he made his first 2-meter EME contacts in 1978 as WA1JXN. Lance moved to Montana in 1979 and started making the antennas larger. The big 2-meter EME array also came in handy for making the first-ever ham radio contact with an astronaut in space when Lance worked Owen Garriott, W5LFL, aboard STS-9 in December 1983!

In 1999, Lance received DXCC #11 on 2-meter EME. Despite his location in propagation-poor Montana, Lance has concentrated mostly on 6 meters for the last decade, and in 2005 received DXCC #815 on six. Lance says much of his success on six can be attributed to the exciting new weak-signal digital mode called JT65, developed by Joe Taylor, K1JT. With the additional sensitivity of this mode, it is possible for much smaller stations to be successful on EME, and he says it is responsible for making 6-meter EME practical. Lance's current goal is to duplicate his 2-meter achievement and work 100 countries on 6-meter EME (and he is over halfway there, with 58 so far!). Lance says, "See you on the moon—the ultimate DX!" *(Cover photo by Larry Mulvehill, WB2ZPI)*

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MFJ-801 has 1¾ inch meter, sensitivity control, 20 inch extended telescoping monopole antenna.

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MFJ-888 **$189.95**

MFJ-888, like MFJ-886, but covers *10 Hz*-3 GHz. Measures frequency/period, has 50/1M Ohm input, auto hold, LED backlight, beeper. 2¾x4¼x1¼ in.

MFJ HF/VHF/UHF Dummy Loads

Oil-Cooled 1 KW CW 2 KW SSB VersaLoad™

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Run 1KW CW or 2 KW PEP for 10 minutes. Run *continuous duty* with 200 Watts CW or 400 watts PEP. Transformer oil not included. Low VSWR to 400 MHz. Under 1.2:1 to 30 MHz. SO-239 connector. Safety vent with cap, carrying handle. 7½Hx6⅝D in. **MFJ-250, $69.95.** Includes transformer oil (no PCB).

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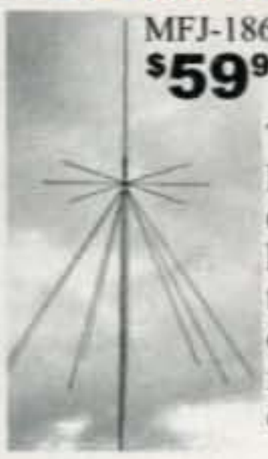

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math's notes

BY IRWIN MATH,* WA2NDM

A New Frontier of Communications?

Basic physics states that any time there is an alternating flow of current through a conductor there is an electromagnetic field formed around that conductor. Depending on the frequency of the alternating current flow, the field essentially can either be contained within the vicinity of the conductor or radiated beyond the vicinity of the conductor. It is also a fact that any time an electrical conductor is present within an electromagnetic field, an electrical current flow is induced into that conductor. When the alternating current flow is at the proper frequency (and applied to a suitable antenna), worldwide and even extraterrestrial communications are possible. This electromagnetic radiation, of course, is the basis of radio.

Now considering the fact that the human mind works on electrical impulses, it is pretty certain that the various current flows that produce these impulses within the brain are also simultaneously producing electromagnetic fields. Furthermore, as we have just stated, whenever an electromagnetic field is in the vicinity of a conductor (such as, in this case, a conducting nerve cell), an electrical signal is induced into that conductor. This seems to clearly indicate that the human mind is capable of both transmitting and receiving (electromagnetic) signals.

Perhaps this is the real underlying basis of telepathy. As possible proof of this, sometimes in a crowd of people you might inadvertently gaze at a person and suddenly that person is aware of your gaze and turns toward you simultaneously, or you are sitting in a car in the parking area of a large mall daydreaming and a total stranger suddenly turns to look at you for no apparent reason. Does this mean that you and the unknown person are in resonance (or tuned to the same frequency)? It is certainly food for thought.

Since all of this seems very similar to radio (but at obviously unknown frequencies and modulation schemes), we thought perhaps an investigation was

*c/o CQ magazine

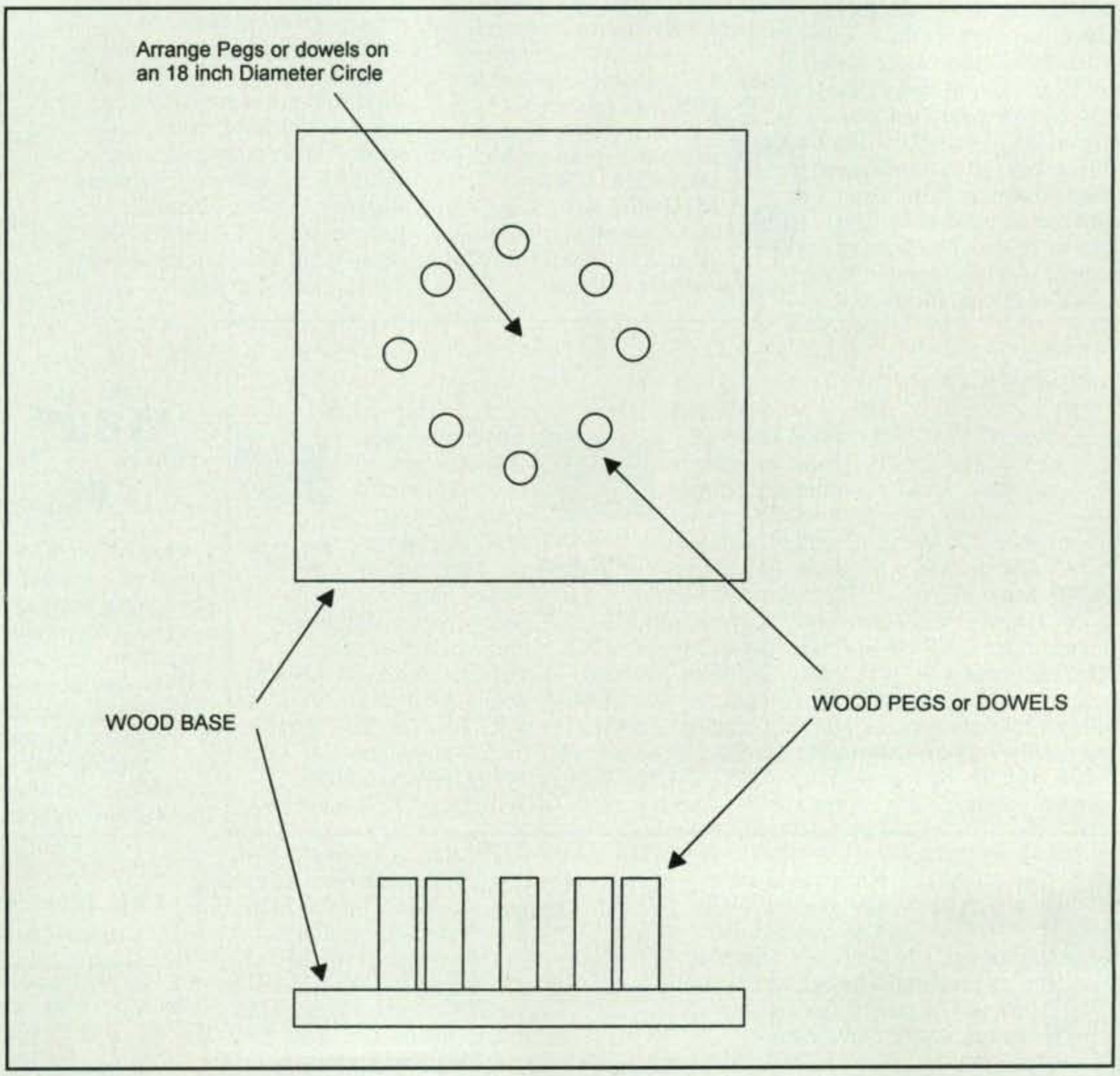

Fig. 1– Coil form for low- to high-frequency experiment.

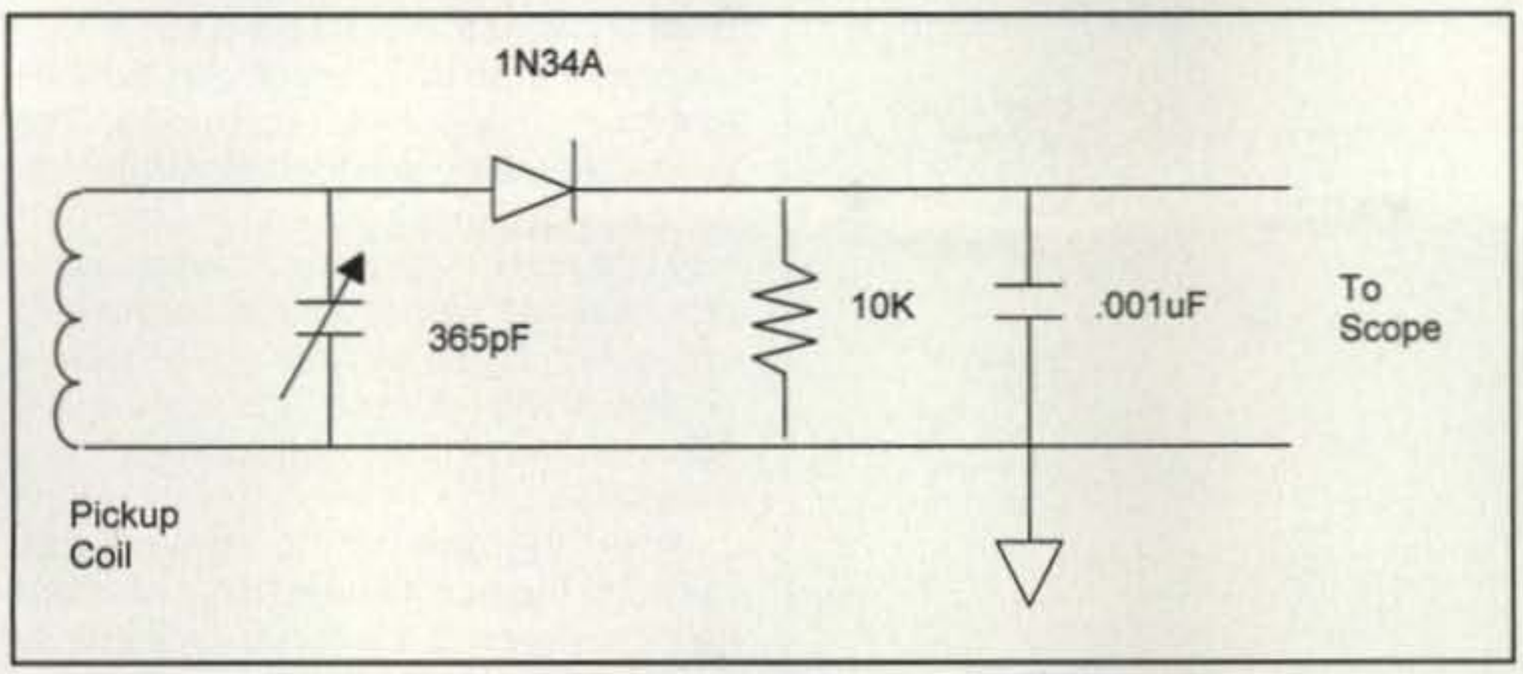

Fig. 2– Schematic of RF detection scheme.

in order. If it is indeed true (and we can determine the particulars), personal communications between random individuals should be possible—which is, of course what amateur radio is about.

To try to gain some understanding of this, we first fashioned a large coil of about 100 turns of #30AWG. The coil was wound on a form consisting of wooden pegs mounted on a baseboard such as shown in fig. 1 to achieve the large needed diameter. The opening in the center of the coil was designed to be large enough to allow one to easily put his or her head within it. The turns were then secured with electrical tape.

Next we obtained a 365-pF variable capacitor from an old broadcast-band radio and connected it across the coil. A 1N34 germanium diode, a resistor, capacitor, and an oscilloscope were connected as per fig. 2. Now we could tune the coil/capacitor over a wide frequency range while looking at the scope to see any signals. The results unfortunately produced nothing except for the audio from a strong local broadcast station! We did not attempt to transmit into the coil at this time, however; ***nor should anyone else attempt to transmit into it either, as the strong RF field produced so close to the brain would no doubt be quite dangerous!*** Perhaps the frequency range of our initial setup (somewhere in the HF region) was wrong.

When we next reduced the number of turns to 10 and the capacitor to a 50-pF trimmer, we still got no results! OK, the HF and near-VHF regions probably were not correct, but where to look? After some consideration we realized that even the UHF and microwave region would not be correct, as no one (to our knowledge) can directly receive, detect, or transmit cell-phone signals, microwave-oven radiation, or radar signals. What was left?

Upon an investigation of the remaining spectrum, we decided that the sub-RF region (below 50 kHz or so, but not sound, just pure RF) would not be suitable due to the vast amount of interference from 50- and 60-Hz power-line frequencies and their various harmonics. The optical range (the THz region) also would not be right, since the skin and bone covering of the head would prevent any light from either escaping or being detected. All that was left was the largely unknown 100-GHz to 1000-

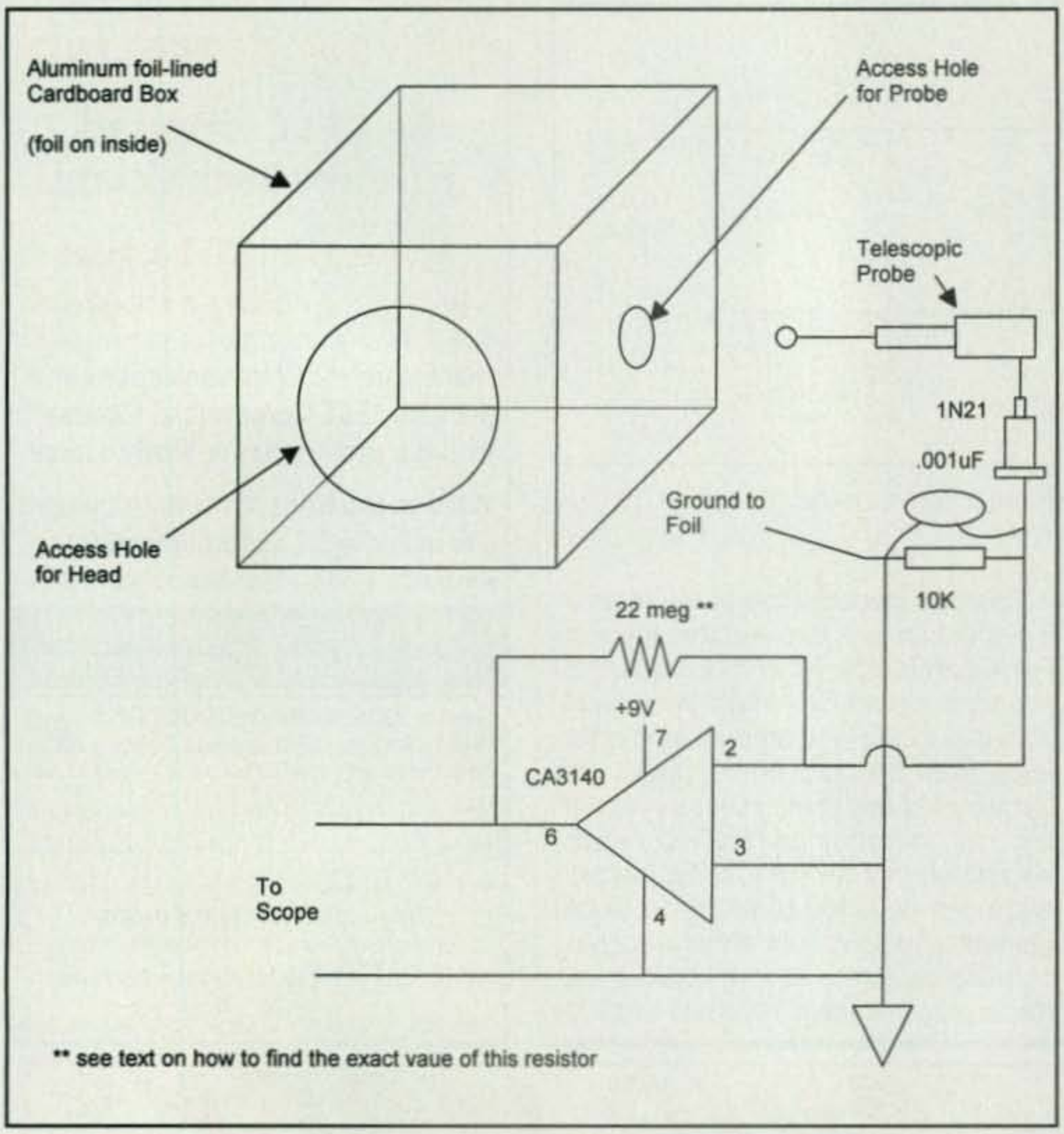

Fig. 3– Ultra-high microwave-frequency test setup.

GHz in-between-microwaves-and-light region. Perhaps this is where the elusive signals were.

As a result, we constructed a tuned chamber of aluminum foil and cardboard that was large enough to fit over a person's head. We then fashioned a simple probe from a small telescopic whip salvaged from an old transistor radio. This would allow the length of the probe to easily be varied, enabling some degree of tuning. We then connected this "probe" assembly to a surplus 1N21 microwave diode, as this was the highest frequency device we could find. Also, from past experience we knew that it easily worked at tens of GHz, so there should at least be some sort of response higher up. Finally, a high-gain op-amp was added to complete the setup. We used a CA3140 op-amp, as it is an FET device and exhibits extremely low self-induced noise. The probe, amplifier, shielded external connector, and a 9-volt transistor-radio battery (for power) all were mounted within a shielded aluminum box to prevent any stray signal pickup. All of this is shown in fig. 3, and the results we achieved were quite interesting, to say the least

When the gain of the op-amp was raised to the point where noise covered half the screen of the scope (by increasing the value of the 22-megohm resistor until noise was seen), there seemed to be some sort of un-syncable signal that we just couldn't resolve. Various thoughts changed the "pattern," but we could not get it to repeat, even though we tried repeatedly to think the same thought. The only conclusion we could reach at all was that our thoughts did seem to change the pattern. We tried the sensor on a couple of people and the results were always similar (but never exact, even when thinking the same thought). We therefore concluded that actually the brain was probably radiating something. What we could see of the pattern was that it was not really an analog type waveform, but seemed to be some sort of digital pulse train similar to the so-called "eye diagram" that engineers use to check on the robustness of a high-speed data stream. Unfortunately, the pattern was never really stable or easily detected, as it was well within the noise of the setup.

After spending considerable time on this experiment, we concluded that to research it further we would need a much more stable tuned cavity, a much lower noise amplifier (at least three to four magnitudes), and a detection system much better than a simple microwave diode. This is beyond our capabilities at the present, so regretfully we concluded this investigation.

If one were to actually investigate these findings with better equipment and more time, perhaps something significant could be found. One interesting fact, however, was that any time any of our test subjects thought of the current month, there was a large spike of energy displayed on the scope. Was this just coincidence (since it was *this* month), or was it perhaps that the pattern produced by the modulation of the thought of the word "April" allowed our particular scope to momentarily sync on the received signal? If you decide to repeat these experiments, please let us know what you find.

73, Irwin, WA2NDM

The ARLHS Lighthouse Lens

Amateur Radio Lighthouse Society ● 114 Woodbine Ave ● Merchantville, NJ 08109

Special CQ Insert > for complete issue, go online to http://arlhs.com < Spring 2007

In This Issue:

Turtle Rock Light — ARLHS USA-1088

- Present location: Schuylkill River, Philadelphia, PA
- Managing Organization: Sedgeley Boat Club
- Telephone: 215-765-3585
- Non-operational
- Other buildings: attached clubhouse
- Date established: 1887
- Date present tower built: 1887
- Current use: Part of clubhouse
- Open to public: No
- Best seen by boat from the river
- Photo by Ron, WB3AAL, who has activated the light on several occasions.

This lighthouse was privately built in 1887 by Frank Thurwanger at a cost of $2,663. It is now enclosed by a clubhouse in Fairmont Park in Philadelphia, is lighted on special occasions, and is available for rent.

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BY DAVE INGRAM,* K4TWJ

Devising Your Own Alternate Energy System

As a spin-off of our last two columns on emergency preparedness and you, this month's column looks at what's involved in putting together your own alternate energy system for emergency or stand-alone use. Bear in mind that this is only a glimpse into a large and rapidly growing area and market, a market encompassing more products and companies than amateur radio overall. Including anything beyond ground- floor details in our limited space obviously is impossible. We will, however, highlight related websites as we proceed. Hopefully you will find this approach beneficial for expanding your knowledge and visualizing your options. Yes, there is more to emergency preparedness than grabbing a couple of flashlights and some extra batteries for your VHF/FM handheld transceiver. The question is how elaborate you wish to go.

The first considerations are whether you wish to power only your ham gear or most of your house during emergencies, and if you prefer to go all out in extras or go low-budget style. I assume most readers desire to start small and simple, so I will favor the "cheap and proud of it" approach. If you need more details on parts and systems, investigate some of the websites listed both here and in our February column, plus some of the companies that advertise in *Home Power Magazine* (www.homepower.com) or *Solar Today Magazine* (www.solartoday.org).

Photo A– Where to start in planning your own alternate energy system? Check out Home Power Magazine *(www.homepower.com) and* Solar Today Magazine *(www.solartoday.org). Both magazines are excellent sources of "how to do it" articles and advertisements for companies producing everything from generators and deep-cycle batteries to solar panels, inverters, and charge controllers.*

Production of Alternate Energy

Surely the most well known form of emergency or alternate power is a portable gasoline-engine-driven generator such as the types made by Coleman, Honda, and a number of other companies. These power-on-demand units are handy for supplying a relatively high level of energy for short-term outages. However the cost of fuel and engine maintenance (plus engine noise) tends to limit their long-term use, plus they *must* be operated outdoors because of exhaust fumes.

Paralleling gas-engine-driven generators in popularity (and noticeably surpassing them in long-term application) is solar power. Indeed, technical advancements in photovoltaic panels, deep-cycle storage batteries, etc., now make solar powering anything from 100-watt transceiver to an entire house both feasible and cost effective. Most solar energy systems do not produce the high current or wattage like an engine-driven generator, but they are silent and require minimal maintenance, and the resultant energy can be stored in deep-cycle marine-type batteries. Most southern U.S. and many northern U.S. areas receive sufficient sun to make a small or large solar-power system quite attractive.

If you live in a slightly windy area, installing a wind generator holds good merit, especially if it is used to supplement a solar energy system. The logic here is simple: Wind rather than a gasoline engine turns a generator, which in turn charges deep-cycle batteries. Also, wind speeds are sometimes high when sunlight is not available (typically during cloudy or stormy weather). Wind generators are available in plans only, parts, or fully

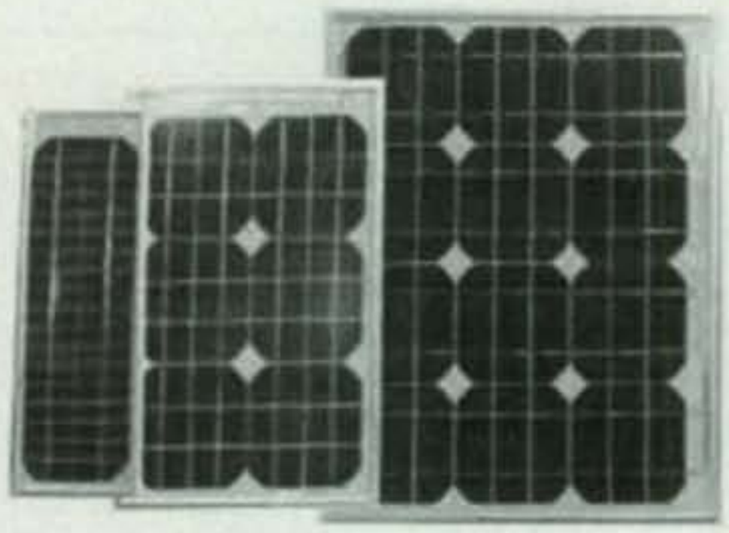

Photo B– Solar panels are available in a wide array of sizes and power ratings, and they may be connected in series or parallel to produce large amounts of power. The average solar panel can produce approximately 15 to 45 watts of power, which is usually good for slow-charging two or three deep-cycle batteries. The panels shown are available from <www.survivalunlimited.com> (phone 1-800-455-2201).

*3994 Long Leaf Drive, Gardendale, AL 35071
e-mail: <k4twj@cq-amateur-radio.com>*

assembled versions/systems and in sizes and power ratings to fit any budget. We found some outstanding 10- and 20-foot models available in plans or parts and kits from Dan Bartmann, KCØVSU, of <www.otherpower.com> and were quite impressed with the units. The 10-foot generator produces approximately 700 watts of power in a 20- to 25-mph wind, which is enough to keep a ham rig and a couple of lights going quite reliably. The 20-foot turbine is a real romper capable of producing 3000 to 4000 watts in the same wind. If you would like more details and wish to e-mail Dan, his address is <danb@otherpower.com>.

Which of the above systems (or combination of systems) works best for you? That depends entirely on your own needs and dedication to pursuing the project. Where do you start and how can you calculate or estimate associated power/energy levels? Read on.

Photo C– This 10-foot wind turbine produced by Dan Bartmann, KCØVSU, of <www.otherpower.com> produces up to 700 watts in a 20–25 mph wind and doesn't require fueling for operation. It's a good source of alternate energy and it is also an excellent way to back up a solar-power system. E-mail <Danb@otherpower.com> for more information.

Powering Your Portable Transceiver

A number of amateurs have experimented using small solar panels as "sun batteries" to power a QRP rig or as a source of DC to charge an FM handheld's battery pack. In the latter case, the solar panel's output voltage was 10 or 20 percent greater than the battery pack, so it would charge rather than discharge the pack, and a silicone diode with .7-volt drop was inserted in series with the panel's positive lead to prevent battery discharge back through the panel during times of no sun. A milliamp meter also inserted in series with the positive wire indicated charge current, which was typically set at one tenth of the battery's milli-amp-hour rating. A fully discharged battery was then charged 10 hours plus 1 or $1^1/2$ hours to overcome charging losses.

Since all silicone diodes (those little black ones like those used in power supplies) exhibit a .7-volt drop, a number of them can be connected in series to produce a required voltage drop and related charge current. That works because the lower the charging voltage, the lower the charging current. Sound familiar? That same concept still works today, but we now have charge controllers that automatically monitor charge current and switch or disconnect a fully charged battery to avoid overcharging or discharging. Solar-panel (and battery) technology has also progressed noticeably, but the same basic concept of control charging batteries and using their stored energy as needed over time continues to have merit for powering FM handhelds, 100-watt HF rigs, and/or for powering entire homes. Let's step up a level or two and I will explain.

As an easy-to-duplicate example of a homebrewed solar-powered system, let's look at a basic panel, charge controller, and rechargeable battery with 100-watt transceiver setup as illustrated in fig. 1. First look in the rig's manual to determine its current demands on receive (3 amps typical) and transmit (10 amps key-down CW at 40 or 50 watts output and 10 amps average SSB with full speech compression). Next estimate the number of hours you wish to operate per day and per week (such as 2 hours a day and 5 days, or 10 hours, per week). Now compute 3 amps receive × 2 hours a day = 6 amp-hours per day, or 6 amp-hours × 5 days = 30 amp-hours per week. Similarly, 10 amps transmit × .5 hour total transmit time per day = 5 amp-hours per day, or 5 amp-hours × 5 days = 25 amp-hours per week. Combined receive and transmit time is thus 11 amp-hours per day, or 55 amp-hours per week.

Next estimate the number of usable sun hours at your QTH per week. Need some helpful notes? On the average, only five of seven days per week yield usable sun energy, and on

Photo D– In the presence of high winds (over 10 or 15 mph) the wind turbine furls for self-protection, and continues developing maximum output. (Photo courtesy of Dan Bartmann, KCØVSU)

Photo E– One of the top energy guzzlers in a typical home is an electric water heater. Replacing it with a solar water heater similar to this Solahart unit reduces one's electrical needs quite noticeably. Details on the heater can be found at <www.solahart.com>.

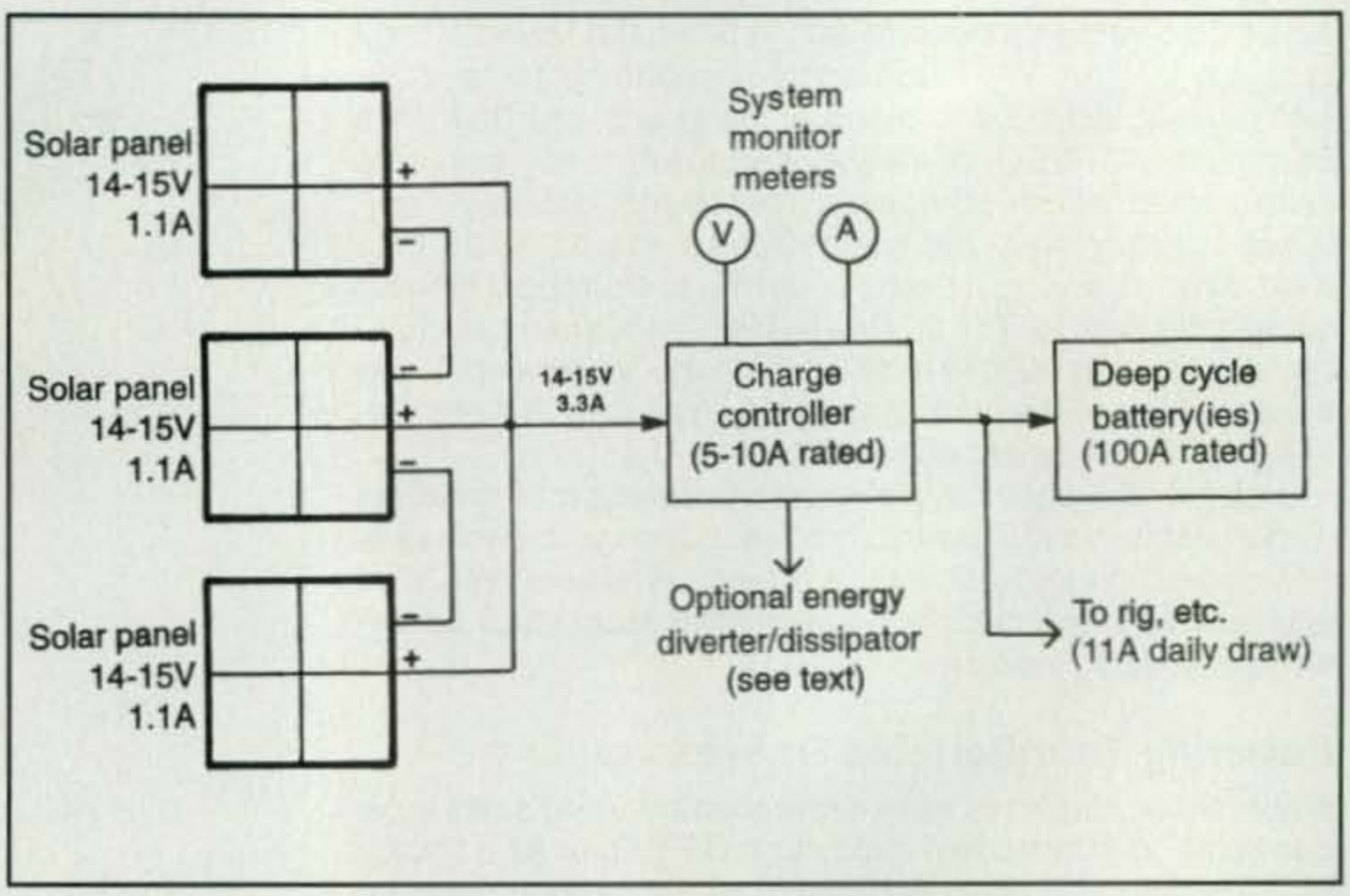

Fig. 1– Outline of a basic solar power system as discussed in the text.

the average only six of 24 hours per day produce usable sun energy. That's because clouds and trees can block the sun and fixed-position panels receive only part of a sun's usable energy. I thus estimate as close to typical 30 hours of sun per week for upper/northern U.S. areas and/or 45 hours of sun per week for lower/southern U.S. areas. However, you may wish to check almanacs and run your own computations.

Next calculate battery needs as total transceiver amp-hours per week (55 amp-hours) plus enough extra charge to cover two no-sun days a week (22 amp-hours) and also maintain a 20- or 25-percent reserve for unexpected needs and to avoid total discharge. That equates to:

Photo F– Front and rear view of a forced-air window heater made by Kevin Campbell, KCØGAB, available from <www.coloradosolarsystems.com>. The heater measures 20" × 32" × 3.5", quickly installs on a south-facing window sill inside a home or condo, and makes a very effective room heater while noticeably reducing your winter power bill. Photo courtesy of KCØGAB)

55 amp-hours (week) + 22 amp-hours (2 days) + (.20 × 77 amps) = 15.4, which altogether gives 92.4, which rounds off to a 100 amp-hour battery.

Finally, calculate the (14–15 volts) solar panels necessary output current rating by dividing the battery's total weekly charge (100 amps) by the number of sun hours a week at your QTH (approximately 30 for New England): 100/30 = 3.3 amps, which can be secured by three approximately 3-foot panels connected in parallel. Panel output can vary from day to day and overcharging can damage batteries, so we suggest adding a low-cost charge controller to the setup for best results.

As you look back over my figures, notice how solar-panel size and battery capacity are closely matched to need in the examples given. This "balance" helps ensure high efficiency and reasonable cost. Comparatively, panels with higher than calculated output (20 percent higher) will require adding an energy diverter or dissipater. Likewise, improper charge rates will reduce battery life. The old "keep it simple" logic definitely works best here.

Powering Your Entire House

Using alternate energy to power your whole house follows the same basic format as powering a transceiver, except all associated components are sized up (but still matched in current capabilities) to ensure full charging without overcharging or undercharging. Learning the ropes and maintaining a large system also requires a fair amount of study and dedication. Even if you elect not to go the whole house route, going through the first steps of making your house more energy efficient can result in a 30- to 40-percent reduction in your electric bill and warrants pursuing. The steps involve adding extra insulation in the attic (and possibly walls), sealing cracks around doors, turning off lights when you don't need them on, and putting a timer on your electric water heater to prevent unnecessary use. Additional steps worthy of consideration include installing a solar water heater, solar room heaters, and a solar oven (the big energy users). Incidentally,if you own a small camper or travel trailer, setting it up for full operation (including your ham rig, of course!) on alternate energy is a great starting point. Give it a go!

Conclusion

This column presented a ground-floor study of alternate energy systems, mainly for powering your amateur radio gear. If you elect to make the change, call in a professional alternate-energy engineer or comparable electrician to at least check your work before making critical connections. Bear in mind that even 12 or 14 volts at 50 to 100 amps can turn jewelry such as rings and watchbands into high-intensity soldering irons capable of severing limbs. ***Never, never take chances with high voltage or high current!*** Both are dangerous, and we want you to stay with us for many more years!

73, Dave, K4TWJ

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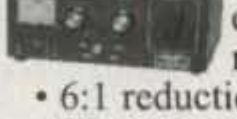

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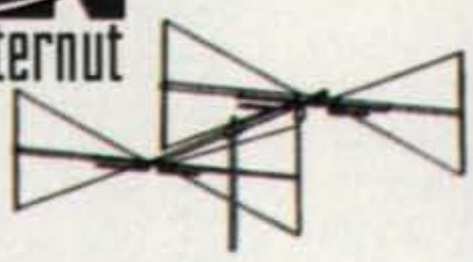

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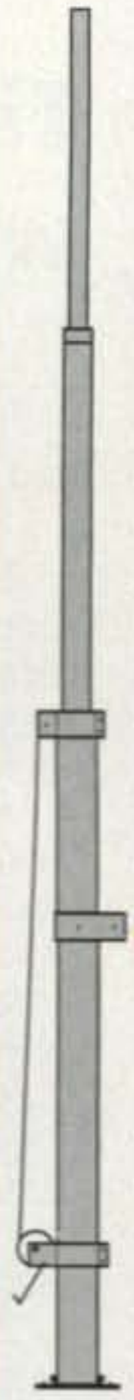

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washington readout

BY FREDERICK O. MAIA,* W5YI

Timekeeping for the Radio Amateur

What is time? Where did it come from and how is it regulated?

We recently were asked why the recent rulemakings expanding voice frequencies for radio amateurs and ending Morse code testing were effective at 12:01 a.m. Eastern Standard Time rather than 12:00 a.m. The reason is to eliminate confusion. Timekeeping is more complex than you may think!

Actually the terms 12 a.m. and 12 p.m. do not exist and should not be used. The abbreviation "a.m" stands for the Latin phrase *ante meridiem,* and "p.m." is *post meridiem.* They mean "before noon" and "after noon," *meri diem* meaning "middle of the day." Noon is neither before nor after noon; it is simply noon. Therefore, neither the "a.m." nor "p.m." designation is correct. On the other hand, midnight is both 12 hours before noon and 12 hours after noon, so either 12 a.m. or 12 p.m. theoretically is correct.

To be certain the the public knows the proper time, an event that begins at the start or end of the day is referred to as beginning at 12:01 a.m. or ending at 11:59 p.m. This method is used by the railroads and airlines for schedules and found in legal papers, such as contracts and insurance policies.

Specifying the beginning and end of a day using a 24-hour clock—so called "military time"—might be less confusing, but it is rarely used by the general public. A day begins at 0000 and ends at 2400. Both actually are midnight on two different days. Thus, specifying that a rulemaking takes effect at midnight is also unclear. While there is only one "noon" in a day, there are two midnights. Which midnight are they referring to?

Upgrading one's ham radio license used to be based on Morse code proficiency. The faster you could accurately copy code, the more privileges you got. Now, for the first time, Technician Class amateurs will be able to upgrade to General Class without learning the code. They need only pass a relatively easy 35-question multiple-choice exam. Judging by the sales of license preparation material, tens of thousands, perhaps more than 100,000, Technician Class hams intend to do exactly that. General Class amateurs gain access to every ham band allocated to the Amateur Service. The stampede to the high-frequency bands is on and international SSB communication will expand greatly.

While logs are no longer required in the Amateur Radio Service, most HF operators do keep one, if for no other reason than to keep track of the countries they work. Most logging is done in UTC, or Coordinated Universal Time, which many hams still refer to as GMT (Greenwich Mean Time).

This month let's talk about "time." It really is a very complex subject. However, we will try to keep it simple.

Timekeeping Linked to Astronomy

Up until the late 1800s, local time was just that—determined locally. It was whatever the locals said it was, such as the time in the town square or on a church steeple, based on when the sun was directly overhead in that location. As communications and travel lengthened, the need for time standardization became evident. Ancient astronomers set the ground rules.

They decided that a day should be one rotation of the Earth on its axis. However, not all days are 24 hours long. The overhead sun at noon can arrive as much as 17 minutes early or up to 15 minutes late. In fact ,only four days per year have exactly 24 hours in them. These days occur on or about April 15th, June 14th, August 31st, and December 25th. The rest are longer or shorter as measured from the overhead midday sun.

A day was defined as the amount of time from daybreak followed by night and back to dawn. Midday was when the sun was directly overhead as depicted in the early days by a shadow clock (sundial). Astronomers named the day part before midday *ante meridiem* (a.m.) and after midday *post meridiem* (p.m.), and a.m. and p.m. have stuck ever since.

The planet Earth completes one trip (a 360-degree orbit) around the sun every 365.242 days, or one year. Leap years are years with 366 days. Leap years are necessary because the actual length of a year is about a quarter day longer than the usual 365. The extra day is added every four years to keep the calendar year synchronized with the astronomical or seasonal year. This is accomplished by adding an extra day to February so that it has 29 days instead of 28. The different calendar months—a period of between 28 and 31 days—were originally tied to the phases of the moon.

A year is not exactly 365.25 days long, so to get even closer to the astronomical year, it was decided to have a leap day 97 years out of 400 rather than once every 4 years. To implement this, end-of-the-century years must also be divisible by 400 as well as 4. Thus, the year 2000 was a leap year, but 1700, 1800, and 1900 were not and 2100 also will not be one. More recently, scientists began adding "leap seconds" to years to compensate for the slowing down of the Earth's rotation. Currently about four "leap seconds" are required every 5 years. The last was in 2005.

Greenwich Mean Time

Credit for the establishment of international time really belongs to the 21st President of the United

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States. At the specific request of Pres. Chester Arthur, the International Meridian Conference was convened in Washington, DC on November 1, 1884. It resulted in the establishment of a mean solar day based on Greenwich, England, the International Date Line, and 24 time zones.

Actually, Greenwich Mean Time (GMT) had been adopted by the United States a year earlier when wireline telegraph lines transmitted time signals to all major cities. Prior to that there were over 300 local times in the USA.

By definition, GMT is the time along the zero-degrees meridian. It was selected since it runs through the primary transit instrument at the Royal Observatory in Greenwich, England. From Greenwich, longitudes are measured around the world. East longitude travels east of Greenwich, and west longitude goes west. The U.S. Naval Observatory (USNO) was established in Washington, DC in 1830 to cooperate with the Royal Greenwich Observatory to develop accurate timekeeping for the Navy. It still does so today.

Greenwich, being "0" degrees longitude, is called the prime meridian. A meridian is the imaginary north-south line that divides the Earth into 360 slices, or degrees, at the Equator. All meridians begin at the North Pole and extend to the South Pole. The east-west "latitude" lines combine with north-south "longitude" to form grids, or coordinates.

Since the Earth rotates once (360 degrees) in an approximate 24-hour period, 15 degrees of longitude was made to correspond to one hour of time. The problem was, however, since state or international boundaries don't follow the 15-degree rule, time-zone boundaries often zig-zag.

The primary use for GMT is for communications, navigational, and scientific purposes, especially where observations or activities must be synchronized over great distances. Amateur radio communications and the worldwide internet web are two examples. Using GMT, when you get a QSL card from a foreign amateur it contains the same QSO time as your log book. Time is referred to as being so many hours plus or minus GMT. GMT, the worldwide Universal Time standard, is also known as Zulu or "Z" time.

"Zulu" time (also called military time) is the phonetic word for Z. It is also an acronym for the zero meridian. In military time, the hours are numbered from 00 to 23. Two sources of military time are digital wrist watches and 24-hour clocks. In military time, 1:00 p.m. is actually 1300; 1:00 a.m. is 0100. You will receive many QSLs that have four numbers followed by "Z" or "Zulu" time. (Some nautical time zone maps show Z as the zero zone, and assign the letters "A" through "M"—except "J"—to the 12 time zones east of Greenwich and "N" to "Y" to the west. "J" is left out because in the days before radio, ships at sea "traded time" based on who had been in port more recently. The signal flag "J" meant "time will follow," so to avoid confusion, the letter "J" was skipped in designating time zones.)

Did you know that all e-mail has references to GMT? Check it out! Does your e-mail have a line in your header date/time stamp that reads, for example, "Sat, 03 Mar 2007 15:42:47 –0500 (EST)" The "minus 500" is the local time offset from GMT. In this example Eastern Standard Time is 5 hours before GMT. A "+300" offset indicates the message was probably sent from eastern Russia, a common spam origination point.

Have you ever analyzed "cookie" files installed by some websites on your PC's hard drive? They contain information about you that the site can use to track your activity. "Cookies" work only on GMT. For example, a cookie file might read: "expires Mon, 03-Dec-2007 13:46:00 GMT." Even the U.S. Space Shuttle is on GMT. As the world seems to get smaller and smaller, we must turn to international time!

Basically, a standard time zone is one of 24 fifteen-degree slices that make up the 360 degrees on the Earth's circular orbit around the sun. Each 15 degrees of longitude "with local variations" observes a clock time one hour earlier than the zone immediately to the east. It is the "local variations" that really confuse the issue!

Clocks are set one hour earlier each approximate 15 degrees going west from Greenwich, England. The eastern section of the United States is approximately 75 degrees west (5 fifteen-degree slices) of Greenwich, so the U.S. Eastern Standard Time (EST) zone is designated as GMT minus 5 hours. Another 15 degrees is Central time (minus 6 hours), then Mountain time, Pacific time, Alaska time, and so forth.

However, standard time zones are really not that simple. The fact is that they seldom conform to the 15-degree rule. Instead they follow regional and country boundaries as agreed upon by various local and national governments.

Geographic areas at the same longitude (meridian) location can (and often do) observe different times. For exam-

ple, Russia has the largest number of time zones of any country in the world—11 (GMT+2 to GMT+12.) China, a large country right below Russia, has only one time zone (UTC+8). China covers a 60-degree longitudinal range and theoretically should have four time zones. A political decision was made to have the entire country on one time zone.

International Date Line

Time zones increase one hour as you travel east each approximate 15 degrees around the globe until you get half way around the planet. The International Date Line (IDL) is located on the opposite side of the planet (12 hours) from the Greenwich Observatory. It is where each day officially begins and ends.

The International Date Line is an imaginary boundary that zig-zags through the Pacific Ocean roughly corresponding to 180 degrees longitude. The line is not straight (it bends east of 180th meridian in Russia and various Pacific island groups), because no country wants to have its citizens functioning on two different dates.

By international agreement, the IDL is one day earlier to the east than to the west. It corresponds to the time zone boundary separating +12 and –12 hours GMT. Crossing the International Date Line traveling east results in a day, or 24 hours, being subtracted, and crossing west results in a day being added.

The IDL is not without its problems. For example, it takes less than two hours to fly from Tonga (A3 callsign prefix) to Samoa (5W, KH8 for American Samoa). However, since you cross the international date line, you arrive the day before you left! The QSLs for DX radio contacts with Tonga and Samoa made at virtually the same time will have different dates (but not in GMT). Actually, both Samoa and Tonga are a little east of the 180th meridian but have decided that the IDL will split them.

Daylight Savings Time

On Earth north of the equator there is much more daylight in the summer than in the winter. During the early 20th century many countries began shifting daylight, adjusting their clocks during the summer to more closely match the hours that people are awake.

In the United States, Benjamin Franklin first conceived the idea of "daylight-saving time" (DST). The longer daylight hours were first moved to the evening during World War I. Daylight replaced artificial lighting and saved precious fuel for the war effort.

For decades, DST started at 2:00 a.m. local time on the first Sunday in April and ended on the last Sunday in October. The "spring ahead and fall back" memory aid helps people remember how to reset clocks when the time changes. (Actually, we think DST should be known as Daylight Shifting Time, since no time, or daylight, is really saved).

The Energy Policy Act signed into law by President George W. Bush on August 5, 2005 changed the dates beginning in 2007. Starting this year DST in the U.S. is being extended three weeks—two weeks earlier in the spring and one week later in the fall. **It now begins on the second Sunday of March (Mar. 11) and will end on the first Sunday in November (Nov. 4.)** However, not all states and countries observe "Summer Time" (as it is called in Europe)—and in the European Union countries, the schedule this year is March 25 to October 28—so in reality, it is just about impossible to know what the local time is anywhere.

Arizona, Hawaii, and Puerto Rico, for example, ignore Daylight Time and stay on standard time year round. Adding to the confusion, the Navajo Nation in Arizona does observe Daylight Saving Time. In Australia, where the seasons are opposite those of the Northern Hemisphere, DST begins in October and ends in March. Japan, China, India, and most of Africa do not observe Daylight Saving Time at all.

Thus, the question becomes how do you determine what the local time is in other parts of the world. Even though there are websites that can give you an answer, in many cases they are not totally accurate, again, due to local variations. That's the reason why ham operators almost universally use GMT—the time through Greenwich, England—when keeping track of their international radio contacts.

Coordinated Universal Time

The term "Coordinated Universal Time" was introduced in 1970 by an advisory

Looking Ahead in CQ

Here's a look at articles we're working on for upcoming issues of *CQ*:

- Results: 2006 CQ WW RTTY DX Contest
- VU7LD —Report from Lakshadweep
- A "New" 6-Meter Propagation Mode, by JA1ELY and TZ1JA
- "Samoa, A DX Paradise," by KT8X/5WØDP
- "Want to Spice Up Your QSOs? Go Video, Part II," by KZ1Z
- "Woodpeckers, XYLs, and Tall Wooden Antenna Masts," by W1FK

Do you have a ham radio story to tell? See our writers' guidelines on the CQ website at <http://www.cq-amateur-radio.com/guide.html>.

group of technical experts in the International Telecommunication Union (ITU). It is based on the *coordinated* readings of atomic clocks around the world rather and local noon in Greenwich, England.

The acronym for Coordinated Universal Time strangely is UTC rather then CUT. The ITU felt it was best to designate a single abbreviation for use in all languages in order to minimize confusion. Since unanimous agreement could not be achieved on using either the English word order CUT or the French word order TUC (for *Temps Universel Coordonn*), a third acronym, UTC, was chosen as a compromise. UTC officially replaced GMT in 1986. However, hams still refer to GMT as the universal worldwide time. UTC, GMT, and Zulu ("Z") time all mean the same thing, and a QSL card could indicate any of these abbreviations.

The switch to Daylight Saving Time does not affect UTC/GMT, since the time on the zero or Greenwich meridian is not adjusted to reflect changes either to or from Daylight Saving *Time* (even though local time in England does change in the summer).

Government Regulation of Time

The National Institute of Standards and Technology is the U.S. federal agency involved in time and frequency measurement. NIST, a part of the U.S. Department of Commerce, was founded in 1901 as the National Bureau of Standards. Its laboratories are located in Boulder, Colorado. Through its Time and Frequency Division, NIST maintains the official time and frequency standards for the United States and distributes these standards to the American public.

NIST has maintained these standards since 1923 when radio station WWV went on the air. WWV broadcasts accurate UTC time and frequency information over a number of media, including HF (double-sideband AM) and LF (data) radio, telephone lines, and the internet. To hear these broadcasts over the telephone, dial (303) 499-7111 for WWV (Colorado) and (808) 335-4363 for WWVH (Hawaii). These are not toll-free numbers. The telephone service is very popular and the WWV number receives over 1-million calls per year. The internet address is <http://nist.time.gov>.

The WWV and WWVH shortwave broadcasts can be received on most general-coverage radios, and they are very useful to ham operators, especially for frequency calibration of radio equipment.

WWV radiates 10 kW on 5, 10, and 15 MHz, and 2500 W on 2.5 and 20 MHz, with each frequency being broadcast with a man's voice from a separate transmitter located in Fort Collins, Colorado, about 60 miles north of Denver. A woman's voice is heard on WWVH at 2.5, 5.0, 10.0, and 15.0 MHz from Kauai, Hawaii and is designed primarily to serve the Pacific Ocean area. The variety of frequencies makes it likely that at least one frequency will be usable at all times.

In general, the lower frequencies of 2.5 and 5 MHz are best heard during nighttime hours, the higher frequencies of 15 and 20 MHz are better during the day, and 5 and 10 MHz are probably the best compromises overall.

WWV (and WWVH) also broadcasts precise 1-second time intervals, the interval between the ticking sounds you hear. In addition to the time and frequency standards, radio-wave propagation forecasts, weather bulletins, and geophysical data are broadcast by WWV and WWVH.

WWVB is a low-frequency service that broadcasts time data (without voice) only on a 60-kHz carrier frequency. It first went on the air in 1965 with a 7-kW signal. In 1999 its power was increased to 50 kW effective radiated power. The station is located on the same site as WWV near Fort Collins, Colorado. The 60-kHz WWVB signal has a wavelength of approximately 5000 meters and can penetrate buildings and walls and easily reach indoor antennas.

The WWVB broadcasts are now used by millions of people throughout North America to synchronize consumer electronic products such as "atomic" clocks and wristwatches, and even kitchen appliances, home-entertainment equipment, and computer systems. In addition, WWVB is used for applications such as radio and television network time synchronization.

Due to the higher output power at WWVB and modern microchip technology, the price of these radio-controlled "atomic time" pieces has dropped drastically in recent years. They are called "atomic," since their time keeping is based on the cesium atom, which oscillates at a perfectly constant rate.

RadioShack stores carry a battery-operated combination wall/desk radio-controlled atomic clock that costs only $19.95 (catalog No. 63-1438). The time code contains the year, day of year, hour, minute, second, and flags that indicate the status of Daylight Saving Time, leap years, and leap seconds. You never have to reset it once it is synchronized with WWVB. Some radio-controlled clocks can display Coordinated Universal Time (UTC), which is ideal for ham operators.

We could go on much longer on this topic, but we're out of … time … for this month.

73, Fred, W5YI

beginner's corner

BY WAYNE YOSHIDA,* KH6WZ

A Practical Primer on HF Antenna Building

Last month *CQ* Editor Rich Moseson, W2VU, introduced everyone to the world of HF-band operating. These are the frequencies below 30 MHz. The antenna is the most important part of any station, and in many cases the easiest part to put together. Thus, this month let's take a closer look at some practical aspects of antenna building. It may also be a good idea to review the basics of soldering, since this is an important skill to possess in building any electronic project, including wire antennas (see the sidebar "Basic Soldering Skills").

While building this project, we get to transform the theoretical information on frequencies, wavelengths, and antennas from the FCC tests into something we can actually see and touch. This is one of the things I enjoy most about ham radio: It's really a hobby in which we can take theory and knowledge from books and actually see how it works (or doesn't work) in the real world.

The frequency band I like to recommend for beginning HF operations is 40 meters, and perhaps the best beginners' antenna is a dipole in the inverted-Vee configuration. Mechanically, this is one of the strongest forms of a wire antenna, since the Vee requires only one support and the wire elements or legs can be suspended from the middle. In other words, the legs of the antenna do not have to support the weight of the entire system, but instead the wire legs can be "draped" or allowed to "droop" naturally. Another reason is the capability of the 40-meter antenna. This one antenna can be used on another band, 15 meters, because a dipole can be used on its odd harmonic, and in this case, the third harmonic of 7 MHz is 21 MHz, or 15 meters. Thus, with a single 40-meter antenna, your station capability will include both "daytime" and "nighttime" activity and the ability to work local and long-distance (DX) stations year-round. Therefore, let's keep the first antenna simple and get the most bang for the buck with a 40-meter dipole antenna!

Step One: The "Design Phase"

Let's get out the calculator and do some figuring and designing. The portion of the 40-meter band available to Technicians goes from 7025 to 7125 kHz (7.025 to 7.125 MHz), and the 15-meter Tech band goes from 21,025 to 21,200 kHz (21.025 to 21.200 MHz). Let's make an antenna for 7.065 MHz. That's roughly in the middle of the 40-meter Tech band, and its third harmonic, 21.195 MHz, is still within the 15-meter Tech band.

*16428 Camino Canada Lane, Huntington Beach, CA 92649
e-mail: <kh6wz@cq-amateur-radio.com>

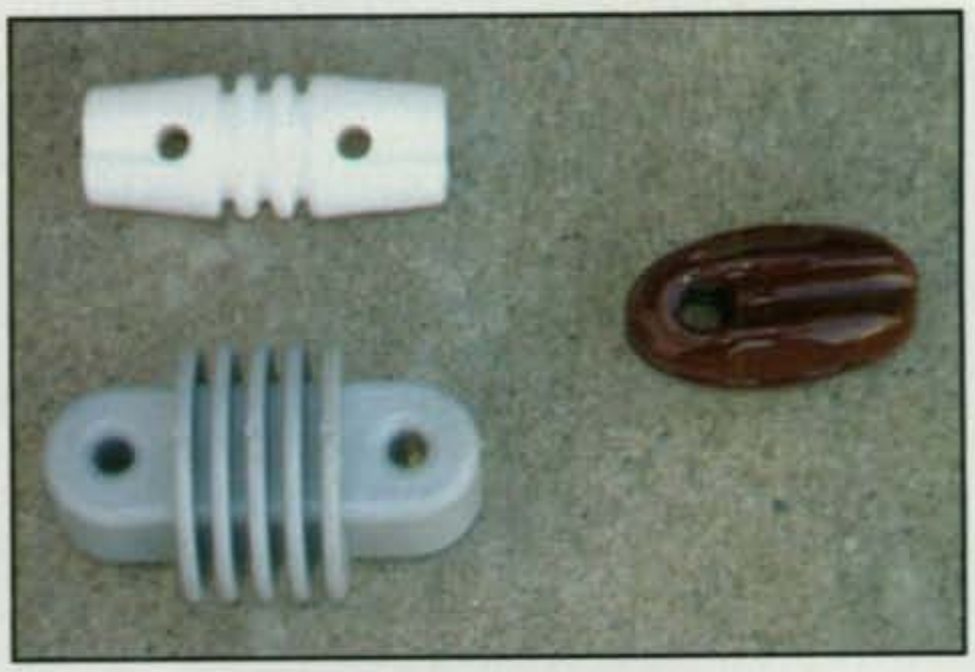

Photo 1–Typical antenna insulators available from most ham radio shops. The two on the left are made of plastic, and the brown "egg" insulator on the right is made of porcelain.

Recall the formula for a half-wave in free space:

$$\frac{468}{f(MHz)} = \text{length in feet}$$

We then plug the numbers into the calculator and get 66.242038 feet. I am never sure if my tape measure can accurately tell me where .242038 feet is, so I always cut my antenna wire a fair amount longer than the calculated length. Besides, you need some extra length in order to build the antenna itself. As a result, cut the wire to 70 feet and remember this extra amount.

The antenna will be supported in the middle, about 33 feet from each end. Take a look around your house and yard and figure out where you will install this antenna. If you have a nice tree in your back yard, you might be able to take advantage of this natural support. If you need a mast or a pipe of some kind, make sure it is tall enough to accommodate the legs of the antenna. A sturdy TV mast, 20 feet or so high, should work fine.

How much room is needed for this 40-meter inverted-Vee? Get out the calculator again. Say the support is a 20-foot TV mast, so this is one side of a right triangle. The wire will be the hypotenuse. The third side is the length across the ground, and it actually is half of the "footprint" of the antenna. We need to calculate the length of the third side, using the Pythagorean Theorem ($a^2 + b^2 = c^2$, if you're too far removed from your high school years to remember). If you need help with this (as I did), there is a very handy calculator for this on the internet; go to <http://www.1728.com/pythgorn.htm>.

Plugging away at the calculator again, or in my case plugging the values into the triangle-figuring utility, we go like this:

Input known Side 1 (the mast): 20 feet

Input the hypotenuse (half of the antenna): 33 feet

The unknown side is 26.429 feet. This is the length from the center support (the mast or tree) to one of the ends of the antenna. The total "footprint" then is roughly 53 feet ($26^1/2 \times 2$). We will ignore the angles for this estimate because the angle of an inverted-Vee can be more or less than 90 degrees and still work. This is where the theory and the reality must differ, and we must use the space we have.

Time to Go Shopping

Now that we know how much wire and how much space we need, let's make a shopping list of things needed to build this inverted-Vee:

Bill of Materials

Wire: 70 feet or so
Antenna end insulators: one pair
Antenna center insulator: one
Feedline (50-ohm coax cable)
A "wall tube" for the coax cable, used to pass the cable through the wall
Dacron line or rope
Swivel pulley (optional enhancement) and a fastener to mount the pulley to the mast (stainless-steel hose clamps, U-bolts, or other hardware can be used)
Mast or other support

The wire can be just about anything available, either something you may have in your garage, or something easy to buy. You can go to your local hardware or home supply center, or you can go to your ham radio equipment store. The wire can be either solid or stranded. I have thousands of feet of No. 10 stranded copper wire, with various colors of insulation. The color is not critical. If you need to buy the wire from the hardware store, get No. 10, 12, or 14 wire in solid copper, since solid-copper wire will be easier to handle. There are several commercial wire antenna companies that use this type of "house wire" for their antennas, so it should be suitable for the first dipole.

Speaking of using insulated wire for an antenna, it does not have to be bare. I remember a friend of a friend who spent hours with his dad as they carefully stripped the plastic insulation off the wire they bought at the hardware store. You do not have to waste any antenna-building time removing the insulation. Sometimes, if you're trying to have an antenna that doesn't "jump out" at the neighbors, it may be better to leave on the insulation.

The radio store can show you what they have in stock, and usually this is either stranded, bare copper wire, or it may be a special kind of wire called CopperWeld™ or something similar. CopperWeld is a steel wire core with a copper-plating on top, with a shellac or varnish finish. It is very strong and very stiff. The advantage of this type of wire is that it does not stretch, but a slight disadvantage is that it is a little harder to work with.

End insulators can be either home-made or store-bought and come in a variety of materials. Perhaps the best ones are made of glass or porcelain. They will last a lot longer than the newer plastic types, but are getting hard to find.

Photo 1 shows three typical insulators, including the standard "straight" type on the left and a special version called the "egg" on the right. The egg insulator has a particularly good safety feature: In case the insulator breaks, the wire loops that attach to the insulator will remain in place, and the wire element will not fall down—as long as you've followed the guides on the insulator and essentially looped the wires through one another (while keeping them from touching). If the wire breaks, well, then the antenna *will* fall.

For the center insulator I recommend a store-bought item. The one shown in the picture includes a coax connector (type SO-239) and makes building the antenna easier. You do have to fasten the wire to the center insulator carefully in order to make the wire elements last. Photo 2 shows how this should be done. The idea is to relieve as much stress as possible so the soldered connection does not flex and break.

The feedline can be any good-quality 50-ohm coax, and the length needs to be as long as it takes to go from the top of the mast and into your station. It may be best to get the feedline with connectors (type PL-259) already installed. Lately I have been using RG-8X, since it is smaller and lighter than the RG-8, and yet has better qualities than the RG-58 (smaller) coax. Check with your radio dealer for some advice.

The ends of the antenna must be secured to anchor points, such as a tree or some other strong object. I have used a fence post at one end and a tree for the other end in an installation. The best "rope" to use for the ends of the wire antenna is Dacron® line, and it is carried by many ham radio shops. As an alternative, you can use some of the leftover wire.

Get the Tools Out and Let's Build It!

Photo 3 shows some of the materials and tools needed to build a wire antenna. Now study photo 4 carefully. I use a knot called the "water knot," or "fisherman's bend," to secure stranded wire to the insulator. If you are using solid wire, you can just twist the ends of the wire back onto itself, as shown in photo 5. The ends are stripped for about an inch or two and then soldered to the connections to the coax cable. Attach the coax to the center insulator and carefully coil the antenna into three bundles.

If you are using a mast, assemble any sections and attach the pulley (see photo 6). String a support rope through the pulley along the length of the mast and mount the mast with a suitable support. With the rope and pulley installed, it will be very simple to raise or lower the antenna for maintenance, replacement, or changes. Just un-tie the rope and lower the antenna to the ground, instead of dismantling the entire antenna.

Now that we have the pulley system going, how does the antenna attach to the mast? Refer to photo 7 to see one way to secure the center insulator to the line. The fisherman's bend makes the support rope into one loop, and a prusik knot is used to secure the center insulator to the support rope. Now pull the support rope to raise the center of the antenna and tie off the support rope to the mast or other suitable cleat. Next tie the ends of the antenna their supports.

As an alternative, if you are not using a pulley, you can fasten the center insulator to the top of the mast using some of the leftover wire. Then you can raise the mast to its vertical position. In photo 8, the inverted-Vee was raised up to the top of the mast, but I forgot to attach the coax cable. Good thing I have this antenna attached to a raising line and a pulley. . . .

Basic Soldering Skills

Any electronics project, including antennas, requires the skill of soldering. Like any other skill, learning how to solder properly takes practice. Fortunately, it is a simple skill to master, and there are many references showing the proper techniques. A very good soldering tutorial, "Soldering Tips," by Tom Hammond, NØSS, is presented on the Elecraft website. Although the tutorial is written for small electronic projects using electronic components, the advice is still good to know. See <http://www.elecraft.com/TechNotes/N0SS_SolderNotes/N0SS_SolderNotesV6.pdf>.

Here is another good reference on wire splicing. This is an automotive car audio installation tutorial calle, "12 Volt Electrical Connections, the Good, the Bad and the Ugly," by Jason Hodges, and can be found online at: <http://www.mmxpress.com/technical/connections.htm>

Read and follow the authors' advice and practice, practice, practice. Make a "soldering practice board" as shown in photo A, concentrating on making wire splices. For wire-antenna-building, you can use a large- diameter solder, since the larger wires used for antennas will soak up ("wick") a lot more solder. Buy solder made with a tin-lead (Sn/Pb) alloy of 63/37 or 60/40 with rosin core. Never use acid-core or acid fluxes for any electrical or electronics work.

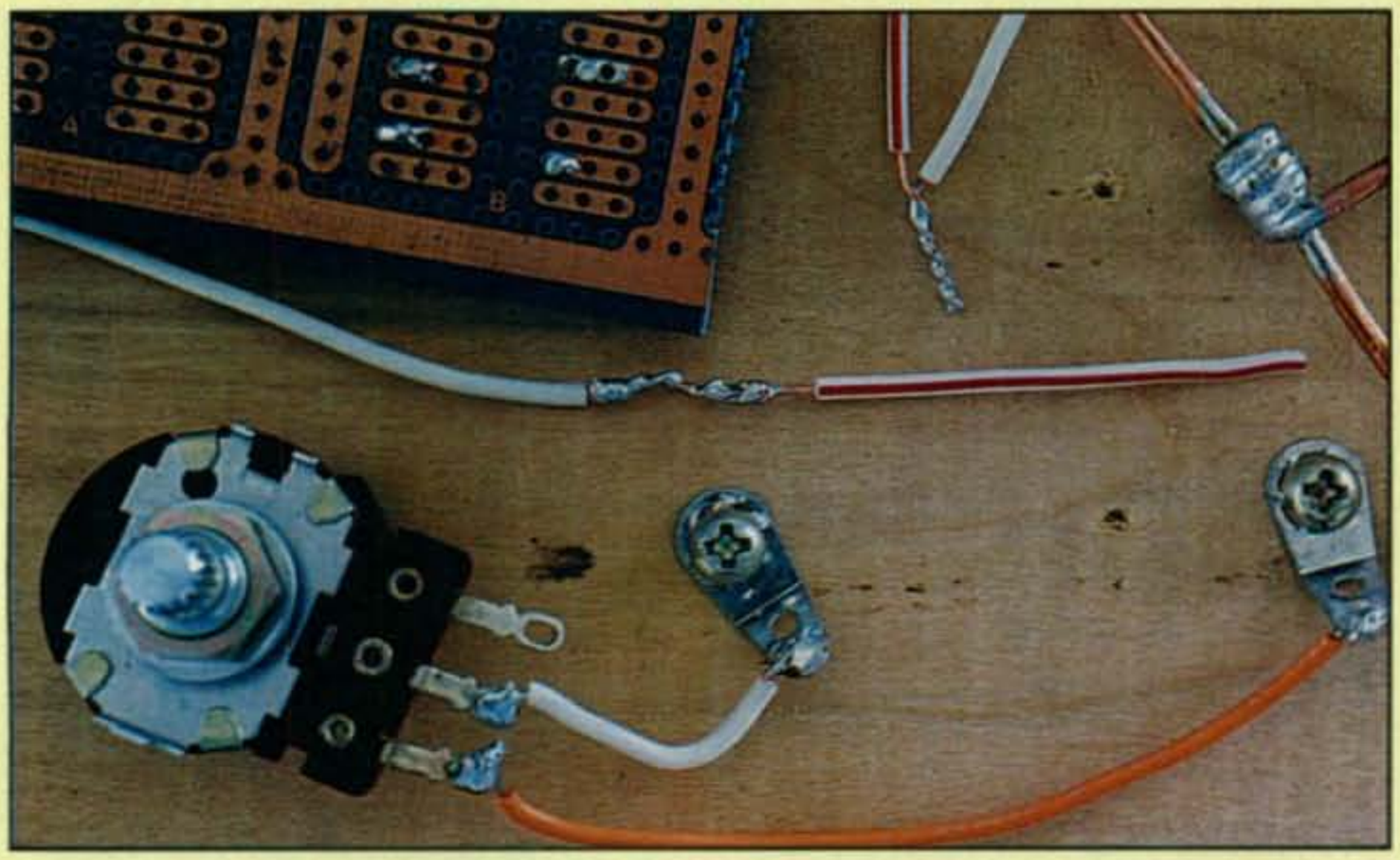

Photo A– The soldering practice board. Practice making wire splices with both stranded and solid copper wire. These connections are especially useful for wire antennas, including the trusty dipole.

Photo 2– The store-bought center insulator includes an SO-239 coax connector and terminals for the antenna wire elements. The screw-eyes are used to mechanically secure the wire elements to the center insulator unit and remove the pulling force from the electrical connection.

Route the coax down along the mast and into your operating location. The wall tube can be used to make the installation look nice and professional. As an alternative, you can drill a hole through the wall and use caulk to seal the wall from bugs and water. If you do not want to drill holes in the house, you can go through a slightly open window, but you will have to insert some insulation material to close off the open gap, and also you will need a way to lock the window for security. Some lengths of pipe insulation will work for the weather-proofing part, but other alternatives are needed for the security part. When I used the partly-open window route, I used an upstairs window that is not accessible from the ground. You may also insert a security pin (available from your local hardware store) into the window frame. (At least one ham manufacturer, MFJ, offers a feed-through that sits in the bottom of the window frame, held in place by the window itself.)

Congratulations, you have built and installed an effective, but simple HF antenna.

Testing and Adjusting

There are two ways to adjust a dipole. The old-fashioned "cut and try" method means that you build the antenna, install it, "try it out," and cut the lengths to make adjustments. Remember the pulley enhancement? The cut-and-try method means that you have to put up the antenna to try it out, using your radio. You put the rig into transmit at its lowest power setting and watch the SWR or reflected power. Then you have to take down the antenna to adjust it (making it shorter, a quarter-inch or so at a time). Then you have to put the antenna back up and do the same thing again. This always takes several tries to get it right. Remember, it's harder to add on wire than to cut it off, so don't get carried away. Plus, when you do this "testing," you must keep your transmissions as short as possible to minimize interference. Of course, too, you must always listen first to make sure no one is using the frequency!

In my case, I never had a lot of patience, so I would build an antenna using the standard formula, put it up, and discover that the antenna was always "way off." I cheated and used the antenna anyway. More on this cheating idea later.

Photo 3– Here are some of the materials and tools needed to build wire antennas. The "extra long" tape measure is very handy when using long runs of wire.

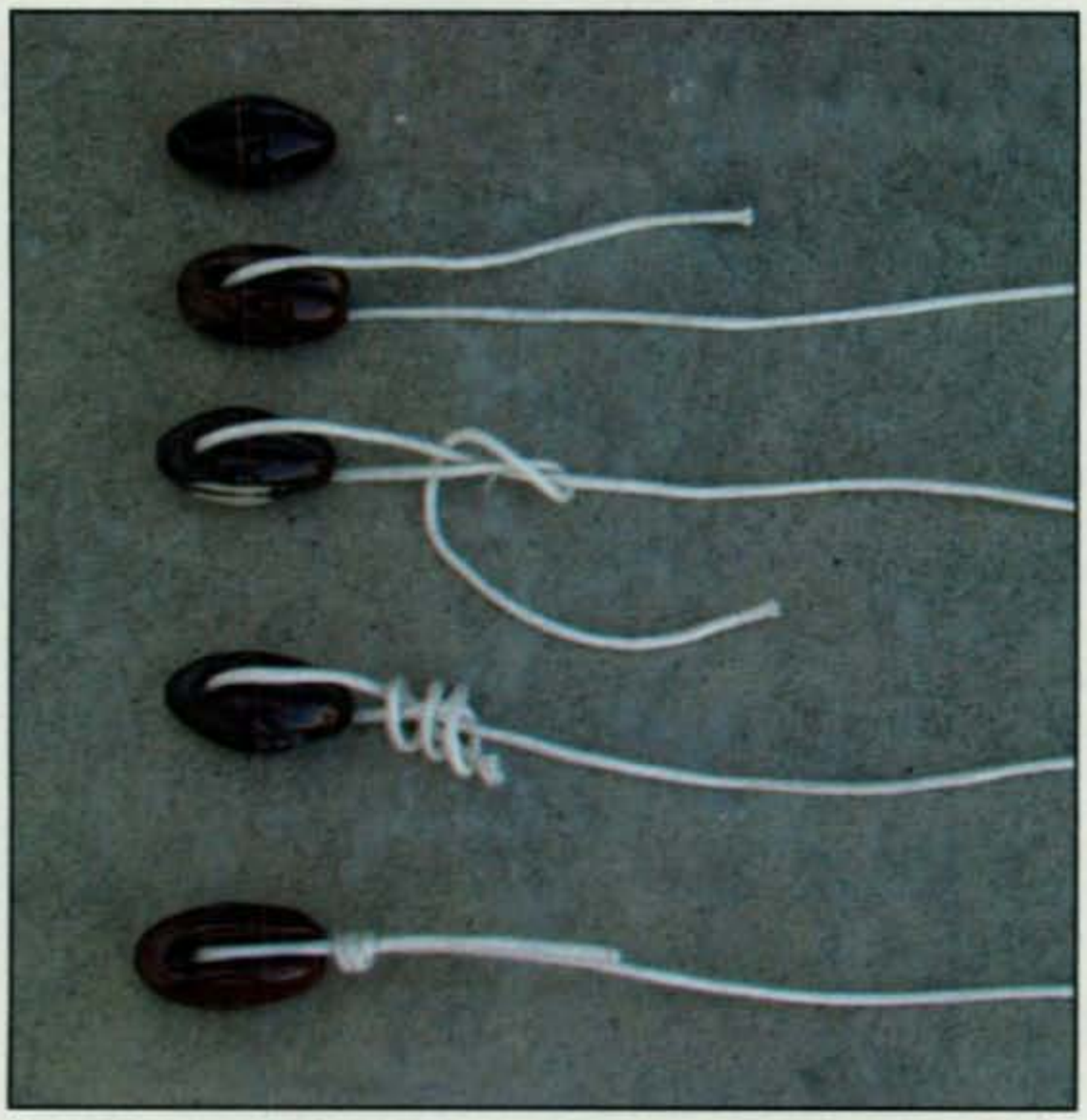

Photo 4– Study this picture carefully to learn how to tie a very useful knot for antenna-building. The "fisherman's bend" is useful for splicing rope,or joining two different types of line. It is very secure and yet easy to untie if necessary.

A gizmo called an antenna analyzer will be very helpful in tuning the antenna and is a much better way to tune it, since you are not sending a strong signal into the air, which prevents interference to other stations. These units generate a small signal and feed it into the antenna system and measure the reflected power on the antenna to assess its resonant frequency.

The analyzer can find the antenna resonant frequency in its "as-built" state. Then you can trim the lengths to proper size. Since the elements are longer than calculated length, this means that the antenna will be lower in frequency than the desired operating frequency. Remember, a longer antenna means lower in frequency, and shorter antenna means higher in frequency. The only drawback to an antenna analyzer is cost.

Photo 5– If using solid wire, the ends can be wrapped back upon themselves as shown. This photo also illustrates what the far end of a wire antenna and its insulator looks like.

Photo 6– Here is one way to attach a pulley to a mast. Drill a hole through the mast, insert a long eye-bolt, and use a link to secure the pulley to the eye-bolt.

The second way to optimize the antenna requires a little bit of math. Once you determine at what frequency the antenna really works, adjustments can be made. The formula goes like this:

Desired Length = Actual Length × Actual Frequency/ Desired Frequency

Thus, for our 40-meter antenna cut for 7.065 MHz, we might go like this:

Desired Length = 70 ft. Actual Length × 6.623 MHz Actual Frequency/7.065 MHz Desired Frequency

The Desired Length is then 65.621 feet (463.61/7.065), quite different from the "theoretical" calculation of antenna

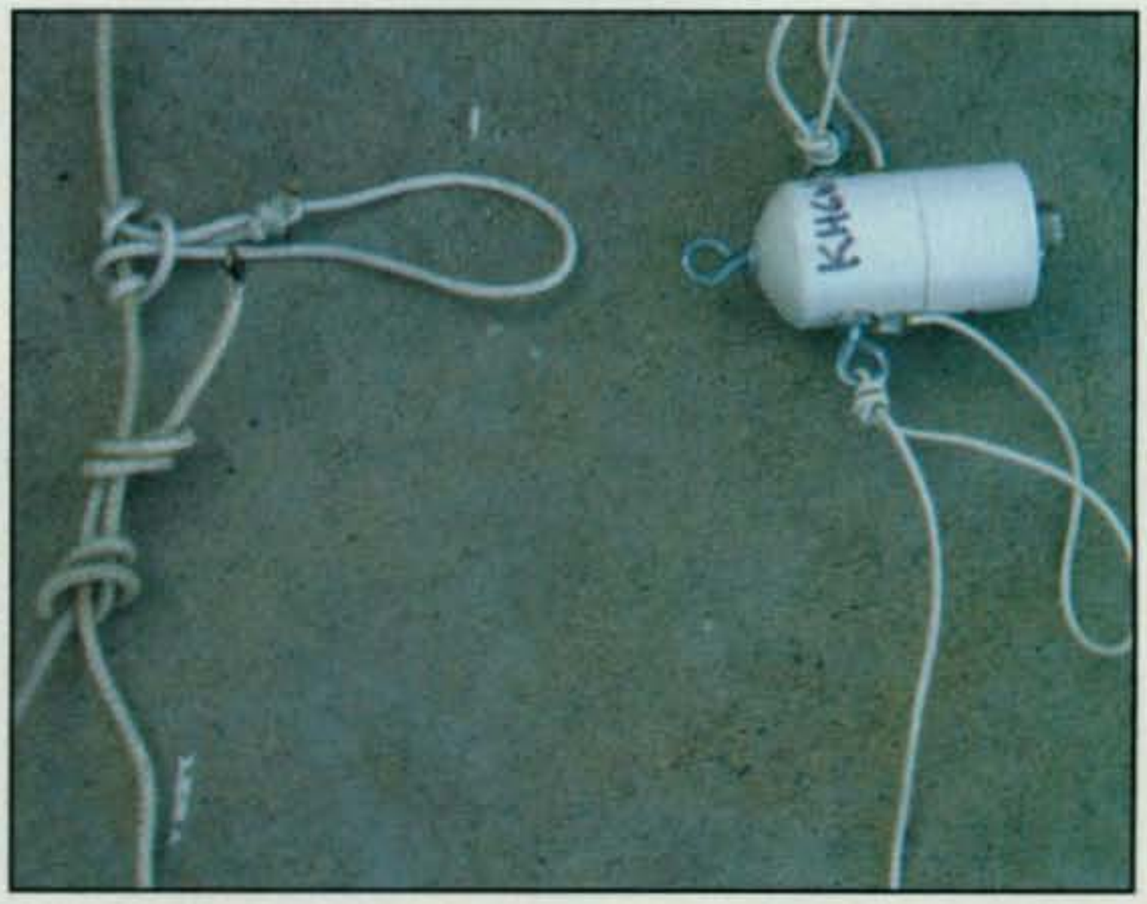

Photo 7– Here is a photo of a secure way to tie the antenna and the center insulator to the support rope. The knots were left loose so you can see how they are tied. The next step is to pull the knots tight and secure. On the left, the bottom pair of knots is a fisherman's bend used to make the support rope a single loop. Above the fisherman's bend is a knot called a prusik (also called a "rescue knot"), which will cinch tight onto the support rope. The center insulator will be attached to the loop.

Photo 8– The completed antenna is raised to the top of the mast by pulling on the support line. When you do this, make sure the coax feedline is attached to the center insulator. . . .

Electrocution Warning!

Wire antennas (all antennas, actually) should be kept as far away as possible from power lines, and should not cross over or under them. You do not want an antenna wire to be able to fall onto a power line or a power line to fall onto an antenna wire. This would be distinctly unhealthy for your radio and for anyone sitting near it.

The same precautions should be taken regarding lightning protection, and this applies to any outdoor antenna. If a thunderstorm is possible, the feedline should be removed from the radio and grounded whenever the radio is not in use. Plus, you should never operate during a thunderstorm.

length, eh? Since the actual wire antenna is 70 feet, we have to make the antenna shorter by a total of 4.38 feet (70 – 65.621). This means we have to cut off 1.19 feet (about 14 inches) of wire on each side.

The Antenna Tuner for Cheaters

Okay, before I get some hate-mail about the antenna tuner being for cheaters, let me explain that I have never really learned much about the dipole or inverted-Vee antenna until very recently. Antenna tuners are excellent accessories for any ham station, and I own several. They also may help suppress radio and television interference, can extend the bandwidths of antennas, and can make them usable on more than their harmonic frequencies.

In my early antenna-building days I used to build a dipole, put it up, and it would be wildly off frequency. I talked to another beginner friend and he said to "just get an antenna tuner," so I did. For many years I never adjusted a wire antenna properly until I discovered the methods mentioned here. Sure, this antenna tuner method of adjusting an antenna will work, but I always wondered if my marginal to poor success when using these antennas was the result of the poorly- adjusted wire elements, since some (or most?) of the radio energy on both receive and transmit must be lost or wasted while going through all the parts inside an antenna tuner.

Summary

I hope these practical hints on wire antenna building will help you to build and install an optimized antenna system for the best performance. On the other hand, using an antenna tuner can save a lot of "cut and try" time, and you can use the antenna on more than its harmonically related frequencies. I am sure that after a short time you will look for other wire antennas to build and use in a search for better station performance. These basics can be applied to building any wire antenna system that will last a long time.

73, Wayne, KH6WZ

References and Sources

Autek Research
Model RF-1 RF Analyst
<http://www.autekresearch.com>

Kuranishi Instruments
Model BR-210 Standing Wave Analyzer
<http://www.cometantenna.com>

MFJ
Model MFJ-207 10-160 Meter Antenna/SWR Analyzer
MFJ also makes a broad line of antenna tuners
<http://www.mfjenterprises.com>

Many other companies make antenna tuners and other antenna-building accessories. Check the ads in *CQ*, as well as your favorite ham radio shop for price, availability, and purchasing information.

Antenna Books

CQ Bookstore: <http://www.cq-amateur-radio.com>

ARRL: <http://www.arrl.org/catalog>

the weekender

BY PHIL SALAS,* AD5X

Precision Mismatches for Checking Your SWR Meter and Antenna Analyzer

This project began as part of my quest to try to understand, and therefore compensate for, any inaccuracies in my SWR meters and antenna analyzer. In other words, when you see a 2:1 SWR indicated on your SWR analyzer or SWR meter, just how accurate is that reading? It seemed to me that what I needed were precision non-inductive power resistors that I could use for verifying and calibrating my SWR meters and antenna analyzer. However, where do you find good non-inductive power resistors?

While paging through the Mouser catalog one day (www.mouser.com), I stumbled across a series of thick-film non-inductive power resistors at very reasonable prices. These are 1%-tolerance power resistors made by Caddock and Ohmite that will handle power levels from 15–100 watts. The resistors typically have just 10 nanoHenries of inductance associated with the package and mounting, which makes them excellent through 225 MHz and very usable to 450 MHz. For load mismatches, it is best to use higher value resistors when possible, as this improves the UHF performance by minimizing the effects of the package inductance. As an example, you can make a 2:1 SWR load with either a 25-ohm resistor or a 100-ohm resistor. At 440 MHz with a 10-nHy package inductance, the SWR of the 25-ohm load is 2.75:1, whereas with the 100-ohm resistor the SWR is 2.2:1 (equations can be found in the ARRL *Antenna Book*).

I decided to build fixed loads of 200 ohms (4:1 SWR), 150 ohms (3:1), 20 ohms (2.5:1 SWR), 100 ohms (2:1 SWR), 75 ohms (1.5:1 SWR), and 50 ohms (1:1). I had to use a 20-ohm resistor for the 2.5:1 load, as 125-ohm resistors were not available. However, the 20-ohm resistor is very good through 2 meters. Also, I mostly used the 15-watt Caddock resistors, but I used a 35-watt 150-ohm Ohmite resistor for the 3:1 load, as a 150-ohm Caddock resistor was unavailable. Besides being excellent for checking your antenna analyzer, the power-handling capability of these resistors is convenient in that you can apply some power and check your SWR meters. If you wish, you can use up to 100-watt resistors for high-power loads. However, they must be properly heat-sinked in order to dissipate that much power. For reference, the 100-watt Caddock 50-ohm resistors are Mouser part number 684-MP9100-50. These resistors cost approximately $9.00 each.

Photo A– The brass plate mounted and soldered in place.

In order to ensure I didn't add any additional inductance, I built brass mounting plates for attaching the thick-film resistors to UHF or N connectors with minimum lead lengths. Fig. 1 shows the dimensions of the plate. These plates were cut out using metal shears, an inexpensive nibbling tool, and needle files. To bend the tabs, I inserted the plates into a vise and then bent the plates over using a hammer.

Tin the rim of the connectors with a heavy soldering iron, and then mount the brass plates to the connectors with #4 screws, nuts, and lockwashers. Then solder the brass plates to the tinned rim of the connectors. Photo A shows a plate mounted and soldered in place.

Next place a thick film resistor on the plate, positioning the resistor and shaping the resistor leads

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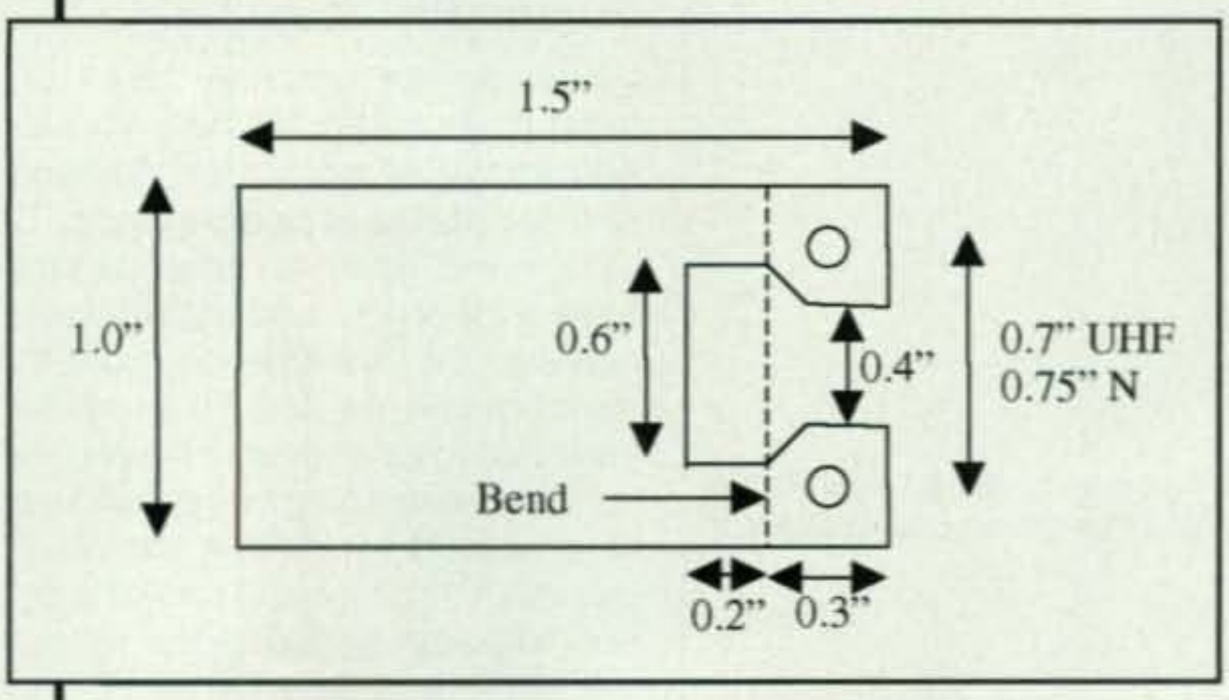

Fig. 1– Brass-plate dimensions.

Photo B– The assembled precision loads using both SO-239 and N connectors.

Qty	Description	Source/Part Number	Price ea.
1	20-ohm 15-watt resistor	Mouser 684-MP915-20	$2.88
1	200-ohm 15-watt resistor	Mouser 684-MP915-200	$2.88
1	100-ohm 15-watt resistor	Mouser 684-MP915-100	$2.88
1	75-ohm 15-watt resistor	Mouser 684-MP915-75	$2.88
1	150-ohm 35-watt resistor	Mouser 588-TCH35P-150	$5.66
1	50-ohm 15-watt resistor	Mouser 684-MP915-50	$2.88
6	SO-239 connector	Mouser 530-CP-AD206	$1.36
1	0.032-inch brass sheet	ACE Hardware	

Table I– Parts list, precision mismatches.

for minimum lead lengths. Hold the resistor in place and mark a hole for the resistor mounting screws (#2 for 15-watt resistors, #4 for 30-watt resistors, and #6 for 100-watt resistors). Also, mark where the resistor ground lead will solder to the brass plate so you can tin this area as well. Mount the resistor to the plate using a dab of heat-sink grease, and solder one resistor lead to the connector center conductor and the other resistor lead to the brass plate. Photo B shows the assembled precision loads using both SO-239 and N connectors.

For all practical purposes, you probably only need to build 50-ohm, 100-ohm, and 150-ohm loads to give you 1:1, 2:1, and 3:1 SWR testing loads. I just tend to get a little carried away!

Next month I will expand on this idea a bit and show you how to build a couple of inexpensive devices to let you accurately determine your transmit power.

73, Phil, AD5X

qrp

BY DAVE INGRAM,* K4TWJ

All Round QRP

One of the special rewards of traveling the QRP route is building and using all types of novel rigs. Some are tiny pocket items, some squeeze into Altoids® mint tins, some are built as retro spy rigs, and some are . . . well, you name it and QRPers build it! Yet another unique style of QRP is the feature of this month's column—all round rigs. That's right, and of these circular-based gems, two are available in easy-order kit form, one is a creative idea generator, and one is a home-dink project. It promises to be a fun-inspiring month, so I simply will say, build, build, build and bring on the goodies—starting with an all round 40-meter treat.

New Sudden Storm Receiver

Remember the Tuna Tin 2 transmitter designed by W1FB, updated and made into kit form by W1REX of <www.QRPME.com>, and highlighted in our December 2006 QRP column? It has now been joined by a mating receiver kit, a direct-conversion 40-meter gem called the Sudden Storm and shown in photos A, B, and C and fig. 1. The little tyke is QRPme's implementation of the 2-IC Sudden receiver written up by Rev. George Dobbs, G3RJV, in October 2006 *Practical Wireless Magazine* of the UK. Like the Tuna Tin 2 kit, the Sudden Storm is also packed in a pull-top can sporting an attention-grabbing label and step-by-step assembly instructions. Thanks to its top-of-tin PC-board layout, you can look right at its circuit and watch the little electrons flowing during operation. Every amateur needs a receiver like this!

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Photo A– Making its debute this month is the new Sudden Storm 40-meter receiver kit from W1REX <www.QRPME.com>. All parts, sockets, etc., plus step-by-step assembly instructions come packed in a cool-labeled pull-top tin, which also serves as the receiver's base after assembly.

Photo B– The Sudden Storm goes together so quickly that pausing to shoot this photo midway during assembly was the most time-consuming step. There are no off-board components to wire, no toroids to wind, and performance is quite good for a two-IC receiver.

I recently quickly assembled a Sudden Storm receiver kit, and it is proving to be a cheerful addition to the shack for both casual QRPing and general band monitoring. The sensitivity is quite good—actually impressive for a two IC receiver—and audio output is more than sufficient for in-shack listening with a pair of Dollar Store earbuds lying on the desk (micro speakers!). Since it is direct conversion, the Storm tunes both sidebands, and since a crystal filter is not included, receiver bandwidth is four or five kilohertz. That does not seem like a serious drawback to me, however. I just tune in signals for a pleasant note and ignore stations I do not wish to copy (the operator, not the rig, makes the difference!). In fact, the wide bandwidth has an advantage for monitoring general QRP activity. You just set the receiver on 7.040 kHz and concentrate on one tone/signal at a time. That, dear friends, is a trick you cannot use with a modern transceiver.

If you are not familiar with the Storm's circuitry (fig. 1), it uses a popular NE612 IC as a combination local oscillator and mixer, and an LM-386 as a high-gain audio amplifier. The local oscillator's frequency is controlled by the crystal and can be warped a few kilohertz by D1, which acts like a varicap. Potentiometer P2 controls the bias applied to the varicap for tuning. Simple and efficient.

I decided to have a little modification fun with the receiver, so I replaced its rear power socket with a small toggle switch from a Tuna Tin 2 transmitter and installed a 9-volt battery in the base/tin. An LED with a 15K-ohm resistor was added as a "On indicator" and installed in a hole for a mounting screw. The mods gave the receiver go-anywhere portability. Then I substituted a 10.108-MHz crystal and parallel-connected a 4.7-µHy inductor across input coil L1 and bingo! The little receiver

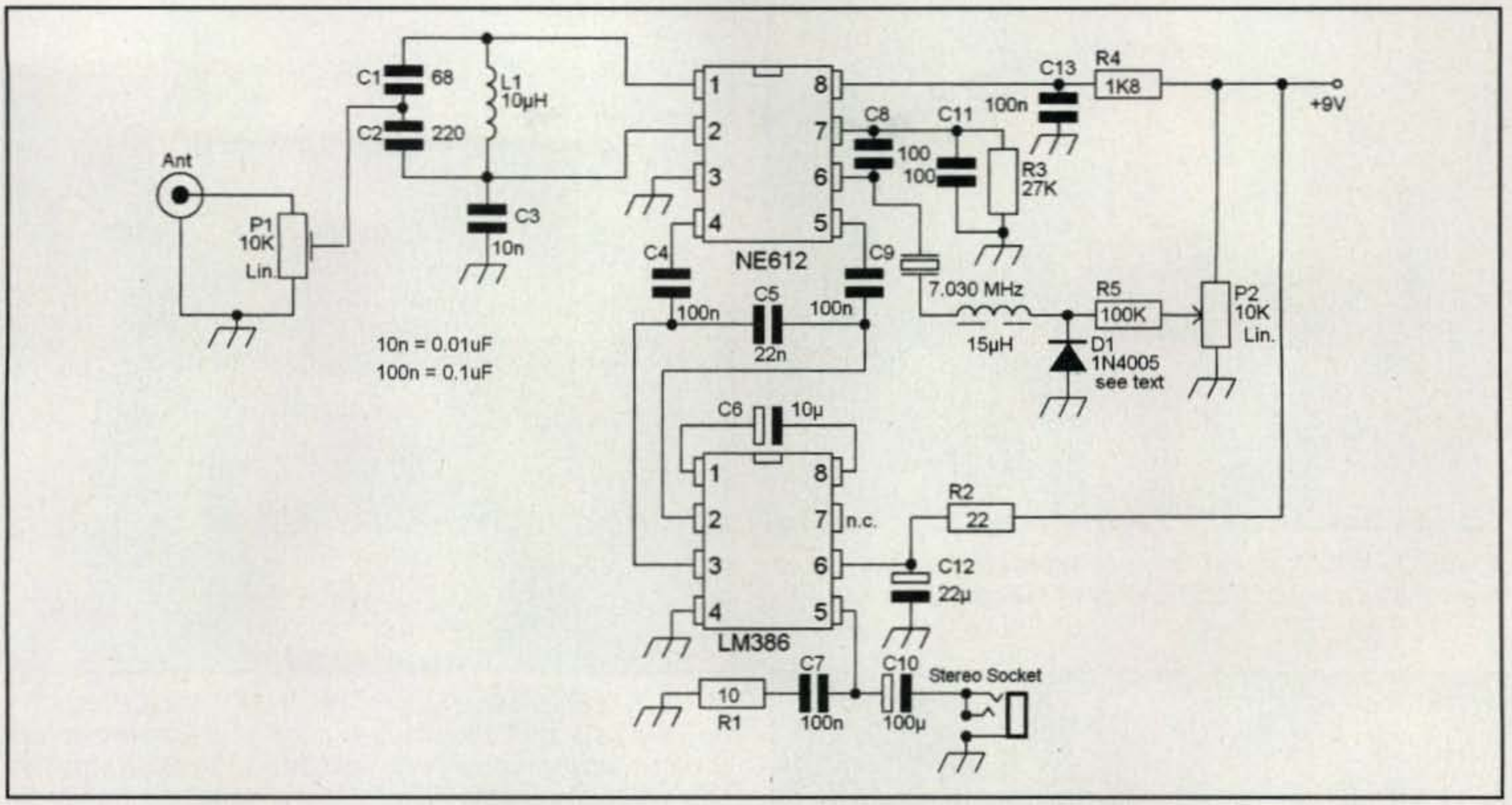

Fig. 1– Circuit diagram of the Sudden Storm receiver. The NE-612 serves as local oscillator and mixer; a LM-386 is the high-gain audio amplifier. (Discussion in text.)

started copying 30-meter signals like, well, like a storm! Switching between bands now is simply a matter of swapping crystals (what's a few microHenrys between friends . . . err, bands).

As a wild and wacky next step, I combined the Sudden receiver with a freshly built for April Fool's Day Tuna Tin 2 transmitter (note label in photo C) modified to produce almost 1-watt output. What kinds of mods did I make? First I cut extra pins from the tiny strip of pins QRPme supplied with the kit for making a crystal socket and used them to make sockets for the transistors. That made it easy to experiment with transistors and replace the ones that smoked. Then I moved the kit's metal-case 2N2222 to the oscillator section, substituted a 2N3053 in the amplifier section, and replaced its 56-ohm emitter resistor with a 5-ohm resistor. That gave the output-adjusting potentiometer on the emitter full control of transmitter power.

Throwing caution to the wind, I next capped the 2N3053 with a big heat sink and installed two series-wired 9-volt batteries for power in the base/tin. The batteries are small, readily available, and 18 volts really makes the transmitter scream! The keying transistor would not switch at 18 volts, so I jumped it too and just keyed the rig's negative battery line.

Those were my first mods. Now a 30-meter mod, a VXO, and more are planned as time permits. In fact, I am having so much fun with this combo that I am considering mounting them on the console of my dear little Camaro and going mobile with the pair. Yes, indeed—Tu Cans for the road!

Want to know more about tin-can QRP fun? Check out the Sudden Storm and Tuna Tin 2 kits at <www.QRPME.com> or contact W1REX at P.O. Box 160, Limerick, ME 04048 for details.

Photo C– All round QRP! The Sudden Storm receiver on the left is powered by a 9-volt battery in the base and modified for both 40 and 30 meters. The Tuna Tin transmitter (with a timely April Fool's brand label) on the right was modified to run on two 9-volt batteries in the base and produce almost one watt output. The round-base key made by Jim Richards, K6VDH, uses a Hand Cuff Key for the lever.

Shoe-Shine Smite

Next in our round rig spotlight is the KnightSMite Pixie transceiver Dennis Payton, N9JXY, built, beefed up with several extras, and mounted in a shoe polish tin (photos D, E, and F). You would think that just assembling a 9-volt battery-size transceiver and squeezing it into a shoe-polish tin would be enough

Photo D– What's round, fully self-contained, and looks like a can of shoe polish? The answer is in photos E and F.

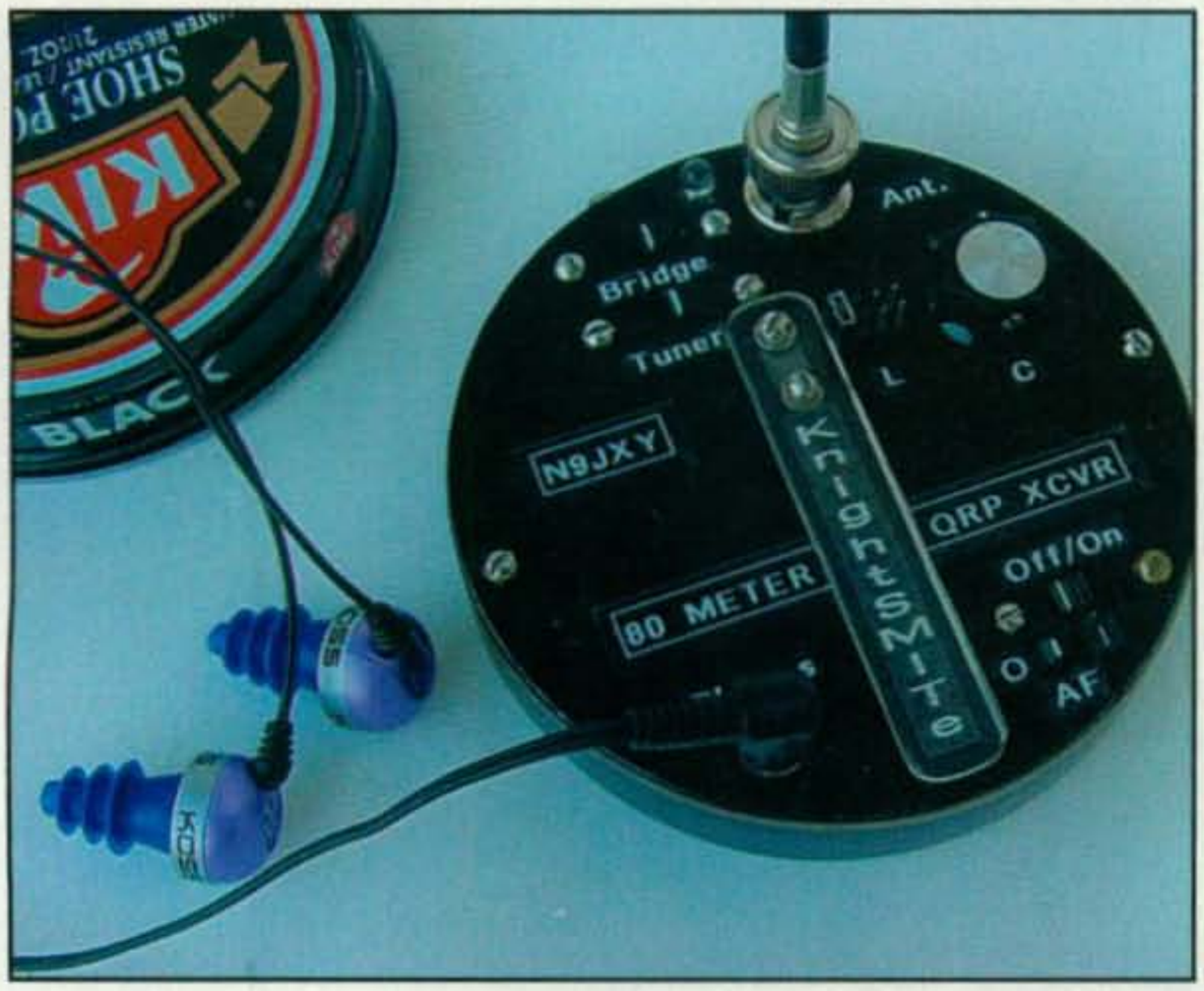

Photo E– Removing the can's lid, we find an ultra-compact 80-meter transceiver complete with audio filter, antenna tuner, and SWR indicator ready for action. This gem is the handiwork of homebrewer extraordinaire Dennis Payton, N9JXY, and it is fully portable to boot!

challenge for one person, but no: Dennis topped it with an audio filter, antenna tuner, LED SWR indicator, and a 9-volt battery. Unbelievable!

The KnightSMite is a surface-mount version of the well-known Pixie mini-transceiver produced as a kit a few years ago by the KnightLites QRP Club of North Carolina (check them out at <www.Knightlites.org>). The PC board measures 1" × 1.75" and utilizes a 2N2222 oscillator driving a 2N2222 RF amplifier to produce approximately 250 mw output on 80 meters.

The transmit RF amplifier stage also serves as an active mixer on receive, combining the local oscillator signal on its base with incoming signals from the antenna at its collector and outputting resultant audio difference to an LM-386 IC. The audio is then boosted in level and output to an earphone,

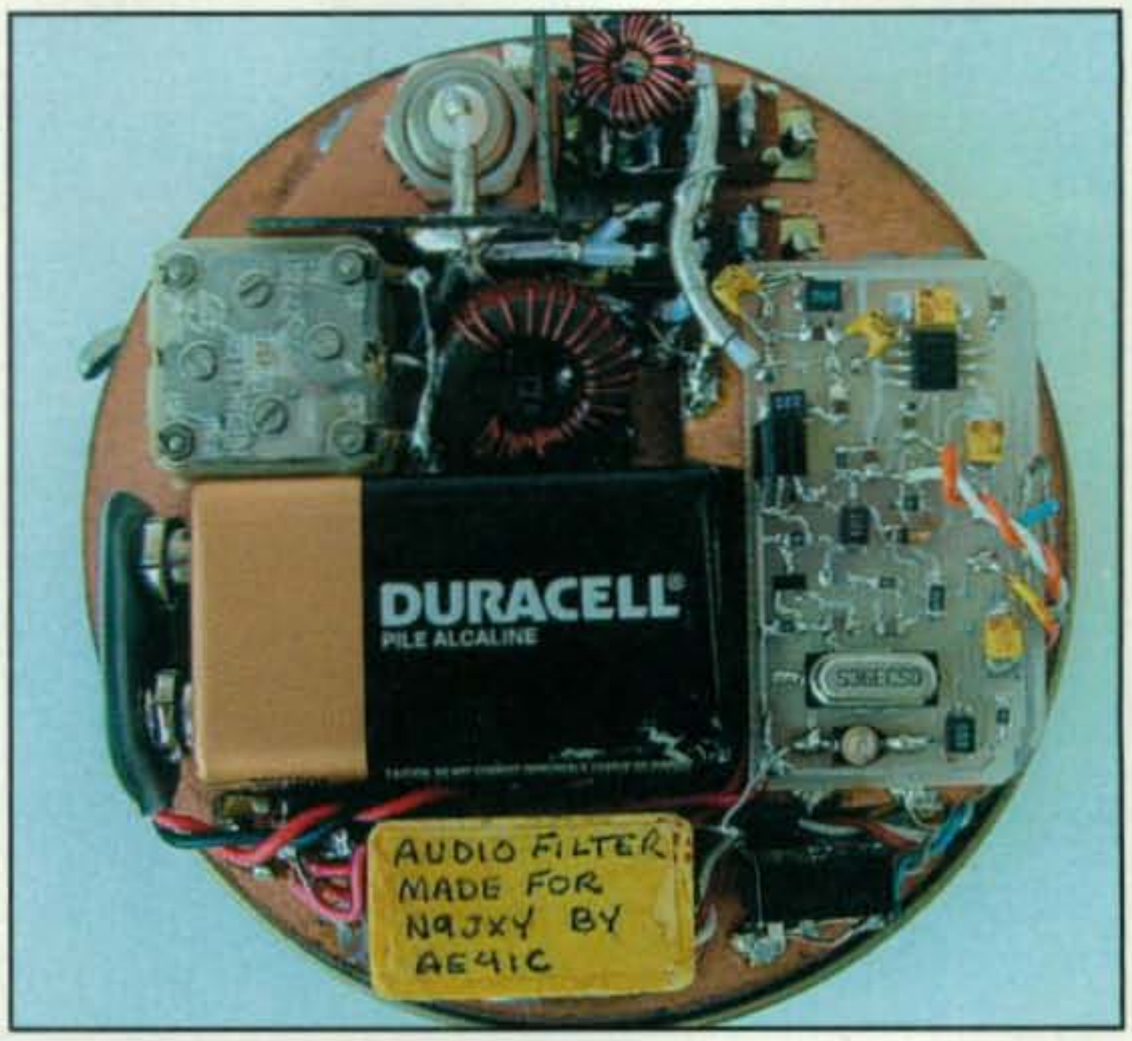

Photo F– Below-panel view of the N9JXY Shoe Polish Tin rig reveals a surface-mount version of the ever-popular Pixie transceiver (previously sold as a kit by the Knightlites QRP Club), an audio filter for extra selectivity (made by AE4IC), a toroid, and plastic-case capacitor for antenna tuning, a Wheatstone-type SWR Bridge, and a 9-volt battery for power.

or in the case of the N9JXY rig, to an audio filter and then to the earphone. Keying is performed by grounding the RF amplifier's emitter. This step also grounds the input of the LM-386 and mutes the receiver.

The Pixie design is both simple and unique, and it has also been produced in kit form (and for different bands) by several well-known QRPers. The last one to produce it was Embedded Research. Its sole distributor today, incidentally, is Bill Kelsey, N8ET, of <www.kangaus.com>. Check it out.

Hot Herring Aid

Another delightful little round rig also built by N9JXY is the tubular-case version of W1FB's famed "Herring Aid 5" receiver shown in photo G. Dennis cut the Herring tin in half, used it for the front and rear panels, and then made a clear center cover from a one-liter soda bottle. Closer inspection also reveals that Dennis made a real high-end Herring Aid 5 with varicap tuning controlled by a precision 10-turn potentiometer and double-turn counter knob. A dial number-to-frequency chart is even included around the front panel for big-time operation. There is an underlying lesson here, friends: Packaging and eye appeal are everything! Our compliments and thanks to Dennis for sharing views of his handsome homebrews!

Round-BaseTube Rig

Wrapping up our round-rig review is the captivating 955 Acorn Tube transmitter built by Walt Bullerwell, KF4YJQ, and shown in photo H. Is this not the best looking example of vacuum-tube QRP you have seen in many moons? Look at that "spacey" little tube, that round socket, that round wood base, that round coil. Wow! The circuit diagram plus full homebrew-a-copy details of this 40-meter marvel were in our February QRP column (you are saving this ongoing series, aren't you?). The featured (955) transmitter had a rectangular base,

New ARD9000 MK2 steps up to the mike!

When you add digital capabilities to your existing HF rig with a new ARD9000 MK2, the advantages will come through LOUD and CLEAR.

AOR digital voice operators around the world are amazed at the audio quality delivered by the ARD9000 and ARD9800. Now AOR has improved the ARD9000 by adding a high quality speaker microphone with a traditional 8-pin round connector that lets you "go digital" with just a mike click. Its compact size makes the ARD9000 a favorite for backpackers who want to go HF digital while hiking or climbing. Of course, you don't have to leave home to enjoy the fun of clear DIGITAL contacts.

With thousands of AOR digital units worldwide, digital HF is rapidly gaining a dedicated group of followers. **Isn't it time you joined the fun?**

Using the open G4GUO protocol, the ARD9000 or ARD9800 allows any ham to convert any existing HF analog transceiver to work digital voice in one easy step! No radio modifications are necessary and it works with any brand of transceiver. The unit automatically detects digital signals and decodes them, but you also maintain full analog capabilities. Whether a contact comes in as digital or analog, the ARD9000 and ARD9800 can handle it.

It's a real breakthrough in communications technology that uses the same audio frequencies (300 Hz ~ 2500 Hz) as microphone audio to transmit digital SSB voice signals. It's like adding a whole new mode to your HF radio without having to buy a new one!

- ARD9000 MK2 for "voice only" operations
- 12V DC only operation
- Use the provided speaker-mic or your own high-quality audio mic. (rewiring mic input may be required)
- NO transceiver modifications necessary
- Digital voice communications using existing analog transceivers
- Works on Single Side Band (SSB) mode.
- Automatic digital receive
- Optional interface cables for most popular transceivers
- Built-in high grade Vocoder (AMBE)
- Built-in FEC
- Compact unit. Easy to operate.
- Utilizes a uniquely designed high performance DSP engine
- Uses the established G4GUO open protocol

Be sure to check the website at www.aorusa.com for FAQs, links to user groups and more!

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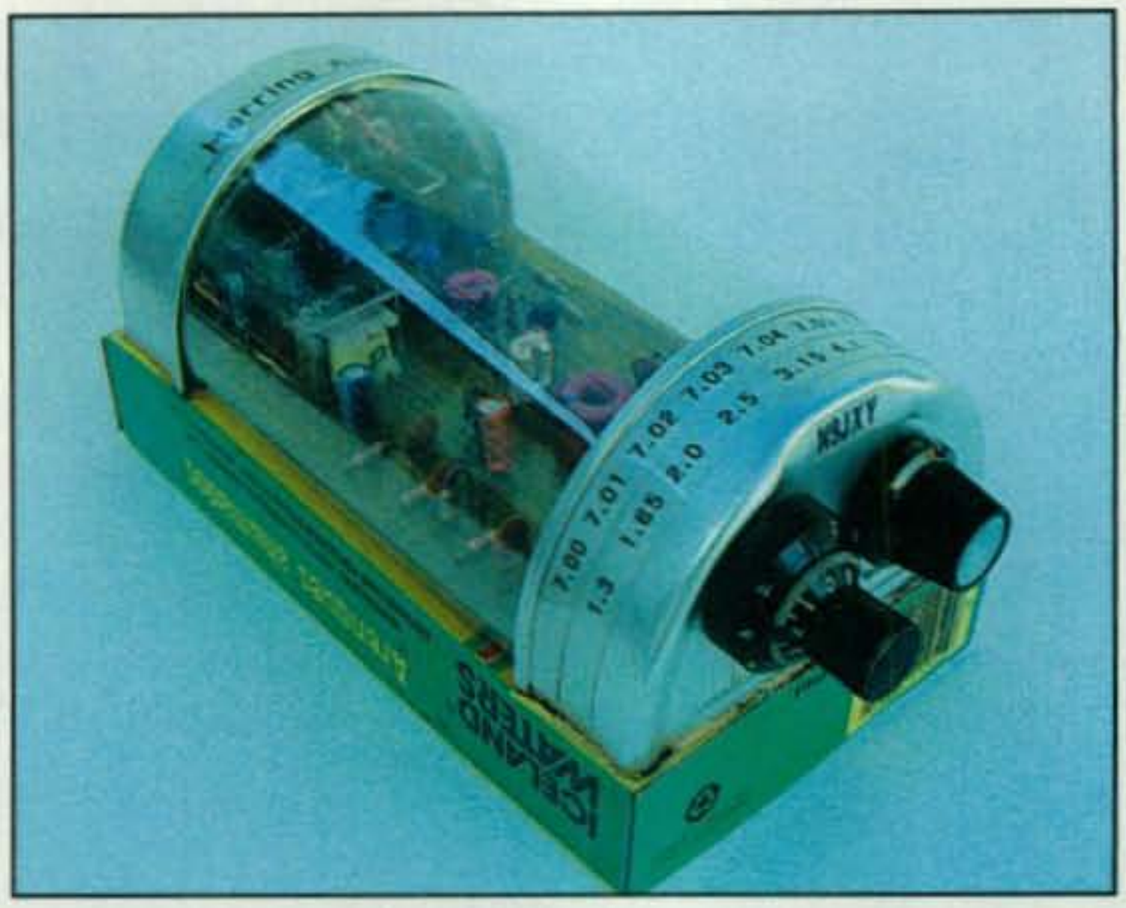

Photo G– This round beauty, also made by Dennis Payton, N9JXY, is a classic Herring Aid 5 receiver built with a Herring tin cut in half for end panels and a center cover cut from a one-liter plastic bottle. Note the 10-turn pot for tuning and its frequency calibration chart around the top panel. (Photo courtesy N9JXY)

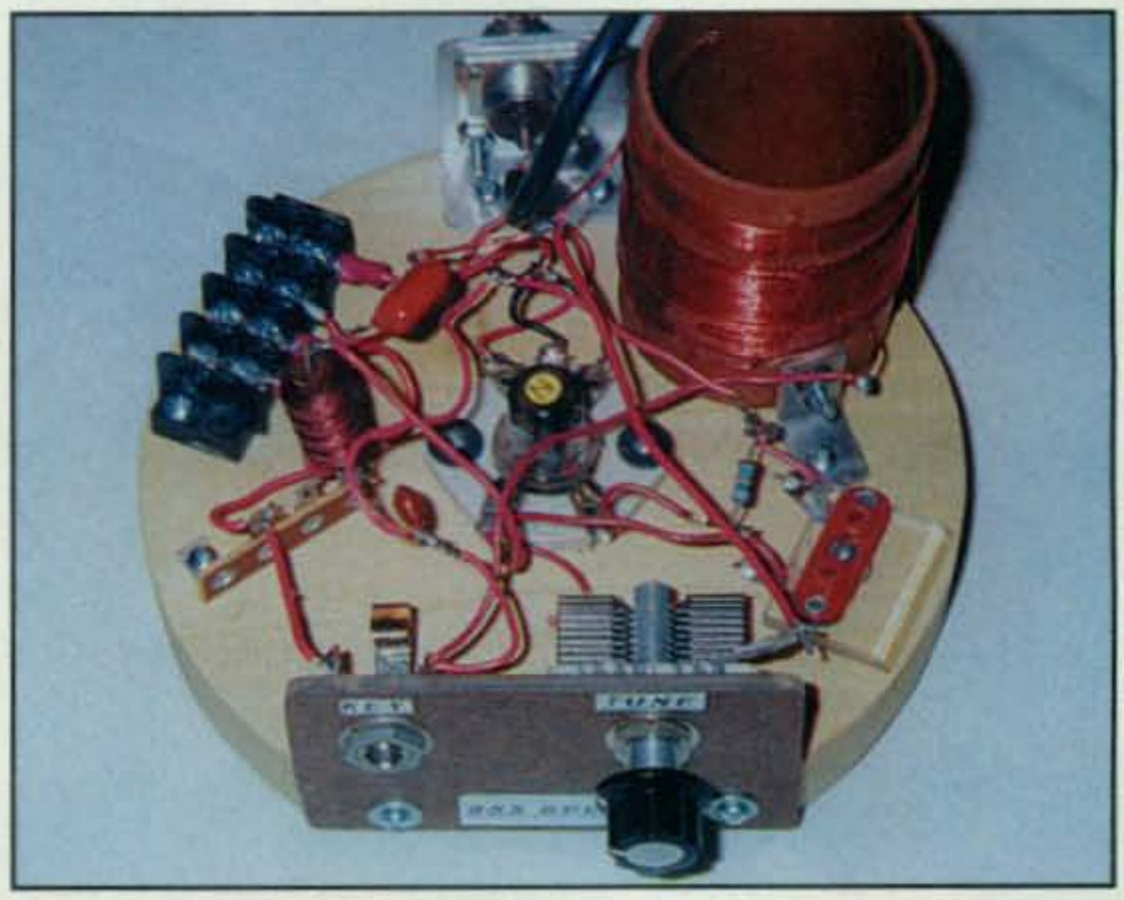

Photo H– More round QRP! This sweet little 955 Acorn Tube Transmitter was built by Walt Bullerwell, KF4YJQ, and he worked several stations on 40 meters with it "right off the bat." The circuit diagram and details on a rectangular-base copy were included in our February QRP column.

but all presented information applies equally to the round-base version. It is also a good "first tube" project for newer amateurs, because a double handful of 9-volt batteries (sold two for $1.00 at Dollar Stores) is used for plate power. They are not "shock proof," but you really must work at "getting bitten" by them.

That overflows available space for this time, and we must quickly bow out. before closing out this column, though, I will say: Bored with high-performance and super-features transceivers in plain black boxes? Prefer a rig with real personality? Take a walk on the fun side by building a simple rig in an unusual enclosure. You'll love it! 73, Dave, K4TWJ

A Simple Encryption Program for MARS Use

BY DON ROTOLO,* N2IRZ

Encryption for amateur radio is a hot topic these days. We're able to implement powerful encryption on 802.11 equipment, but what about the rest of the ways we communicate, such as WinLink, RTTY, PacTOR, and even voice? Well, Doug Hilton, AG4FL, will be our guest columnist this month, explaining a simple application called TWISTER to allow for basic encryption. Depending upon the purpose, this may or may not be legal for use on the air. *(In the usage presented here, the intent of the encryption is to obscure the meaning of the communication, so it would not be legal for amateur use under Part 97 of the FCC rules. In the example, however, it is being used in conjunction with the Military Affiliate Radio System, or MARS, which does not operate on amateur frequencies and is not subject to the limitations of Part 97.—ed.)*

Here's Doug...

After reading "Data Encryption is Legal!" in the August 2006 issue of *CQ* magazine, I decided that the opinions expressed were very interesting. Tackling a controversial topic such as encryption is curious, since it has been considered a "settled issue" for a long time. However, after looking carefully at that article, I'm convinced that it's time to move ahead. I'm not a lawyer, but hey . . . I *am* a computer nerd, so I'm going to help stir up some interest in data encryption over amateur radio bands by explaining how a simple program I wrote in Visual Basic functions to provide reasonable encryption capability.

The Origin of TWISTER

I developed this software for use by the Alabama State Defense Force (ASDF) in 2005. The ASDF is one of 38 similar organizations called state militia, or state defense forces, around the country. ASDF developed a memorandum of understanding (MOU) with Army MARS so that its trained operators could pass message traffic in case of an emergency. Our State MARS Director was glad to get the MOU, because it guarantees that his members will get some message traffic, and the ASDF was glad to get Army MARS to pass messages because MARS has some of the most reliable operators in the world. I am a Major in the ASDF, and I'm an Assistant G-3 in charge of Communications Security (COMSEC) for the 1st Brigade in Huntsville, Alabama. I'm also an Army MARS operator with the callsign AAV4YP. Life is good for hams who are in ASDF and MARS! (That should encourage *you* to go find your local volunteer organization and help out today).

Why Encode Messages?

Articles and books on encryption and encoding abound. I have several shelves full of them, and there are a lot of good references on the web. The only trouble is that translating a bunch of complex coding theory into something simple to use is not trivial. I was given a specific task last year by ASDF. They did not want to send certain kinds of messages "in the clear"—for example, "send 100 body bags to Mobile," or "a terrorist group was reportedly at Brown's Ferry Nuclear plant," or "The governor is arriving at Huntsville Airport at 15:30 tomorrow," or "50,000 doses of bird-flu virus are en route from Atlanta and will arrive at 21:00, so be prepared." These are examples that the news media would love to hear, but really, they should get information like that through official channels, not by using scanners to snoop for news.

The Rules of the Road

ASDF is a voluntary military organization, but we don't have the skills, expertise, and clearances required to be involved in high-strength cryptography. It's just not practical for most organizations to do that. Therefore, we needed something "good enough," but not more. My boss, Col. Robert Patterson, K5DZE, set some guidelines, and I

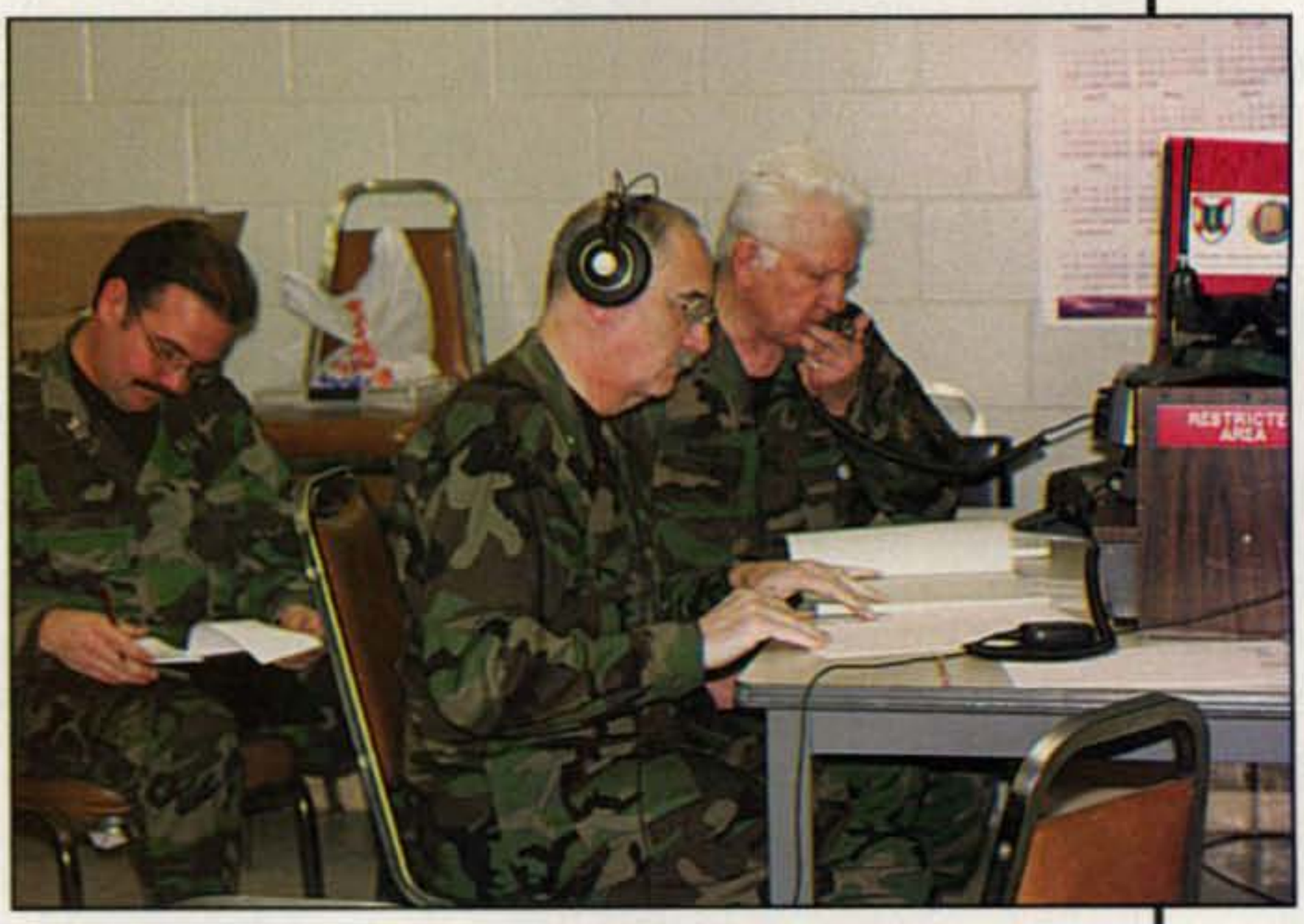

Photo A– Checking in to the Alabama State Defense Force net are (left to right) Jeff Loudin, KF4VEH, Doug Hilton, AG4FL, and Larry Vines, NX4S. Continuous practice using TWISTER ensures easy deployment when it really matters. (All photos and figure by Diane Hilton, KI4LMO)

*P.O. Box 114, Park Ridge, NJ 07656
e-mail: <n2irz@cq-amateur-radio.com>

think that this project addresses these points pretty well:

1. It needs to be easy to use to pass short messages
2. Operators must be able to speak it over the air
3. It must be human usable, as computers may not be available at both ends.
4. It should run from a laptop computer, or a handheld PDA
5. It must provide "reasonable" security against news media or casual snoops
6. There is no need or desire to provide strong encryption

On the surface, that sounds pretty reasonable. Our messages typically are short and to the point. Training is possible, but should take only a brief time, since we may need to deploy rapidly. The human-usable part kind of stumped me, and the requirement to speak it over the air was hard to solve, too. However, both of those requirements make a lot of sense, since MARS operators can't be expected to accurately pass thousands of random characters, symbols, and digits.

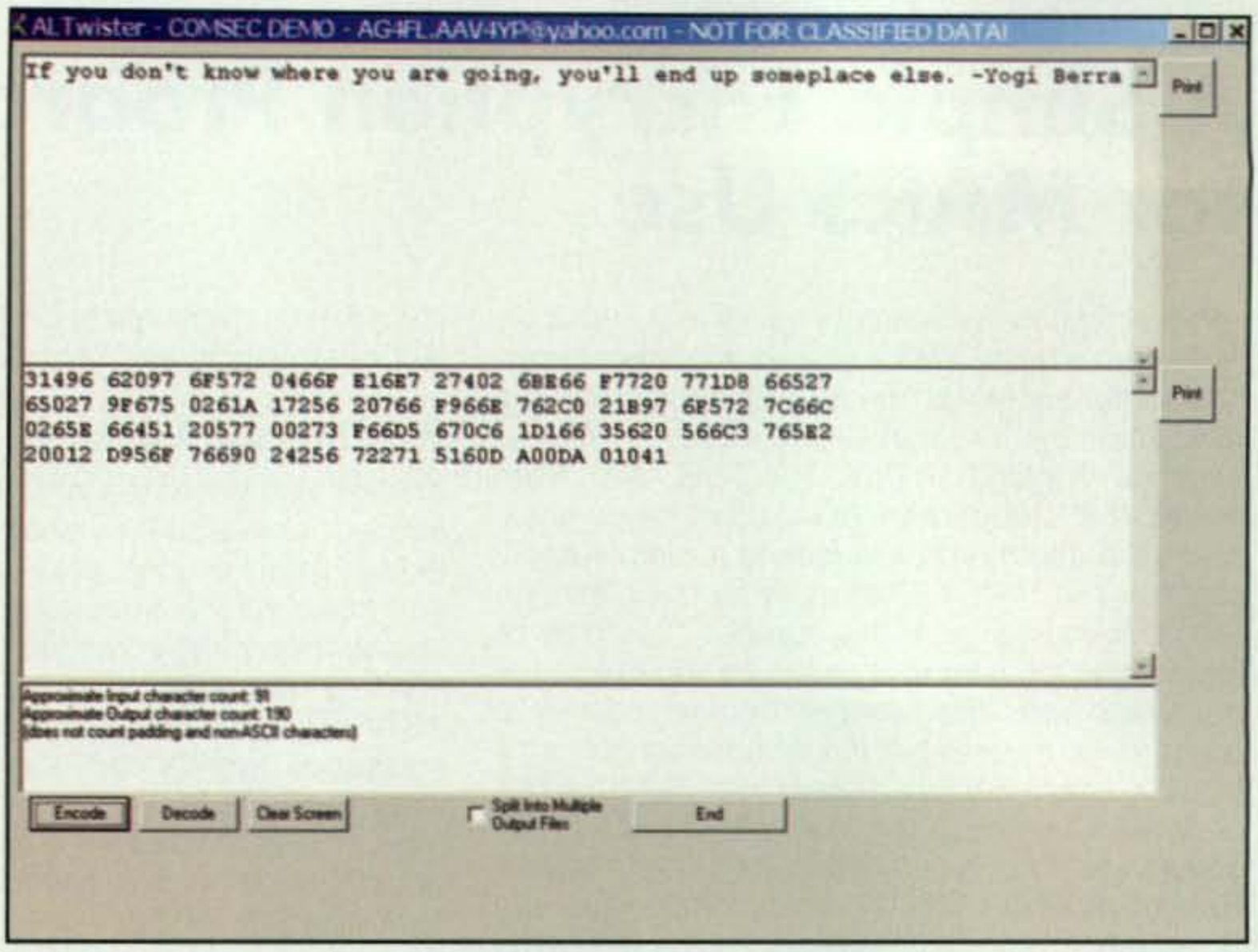

Fig. 1– A screen shot of TWISTER in action, an easy-to-use application that encodes text (upper window) into blocks of characters (lower window) to maintain information security. To decode, just put the character blocks into the upper window instead. Not limited to data modes, any traffic net can handle the message.

Army MARS is Moving Forward

Army MARS has good voice and digital modes, is rapidly moving towards more advanced digital modes, such as Winlink, and is investigating STANAG 5066 for future use. My goal was to develop a simple system that can be used on voice circuits, or digital modes, or scribbled on a napkin and hand-delivered to the recipient, so that's what I did.

Choice of Programming Language

I chose Microsoft Visual Basic 6 (VB6) because it runs on lots of computers and is simple to customize. The final program, called TWISTER, does not require a lot of training to operate (5 minutes). It must not be used for classified information, since it is only moderately secure. It is also not intended for "long" messages, because it's supposed to be human-usable, which means speaking, receiving, and decoding must be practical.

Public Domain

I intend to put this *in the* public domain for non-profit use so that any U.S. ham can use it completely free of charge. There are other good software systems out there that do encoding, but they generate complex output that is hard for radio operators to pass accurately. Most programs are much more secure, but I don't care about that. TWISTER is "secure enough" that I bet you can't crack the message, even after I give you all the source code. As you will learn, it isn't the encoding method, it's the "key" that makes decoding so difficult! Can NSA crack it? Of course! Do you care? I sure don't! Can Channel 48 TV crack it? We'll see!

Operating Instructions for Emergency Communications

At ASDF we developed an operating instruction manual that covers the "holistic" aspects of moving messages—e.g., the use of tactical callsigns, operating frequencies, how to authenticate both ends of a communications circuit, etc. These kinds of procedures should always be used when passing "record" (or formal) message traffic. During an emergency, every message is important, and training plus documentation helps reduce the risk of dropped messages and increase the probability of a successful mission.

Hybrid Messages

The best way to use TWISTER is to make a "hybrid" message, which contains some plain text and some encoded text. Messages can be formed in any text processing system (Notepad, Airmail, Word, etc.). The user then cuts the portion of the message to be encoded and pastes it into TWISTER, and then cuts and pastes the encoded text back into the message, which is then sent in the usual fashion. Let me show you an example, based on standard form ICS-213:

TO CDR 4th BDE, ASDF Position CDR
FROM CDR 1st BDE, ASDF Position CDR
Subject DEPLOYMENT OF RESOURCES FOR KATRINA RELIEF
Date 25 AUG 2006
Message Follows
100 TROOPS FROM 1ST BDE WILL ARRIVE AT YOUR LOCN 26 0101Z AUG 2006. PLS ARRANGE FOR SHELTER AT ARMORY.
Date 25 AUG 2006 Time 0100Z
Signature/Position COL W.EDWARDS, 1ST BDE, ASDF, COMMANDING

Here is a "hybrid" message that might be sent instead:

TO CDR 4th BDE, ASDF Position COL
FROM CDR 1st BDE, ASDF Position COL
Subject (20 GROUPS)
81445 450C4 4F954 D544E A1540
24F64 20254 5354F 55132 54354
53024 6F452 024B3 14145 52944
E1420 2545C 41D94 45641 DE11D
Date 25 0101Z AUG 2006
Message (36 GROUPS)
C144F 45574 20754 9C44C B1200
54195 20423 50264 F612E 66147
69F66 E0274 F6206 15256 64024

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MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SS-10	7	10	1⅛ x 6 x 9	3.2
SS-12	10	12	1⅛ x 6 x 9	3.4
SS-18	15	18	1⅛ x 6 x 9	3.6
SS-25	20	25	2⅞ x 7 x 9⅝	4.2
SS-30	25	30	3¾ x 7 x 9⅝	5.0

MODEL SS-25M

DESKTOP SWITCHING POWER SUPPLIES WITH VOLT AND AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SS-25M*	20	25	2⅞ x 7 x 9⅝	4.2
SS-30M*	25	30	3¾ x 7 x 9⅝	5.0

MODEL SRM-30

RACKMOUNT SWITCHING POWER SUPPLIES

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25	20	25	3½ x 19 x 9⅝	6.5
SRM-30	25	30	3½ x 19 x 9⅝	7.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M	20	25	3½ x 19 x 9⅝	6.5
SRM-30M	25	30	3½ x 19 x 9⅝	7.0

MODEL SRM-30M-2

2 ea SWITCHING POWER SUPPLIES ON ONE RACK PANEL

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25-2	20	25	3½ x 19 x 9⅝	10.5
SRM-30-2	25	30	3½ x 19 x 9⅝	11.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M-2	20	25	3½ x 19 x 9⅝	10.5
SRM-30M-2	25	30	3½ x 19 x 9⅝	11.0

MODEL SS-12SM/GTX

MODEL SS-10EFJ-98

CUSTOM POWER SUPPLIES FOR RADIOS BELOW

EF JOHNSON AVENGER GX-MC41
EF JOHNSON AVENGER GX-MC42
EF JOHNSON GT-ML81
EF JOHNSON GT-ML83
EF JOHNSON 9800 SERIES
GE MARC SERIES
GE MONOGRAM SERIES & MAXON SM-4000 SERIES
ICOM IC-F11020 & IC-F2020
KENWOOD TK760, 762, 840, 860, 940, 941
KENWOOD TK760H, 762H
MOTOROLA LOW POWER SM50, SM120, & GTX
MOTOROLA HIGH POWER SM50, SM120, & GTX
MOTOROLA RADIUS & GM 300
MOTOROLA RADIUS & GM 300
MOTOROLA RADIUS & GM 300
UNIDEN SMH1525, SMU4525
VERTEX — FTL-1011, FT-1011, FT-2011, FT-7011

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NEW SWITCHING MODELS

SS-10GX, SS-12GX
SS-18GX
SS-12EFJ
SS-18EFJ
SS-10-EFJ-98, SS-12-EFJ-98, SS-18-EFJ-98
SS-12MC
SS-10MG, SS-12MG
SS-101F, SS-121F
SS-10TK
SS-12TK OR SS-18TK
SS-10SM/GTX
SS-10SM/GTX, SS-12SM/GTX, SS-18SM/GTX
SS-10RA
SS-12RA
SS-18RA
SS-10SMU, SS-12SMU, SS-18SMU
SS-10V, SS-12V, SS-18V

*ICS – Intermittent Communication Service

Photo B– Chief (CW2) Pam Loudin, KI4ITL, decodes a message received by voice net on a laptop computer using TWISTER.

3276F 37730 21696 66027 9F675
02632 76111 63B62 04768 96731
20DA0 16733 3C220 14474 346C4
40216 12772 C62EE 66547 17011
93118

Date 25 AUG 2006 Time 0100Z
Signature/Position COL W.EDWARDS,
1ST BDE, ASDF, COMMANDING

In this example, note that only numbers and uppercase letters are used for ease of human usage. The encoded portion of the message uses five-character mixed groups, and a count of the groups is used. If necessary, large groups (such as the second part of the example) can be split into smaller groups, allowing it to be passed via different circuits to save time. Although the encrypted message has expanded in size, this also works to improve security; if you sent just the word "yes," it would be expanded sufficiently so that a snoop wouldn't know it is a single word.

It should be clear how this message can be "wrapped" in a standard MARS message, or ARES message, or sent via Winlink, or printed on a printer and mailed to the end-user. That's pretty good flexibility, and yet it provides reasonable security against snoops.

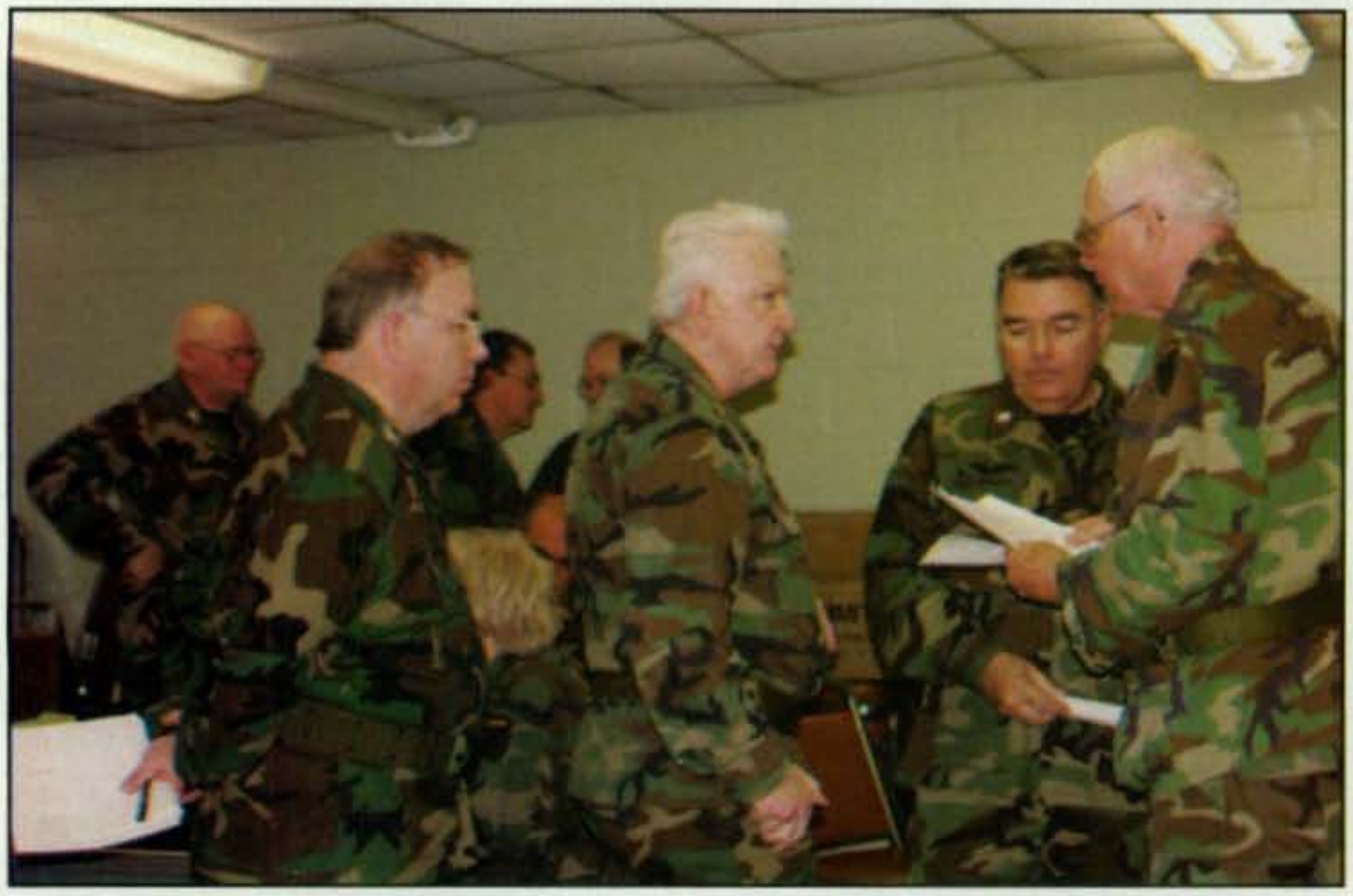


Photo C– Col. Bill Edwards and LTC Larry Vines deliver the decoded message to Cdr. (Ret.) Patrick Meagher as Col. Bob Patterson looks on. Hybrid messages make it easy for humans to deal with encryption and avoid unnecessary burdens on the traffic handlers.

The Purpose of TWISTER

My purpose in developing TWISTER was to provide privacy for third-party traffic and to support emergency communications. It is imperative that the privacy of disaster victims be protected, yet we need to be able to pass traffic in a reasonable manner. If you want to try out this software, it is available at http://www.cq-amateur-radio.com/WEBTWISTERDC0407.zip. The source code is commented so you can understand how it works. Some may question why a particular bit of code was done this way instead of that, but I'm not claiming it is perfect. The idea was to allow a beginner to understand the code and be able to start using it —and more important, modifying and improving it—with minimal effort.

Shortly after I finished the Windows® version, I ported it to a cheap Viewsonic Hand-Held computer I have. Surely someone out there will find it a simple task to compile this for a Palm or other PDA platform.

TWISTER was never meant to be more than a simple and unsophisticated application. In emergency communications, simple and robust is a good combination. I'm writing this for *CQ* to share what I've done, with the hope that others will use it, take it apart, learn from it, improve it, and most important, help out citizens in an emergency. I'm really looking forward to seeing "Improved TWISTER" published in the near future by you!

N2IRZ here again. TWISTER is a great program for basic communications security, and even though you can just download and use it, I encourage everyone to also get the source code, "open the box," and see how it works. It's fascinating in its simplicity, and you'll gain some understanding of encryption as well.

For your own copy of this tiny (only 56 kb!) program, along with the source code and support files, visit the CQ website download page at http://www.cq-amateur-radio.com/WEBTWISTERDC0407.zip

My sincere thanks to Doug for sharing his work with all of us. I'm sure he would be pleased to hear from you, with praise, brick bats, or details of how you'll be using it. Until next time . . .

73, Don, N2IRZ

what's new

BY KARL T. THURBER, JR.,* W8FX

Linear Power Amp, USB Rig Controller, Speaker/Mics, and more

This month we will focus on radio gear, accessories for the shack; antennas and antenna accessories; and the radio bookshelf—taking a close look at "what's new" in our amateur radio hobby. Are you ready? Well, then, let's dig right in.

Radio Gear

HL-1.5KFX HF/50-MHz Linear Power Amplifier from Tokyo Hy-Power Labs. Tokyo Hy-Power Labs (THP) has announced a new product to the American amateur radio market, available exclusively from Ham Radio Outlet. The HL-1.5KFX HF/50-MHz Linear Power Amplifier (photo A) is a compact and lightweight 1-kW desktop HF/50-MHz amp that has a maximum input power of 1.75 kW. It's said to be great for both desktop and DXpedition work.

The solid-state broadband power amplifier reportedly is the smallest and lightest weight self-contained amplifier in the industry, with a built-in power supply of 230 VAC (default) or 115 VAC (selectable). The amplifier complies with new FCC regulations regarding linear amps, allowing for 12- and 10-meter operation without modification.

Typical output power is 1 kW PEP/SSB on HF and 650 watts on 6 meters, with drive power of 85–90 watts. Bands are set automatically with the built-in band decoder, and bands are changed automatically with most ICOM, Kenwood, and Yaesu radios—with data band cables supplied. You also can select band changes manually.

Photo A– The HL-1.5KFX HF/50-MHz Linear Power Amplifier from Tokyo Hy-Power Labs is a compact and lightweight 1-kW desktop HF/50-MHz power amp, one with a maximum input power of 1.75 kW. (Photo courtesy of Tokyo High Power Labs)

The new THP amplifier conveniently has two antenna ports selectable from the front panel, and it uses an advanced 16-bit MPU (microprocessor) to run the various high-speed protection circuits, such as overdrive, high antenna SWR, DC overvoltage, and band miss-set. The amp also is equipped with a very handy control-cable connection socket for the firm's brand-new HC-1.5KAT auto antenna tuner.

For more information, contact Tokyo Hy-Power Labs, Inc., 487 East Main St., Suite 163, Mount Kisco, NY 10549 (914-602-1400; on the web: <http://www.thp.co.jp>; or contact any Ham Radio Outlet by visiting <http://www.hamradio.com>).

Accessories for the Shack

HamLinkUSB™ Rig Controller Plus from Timewave Technology, Inc. Connect and control your transceiver via USB with Timewave's new HamLinkUSB Rig Controller Plus (photo B). It's a very flexible USB-to-logic level conversion device that provides PTT output, keying output, or foot switch input options, and considerably more.

Photo B– Connect and control your transceiver via USB with Timewave's new HamLinkUSB™ Rig Controller Plus. It's a handy USB-to-logic level conversion device that provides PTT output, keying output, or foot-switch input options, and more. (Photo courtesy of Timewave)

Some of the many features include a USB adapter for TTL/CMOS CAT/CI-V rigs; PTT interface option for sound-card programs; PTT and keying with DTR, RTS, or user output options; foot-switch input interface option; LED status indicators; unique serial numbers that allow multiple HamLinkUSB units on the same PC; and an included CD with popular rig control programs and links.

The unit's logic-level serial interface connects directly to radios with non-RS-232 CAT/CIV inputs. Supported radios include Kenwood, ICOM, Yaesu, Ten-Tec, Elecraft, Alinco, and other manufacturer's models.

Besides the standard serial interface on every HamLinkUSB Rig Controller Plus, you can choose an option that connects and controls PTT lines, keying lines, or general-purpose outputs, or that accepts inputs from external devices such as foot

*289 Poplar Drive, Millbrook, AL 35054-1674
e-mail: <w8fx@cq-amateur-radio.com>

switches. The controller is compatible with most sound-card and software control programs. The PTT version of the HamLinkUSB Rig Controller Plus has an RTS output with a driver transistor to operate a PTT line from most sound-card programs. Other versions have DTR/transistor outputs to drive electronic keyers and general-purpose outputs for user-determined purposes; another version has a logic level input to detect external switches, such as foot switches. Timewave supplies a variety of cable choices for the controller.

For more details on available options and product pricing, Contact Timewave Technology, Inc., 1025 Selby Ave., Suite 101, St. Paul, MN 55104 (651-489-5080; e-mail: <sales@timewave.com>; on the web: <http://www.timewave.com>).

Atomic Wristwatches, Speaker/Mics, and Transceiver Voltage Conditioner from MFJ. First up are three impressive MFJ Atomic Wristwatches. You can choose a stainless-steel band, brown leather band, or stainless-steel band with non-numerical display.

The three new watches in the series (photo C) give precision 12-hour time format (accurate to ±1 second per day) and automatically receive and update the time from the station WWVB signal broadcast from Fort Collins, Colorado (see "Washington Readout" in this issue of *CQ*). The watches have a backlight, automatic daylight savings time feature, manual time setting, high water resistance, and included lithium battery. The silver-metallic face has very large analog digits.

The MFJ-188MRC, at $49.95, has a stainless-steel band; the MFJ-188LRC, also at $49.95, has a brown leather band. The MFJ-189RC, at $39.95, is similar to the others in the series, but has a black leather band and stylish, non-numerical 12-hour and second notches on the silver-metallic face.

Next up are MFJ Speaker/Microphones for HTs, the "perfect-size" speaker microphones for tiny HT radios. The compact mics (not shown) have a sturdy PTT switch; 3.5-mm earphone jack; and a long, curly retractable cord. Various models in the series fit many radios. The MFJ-285I, at $15.95, fits ICOM and compatibles; the MFJ-285K, at $15.95, fits Kenwood and other compatibles; the MFJ-285Y, at $15.95, fits the Yaesu R-series, ICOM Q7A, and others; and the MFJ-285R, at $19.95, fits the VX7R series.

Upgrading just a bit, the MFJ-296 (photo D), at $21.95, is a new, deluxe speaker microphone with a volume control knob that allows you to set it for a quiet room or for a noisy environment. The MFJ-296 has a 360-degree rotating lapel clip, an electret mic element, and a full-size speaker for excellent receive audio. The mic gives splendid transmit audio—

Photo C– These three new atomic watches from MFJ give precision 12-hour time format and daily and automatically receive and update the time from the WWVB signal broadcast from Fort Collins, Colorado. See the text of this month's column for the details. (Photo courtesy of MFJ)

Photo D– The MFJ-296 Deluxe Speaker Microphone has a volume control knob that allows you to set it for a super-quiet room or for a noisy environment such as at a hamfest or banquet. (Photo courtesy of MFJ) →

Photo E– The MFJ-4403 Transceiver Voltage Conditioner provides reverse voltage, over-voltage, voltage-transient, and short-circuit equipment protection. (Photo courtesy of MFJ) ↓

no more scratchy voice transmissions. It has a 3.5-mm earphone, momentary PTT switch, and retractable cord. The MFJ-296 fits ICOM, Radio Shack, older Yaesu, Kenwood, Alinco, and other compatibles; while the MFJ-296R ($24.95) fits the VX7R handheld series only.

Third on our MFJ list is the new MFJ-4403 Transceiver Voltage Conditioner (photo E), at $119.95. The MFJ-4403 provides reverse-voltage, over-voltage, voltage-transient, and short-circuit equipment protection. It's said to offer superb noise and ripple filtering as well as power-supply buffering for base, portable, or mobile transceivers.

If you accidentally reverse the voltage connection, the MFJ-4403 protects your radio against possible damage, alerting you with a bright warning LED. Once the DC polarity is corrected, the MFJ-4403 recovers and operates normally. The heavy-duty transient suppressor protects your transceiver from vehicle and poorly regulated power-supply start-up voltage spikes.

According the MFJ, internal ultra-high-value capacitors filter off virtually all power-supply noise and ripple. Also, for temporary mobile operation, the MFJ-4403 reportedly provides enough power-supply buffering to let you run 100 watts SSB from a 10–15 amp cigarette-lighter socket. Standard Anderson Powerpole™ connectors are used for the DC input and output.

All of these new products are protected by MFJ's famous No Matter What™ one-year limited warranty. Under it, MFJ will repair or replace (at its option) your MFJ products no matter what for one complete year.

For more information, to place an order, to get a free catalog, or to find your nearest dealer, contact MFJ Enterprises, Inc., 300 Industrial Park Rd., Starkville, MS 39759 (1-800-647-1800; e-mail: <mfj@mfjenterprises.com>; <http://www.mfjenterprises.com>).

Photo F– The MFJ-265 Fan-Cooled Dummy Load is a 2500-watt, fan-cooled load that handles any legal-limit amplifier and lets you tune up your amplifier quickly and easily. (Photo courtesy of MFJ)

Antennas and Antenna Accessories

LDG Electronics: All Cables will be included with Every Tuner Purchase. Continuing the strategy started with the release of the AT-7000 Autotuner, LDG Electronics has announced that all of its autotuners now come with all of the available optional cables included in the box. The move could save customers $10 to $30 on the purchase of a new autotuner, and it eliminates the hassle of having to have the correct cable for a particular rig.

"We are just trying to solve our customers' problems," said Dwayne Kincaid, WD8OYG, LDG's Chief Engineer. Adds Dwayne, "In feedback from our customers we learned they would really appreciate receiving all of the cables with their purchase. So we decided to increase the value to our customers while also solving the problem they had when buying an autotuner."

All autotuners now are shipped with all of the available cables. The boxes are designated with a sticker stating all of the cables are included. Customers who purchased an LDG autotuner after November 1, 2006 and didn't receive the necessary cable can contact LDG directly and they will send them the appropriate cable. "We ask that our customers understand the transition to this value-oriented concept. We will get them their cables as soon as possible," added Dwayne. Every LDG product includes the new two-year warranty on parts and labor. Under it, you just contact LDG to let them know of your problem, and they will repair or replace your product, with no questions asked.

For more information, contact your favorite dealer, or contact LDG Electronics, 1445 Parran Road, St. Leonard, MD 20685 (410-586-2177; e-mail: <ldg@ldgelectronics.com>; <http://www.ldgelectronics.com>).

MFJ Fan-Cooled 2500-Watt Dry Dummy Load. The new MFJ-265, at $209.95, is a 2500-watt, fan-cooled dummy load that handles any legal-limit amplifier and lets you tune up your amplifier fast and easily. It works with all amplifiers, transceivers, and transmitters from DC through 6 meters, and reportedly can dissipate 2500 watts average power for one minute on, ten minutes off. The SWR is said to be less than 1.25 to 1 below 30 MHz and less than 1.4 to 1 from 30–60 MHz.

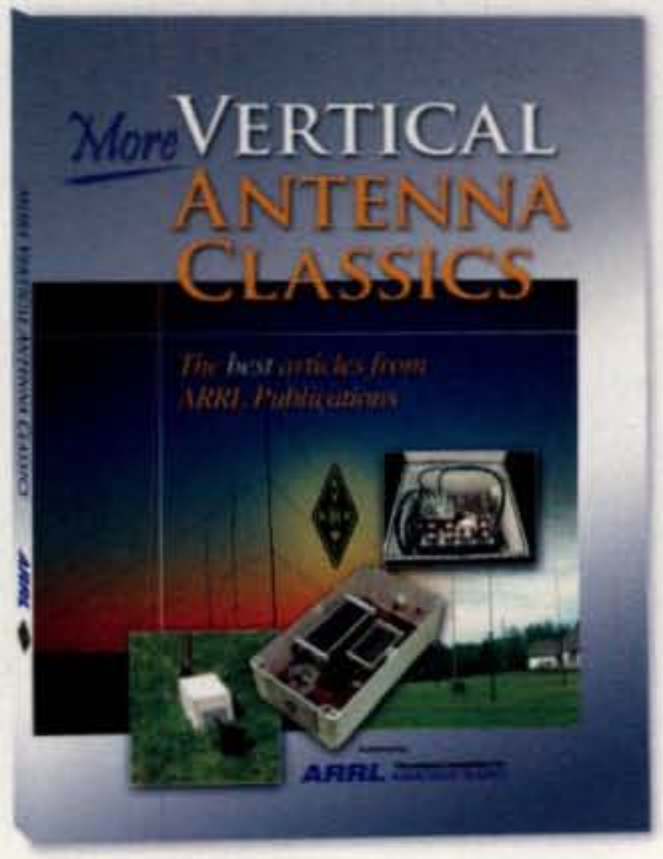


Fig. 1– The ARRL's new book, More Vertical Antenna Classics, *is a collection of articles from magazines such as* QST, QEX, *and the* National Contest Journal, *as well as several ARRL Antenna Compendium publications. (Image courtesy of the ARRL)* →

Photo G– The sounds of the cannons and guns in the powerful World War II epic movie Flags of our Fathers *were captured by the new technology of several Heil PR 40 dynamic mics on the movie set. (Photo courtesy of Heil Sound)*

Photo H– The unusual extended frequency ranges of the new-technology Heil microphones allowed capturing the natural explosions and firings of historic old firearms, such as the World War II rifle pictured here for the epic World War II movie. (Photo courtesy of Heil Sound)

Detailed specifications and power curve are permanently silk-screened on the bronzed cabinet for easy reference (photo F). The dummy load uses 12 VDC or 110 VAC, has SO-239 connectors, and weighs in at just5 pounds.

The MFJ-265, like the other products mentioned this month, also is protected by MFJ's famous No Matter What™ one year limited warranty. For more information, contact MFJ Enterprises, Inc., 300 Industrial Park Rd., Starkville, MS 39759 (1-800-647-1800; e-mail: <mfj@mfjenterprises.com>; web: <http://www.mfjenterprises.com>).

From the Bookshelf

More Vertical Antenna Classics from the ARRL. Many radio amateurs regard vertical antennas among their favorite antennas. Vertical-antenna designs are relatively easy to build, and they take up little space. Build one and you can easily be on the air calling "CQ DX" before the day ends.

The ARRL's *More Vertical Antenna Classics* (fig. 1) is a $17.95 collection of articles from magazines such as *QST*, *QEX*, and the *National Contest Journal*, as well as several ARRL Antenna Compendium publications. Included are designs for a variety of operating preferences and bands, including single-band and multi-band HF vertical antennas. There are also articles on ground systems, portable antennas, phased vertical arrays, and more.

At the bottom line, as we have said, verticals are comparatively easy to build and they take up little space—at least in the horizontal dimension. Whatever you try, you will find that when it comes to verticals, the sky is the limit!

Contact the American Radio Relay League, 225 Main Street, Newington, CT 06111-1494 (1-888-277-5289; e-mail: <pubsales@arrl.org>; web: <http://www.arrl.org/shop>).

Short Bursts

HEIL PR 40 Microphones in the Movies. The sounds of the cannons and World War II era guns in the powerful Clint Eastwood and Steven Spielberg World War II epic movie *Flags of our Fathers* were captured by the new technology of several Heil PR 40 dynamic microphones (photos G and H).

According to Charles Maynes, location sound engineer for the movie, "The PR 40 does handle loud sources remarkably well, and its off-axis rejection make it a tremendous tool for my effects recording. I do not leave home without it." The unusual extended frequency ranges of the new technology created by Heil Sound, Ltd. were the key feature that allowed Maynes to capture the natural explosions and firings of these historic old firearms for the movie sound track.

The film is based on the best-selling book by James Bradley (with Ron Powers), the son of Iwo Jima flag-raiser John "Doc" Bradley. The film recalls February 1945, when one of the bloodiest battles in the war—the battle with the Japanese on the island of Iwo Jima—raged in the Pacific. The battle culminated with the raising of the American flag atop Mount Suribachiby five Marines and a Navy corpsman.

The Heil PR 40 is one of three new large-diaphragm dynamic microphones that have been designed and offered to the commercial sound industry by Heil Sound, Ltd., with its assembly plant in Fairview Heights, Illinois. Heil Sound founder and president Bob Heil, K9EID, is well-known in both home and amateur radio audio circles for his popular audio offerings, and he specializes in top-quality "home theater" design and installation. Through his firm, Bob offers top-notch microphones, headsets/ boomsets, stands, booms, cables, and other accessories, many of them designed for amateur radio.

For product information on Heil products, contact Heil Sound, Ltd., 5800 North Illinois, Fairview Heights, IL 62208 (618-257-3000; e-mail: <info@heilsound.com>; on the web: <http://www.heilsound.com>).

Wrap-Up

That's all for this time, gang. Next time, more "What's New." See you then.

Overheard: I have found that for every action I take, there is an equal and opposite criticism.

73, Karl, W8FX

Note: *Listings in "What's New" are not product reviews and do not constitute a product endorsement by CQ or the column editor. Information in this column is primarily provided by manufacturers/vendors and has not necessarily been independently verified. The purpose of this column is to inform readers about new products in the marketplace. We encourage you to do additional research on products of interest to you.*

Awards from Around the World

BY TED MELINOSKY,* K1BV

We begin this month's column with an award from the Worked All Britain (WAB) Group, which offers a wide variety of awards based on contacting the 10-km small grid squares throughout the United Kingdom. Using these smaller grid squares provides Britain with about as many "areas" as there are counties in the physically larger U.S. Many "areas" are found in locales where there are no roads, so WAB enthusiasts reach these on foot or by boat, operating with low-power portable rigs.

In order to publicize the organization, the WAB group has developed several interesting awards, one of which, offered for working special event stations, is described below.Whenever you hear a GB prefix station making contacts, this is a station that counts for this award. By the way, it is planned as an annual award, so if you don't make it this year, you'll get another chance next year.

Visiting the group's website (http://www.worked-all-britain.co.uk) is also a good way to introduce yourself to a very enthusiastic and active group of award hunters.

Worked All Britain Group Special Event Stations Award 2007

Contact British special event stations during 2007 to earn this award. SWL okay. Only contacts with special event stations using a GB prefix will be valid. Make sure that you obtain the WAB "area" of the special event station during a contact, since it is required on the application. The WAB area will look like one of these examples: SP87 Northamptonshire, SP87 NHM, TQ28 Haringey UA, TQ28 HGY, etc.

*12 Wells Woods Rd., Columbia, CT 06237
e-mail: <k1bv@cq-amateur-radio.com>

Contact British special event stations during 2007 to earn the Worked All Britain Group's Special Event Stations Award.

USA-CA Special Honor Roll

Michael V. Zbrozek, K8XF
USA-CA All Counties #1148
January 8, 2007

USA-CA Honor Roll

500

LZ1JZ	3396	JH8JYV	3397

The total number of counties for credit for the United States of America Counties Award is 3077. The basic award fee for subscribers is $6.00. For nonsubscribers it is $12.00. To qualify for the special subscriber rate, please send a recent CQ mailing label with your application. Initial application may be submitted in the USA-CA Record Book, which may be obtained from CQ Magazine, 25 Newbridge Road, Hicksville, NY 11801 USA for $2.50, or by a PC-printed computer listing which is in alphabetical order by state and county within the state. To be eligible for the USA-CA Award, applicants must comply with the rules of the program as set forth in the revised USA-CA Rules and Program dated June 1, 2000. A complete copy of the rules may be obtained by sending an SASE to Ted Melinosky, K1BV, 12 Wells Woods Road, Columbia, CT 06237 USA. DX stations must include extra postage for airmail reply.

Certificates may be endorsed for any band/mode. A station may only be claimed once during each 12-month period for any particular endorsement. The basic award will be awarded for working/hearing 20 stations, with endorsements for each subsequent 20. On working/hearing 100 stations, another certificate will be awarded. An application sheet is available for this award, but if you use your own or any logging program, the WAB area of the station must be recorded.

Send a log extract and the fee of £1.00, 5 Euros, or $US5 to: Dave Brooks, G4IAR, 28 Avon Vale Road, Loughborough, Leicestershire, LE11 2AA, England (e-mail: <g4iar@worked-all-britain.co.uk>).

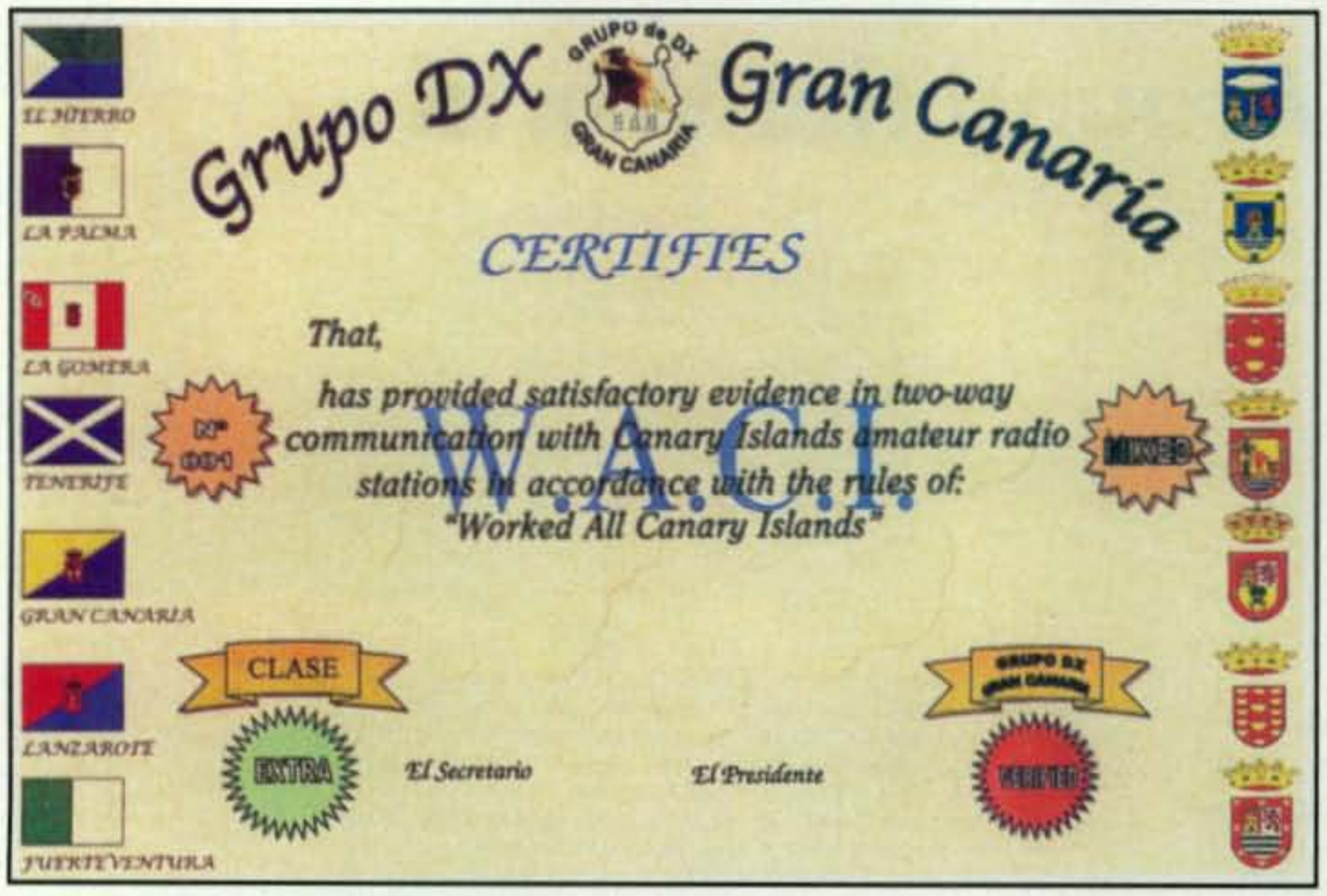
Worked All Canary Islands

EA8 (Canary Islands) stations can be found in almost all DX contests, and they almost always do quite well. These islands offer a great contest location, since the operators can work a large number of European and North/South American stations.

This award is sponsored by the Grand Canaria DX Group and is available to any amateur radio operator or SWL who provides proof of contact, or reception, with the Canary Islands. The basic award requires a contact with each of the seven major islands. This is a bigger challenge than it seems, since most of the activity from the islands comes from just a few of the islands. You're going to have to fill in the missing islands with contacts from the IOTA (Islands On The Air) operators.

Basic Award: Contact or hear the seven major Canary Islands: El Hierro, Fuerteventura, Gran Canaria, La Gomera, La Palma, Lanzarote, and Tenerife.

Extra Award: Contact the seven islands listed above plus an additional seven islands, islets, or rocks on which there is no permanent amateur radio



Sponsored by the Grand Canaria DX Group, the Worked All Canary Islands Award is available on two levels (Basic and Extra) to any amateur radio operator or SWL who provides proof of contact, or reception, with the Canary Islands.

population and which appear in the official listing of the Spanish DIE (Diploma Islas Espanolas; <http://www.ea5ol.net/die/>) award program. These are identified in the "S-###" reference section with either "GC" (Gran Canaria) or "TF" (Tenerife) as the province and "AF-004" as the IOTA number.

Contact and have confirmed at least 100 different valid countries on each of nine amateur radio bands from 160 to 10 meters (plus WARC bands) to earn the OK DX Foundation's Nine-Band Trophy.

The award in either category can be requested for the following five modes: CW, SSB, FM, Digital (RTTY, SSTV, BPSK31), or mixed modes. All bands and modes may be used and there are no date restrictions. Send a list including callsign, name of the island, band, and mode. Include scans or photocopies of the cards. You may also send scans of the cards by e-mail directly to the Gran Canaria DX Group at <grupodx@ea8.net>. The fee for each award is 10 Euros, $US15, or 7 IRCs. Apply to: W.A.C.I. Award Manager, P.O. Box 54, E-35080 Las Palmas de G.C., Spain (http://www.grupodxgc.com/).

OK DX Foundation Nine-Band Trophy

The Czech Republic's OK DX Foundation is a well-known sponsor of DXpeditions and offers a nice selection of operating awards. The latest addition to its series of awards is a handsome wooden plaque for the equivalent of working a 9-band DXCC, including endorsements all the way up to the 300 country level. The plaque is issued to any station that meets the following requirements:

1. Contact and have confirmed at least 100 different valid countries on each of nine amateur radio bands from 160 to 10 meters (plus WARC bands).
2. Contacts are valid on the 30-meter band after January 1,1981 and on the 17- and 12-meter bands after January 1, 1987.
3. Contacts on the rest of the bands are valid after February 15, 1945.
4. Mode may be either Mixed or CW.
5. An endorsement plaque will be issued for each additional 9-band 50 countries—i.e., 9-band 150, 9-band 200, 9-band 250, 9-band 300 countries.
6. Send a list of QSLs in your possession, with GCR list certified by other two radio amateurs and affirmation of fulfilling all rules to the award manager of OKDXF.
7. OKDXF reserves the right to check some QSLs upon request.
8. The cost (including shipping) of the basic plaque is 30 Euros or $US40; fee for the endorsement plaque is 10 Euros or $US15.
9. Applications must be send in paper form to the award manager, Jaroslav Nemec, OK1FAU, Dukelska 430, Milovice, Czech Rep. (http://www.okdxf.cz).

Russian Castles Award

Over the past few years several European countries have announced "castle" awards for contacting stations that operate on castle premises or within a certain distance of the grounds of the many castles and fortresses that are found all over the continent. In 2004, when I traveled in Spain and Portugal, it seemed that almost every hilltop or outcropping was occupied by a castles of various sizes and states of preservation.

Awards for contacting castles have been announced in England, France, Germany, and Italy. Now Russia joins

The Russian Castles Award, basic level, is issued for contacting 15 stations in or near castles of Russia.

this group and celebrates its historical heritage of castles and fortresses with this latest award.

A common feature of all the castle awards is that the sponsor develops or relies on an official listing of the structures that qualify as valid for contacts. The research and scholarship represented by these lists is impressive. The lists are found on various internet sites and are updated as new data is received. These internet locations are also valuable for publicizing future castle activations, often giving times and frequencies where contacts are likely to be made. This can reduce the time needed to earn the award.

The Russian Castles Award is given for making contacts with listed castles and fortresses of Russia on or after January 1, 2006 on all bands and modes. The contacts must have been made with stations operating within a radius of not more than one kilometer of the castle and be located on territory of the Russian Federation. The sponsor has prepared a list of valid castles and fortresses , and it is located on the website shown below. Each valid station may be contacted one time only. SWL okay.

The basic award is issued for contacting 15 stations, and endorsement stickers are available for 30 and 45. A special plaque is awarded for contacting 60 stations.

The fee for the basic award is 100R for Russians, $US4 or 6 IRCs for CIS country amateurs, and $US7 or 10 IRCs for all others. Endorsement fees are 30R for Russians, $US1.50 for CIS applicants, and $US2 for all others. The fee for the plaque is $US35 for Russians, $38 for CIS applicants, and $US42 for all others.

Apply with fee noted above and GCR list plus a copy of all QSL cards to: Andrey Alexandrovich Petushkov, RN1CW, 12 Komsomolskaya Street, Apt. 49, Pine Bor Str., 188540 Leningrad Oblast, Russia (e-mail: <rn1cw @mail.ru>; <http://www.sbor.ru/~rz1cxo/pages/diplom/rca.htm>).

Looking for some help in publicizing your group or club's award? *CQ* magazine can help. Please send all details and samples to me for review.

73, Ted, K1BV

Michael Zbrozek, K8FX

USA-CA #1148, January 8, 2007

Over the past few years I had considered going for the USA-CA All Counties award, but I never wanted to commit the time and effort to find and work 3077 counties. Over the past five years I received a few ARRL awards: 5 Band WAS, 5 Band WAC CW, etc. I then reconsidered the USA-CA award and started working on it in April 2005. Many of my fears were realized, though. You must devote a lot of time to sitting in a radio room listening to various mobiles run counties on the SSB or CW nets.

After many months of county chasing, I found that the CW net on 10 MHz is the best place to work mobiles. With both CW and SSB county hunter nets I think the mobiles should be more mindful of the fact that there are a lot of people out there, and it would be very helpful if a mobile would announce what the next county is going to be. Many times I have heard the following: "More to come." That's not what people need to hear. Also, if there is another mobile, or two, running other counties, you can become dizzy figuring out the next county. I have index cards and keep a list of who is running and on what frequencies.

Also, I would like to stress consistency with mobile ops. If you start running a county on 20 meters SSB and go to 20 meters CW next, then 40 SSB and 40 CW, etc., please do that with each county. Many times a person can miss a county because he or she can hardly hear the mobile op on 20 SSB, and then awaits the arrival of the mobile on 40 CW only to find the mobile didn't go on 40 CW for that county. But did the mobile visit 40 CW for the last county? It doesn't take much effort to announce the road you are on so that a fellow at home can figure out your probable route.

A helpful aid for county hunting is the site <http://ch.w6rk.com>. This is a spotting site and is helpful to see what is going on at the moment. Also, the County Hunter's website has a few links for planned trips and a forum for questions. Without the internet I don't think I would have been able to find and work so many mobiles.

In my final days of working for USA-CA All Counties I resorted to the internet to look up ops in counties that are rare and rarely visited. It makes no sense to wait and hope that some mobile will pass through some county you need exactly when you are home and available to work him. Looking up ops in a certain county is easy. Getting them to answer a request for a sked is another matter. Why is it that many hams don't update their e-mail addresses on websites? About half of the addresses I found were no good and the messages bounced back. Please update! Even with problems of incorrect e-mail addresses or ops who cannot accommodate a request for a sked, I did find a few.

I also hunted counties in the evening on 40 or 80 meters CW. Just regular QSOs can sometimes produce a new county, too. If you just depend on the nets to produce contacts, it will take you a long time to earn the award. Since 99% of the activity is in the daylight hours I notice a lot of the same people on the nets daily. It is a good award for a retired person who has a lot of time.

Hunting counties has been an interesting experience. The award requires a lot of paperwork—sending out MRCs (Mobile Reply Cards) via the bureau, mailing in the application for each 500 county sticker, and keeping track of QSLs. One thing I do not like is sometimes when I receive an MRC from the county hunter bureau the mobile station crosses out the unused lines. Each MRC has six lines, and sometimes you can fill out an entire card if a mobile station was busy all day. many times all you have is one or two entries. It is not required to cross off the lines. I am sure I speak for many county hunters when I say no one is going to fill in bogus counties under the ones you signed off on.

In conclusion, I worked all of the 3077 counties with an ICOM IC-738, 100 watts, and a homebrew G5RV up 50 feet and I applied myself to earning the award on a daily basis. For me, this was the most difficult award I had ever gone after. *—73, Mike, K8XF*

dx

BY CARL SMITH,* N4AA

Scarborough Reef to be Activated

Some *great* news for April: Scarborough Reef will be activated by a multi-national team of nine or ten operators in late April. Thousands of DXers worldwide are waiting for this one, including me. *If,* and I repeat *if,* I am lucky enough to get just one QSO, it will wrap up my chase for that coveted #1 DXCC plaque. Also, if my mail is any indication, it will do the same for a whole lot of folks. Since this will be one of the most sought-after contacts in a long time, I *beg* all of you to exercise self-restraint in the pile-ups. A website is available for details of this DXpedition: <http://www.bs7h.com>. There will be *no* on-line log search, but it is expected the logs will be available on the website after the operation.

The team of operators who brought you BXØZR from Taiwan in January. Left to right: BV4FH, W9ZR, W8UVZ, N8BJQ, and BV4MU. (Photo courtesy of Sam, N4XP)

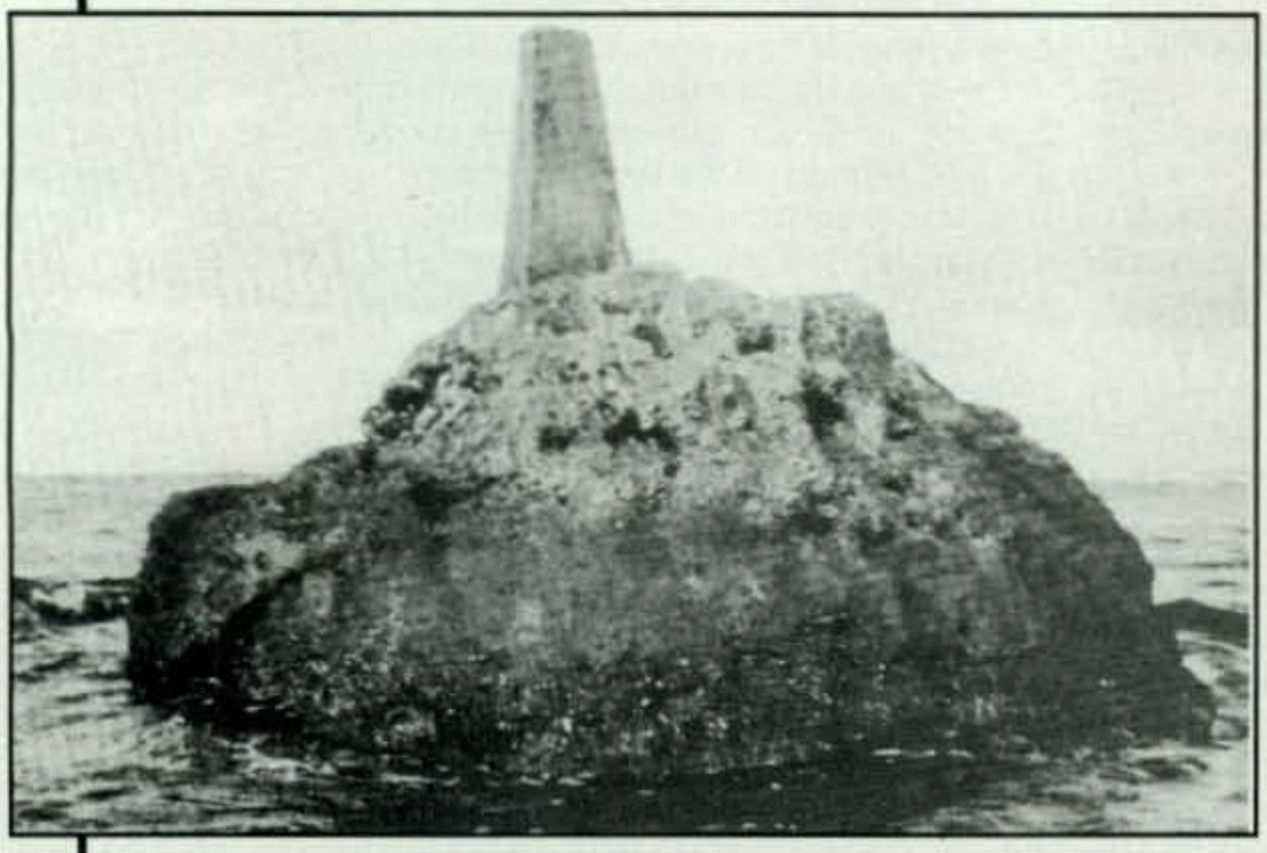
Operating Habits—Again

For those who have been reading this column for a while, you know I have been conducting a running battle with those who have less than desirable operating habits. A recent DXpedition caused me almost to come to tears. I heard a couple of W3s who I know have been around for a very long time doing the dumbest things in the CW pile-up on 80 meters—constant calling, calling, and calling some more, regardless of whom the DX stations came back to. These two guys know better than that, and it makes we wonder why in the world they did it. These are not newcomers who have never had any experience in pile-up operation. If the truth were known, they probably didn't even need the contact on that band/mode. I did, and I definitely didn't appreciate their actions. In the pile-ups I have heard other calls that I recognize doing dumb things as well, but these two just really caused me to hang my head. I found myself saying, "They know better than that."

How do we get through to these people? A group of us have been soliciting funds to cover the cost of printing QSL stuffers of "Uncle DX Suggestions for Pile-ups" and distributing them through QSL Managers in an effort to reach those who don't read the pages of *CQ* or *The DX Magazine.* Over 20,000 of these "greenies" have been distributed thus far. Somehow, some way, we have to reach those who are making DXing less than fun.

Please, do whatever you can through your clubs and even one-on-one when you know someone who is doing these dumb things. There is no

*P.O. Box DX, Leicester, NC 28748-0249
e-mail: <n4aa@cq-amateur-radio.com>



Scarborough Reef. This is a Chinese Survey Marker on one of the rocks that make up Scarborough Reef. (Photo courtesy of Tim, N4GN)

CQ DX Field Award Honor Roll

The CQ DX Field Award Honor Roll recognizes those DXers who have submitted proof of confirmation with 175 or more grid fields. Honor Roll lisiting is automatic upon approval of an application for 175 or more grid fields. To remain on the CQ DX Field Award Honor Roll, annual updates are required. Updates must be accompanied by an SASE if confirmation is desired. The fee for endorsement stickers is $1.00 each plus SASE. Please make all checks payable to the Award Manager, Billy F. Williams. Mail all updates to P.O. Box 9673, Jacksonville, FL 32208.

Mixed

K2TQC....249	N4MM....196	KØCA....181
HAØDU....228	W4UM....193	W5ODD....177
VE3XN....217	BA4DW....188	K2AU....177
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SSB

VE7SMP....190	W4ABW....177	DL3DXX....175
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JN3SAC....193	N4MM....177	

5 Band WAZ

As of February 1, 2007, 711 stations have attained the 200 zone level and 1530 stations have attained the 150 zone level.

New recipients of 5 Band WAZ with all 200 zones confirmed:
EA5BM

The top contenders for 5 Band WAZ (zones needed, 80 meters):

N4WW, 199 (26)
W4LI, 199 (26)
K7UR, 199 (34)
W2YY, 199 (26)
VE7AHA, 199 (34)
IK8BQE, 199 (31)
JA2IVK, 199 (34 on 40m)
IK1AOD, 199 (1)
DF3CB, 199 (1)
GM3YOR, 199 (31)
VO1FB, 199 (19)
KZ4V, 199 (26)
W6DN, 199 (17)
W3NO, 199 (26)
HB9DDZ, 199 (31)
RU3FM, 199 (1)
N3UN, 199 (18)
OH2VZ, 199 (31)
W1JZ, 199 (24)
W1FZ, 199 (26)
SM7BIP, 199 (31)
SP5DVP, 199 (31 on 40)
N4NX, 199 (26)
N4MM, 199 (26)
EA7GF, 199 (1)
N6HR/7, 199 (37)
JA5IU, 199 (2)
CT3DL, 199 (26)
NØIJ, 199 (21)
RU3DX, 199 (6)
N4XR, 199 (27)
WØPGI, 199 (26)
HA5AGS, 199 (1)
EA8AYV, 199 (27)
VE3XN, 199 (26)
K7BG, 199 (22)
W6XK, 198 (17, 34)
EA5BCX, 198 (27, 39)
G3KDB, 198 (1, 12)
KG9N, 198 (18, 22)
JA1DM, 198 (2, 40)
9A5I, 198 (1, 16)
K5PC, 198 (18, 23)
K4CN, 198 (23, 26)
G3KMQ, 198 (1, 27)
N2QT, 198 (23, 24)
OK1DWC, 198 (6, 31)
W4UM, 198 (18, 23)
US7MM,198 (2, 6)
K2TK, 198 (23, 24)
K3JGJ, 198 (24, 26)
W4DC, 198 (24, 26)
F5NBU, 198 (19, 31)
OE2LCM, 198 (1, 31)
HA1RW, 198 (1, 31)
WK3N, 198 (23, 24)
W9XY, 198 (22, 26)
KZ2I, 198 (24, 26)
WA5VGI, 198 (34)
W7VJ, 198 (34, 37)
WØCP, 198 (18, 40)
K9MIE (18, 21)

The following have qualified for the basic 5 Band WAZ Award:

YU7GMN (199 zones)
K8SIX (170 zones)

****Please note: Cost of the 5 Band WAZ Plaque is $100 ($120 if airmail shipping is requested).**

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Award Manager, Floyd Gerald, N5FG, 17 Green Hollow Rd., Wiggins, MS 39577. The processing fee for the 5BWAZ award is $10.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $15.00 for nonsubscribers. An endorsement fee of $2.00 for subscribers and $5.00 for nonsubscribers is charged for each additional 10 zones confirmed. Please make all checks payable to Floyd Gerald. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. N5FG may also be reached via e-mail: <n5fg@cq-amateur-radio.com>.

excuse for this behavior. The "Suggestions" are available on the website <http://www.dxpub.com>, under DX News, along with the 2006 Most Wanted Country survey results.

DXpedition News

The Italian operation from Djbouti as J20MM and J20RR was a success. They did an outstanding job of handling the pile-ups and operating in an exemplary manner. My compliments to them.

As I write this in mid-February, the team at YWØDX is actively working several bands/modes. They will only be there for about a week, but they appear to be making the most of that time.

The operation from Swains Island (N8S) is slated for early April. As that one has only had one short operation in the past, the pile-ups will be huge there as well. It is considered to be the #1 Most Needed at this time. Hopefully, N8S will reduce that need.

DXØJP from Spratly was pretty active in early February. Signals were not that strong into the eastern U.S., but they were workable. Another operation from Spratly is slated for early March, so we will have had another chance at working this one by the time you read this.

ZK3RE from Tokelau has been quite active on several bands. He had some trouble with low-band antennas but apparently resolved that problem, as I noted a number of reports on him for the lower frequencies.

The Polish operation from Agalega (3B6) is scheduled for late March into early April. This will be followed up by the Five Star Group's operation from St. Brandon as 3B7C in September.

Swaziland (3DA) will see action for the last two weeks of March by a team of Irish DXers. Members of the Irish Radio Transmitters Society will put Swaziland on the air in a big way for both St. Patrick's Day and the CQ WW WPX SSB Contest March 24–25).

Frosty, K5LBU, will lead another expedition to Africa in July. This time the trip will include Botswana (A2) and Lesotho (7P8). The trip is scheduled for July 9 to 23, which includes the IARU contest. If you are interested in going, contact Frosty, e-mail: <frosty1@pdq.net>.

Upcoming Conventions

The annual Visalia International DX Convention will be held April 27–29 at the Holiday Inn Hotel & Conference

The WAZ Program

20 Meter SSB

1156 .....SP8DYY

All Band WAZ

Mixed

8444 .....YV5YMA
8445 .....W5MO

SSB

5022 .....N2SQW
5023 .....WS4V
5024 .....I7IWX
5025 .....DL2RTL

CW

499 .....EA5RM

RTTY

170 .....HB9BGV

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Award Manager, Floyd Gerald, N5FG, 17 Green Hollow Rd., Wiggins, MS 39577. The processing fee for all *CQ* awards is $6.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $12.00 for nonsubscribers. Please make all checks payable to Floyd Gerald. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. N5FG may also be reached via e-mail: <n5fg@cq-amateur-radio.com>.

The WPX Program

CW

3177 .....N7JXS

SSB

2968.....EA5FL
2969.....UT7DX
2970.....N7JXS

MIXED

1975.....JF7VVL
1976.....LY2QT
1977.....VA2SG
1978.....N7JXS
1979.....HL4CEL

CW: 1300 OM7CA. 2150 W9IL. 2200 VE6BF, OM7CA. 2500 S51NR. 2550 K9UQN
SSB: 850 VE6BF. 950 WD8EOL. 1550 K9UQN. 2200 W9IL.
Mixed: 2350 VE6BF. 2450 7K3QPL. 2900 K9UQN. 2950 W9IL. 3200 ON4CAS.
80 Meters: W9BOK, N7JXS
40 Meters: N7JXS
20 Meters: N7JXS, DS4DRE
15 Meters: N7JXS
10 Meters: OM7CA, N7JXS
Asia: JF7VVL, UT7DX, N7JXS
Africa: UT7DX
Europe: UT7DX, N7JXS
Oceania: JF7VVL, UT7DX, N7JXS
North America: UT7DX, N7JXS
South America: KWØU, UT7DX, N7JXS

Award of Excellence Holders: N4MM, W4CRW, K5UR, K2VV, VE3XN, DL1MDD, DJ7CX, DL3RK, WB4SIJ, DL7AA, ON4QX, 9A2AA, OK3EA, OK1MP, N4NO, ZL3GO, W4BQY, IØJX, WA1JMP, KØJN, W4VQ, KF2O, WB8CNL, W1JR, F9RM, W5UR, CT1FL, WA4QMQ, W8ILC, VE7DP, K9BG, W1CU, G4BUE, N3ED, LU3YL/W4, NN4Q, KA3A, VE7WJ, VE7IG, N2AC, W9NUF, N4NX, SMØDJZ, DK5AD, WD9IIC, W3ARK, LA7JO, VK4SS, I8YRK, SMØAJU, N5TV, W6OUL, WB8ZRL, WA8YTM, SM6DHU, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, DK4SY, UR2QD, AB9O, FM5WD, I2DMK, SM6CST, VE1NG, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, HA8UB, HA8XX, K7LJ, SM3EVR, K2SHZ, UP1BZZ, EA7OH, K2POA, N6JV, W2HG, ONL-4003, W5AWT, KBØG, HB9CSA, F6BVB, YU7SF, DF1SD, K7CU, I1POR, K9LJN, YBØTK, K9QFR, 9A2NA, W4UW, NXØI, WB4RUA, I6DQE, I1EEW, I8RFD, I3CRW, VE3MS, NE4F, KC8PG, F1HWB, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, KC7EM, YU1AB, IK2ILH, DEØDAQ, I1WXY, LU1DOW, N1IR, IK4GME, VE9RJ, WX3N, HB9AUT, KC6X, N6IBF, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, WØULU, K9XR, JAØSU, I5ZJK, I2EOW, IK2MRZ, KS4S, KA1CLV, WZ1R, CT4UW, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, OE1EMN, W9IL, I7PXV, S53EO, DF7GK, S57J, EA5BM, DL1EY, DJ1YH, KUØA, VE2UW, 9A9R, UAØFZ, DJ3JSW, OE6CLE, HB9BIN, N1KC, SM5DAC, RW9SG, WA3GNW, S51U, W4MS, I2EAY, RAØFU, CT4NH, EA7TV, W9IAL, LY3BA, K1NU, W1TE, UA3AP, EA5AT, OK1DWC, KX1A, IZ5BAM, K4LQ, KØKG, DL6ATM, VE9FX, DL2CHN, W2OO, AI6Z, RU3DX, WB9IHH, CT1EEN, G4PWA, OK1FED, EU1TT, S53MJ, DL2KQ, RA1AOB, KT2C, UA9CGL, AE5B, DKØPM, SV1EOS, UAØFAI, N4GG, UA4RZ.

160 Meter Endorsements: N4MM, W4CRW, K5UR, VE3XN, DL3RK, OK1MP, N4NO, W4BQY, W4VQ, KF2O, W8CNL, W1JR, W5UR, W8ILC, K9BG, W1CU, G4BUE, LU3YL/W4, NN4Q, VE7WJ, VE7IG, W9NUF, N4NX, SMØDJZ, DK5AD, W3ARK, LA7JO, SMØAJU, N5TV, W6OUL, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, UR2QD, AB9O, FM5WD, SM6CST, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, K7LJ, SM3EVR, UP1BZZ, K2POF, IT9TQH, N6JV, ONL-4003, W5AWT, KBØG, F6BVB, YU7SF, DF1SD, K7CU, I1POR, K9LJN, YBØTK, K9QFR, W4UW, NXØI, WB4RUA, I1EEW, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, YU1AB, IK4GME, WX3N, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, K9XR, JAØSU, I5ZJK, I2EOW, KS4S, KA1CLV, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, S53EO, S57J, DL1EY, DJ1YH, KUØA, VR2UW, UAØFZ, DJ3JSW, OE6CLD, HB9BIN, N1KC, SM5DAC, S51U, RAØFU, CT4NH, EA7TV, LY3BA, K1NU, W1TE, UA3AP, OK1DWC, KX1A, IZ5BAM, DL6ATM, W2OO, RU3DX, WB9IHH, G4PWA, OK1FED, EU1TT, S53MJ, DL2KQ, RA1AOB, UA9CGL, SM6DHU, KØDEQ, DKØPM, SV1EOS, N4GG, UA4RZ.

Complete rules and application forms may be obtained by sending a business-size, self-addressed, stamped envelope (foreign stations send extra postage if airmail desired) to "CQ WPX Awards," P.O. Box 355, New Carlisle, OH 45344 USA. Note: WPX will not accept prefixes/calls which have been confirmed by computer-generated electronic means. *Please Note: The price of the 160 meter bar for the Award of Excellence is $6.50.

The CQ DX Field Award Program

Mixed

83.....OK2OZL

Endorsements

Mixed

225.....K2TQC/249
200.....W4UM/196
150.....OK2OZL/153
100.....PY2DBU/134
28 MHZ.....W1CU
3.5/7 MHZ.....W1CU
1.8 MHZ.....W1CU

SSB

175.....W4UM/178

CW

175.....JN3SAC/193
175.....W4UM/188

The basic award fee for subscribers to *CQ* is $6. For non-subscribers, it is $12. In order to qualify for the reduced subscriber rate, please enclose your latest *CQ* mailing label with your application. Endorsement stickers are $1.00 each plus SASE. Updates not involving the issuance of a sticker are free. All updates and correspondence must include an SASE. Rules and application forms for the CQ DX Awards may be found on the <www.cq-amateur-radio.com> website, or may be obtained by sending a business-size, self-addressed, stamped envelope to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. Please make all checks payable to the award manager.

CQ DX Awards Program

SSB Endorsements

330.....OE3WWB/337
330.....K9OW/337
330.....N7RO/337
330.....OK1MP/336
330.....K9HQM/336
330.....W9SS/336
330.....EA3BMT/336
330.....AB4IQ/334
330.....W2FKF/334
330.....ZL1BOQ/331
310.....XE1RBV/310
275.....XE1MW/293

CW Endorsements

330.....W7OM/336
330.....N7RO/336
330.....OK1MP/335
330.....K9OW/334
320.....N7WO/325

RTTY Endorsements

320.....OK1MP/323

The basic award fee for subscribers to *CQ* is $6. For non-subscribers, it is $12. In order to qualify for the reduced subscriber rate, please enclose your latest *CQ* mailing label with your application. Endorsement stickers are $1.00 each plus SASE. Updates not involving the issuance of a sticker are free. All updates and correspondence must include an SASE. Rules and application forms for the CQ DX Awards may be found on the <www.cq-amateur-radio.com> website, or may be obtained by sending a business-size, self-addressed, stamped envelope to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. Currently we recognize 337 active countries. Please make all checks payable to the award manager.

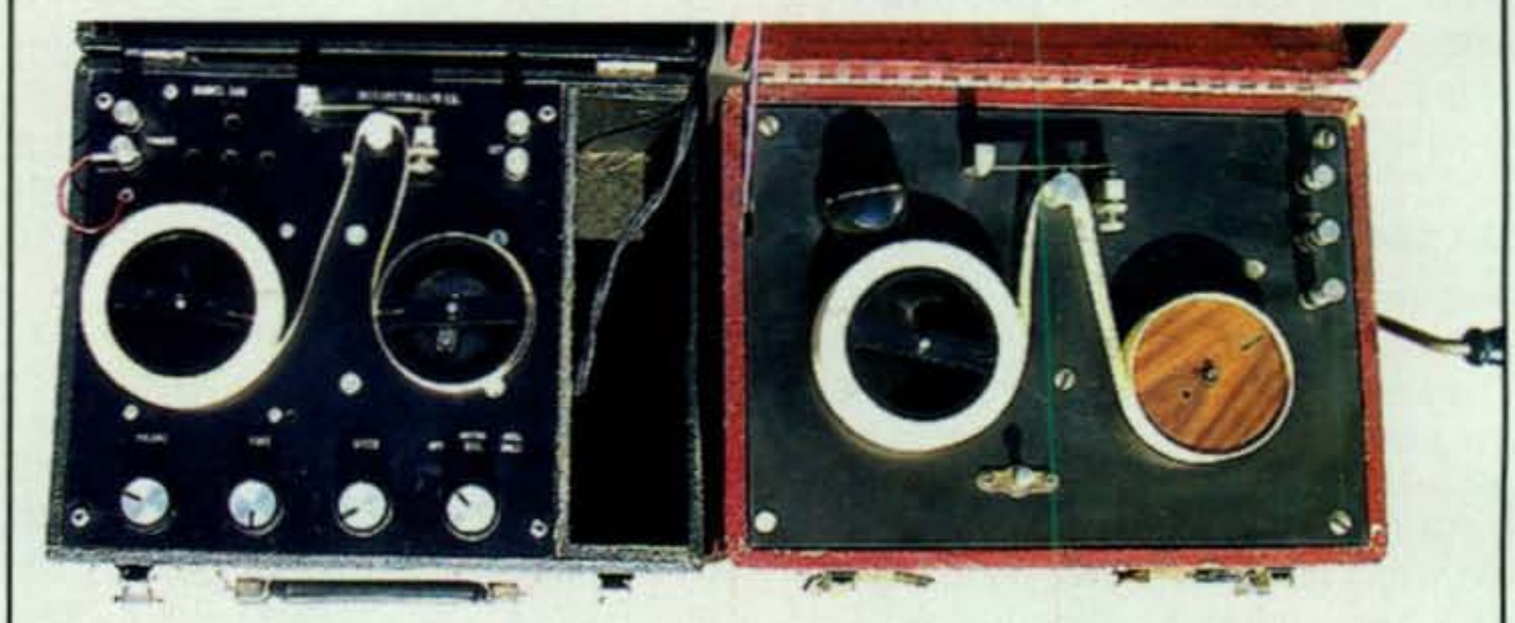
Center in Visalia, CA. As usual, the scheduled program will be excellent, with hundreds of DXers from around the world meeting to enjoy the fellowship. Check out the program on the web at: <http://www.dxconvention.org>.

Dayton Hamvention®! Little more needs to be said than those two words. Dayton is always *the* event of the year, and this year's should be no exception. The SWODXA (Southwest Ohio DX Association) DX Dinner and the Dayton Contest Dinner are always great. New products will be displayed at the Hara Arena, the flea market is always full of goodies, and the weather . . . well, the weather will be what the weather will be in Dayton. One never knows, so come prepared for just about anything!

As long as I'm talking about conventions, let's not forget HAM-COM June 8–9 at the Plano, Texas Center and the Southfork Hotel. See the event's website: <http://www.hamcom.org>.

Then we can look forward to the W9DXCC Convention in Chicago on September 15. Details are on the web at: <http://www.w9dxcc.com>. This one is always fun for me, as I sponsor the Friday evening Welcome Reception, which kicks off the event. It's a great program, sure to please, and you don't want to miss this one if at all possible.

Just two weeks later, September 29th, we find the SEDCO III 2007 gathering in the Great Smoky Mountains at Pigeon Forge, Tennessee. Held immediately following the annual Ten-Tec Factory Hamfest, this event has grown each year to include some very interesting programs on DXing and contest-



With the demise of CW as a ham license test element, here's something that some of you might remember. For those who don't recognize it, it is called an Instruct-O-Graph, and it used perforated paper tapes to train CW operators. (Photo courtesy of David, K4PZT)

THE WPX HONOR ROLL

The WPX Honor Roll is based on the current confirmed prefixes which are submitted by separate application in strict conformance with the CQ Master Prefix list. Scores are based on the current prefix total, regardless of an operator's all-time count. Honor Roll must be updated annually by addition to, or confirmation of, present total. If no up-date, files will be made inactive.

MIXED

5264 9A2AA	3968 YU1AB	3475 YU7BCD	3011 W2WC	2457 JN3SAC	1947 KØKG	1651 KX1A	1016 RA1AOB
4846 W2FXA	3956 VE3XN	3457 KF2O	2965 9A4W	2442 W6OUL	1891 VE9FX	1643 N1KC	825 KL7FAP
4735 W1CU	3703 I2UIY	3375 WB2YQH	2873 W2ME	2415 K5UR	1826 W7CB	1556 W2OO	742 K5IC
4343 EA2IA	3661 I2MQP	3331 IK2ILH	2815 W9IL	2242 I2EAY	1741 AB5C	1522 N8BJQ	648 KWØH
4187 N4NO	3646 S53EO	3227 K9BG	2704 K2XF	2239 VE6BF	1705 W2EZ	1287 K6UXO	
3980 I2PJA	3560 KØDEQ	3089 W9OP	2637 OZ1ACB	2024 AE5B	1662 SV1DPI	1269 K5WAF	

SSB

4710 IØZV	3395 EA2IA	2857 4X6DK	2227 YU7BCD	2076 K2XF	1719 KQ8D	1458 JN3SAC	1202 AG4W	901 KU4BP
4266 VE1YX	3276 N4NO	2711 LU8ESU	2209 IK2QPR	2051 K5UR	1688 KI7AO	1412 I2EAY	1183 AE9DX	843 VE6BF
3956 I2PJA	3155 I2UIY	2658 KF7RU	2209 I3ZSX	1855 K3IXD	1655 DL8AAV	1386 IK4HPU	1145 EA3EQT	729 K7SAM
3900 F6DZU	3142 CT1AHU	2595 EA1JG	2196 W2WC	1827 AE5B	1623 VE9FX	1371 IK2DZN	1042 IZØBNR	637 K5WAF
3573 OZ5EV	3108 I4CSP	2557 IN3QCI	2178 NQ3A	1776 SV3AQR	1611 W2ME	1330 VE7SMP	999 IK8OZP	
3532 9A2NA	2972 OE2EGL	2431 G4UOL	2093 W9IL	1763 W2FKF	1595 W3LL	1305 SV1EOS	984 KX1A	
3477 I2MQP	2930 KF2O	2326 CX6BZ	2085 N6FX	1729 W6OUL	1480 AB5C	1258 N1KC	978 EA7HY	

CW

4593 WA2HZR	3319 LZ1XL	2541 KF2O	2251 N6FX	2086 IK3GER	1832 I2EAY	1266 K6UXO	915 N1KC
4346 K9QVB	3078 9A2NA	2522 KA7T	2213 OZ5UR	2081 W9IL	1793 EA7AAW	1202 WA2VQV	824 VE9FX
3749 N4NO	2688 I2UIY	2476 W2WC	2120 JN3SAC	1955 K5UR	1402 WO3Z	1109 KX1A	608 IK2SGV
3374 EA2IA	2632 W2ME	2468 EA7AZA	2093 VE6BF	1901 I2MQP	1386 AC5K	1053 K5WAF	
3339 VE7DP	2526 I7PXV	2401 YU7BCD	2089 K2XF	1900 W6OUL	1334 RUØLL	1042 VE1YX	

Doug, ZP6CW, and Dale, N3BNA, at a coffee shop during Dale's visit to Paraguay. Doug is a regular on Top band and Dale was there to try his hand on the low bands. (Photo courtesy of Doug, ZP6CW)

ing. Check the SEDCO website for more details: <http://sedco.homestead.com>. I am pleased to be a part of this event as the emcee for the DX portion of the program. This is a great time of year to visit the Smoky Mountains and especially the Gatlinburg/Pigeon Forge area. The Dollywood Theme Park is there, along with shops of all kinds for the non-ham ladies while the OMs attend the hamfest and SEDCO.

There are varying "theories" about just when the bottom of the current solar Cycle will occur, or whether it has already happened. Most agree that we are at least very close to the bottom, and things should start improving in the months ahead. I'm sure looking forward to better propagation on the higher bands, such as 12 and 10 meters, aren't you?

Until next month, enjoy the chase and Have Fun!

73, Carl, N4AA

QSL Information

LR2F via LU2FA
LX/PA6Z via PA1K
LX1JAB via LX1JU
LY7A via LY2ZO
MD/AC8W via AC8W
MD/K8DD via K8DD
MD/W4DU via W4DU
MSØWRC/P via GØMTD
OA7/DL1CW via DL1CW
OK7K via OK1BN
OM8A via OM2VL
ON100BOIC via ON4CRD
ON25CLM via ON4CLM
ON4SSJ via ON6NR
P29NI via G3KHZ
P29VCX via SM6CVX
P40A via WD9DZV
P40LL via WOØZ
PA/DH1AD via DH1AD
PJ4/PA3CNX via PA3CNX
PJ4/WD9DZV via WD9DZV
PJ4E via WA4PGM
PW2C via PY2WC
PZ5JR via K3BYV
R1ANC via UA1PAC
RK2FWA via DK4VW
SD3N via SM3NXS
SD40JZ via SM5DJZ
SV2ASP/A via SV2ASP
SV5/GM3YOR via GM3YOR
SV8/DF7KHK via DF7KHK
SV8/HA6NL via HA6NL
SV9/DF7KHK via DF7KHK
SV9/G8VHB via G8VHB
SX1VAR via SV1VS
SX5P via SV5FRB
SX5P via SV5FRD
SY2POL via SV2JAO
SY8GE via SV2DGH

(The table of QSL Managers is courtesy of John Shelton, K1XN, editor of "The Go List," 106 Dogwood Dr., Paris, TN 38242; phone 731-641-4354; e-mail: <golist@golist.net>.)

contesting

BY JOHN DORR,* K1AR

Contesting Ten Years from Now

April's Contest Tip

Are you using vertical antennas in your contest station? You'll be amazed at how well an easily installed inverted-L on 160 meters (or other low band) will enhance your station's performance, both on receive and transmit. If you do it, don't cheap out on the radial field. A few extra radials will make all the difference in performance. Give it a try on one or more of the low bands. You'll be amazed!

Have you ever wondered what contesting will be like in the future, maybe ten years from now? Well, it turns out that many of you *have* thought about it. A few weeks ago, the question was put out on the CQ Contest e-mail reflector. The answers were both insightful and entertaining. Fortunately, Tonno Vahk, ES5TV, took the time to compile the answers, and with his permission I'd like to share them with you this month. Enjoy!

The Summary by ES5TV

Welcome to 2017, fellow contesters! What follows is a summary of your comments regarding the future of contesting ten years from now. If you're interested in more detail, you can find the all of the input at: <http://www.lhv.ee/images/files/2017.pdf>. Keep an eye out for the April 2017 edition of *CQ*. I will present a follow-up and we will see who was right and who was wrong!

Here is the summary of the predictions for 2017:

• Most of us are running software-defined radios (SDR). We have high-end TS970SDX-like rigs. Ten-Tec has also released a $10k+ radio. High-end radios have full SO2R functionality and a built-in soundcard interface for PSK and RTTY. Despite sofware-updatable functionality, radios have retained user interfaces similar to what they were in 2007. Receiver performance is also much the same, but tools are available to operators that continue to evolve rapidly.

• Software in SDRs is able to automatically populate band maps, record contests, steer adaptable receiving antennas, and switch the pattern of your stack. There are no more key clicks on CW and filters have become sharper. DSP systems are able to detect weak CW signals that cannot be copied by ear. Newly tested "receivers" are front-end boxes with a high-speed digital output. A PC processes that output stream to implement the functions we use in the IF, DSP, and AF stages of older radios. The new companion transmitters are a direct synthesis of the output RF, which is fed into amplifiers to get up to working levels.

• Some stations are partly operated by robots tuning for multipliers while simultaneously selecting antennas. Speech recognition is now widely used, and many contests are won by stations using 100% recorded voice files. We see continued evolution of the use of various sources of real-time outside information (spotting), and databases by logging software. Attempts are made by contest rule-makers to define the acceptable limits of computer assistance to "unassisted" operators, particularly regarding real-time deciphering of CW and voice signals. Many top contesters advocate that amateur radio contesting needs a new rule: Only the human mind may be used for real-time extraction of intelligence from received signals!

*2 Mitchell Pond Road, Windham, NH 03087
e-mail: <K1AR@contesting.com>

Calendar of Events

All year	**CQ DX Marathon**
Mar. 24–25	**CQ WW WPX SSB Contest**
Apr. 7–8	SP DX Contest
Apr. 7–8	EA RTTY Contest
Apr. 7–8	Missouri QSO Party
Apr. 7–8	QCWA QSO Party
Apr. 14	DIG QSO Party (20-10M)
Apr. 14–15	Japan Int'l DX Contest
Apr. 14–15	Michigan QSO Party
Apr. 14–15	Georgia QSO Party
Apr. 14–15	Yuri Gagarin Int'l Contest
Apr. 15	DIG QSO Party (80–40m)
Apr. 21	Holyland DX Contest
Apr. 21–22	Kids' Roundup
Apr. 21–22	Ontario QSO Party
Apr. 21–22	YU DX Contest
Apr. 28–29	SP DX RTTY Contest
Apr. 28–29	Helvetia Contest
Apr. 28–29	Florida QSO Party
Apr. 28–29	Nebraska QSO Party
May 5–6	MARAC County Hunter's CW Contest
May 5–6	Indiana QSO Party
May 5–6	7th Call Area QSO Party
May 5–6	ARI Int'l DX Contest
May 5–6	New England QSO Party
May 26–27	**CQ WW WPX CW Contest**

• Virtual DXpeditions are possible. Many rare islands are populated with equipment and antennas connected to the internet and can be rented by the hour or the day or for a contest. Contest superstations are for rent over the internet. The use of Kenwood's Sky Command as well as the Yaesu and ICOM versions has created a controversy in the contesting community as to whether remote operation should be a separate class or not. Contest committees are having a hard time regulating and preventing use of remote receiving locations in addition to remote transmitters.

• No-tune and auto-tune amplifiers have become much more popular and affordable. Some high-end amplifiers have built-in LCD video displays capable of oscilloscope and spectrum-analyzer displays of input and output waveforms.

• Antennas that contesters use have gotten better and much bigger. The trap tribander has disappeared, being replaced by the DJ2UT and SteppIR styles, but monobanders still rule. In the U.S., the ever-growing issue continues to be land development and tower zoning. Eighty-meter Yagis are standard, and the first rotating 160-meter Yagis have made an appearance.

• Heil Sound has developed a wireless (maybe Bluetooth) headset for contesting.

• Someone has developed a voice version of MorseRunner/RUFZ. At least 10% of all contesters continue to use DOS-based logging programs!

• Contest logging programs have more decision logic in them. The programs now advise you on what to do next according to your goal and current situation. The log program interacts with the internet in a much more extensive way than in 2007. You are able to predict openings and changes in band conditions using ionospheric resources on the internet.

• Due to the increase in the percentage of Europeans at WRTC (World radio Team Championship), which reflects their overall increase in contest involvement as a whole, a European team won the top spot at the last two WRTC events after Brazil.

• Despite the general aging trend of top-notch contesters, the new influx of "foundation" class licenses has given us many more operators. New records were set in the latest sunspot peak. A single-operator broke the 7000-QSO mark in the ARRL 10 Meter Contest and the 12000-QSO mark in CQWW phone contest, the latter still considered to be the most-prestigious worldwide DX contest.

• Contesting is considered the future of ham radio. The CW requirement has completely been dropped globally, and CW scores are declining. RTTY/PSK popularity is growing and is now the most popular non-voice mode.

• A few contests have instituted an "anything goes" category with respect to computer assistance and external data. Most contest sponsors have shortened submission time for logs dramatically and many are not accepting paper logs anymore.

• To address perceived abuses in the HQ competition, the IARU HF contest has removed credit for "uniques" logged for all stations. Major contest sponsors are far more transparent and public with adjudicated disqualifications for cheating. More contests accept corporate awards sponsorship.

• Real-time sharing of scores during a contest is non-controversial and common. It is not mandatory, but many entrants from the developed countries use it. Initial experiments in real-time log validation are under way. There are a few sites offering gambling odds on the top competitors before major contests. *—73, Tonno, ES5TV*

Many of these ideas are not that far-fetched. Indeed, some may happen sooner than ten years from now. What do you think?

Radio Research: Morse Code and Short-Term Memory

The following piece was picked up from WA6ITF's weekly Amateur Radio Newsline™ broadcast. Given a collective interest in CW among many contesters, and the recent removal of Morse code testing from license exams, I thought you would enjoy the topic.

Morse code testing may soon be a thing of the past in Amateur Radio, but a researcher in Pennsylvania is conducting an experiment is Morse proficiency. Her real goal is to help us learn more about short-term memory. However, those conducting the experiments want ham radio operators to be a part of it.

Dr. Julie Fiez, a psychology professor from the University of Pittsburgh, got the idea to use Morse code from a family member who is a ham with good proficiency in CW. Fiez says she's not licensed herself but was drawn to the idea of using CW in an experiment to compare how people respond to and process verbal and audio tones.

"Our interest in Morse actually arose out of our research in what's called 'verbal working memory,' which is the human's ability to keep information on-line for a short period of time that you can then access later," Fiez explains. "In the verbal domain this could be information about words or letters or digits. A common, everyday example would be when you go to a phone book to look up a phone number, find the listing that you're interested in, and then close the phone book. The time between when you close the phone book and when you actually dial the number necessitates the need to maintain that verbal information in your mind's memory so that you can actually retrieve it when you go to dial the number."

Fiez says her research has focused on using neuro-imaging and behaviorial studies to try to understand what brain areas contribute to a person's ability to perform a task. "Morse is relevant for us because there's a line of work that suggests that when people hear spoken language, they're able to recruit something that some people have called an 'echoic storage' or a virtual tape recorder in the brain," Fiez says. "This echoic storage plays an important role in keeping track of the verbal information that's entered into working memory."

Fiez says that this has raised another question, sparking the idea for her research project.

"For us the question was: 'What about Morse code, where subjects have potentially great skill, and the fact that it's an auditory input, which actually maps into the language system?" Fiez recalls. "While the acoustic part of the signal is not speech, we're interested in understanding whether a highly skilled ham radio operator who's very fluent in Morse is able to make use of this echoic store process in order to support his performance."

Fiez says subjects who will take part in the testing at the university will be exposed to Morse code at different rates—16, 19, and 25 words per minute.

Professor Fiez says that she has relied on some of the same types of resources most hams had been using to learn the code in the first place. The researcher has consulted with local hams in the Pittsburgh area to discuss her parameters and has learned what she might expect from those who take part in the experiment.

"Based upon our conversations with local experts and with a number of people, it is likely that there may be considerable individual variability and it may depend also in part on how often a person tends to use Morse," Fiez says. "If you primarily write down copy as you receive, the use of the brain's echoic store may not be utilized in the same way that it would if you get into the habit of listening to Morse as it's being transmitted and internally process it. We're expecting that there's going to be differences between individuals both on the basis of their Morse proficiency and how they've used Morse in that experience."

Fiez says she's still looking for volunteers who'd be willing to travel to the Pittsburgh area to take part. Sorry, the travel costs are yours. If you want to learn more, you can send an e-mail request to <morsestudy@hotmail.com>. The researchers say that what they learn should be useful for improving our understanding of certain aspects of short-term memory.

Final Comments

As I write this, in mid-February, we're getting our first big snowstorm of the winter in the Northeast. I wonder if anyone has ever tied global warming to sunspot activity? Perhaps global warming is a result of some hams' power levels? That's a subject for another day. Until then, see you on the bands!

73, John, K1AR

BY JOE LYNCH,* N6CL

Jamesburg Earth Station Dish Being Reactivated for Amateur Radio Use

The Jamesburg Earth Station in Cachagua Valley, California (about 20 miles southeast of Monterey), a 10-story tall, 97-foot diameter dish, was built in 1968 and put into service in 1969, just in time to carry the Moon landing live to the world. Until the fall of 2003 the dish was used first for television broadcasts, including the then groundbreaking live coverage of President Richard Nixon's 1972 visit to China. Later it was used for international phone calls, providing the link to nearly half the telephone traffic between the U.S. and Asia. Its operation included providing all forms of overseas communications via satellite between the U.S. and points all around the Pacific Rim.

When the facility was closed, it was sold to an investor who hoped to reopen it as a commercial venture. A web advertisement promoting it can be viewed at http://www.jamesburgstation.net.

Unfortunately, that hoped-for venture was never fully realized, and the new owner now wants to sell the property. However, for the present the owner is cooperating with a group of amateur radio operators to find new uses for the antenna. These uses may include EME, amateur radio satellite, amateur radio astronomy, educational, and/or deep-space applications. Among those amateur radio operators working with the owner is Pat Barthelow, AA6EG. Here is Pat's story concerning his and others' efforts to preserve the dish for amateur radio and other non-commercial use:

*e-mail: <n6cl@sbcglobal.net>

VHF Plus Calendar

April 1	Moderate EME conditions
April 2	Full Moon; 144 MHz Spring Sprint (See text for details.)
April 3	Moon Apogee
April 8	Very poor EME conditions
April 10	Last Quarter Moon; 222 MHz Spring Sprint (See text for details.)
April 15	Very good EME conditions
April 17	New Moon and Moon Perigee
April 18	432 MHz Spring Sprint (See text for details.)
April 21-22	Third weekend of the European Worldwide EME contest (See text for details.)
April 22	*Lyrids* Meteor Shower Peak; poor EME conditions
April 24	First Quarter Moon
April 27-28	Southeast VHF Society conference (See text for details.)
April 29	Moderate EME conditions
April 30	Moon Apogee

—EME conditions courtesy W5LUU.

How all this got started: I suggested some time ago to the new owner that I was interested in mobilizing a group within the ham community to work on bringing the Jamesburg station up to running condition and doing moonbounce contacts with it. This would bring visibility and status to the station, possibly to the professional scientific community, members of whom could see a long-term future for the station, possibly in radio astronomy, space camps, data centers, etc. We are fortunate now to have a very distinguished panel of experts in many areas as Jamesburg group participants.

Our academic brain trust includes professors, scientists, and students involved in astronomy, and space sciences, including amateur radio built satellites (Cubesats, http://www.cubesat.com). They hail from Stanford

Rear side view of the Jamesburg Earth Station dish. (Photo courtesy of AA6EG)

Face side view of the Jamesburg Earth Station dish. (Photo courtesy of AA6EG)

University, Cal Poly San Luis Obispo, UC Santa Cruz, CSU-Monterey Bay, and soon will include scientists from the SETI institute in Mountain View. Many in our group are highly skilled engineers and technicians from industry, including some who are technology business owners. Many are amateur radio operators, really jumping in and getting things done. Among those showing an interest in the site are the following:

Dr. Jill Tarter, the Chief Scientist of the Search for Extra Terrestrial Intelligence (SETI, <http://www.seti.org>), plans to tour Jamesburg soon. Dr. Bob Lash (see <http://www.bambi.net/bob.html>), who has a great amount of experience in satellites, computers, and all types of telecomm, has been quite helpful in on-site work, and bringing in other persons, groups, and organizations to be involved in Jamesburg.

Dr. Bob Twiggs, of Stanford, is the "father" of the internationally known Cubesat program. He sees a possible future activity of Jamesburg in Cubesats, both near (Earth orbit) and far (Moon orbits, and Mars Probes). See: <http://www.space.com/businesstechnology/technology/050928cubesats.html>.

Dave Smith, W6TE, from Fresno, has been on board from the beginning. He is very capable with EME experience. He has offered his 500-watt 1296-EME radio and feed antenna for use at the Jamesburg dish.

John Castorina, ex-WB6AZP, a college chum of mine from way back, worked at Jamesburg for several years in the 1970s and for many more years at COMSAT HQ in Washington. (See: <http://www.longandflatsociety.com> for pictures. Click on Galleries, Jamesburg, and then any of the portfolios of pictures.)

Bryan Klofas, from Cal Poly (<http://cubesat.atl.calpoly.edu/pages/home/contact-us.php>), is lead student in its CubeSat Program. He is looking into long-term solutions for use and preservation of the Jamesburg Earth Station, involving Cal Poly as a player.

Brian Yee and Jim Moss, have been with us on almost all work parties and are from the 50 MHz and up group (South Bay Area). They have been quite an asset, with great ideas, troubleshooting skills, a camera, and a can-do attitude.

Bob Brunnquell, K6OU, a friend of mine from the Sacramento area, also has decades of big-dish experience as part of his Air Force duties, where he did solar studies with big dishes in Hawaii. Chuck Osborne, a seasoned big-dish veteran, is with us from the East Coast, with sage advice and oversight, particularly valuable and relevant, as he is director of operations at the Pisgah Radio Observatory in North Carolina, and knows these 30-meter dishes.

Jack Ramey of our group worked for decades at Jamesburg and is probably the person in our group most knowledgeable about the detailed nuts and bolts of the station operation. Marc Goldman, WB6DCE, along with Thor Rasmussen, N6FNP, has been our crack photographer. Marc is also a tools, nuts, and bolts man with a lot of time on hand. John Hagerty, W6UQZ, an insurance guy in his real job, in addition to being a ham techie, has helped a lot in a number of work-party visits.

We are proceeding, and are well along after several work parties that began in earnest early last November. The computer-controlled 30-meter dish is now able to be rotated in azimuth and elevation after a lot of work to clear computer-controlled interlocks and further understanding of the control system. A pdf file document of the Vertex-RSI 7210 computer-control system is available to anyone who needs it to work on software or hardware problems towards getting the dish under computer control of a moon-tracking program. It is available as a download from the website: <http://www.longandflatsociety.com>.

For those who have not yet come to Jamesburg, it is about a one-hour drive from Monterey. For maps and directions, go to

Google Maps. For a location, type COMSAT Rd., Carmel Valley, California. The station is at the end of COMSAT Rd. The Google photo is cool. You can easily see the dish in the birdbath position, along with the attached 20,000 sq. ft. building.

The above is a compilation of postings on the website <http://www.jamesburgdish.org/>, the October 31 – November 6, 2003 issue of "The Carmel Pine Cone" newsletter (<http://www.carmelpinecone.com>), and e-mail posted to the Moon-net reflector by Pat Barthelow, AA6EG, and Jim Moss, N9JIM. For more information or to lend your support to the project, please contact Pat Barthelow, AA6EG, at <aa6eg@hotmail.com>.

First Spratly Islands EME QSOs

This past February saw the first ever EME operations from Spratly Islands, specifically from the Philippine territorial jurisdiction of the Spratlys. The Philippines has territorial jurisdiction and sovereignty over the Kalayaan Island Group, which forms part of the Spratly Island Group. The Municipality of Kalayaan Island is located in the Province of Palawan, Republic of the Philippines. Pag'asa Island, the site of the DXpedition, and is the largest island of the group (32.7 hectares). It is 903 kilometers (579 miles) due southwest of Manila.

The operators taking part in this historic DXpedition included Tac Yonemura, JA1BRK, the team leader; Kazu Ogasawara, JA1RJU, the VHF operator; Jin Fujiwara, JF1IST, the DXpedition construction engineer and low-band operator; Jun Ohashi, JF2XGF, the power-amp engineer and one of the operators; Hiro Matsuura, JA4DND, one of the low-band operators; Eddie Valdez, DU1EV, in charge of the DU base support; Jun Moreto, DU1BA, one of the operators; and Nao Mashita, JA1HGY, the all-important QSL manager.

Because the operators returned to the Philippines as this column was being written (in mid-February), what follows is a very preliminary report by Lance Collister, W7GJ. He will furnish a more complete report that will appear in next month's column. Among those who worked DXØJP on 6 meters EME are W7GJ, KC4PX, N5BLZ, K7AD, K6MYC, SM7BAE, PE1BTX, and SM7FJE. Among those who worked DXØJP on 2 meters EME are KB8RQ, W5UN, and W7GJ.

Congratulations need to go to all involved in this historic operation to put the Spratlys on the air for the first time on EME. Hopefully, this success will encourage others to consider similar DXpeditions. Kudos also must go to Joe Taylor, K1JT, for his relentless efforts to constantly improve his WSJT software so as to make such previously impossible QSOs now possible—and even an everyday occurrence.

Watonga Windtalker student members pose with radios contributed by Sam Plessenger, W8GRP. (Photo courtesy of AF4CM)

Charles Simonyi, KE7KDP, to Operate from the ISS

Some time this month software architect and former Microsoft Office developer turned philanthropist Charles Simonyi, KE7KDP, is expected to arrive onboard the International Space Station, having hitched a ride on board the Russian Soyuz TMA-10. He will share a ride with two Russian cosmonauts on a 10-day space expedition. He will be the fifth space tourist to visit the ISS. During his time in space he hopes to make as many school QSOs as possible. According to Frank Bauer, KA3HDO, ARISS (Amateur Radio aboard the International Space Station) NASA liaison, the U.S. team is working to get him interested in doing general contacts as well.

Windtalker Students Receive Donation

In this past January's column I included an article written by Jeff Sharrock, AF4CM, concerning his students at Wagoner, Oklahoma High School. Known as the Wagoner Windtalkers, these students named their amateur radio club in honor of the World War I and World War II Native American servicemen who were instrumental in providing secure communications by way of using their native Choctaw and Comanche languages. In response to that article something wonderful happened. I'll let Jeff tell the story via the following letter, which he sent to me:

I would like thank you for highlighting our high school club activities in your column in *CQ* magazine. I would also like to tell your readers about the generosity of Sam Plessinger, W8GRP. After seeing your column, Sam boxed up three of his 2-meter radios, complete with accessories, and shipped them to the school address.

One day in early February I was making copies of my U.S. History lesson plan in the high school copy room when I noticed a box sitting there addressed to the Wagoner Windtalkers amateur radio club. Opening it, I discovered that a man whom I've never met before, or even had a QSO with, had just decided that he had the means to put more radio gear into the hands of my students and took action! I have included a picture of the radios Sam sent, which include an ICOM IC-25 A/E and Yaesu FT-2400H mobile transceivers and a Kenwood HT.

When I presented Sam's donation at the weekly club meeting, you would have thought it was Christmas. The club president, McKenzie Clothier (bottom row, second from left in photo), and some of her officers immediately set out to learn each radio's features and to make plans to use them to carry on a local net.

With School Club Roundup right around the corner, the excitement level among club members has already been running high lately, but the news of being mentioned in *CQ* magazine and the arrival of Sam's donation has stirred them up even more.

My students want Mr. Sam Plessinger to know they are most grateful. As their sponsor, I feel both you and Sam have given me

some tremendous "backup" in my efforts to teach and inspire these kids, and I want you to know I really appreciate it. After watching the students' reactions to both your publicity and to Sam's gift, I can tell that their view of ham radio, and their place in it, has changed for the better. I think they feel a greater sense of fraternity with other hams than before; and with all the other ways young people have to communicate or be entertained these days, if there is a better way than Sam's example to get them to embrace ham radio and carry the torch forward, I just don't know what it is. *73, de Jeff Sharrock, AF4CM, sponsor: WI5ND*

I also thank Sam for his generosity to Jeff and his students. It was an incredibly wonderful thing that Sam did for them. Perhaps Sam's gesture will inspire others to also make a donation their local school radio club.

SuitSat-2 Goes to College

Newington, CT, Jan 24, 2006 (The following is from the *ARRL Letter* and is by Rosalie White, K1STO/ARISS):

Eleven electrical engineering students at The College of New Jersey had a hand in designing some of the software defined radio (SDR) hardware that will fly aboard SuitSat-2. The college seniors signed up last fall for "Software Defined Radio," taught by adjunct professors Bob McGwier, N4HY, and Frank Brickle, AB2KT, both members of the Amateur Radio on the International Space Station (ARISS) SuitSat-2 team.

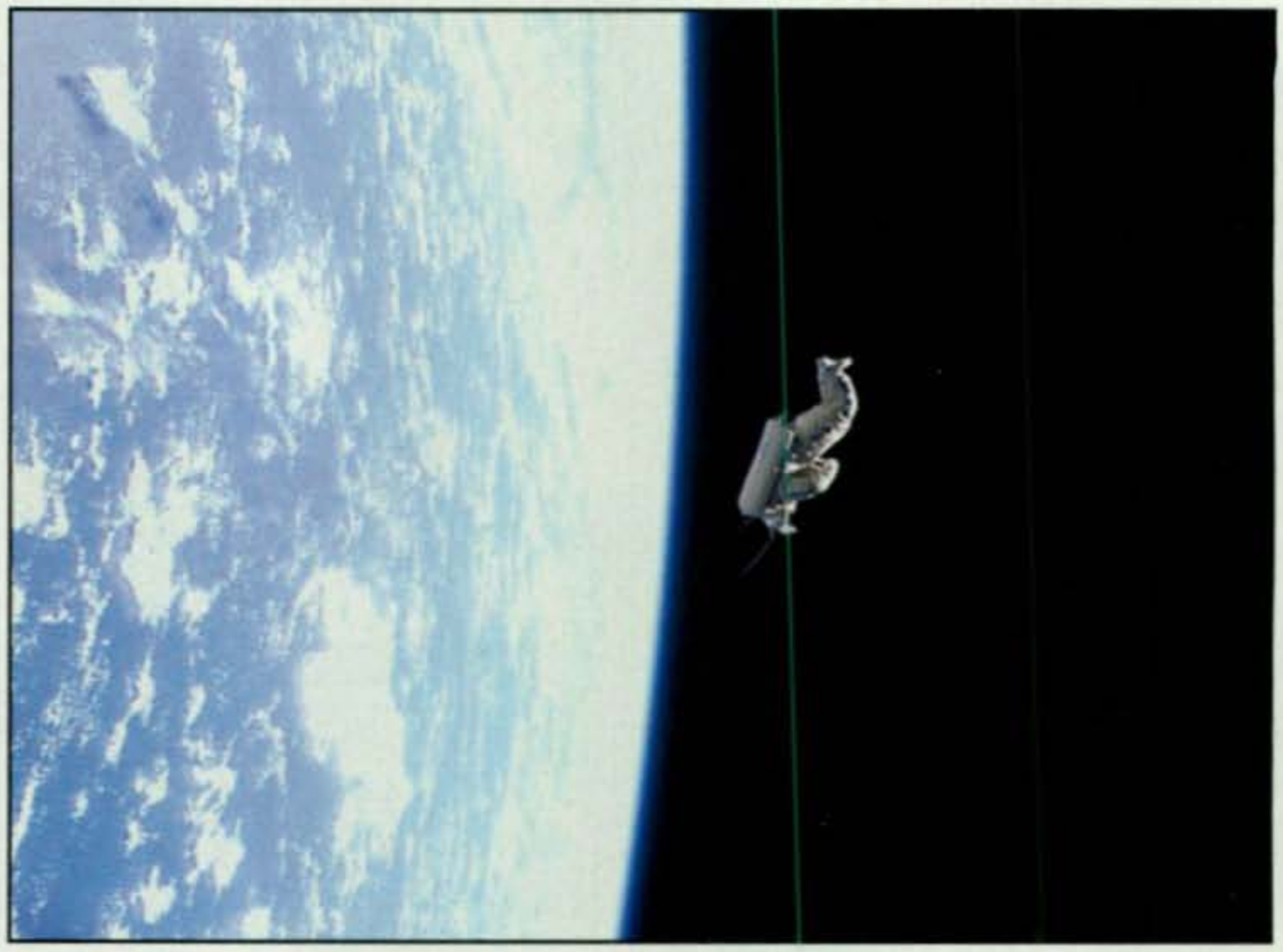
The second SuitSat will have a software designed Amateur Radio transponder (SDX) on board. SuitSat-2 is being viewed as a test bed for the hardware AMSAT hopes to launch on its Phase 3E Eagle satellite.

McGwier and Brickle designed practical, goal-based experiments for the students' projects with an eye toward turning out something that would be a useful SuitSat-2 component. Team members Steve Bible, N7HPR, and Joe Julicher, N9WXU, provided circuit boards employing "bleeding-edge" technology—dsPIC33F 16-bit direct memory access digital signal controllers. Brickle says the circuits will serve as SuitSat-2's heart and brain.

Early on, the students studied signal processing and communication theory as well as what Brickle calls "esoteric corners of computer science." Then, using Matlab—a high-level technical computing language—the students implemented modulators and demodulators for SSB, FM, BPSK, and AFSK.

"Students get a little bit of verbal swimming instruction, and then we toss them straight into the ocean," is how Brickle described the process.

By mid-semester, the students were designing their experiments and getting them up and running. Boards were powered up without diagnostic hardware or software, since that's how the circuitry will be on orbit —"walking a tightrope without a net," as Brickle sees it.



SuitSat-1 was launched into space from the International Space Station in February 2006. (Photo courtesy of NASA)

"Given the complexity of what the SDR/SDX in SuitSat-2 will be required to provide, the applications will need to run in an unprecedented software environment: pre-emptive multitasking under freeRTOS," he explained. FreeRTOS is an open-source, round-robin operating system for embedded devices.

Instead of being scared off, the students ran with the challenge and demonstrated obvious enthusiasm, Brickle reports. "We will be doing a very good thing if we continue to involve these kids, and more like them, in our future AMSAT projects," he said. What surprised him most, he added, was that the students focused on taking new approaches to "very fundamental engineering issues that aren't flashy or trendy." McGwier remarked that both students and teachers shared in the excitement.

The SuitSat-2 team, under the leadership of Lou McFadin, W5DID, has been working on the design of a power converter for the solar panels, the internal housekeeping unit, the antenna mount, the transmitting and receiving hardware, and how it will mount atop the suit's helmet. An ISS crew could launch SuitSat-2 during a spacewalk as early as this fall. SuitSat-2 could have an operational lifetime of six months or more.

In a further update of the status of SuitSat-2, Lou McFadin, W5DID, reported during the ARISS teleconference of January 30 that the SuitSat website (<http://www.suitsat.org/>) is up and running. Additionally, by late February educational materials for teachers should have been made available on the website.

AO-27 Rejuvenated, Back on the Air

The following is from the *ARRL Letter:*

AMSAT News Service reports that AO-27 (EyeSat-1, <http://www.ao27.org>) has again been recovered and returned to operation. Launched in September 1993, AO-27 has been listed as non-operational since the middle of last year. Michael Wyrick, N3UC, of the AO-27 command team told ANS that after addressing problems with the microsat's AFSK modem, ground controllers were able to upload operational software. The satellite carries a Mode V/U FM repeater with the uplink at 145.850 MHz and the downlink at 436.795 MHz. Ground controllers are seeking help in logging telemetry from AO-27. Visit the Logging AO-27 Telemetry page (<http://www.ao27.org/tlm.shtml>) for information.

The AO-27 website reports that as of February 3 the bird is back on schedule.

New VHF-Plus Oriented DVDs Available

Gary Pearce, KN4AQ, formerly the FM columnist for *CQ VHF* magazine, announced that he has formed a company, Amateur Radio Video News (ARVN), which produces videos for the ham radio community. From his production work he now has for sale three new videos on DVD. He states that they are designed to be shown at club meetings, hamfests, or collected by individual hams.

His titles include: the *2006 ARDF USA Championships, Standing Up for Standing Waves* (a demonstration by Bill Hayes), and the *FCC Forum at the 2006 Dayton Hamvention®,* along with a *Hamvention® Tour.* Gary states that other programs in the pipeline include an introduction to digital voice, *The Last Big Field Day,* a review of BPL, and a visit to the Collins ham club in Cedar Rapids, Iowa. He states that his goal is to produce two DVDs per year in addition to the Dayton Hamvention® review.

I highly recommend his work, as I have viewed it and can say that it is top quality. For more information, including how to order his videos, go to his website: <http://www.ARVidNEws.com>.

Current Contests

European Worldwide EME Contest 2007: Sponsored by DUBUS and REF. The EU WW EME contest is intended to encourage worldwide activity on moonbounce. Multipliers are DXCC countries plus all W/VK/VE states. The contest dates and bands for this month are as follows: Third weekend:,144 MHz and 2.3 and 3.4 GHz, CW/SSB, 21–22 April, 0000 to 2400 UTC. Complete rules can be found at: <http://www.marsport.demon.co.uk/EMEcont2007.pdf>.

Spring Sprints: These short-duration (usually four hours) VHF+ contests

Frank Brickle, AB2KT (left, rear), and Bob McGwier, N4HY (right, rear), with part of their TCNJ SDR class. Stephen Hendrickson (center, front, holding circuit board) designed the S-band amplifier proposed for the AMSAT Eagle satellite. He won honorable mention at an international amplifier efficiency competition as the only undergraduate and the only person submitting above 1 GHz. (Photo courtesy of ARRL/ARISS/AMSAT)

are held on various dates (for each band) during the months of April and May. This year's dates and times were not available at press time. It is assumed based on last year's dates that they will be as follows: 144 MHz, April 2, 7–11 PM local time; 222 MHz, April 10, 7–11 PM local time; 432 MHz, April 18, 7–11 PM local time. The up-to-date information on these contests can be found at: <http://www.etdxa.org>. At this URL, click on the VHF/UHF link to get to the contest information.

Current Conference

Southeastern VHF Society: The 11th annual conference will be hosted in Atlanta, Georgia, April 27 and 28, 2007. Hotel registration information was not available at press time. Please check the group's website at <http://www.svhfs.org/> for the registration forms.

Calls for Papers

Calls for papers are issued in advance of forthcoming conferences either for presenters to be speakers, or for papers to be published in the conferences' *Proceedings,* or both. For more information, questions about format, media, hard-copy, e-mail, etc., please contact the person listed with the announcement. The following organization or conference organizer has announced a call for papers for its forthcoming conference:

Central States VHF Society Conference: The Central States VHF Society is soliciting papers, presentations, and poster/table-top displays for the 40th Annual CSVHFS Conference to be held in San Antonio, Texas on July 26-28, 2007. Papers, presentations, and posters on all aspects of weak-signal VHF and above amateur radio are requested.

Deadline for submissions: for the Proceedings, May 7, 2007; for presentations at the conference and for notifying them you will have a poster to be displayed at the conference, July 2, 2006. (Bring your poster with you on the 26th of July!)

Further information is available at the CSVHFS website (<http://www.csvhfs.org/conference/callforpapers.html>). Contacts: Lloyd Crawford, N5GDB, e-mail: <N5GDB@austin.rr.net>. Alternate: Thomas Visel, NX1N, e-mail: <Thomas@neuric.com>. Snail mail: RMG, P.O. Box 91058, Austin, TX 78709-1058.

Microwave Update: Microwave Update 2007 will take place October 18-20 in historic Valley Forge/Philadelphia, Pennsylvania, sponsored by the Mt. Airy VHF Radio Club. Registration, accommodations, and program information are available on the Microwave Update 2007 website: <http://www.microwaveupdate.org>. Register by September 1 and save! Papers, arti-

cles, and presentations are invited on topics related to microwave theory, construction, communication, deployment, propagation, antennas, activity, transmitters, receivers, components, amplifiers, communication modes, LASER, and practical experiences. Submit abstracts in MS-Word or as a pdf by June 1 and completed papers, articles, and presentations (diagrams, photos, and illustrations preferably in black and white; color accepted) by August 15 to Paul Drexler, W2PED, 28 W Squan Road, Clarksburg, NJ 08510; e-mail: <pdrexler@hotmail.com>.

Meteor Showers

The ***Lyrids*** meteor shower is active during April 16–25. It is predicted to peak around 2230 UTC on 22 April. This is a north-south shower, producing at its peak around 10–15 meteors per hour, with the possibility of upwards of 90 per hour.

A minor shower and its predicted peak is ***pi-Puppids*** (peak on April 23). Other April minor showers include the following and their possible radio peaks: April *Piscids,* April 20, 2100 UTC; and *δ-Piscids,* April 24, 2100 UTC.

For more information on the above meteor shower predictions, see Tomas Hood, NW7US's Propagation column in this issue. Also visit the International Meteor Organization's website: <http://www.imo.net>.

And Finally . . .

It was in 1979 that the brokerage firm Smith Barney launched a highly successful advertising campaign starring John Houseman. Houseman had earlier earned a reputation as Professor Charles Kingsfield, a curmudgeon contract law professor in the movie *The Paper Chase* and later the television series of the same name. Houseman's role in the Smith Barney campaign was to reprise his self-possessed professor character to promote the company's sound investment strategy by way of the following scene: As he walks though the old-fashioned college lecture amphitheatre-style classroom, down the steps toward the front, and ending in front of the chalkboard, he is speaking these lines along the way: "Investment executives continually learn about the art of investing—precious little about selling. You don't sell clients, you work for them. You work very hard researching the right investments. And when they're right, no one has to be sold. Investment executives: they make money the old-fashioned way. They *earn* it!"

For those of us who remember that commercial, we especially remember those last two lines, because they became a catchphrase that remains anchored in our subconscious even today, more than 20 years after the campaign ended in 1986. We remember them so well because, by our identification with the commercial, we were in effect taught those lines by *our* professor. More than being taught those lines, we were taught the philosophy those lines espoused: The only way an accomplishment is made worthy is by *earning* it.

For us decades-long licensed amateur radio operators, we recall that philosophy as we reflect back on the good old days when we drew those schematic diagrams for our written exams and endured the Morse code tests—both the receiving and sending tests. Today, many of us mature hams cling to our memories of our difficulties in passing our exams, along with the conviction that *our* amateur radio license was made worthy by our having had to pass that Morse code exam.

Now, however, it is difficult for many of us to dislodge this way of thinking from our minds, because to do so is to devalue what we once thought to be precious. When we attempt to do so, we find a void, because we seem to have nothing else of value to replace what we have previously valued. Additionally, in our devaluing, we experience resentment for this loss of value and attempt to find ways to express our resentment. The easiest way to express this resentment is to project it onto those who do not have to take the same route that we did in order to become licensed amateur radio operators.

When we are tempted to make this projection onto these new hams, I ask all of us to please consider this alternative way of thinking concerning them: Our newly licensed fraternity brothers and sisters are exactly the wrong people for us to target. Furthermore, rather than expressing resentment, we need to focus our energies in more positive and constructive ways. One way that we can do this is by our assuming the role of the professor or teacher—or more accurately, the mentor—for these new hams.

In our amateur radio fraternity we have labeled mentors "Elmers" because of Rod Newkirk, W9BRD, who wrote the following in his March 1971 "How's DX" column in *QST*: "Too frequently one hears a sad story in this little nutshell: 'Oh, I almost got a ticket, too, but Elmer, W9XYZ, moved away and I kind of lost interest.'" Newkirk concluded his reflection by writing: "We need those Elmers. All the Elmers, including the ham who took the most time and trouble to give *you* a push toward your license, are the birds who keep this great game young and fresh." *(Source: Rick Lindquist, N1RL, via: <http://www.arrl.org/ FandES/field/club/mentor/)*

In our reflecting on Newkirk's opinion of how we got our push, let's think about just how we acquired our amateur radio licenses in the first place. Yes, we can identify with Houseman's declaration by saying, "We *earned* it." However, if we really think about it, we realize that belief is at the surface. Much deeper than our having *earned* our license is how we *learned* how to be good amateur radio operators. We learned by way of *our* Elmers—our mentors by whatever name they are known. Now it is our turn to be Elmers to our new brothers and sisters, because using Newkirk's quote, now we are "the birds who keep this great game young and fresh."

How does this mentoring work for us in the VHF-plus world? My bias shows when I say that we in the VHF-plus community have much more precious knowledge to pass on to our newly licensed brothers and sisters than any other niche in our hobby. Whether you agree or disagree with my bias is immaterial. What is material is that we *all* have knowledge to share with the newer members of our hobby.

How can we accomplish this transition? Let's go back to "Professor" John Houseman's lines as he promotes Smith Barney's brokerage strategy and rewrite them to suit our situation: Elmers in the amateur radio community continually spend much time learning about the new niches of our hobby, while learning precious little about promoting our hobby. Even so, one really doesn't need to promote new amateur radio operators within our hobby because they are already in our fraternity. Rather, we need to work for these new hams. We need to work very hard researching the niche that is just right for our mentee. When it's the right one, our mentee knows it. Our mentee does not have to be sold. In the end, Elmers gain respect from their mentees the old-fashioned way. They *earn* it.

At the end of the day what is your attitude toward our new brothers and sisters in amateur radio? Are you being resentful of them or are you earning their respect? If your Elmer were to pose these questions to *you,* how would *you* answer them? Until next month...

73, de Joe, N6CL

HF for Technician Class Hams!

BY TOMAS HOOD,* NW7US

A Quick Look at Current Cycle 23 Conditions

(Data rounded to nearest whole number)

Sunspots
Observed Monthly, January 2007: 17
Twelve-month smoothed, July 2006: 15

10.7 cm Flux
Observed Monthly, January 2007: 84
Twelve-month smoothed, July 2006: 80

***Ap* Index**
Observed Monthly, January 2007: 6
Twelve-month smoothed, July 2006: 9

February 23, 2007 marks the beginning of a new era in amateur radio for licensed operators in the United States. On that day the new rules issued by the FCC eliminated Morse code testing for all levels of amateur radio licenses and extended limited HF operating privileges to all Technicians.

As of that date, only written exams will be required for earning or upgrading an amateur license. Technicians holding valid Certificates of Successful Completion of Examination (CSCEs) showing credit for written element 3 may upgrade to General without further testing, and those with CSCEs showing credit for elements 3 and 4 may similarly upgrade to Amateur Extra. However, it still will be necessary to go to a volunteer examination (VE) session, present a current license and CSCE, and pay the examination fee in order to process the upgrade.

Limited HF operating privileges for all Technicians took effect automatically on February 23. Refer to Table I for the updated Technician frequencies and privileges.

New Technician Class Operating Privileges

Effective February 23, 2007

HF

Band	Frequency Range	Notes
80 meters	3525–3600 kHz	CW only
40 meters	7025–7125 kHz	CW only
15 meters	21,025–21,200 kHz	CW only
10 meters	28,000–28,300 kHz	CW, RTTY, Data
	28,300–28,500 kHz	CW, SSB voice only

(Maximum power 200 watts PEP on all HF band segments)

VHF/UHF

All amateur privileges above 30 MHz

If you are a Technician-class amateur radio operator, this is the time to be very excited. With the ability to work the high-frequency (HF) spectrum, you have the potential to work the world. No longer are you restricted by the line-of-sight characteristics of VHF and above. However, you may become frustrated when you tune up on 10 meters and start hunting for signals. Looking for a contact to enjoy your new HF voice privileges, you quickly will realize that the band is pretty quiet. You call "CQ CQ CQ" and then sign with your callsign. You wait. Nobody responds. After a while, you decide that VHF is much more exciting, because at least there's someone to talk with.

Many who are not used to the HF bands will be frustrated when their HF calls yield no responses. HF isn't magic, but it's not the same as using VHF line-of-sight bands. This is because HF contacts beyond line-of-sight distances depend on ionospheric propagation. You may have heard that we are at the very bottom of the current solar cycle, so HF is dead, and that using the HF bands is a challenge. VHF is just much simpler, you think. This month, let's cut through the rumors and explore the real world of ionospheric propagation of HF radio signals.

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e-mail: <nw7us@hfradio.org>

LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for April 2007

	Expected Signal Quality			
Propagation Index.....	(4)	(3)	(2)	(1)
Above Normal: 1-8, 12-20, 24-30	A	A	B	C
High Normal: 10-11, 23	A	B	C	C-D
Low Normal: 9, 22	B	C-B	C-D	D-E
Below Normal: 21	C	C-D	D-E	E
Disturbed: None	C-D	D	E	E

Where expected signal quality is:
A—Excellent opening, exceptionally strong, steady signals greater than S9.
B—Good opening, moderately strong signals varying between S6 and S9, with little fading or noise.
C—Fair opening, signals between moderately strong and weak, varying between S3 and S6, with some fading and noise.
D—Poor opening, with weak signals varying between S1 and S3, with considerable fading and noise.
E—No opening expected.

HOW TO USE THIS FORECAST

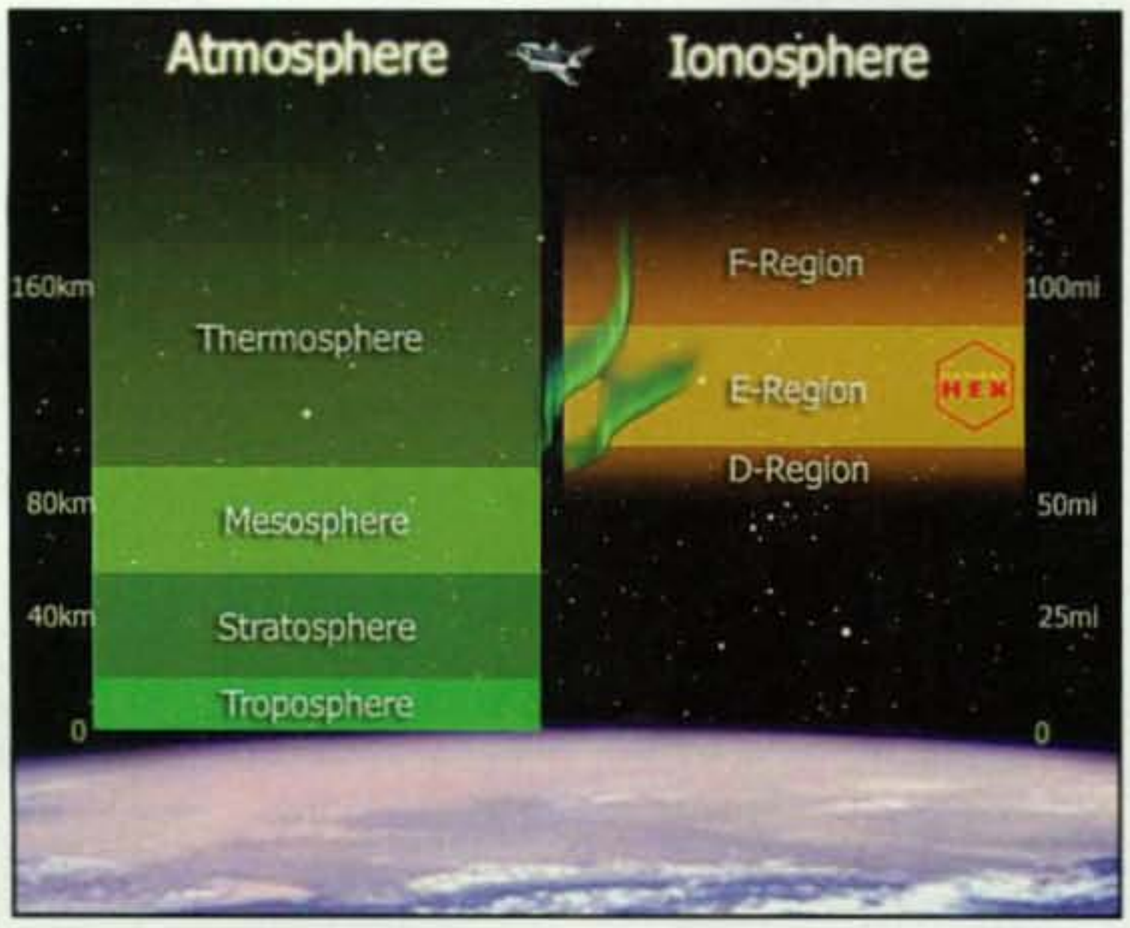
1. Find the *propagation index* associated with the particular path opening from the Propagation Charts appearing in *The New Shortwave Propagation Handbook* by George Jacobs, W3ASK; Theodore J. Cohen, N4XX; and Robert B. Rose, K6GKU.

2. With the *propagation index*, use the above table to find the expected signal quality associated with the path opening for any given day of the month. For example, an opening shown in the Propagation Charts with a *propagation index* of 2 will be Good on April 1 through 8, Fair to Poor on April 9 and 22 , Fair on April 10 and 11, and so forth.

3. As an alternative, the Last-Minute Forecast may be used as a general guide to space weather and geomagnetic conditions through the month. When conditions are Above Normal, for example, the geomagnetic field should be quiet and space weather should be mild. On the other hand, days marked as Disturbed will be riddled with geomagnetic storms. Propagation of radio signals in the HF spectrum will be affected by these conditions. In general, when conditions are High Normal to Above Normal, signals will be more reliable on a given path, when the path is ionospherically supported.

The Ionosphere

Earth's atmosphere is a mixture of gases held to the surface of the Earth by gravity. These gases vary in density and composition as the altitude increases above the surface. As the atmosphere extends outward from Earth, it becomes thinner and blends with the particles of interplanetary space.



Regions of the atmosphere and the ionosphere.

The first 60 miles of Earth's atmosphere consists of a homogeneous mixture of various gases. This region is called the *homosphere*. Above the homosphere, where gases are no longer uniformly mixed, lies the *heterosphere*. Relatively more of the heavy gas molecules such as nitrogen and oxygen are found near the bottom of the heterosphere, while relatively more of the lighter gases such as hydrogen and helium are found near the top.

At an altitude above 50 miles the gas is so thin that free electrons can exist for short periods of time before they are captured by a nearby positive ion. The existence of charged particles at this altitude and above marks the beginning of the ionosphere, a region having the properties of gas and plasma.

Atoms in the ionosphere absorb the incoming solar radiation, causing them to become highly excited. When an atom is bombarded with enough of this energy, an electron may be knocked away from its orbit, producing free electrons and positively charged ions.

At the highest levels of the Earth's outer atmosphere, solar radiation is very strong, but there are few atoms to interact with, so ionization is small. As the altitude decreases, more gas atoms are present, so the ionization process increases. At the same time, however, an opposing process called *recombination* begins to take place in which a free electron is "captured" by a positive ion if they get too close to one another. As the gas density increases at lower altitudes, the recombination process accelerates, since the gas molecules and ions are closer together.

Because the composition of the atmosphere changes with height, the ion production rate also changes, and this leads to the formation of several distinct ionization regions, known as the *D, E, F1, F2,* and *F3* layers. (Yes, an outer *F3* layer has been discovered, and so far it seems that when present, it is most dense over the equatorial region during the peak of the day.) The breakdown between layers is based on the density of ions and what wavelength of solar radiation is absorbed most frequently in that region.

When a radio wave enters the ionosphere, it is possible for the radio wave to be bent away from the denser, and higher, area of electrons. The amount of bending, or refraction, is dependent on the frequency of the wave and the density of the ionosphere the radio wave is traveling through. Think of how a pencil might look if you placed it into a glass of water. When you view the pencil through the side of the glass, it appears to bend right at the boundary between the air and the water. This is caused by the same principle. Light is being refracted by the difference in density of the mass through which it is traveling.

The higher the frequency, the more energy that wave has, making it more likely to pass through to the next higher region. When an electromagnetic wave enters the *F*-layer, the same science takes place. The radio signal rides the free electrons of this layer, and if the frequency of the signal is high enough, it will pass through the layer out into space. Otherwise, it gradually will be refracted back away from the higher and denser layers of electrons to be sent back toward Earth.

This is the way HF radio signals are propagated over vast distances, even around the world. All of this depends on how ionized the gases become in these various layers, and how dense each layer is, as well as the strength, angle of incidence, and frequency of the radio signal. Ionization depends on the direct energy from solar radiation. Would all of the layers of the ionosphere perform identically if they each received the same amount of solar energy? No, because of the different gases found in each layer and the density of those layers.

When we look at the daily measurements of the 10.7-cm solar flux (see explantory box later in this column), we find that the higher the index, the more ionized these various layers become, making it possible for higher shortwave frequencies to propagate by refraction over great distances. When the flux is low, then the ionosphere is weaker and only the lower shortwave frequencies will be propagated. Of course, there are many variations during the day, between regions in daylight and darkness, and from season to season.

All of this science can be daunting, if you are new to HF radio operation. You may be tempted to give up at this point, but please don't! HF operation is exciting, and if you are armed with the right information and tools and have an adequate HF operating station you can reap many hours of HF enjoyment.

This column provides a look at current solar conditions that play a role in how HF communications work. You also will find a wealth of information on how things work on HF. You don't have to be "in the dark" as you venture into your new HF privileges. With the information in this column and other articles in *CQ*, and with the propagation prediction programs available, you can easily master the art of worldwide communication.

Demystifying HF Radio Propagation

Let's take a look at a real-world situation. The illustrations for this month's column are derived from the propagation prediction program "ACE-HF Pro," available at <http://hfradio.org/ace-hf/>. ACE stands for "Animated Communications Effectiveness," a coverage display technique originally developed for U.S. Navy submarine communications. ACE-HF's advantage is that the effects of solar phenomena and the day's passage may easily be understood. ACE-HF shows when the HF bands will be open in different areas of the world. More accurately, the program is known as system simulation and visualization software, a powerful tool for an amateur radio operator that allows you to simulate a radio signal path between two points. The simulation includes the most current propagation modeling, and visually provides the results of your analysis.

I have used the ACE-HF PRO System Simulation & Visualization program to illustrate how useful propagation predictions can be to you, as you begin this journey. The new Version 2.05 of ACE-HF reviewed last year in the May 2006

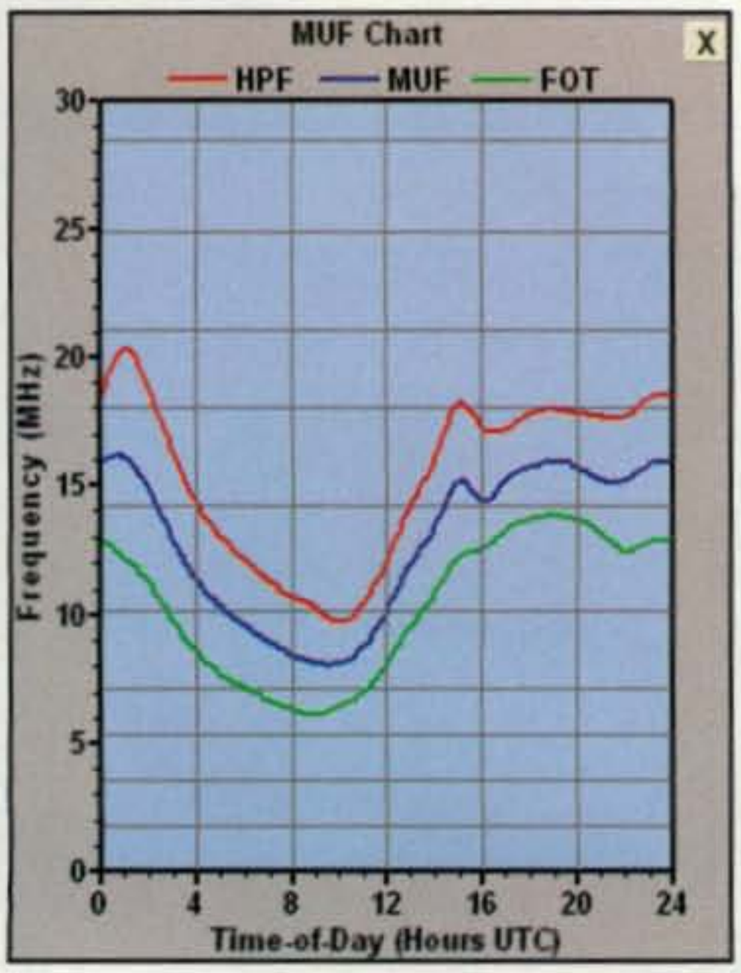


Fig. 1– MUF chart for CW, SSN 12.

issue of *CQ* has been called the "Cadillac of propagation programs." That name isn't surprising, since the design derives from the professional ACE-HF NETWORK software for government and commercial HF network operators, in use by the military and commercial groups. The new edition of ACE-HF has many new features for the radio amateur, and has even been expanded for use by shortwave listeners. (See <http://hfradio.org/ace-hf/> for my various reviews and application notes for ACE-HF Pro, version 2.05).

To demonstrate how HF propagation works, and how HF circuits may be simulated, I used the NW7US to Chicago radio circuit shown in the accompanying figures. ACE-HF is really a full-scale system simulation model, so I had to select some system parameters first. Specifically, I selected the transmitter's power to be 200 watts, the maximum power permitted by the new rules for Technician Class HF operation. I selected isotropic antennas at each end of the circuit, with an assumed gain of +6 dBi (more about that later). I chose the month of April, and selected the CW mode of operation since that's the majority of what's allowed on most of the newly available HF bands. This will work to illustrate how easy it is for you to get a handle on using the HF radio spectrum.

From within ACE-HF, I searched the internet to learn what the predicted smoothed sunspot number is for April 2007. (In upcoming editions of this column, I will explain the smoothed sunspot number (SSN) and other space weather and radio propagation terms and measurements.) Next I created my first prediction, the "Maximum Usable Frequency" (MUF) on the radio path between my home in western Washington and Chicago (fig. 1). The MUF is the highest radio frequency that can be refracted back to Earth by the ionosphere. This MUF changes throughout the day and is tied to the state of the ionosphere's energy level.

The MUF curves give Maximum Usable Frequency predictions versus time of day. The blue curve is the median of the daily MOFs (Maximum Observed Frequencies) over all days of the month at a given hour. The HPF (Highest Possible Frequency) red curve gives values expected only 10% of the time. The FOT (from the French: *Frequence Optimum de Travail*) green values are defined as the frequencies where the MOFs will be higher on at least 90% of the days of the month at that hour. FOT is sometimes called OWF (Optimum Working Frequency).

The MUF chart also has a blue flashing line to indicate current time, and horizontal lines showing the frequencies of each band. The band lines change automatically if a frequency change is made.

Note that the curves in fig. 1 dip down during the nighttime hours, suggesting that the lower frequencies will be favored at night. However, each circuit has a different MUF prediction. You are beginning to see why a prediction program is so valuable! This MUF chart is for SSN 12. Later on we will see how the MUF changes as SSN varies, another reason to use software to predict your operation and assure successful HF contacts.

The MUF curves show how ionospheric propagation changes with time of day and frequency, but they do not show how well your signals may be received. For that we need a full-scale system performance prediction, and for that we must consider both predicted signal strength and noise, because it is the signal-to-noise ratio (SNR) that determines our ability to hear the signal. It doesn't matter how strong the signal level might be if it is overwhelmed by noise. It's the same phenomenon that one encounters in a room full of people. If everyone else is silent, you can hear your neighbor whispering to you from across the room. However, if all the people are talking and laughing, you might not hear him even if he is shouting. Again it is SNR that matters, just as in radio communications.

ACE-HF PRO is a system performance model with noise predictions

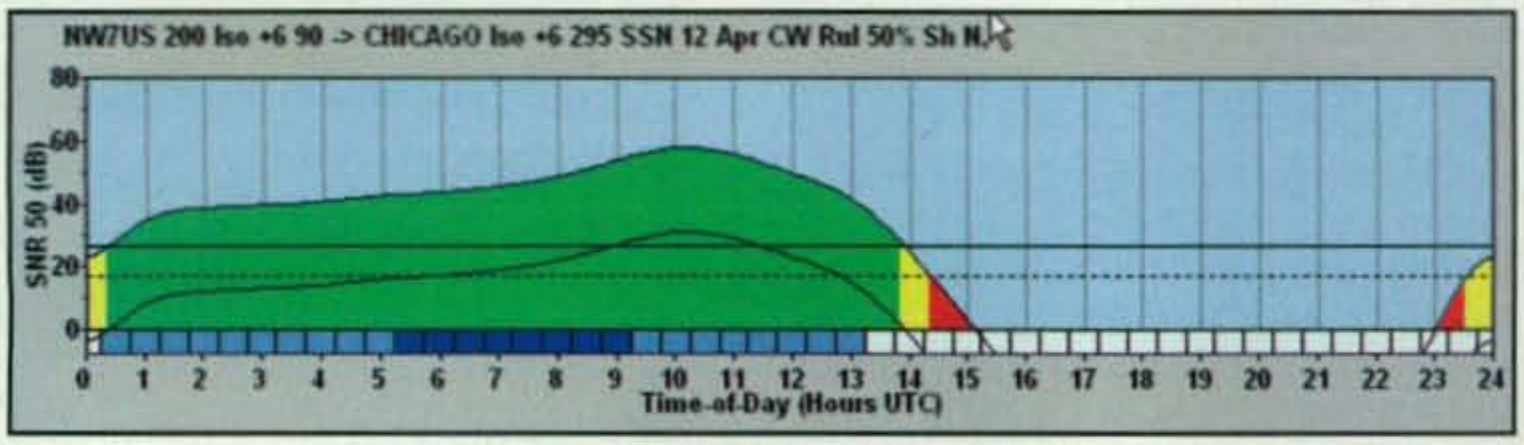


Fig. 2– SNR, 80 meters CW, SSN 12.

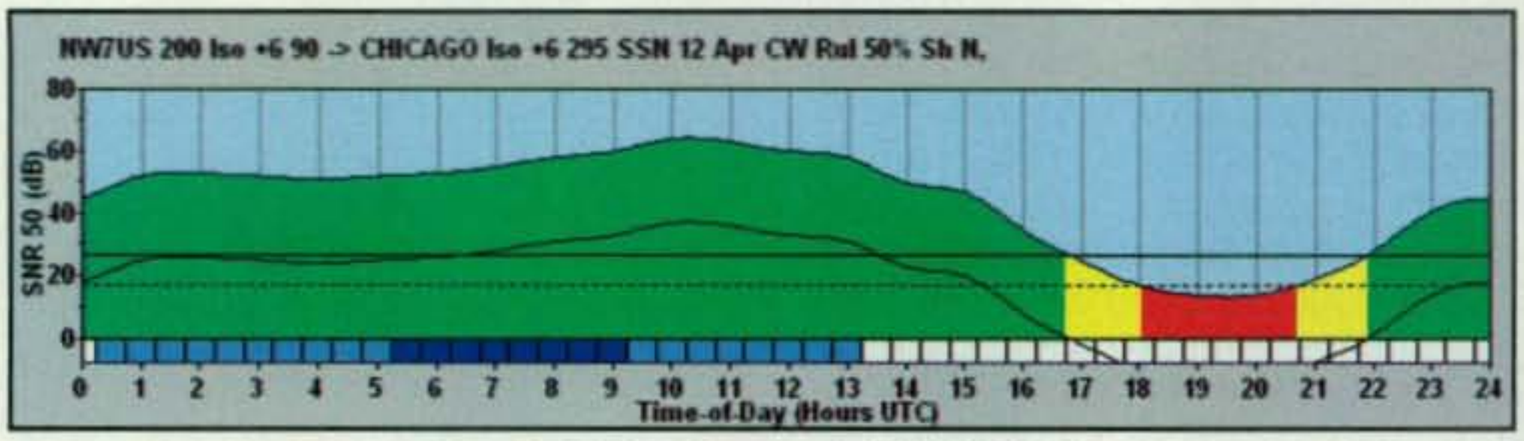


Fig. 3– SNR, 40 meters CW, SSN 12.

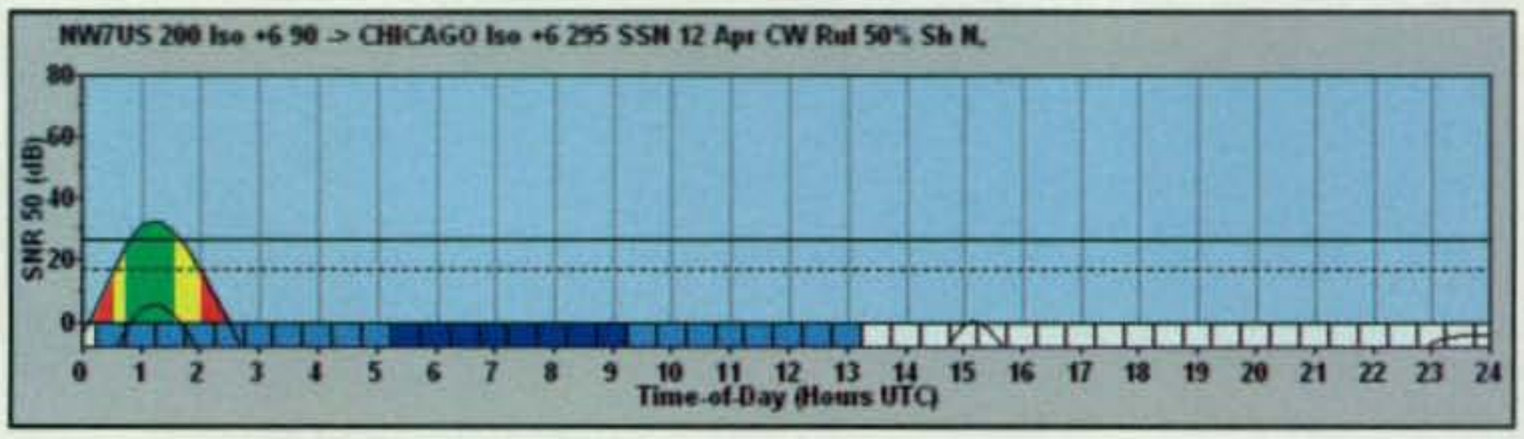


Fig. 4– SNR, 15 meters CW, SSN 12.

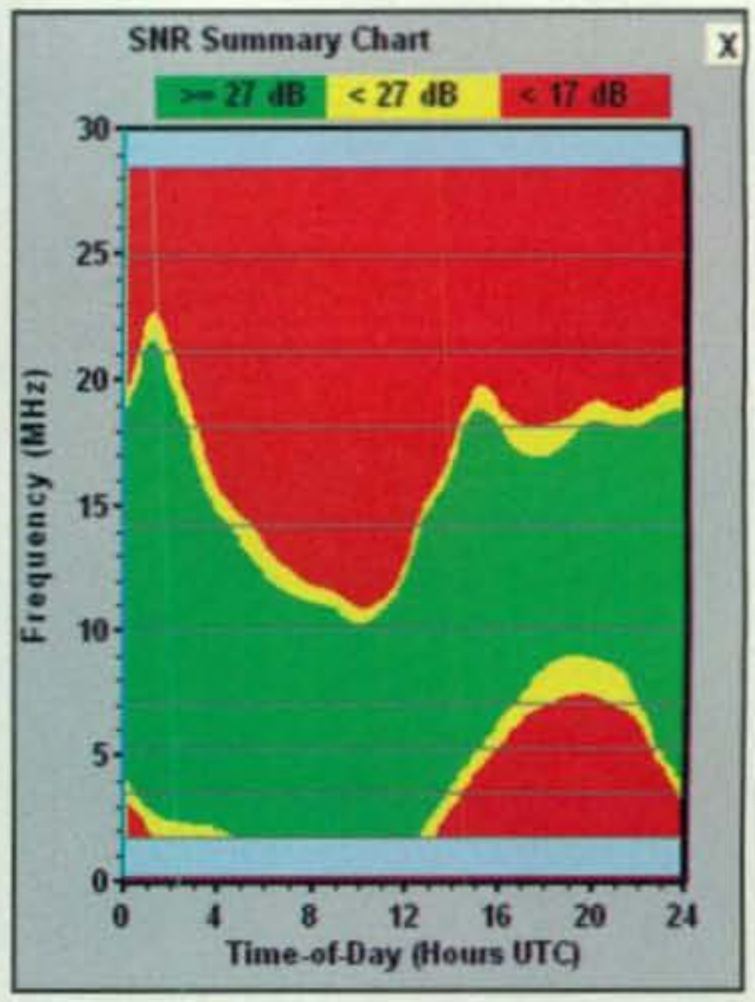


Fig. 5– SNR Summary Chart, CW, SSN 12.

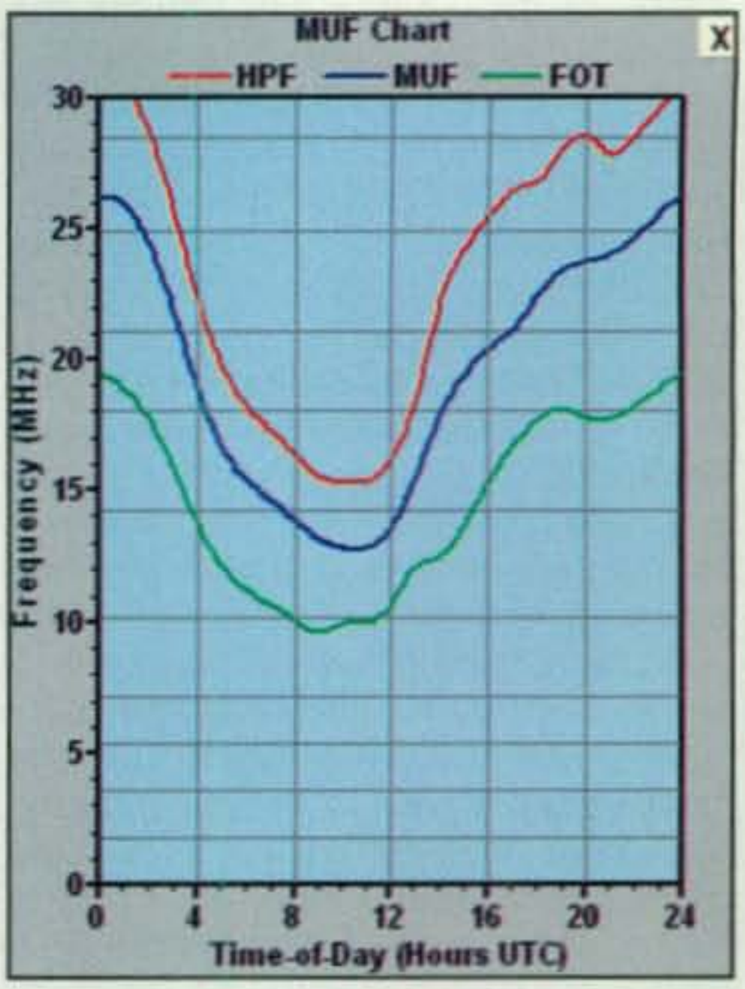


Fig. 6– MUF chart for CW, SSN 130.

that include interference from atmospheric noise (caused by lightning flashes), man-made noise, and galactic noise. All of this is computed automatically, but it is different for every circuit, frequency, and time of day. To illustrate how SNR varies throughout the day, figs. 2, 3, and 4 show SNR vs. time-of-day for 80 meters, 40 meters, and 15 meters, assuming CW transmissions as permitted by the new Technician-class rules.

The areas of these figures change color as the predicted SNR changes. A green area shows that the predicted SNR is above the minimum Required SNR (called RSN). The yellow areas show SNRs within 10 dB of RSN, and the red areas show values that are less than 10 dB below RSN. Obviously, predictions that are in the green show the best times for making your contacts. Note that in the 80-meter predictions of fig. 2, there are times during the daylight hours when ionospheric propagation simply doesn't support this circuit to Chicago. Thus, we know right away that a different frequency might be a better choice, or we may have to cool our heels until a time when the ionosphere decides to cooperate for 80-meter operation.

In fig. 3, 40-meter connectivity is seen to be better than that on 80 meters. There is at least some value of SNR that suggests a good circuit, although again the SNR is sometimes below the desired RSN threshold. In fig. 4, however, CW operation at 15 meters doesn't work except during a few very early morning hours, and even then the SNR levels are much below what would be desired. Also, on 10 meters the chart is blank (so we don't even show it) because of the severe attenuation caused by the ionosphere operating at such very low SSN levels.

My favorite ACE-HF chart is shown in fig. 5, where a summary of SNR predictions is given as a function of both frequency and time of day. Here we see that the green areas, those where predicted SNR is above RSN, tend to follow the MUF curves, but this chart is much better to use because it considers all parameters of the system calculation.

Now we begin to see the likelihood of making contacts on the various HF bands. The lower bands seem to work better and nighttime operation is favored, as was predicted by the MUF chart. As the Summary Chart shows, however, the 15- and 10-meter bands aren't supported very well (because of the very low SSN level). It can be seen that the sunspot level plays a significant role in HF propagation. During this period of the approximately 11-year solar cycle, operation on the higher HF bands doesn't work well over medium to long circuits, but as the years pass things will get better. The next few accompanying figures show how the other extreme of the solar cycle, where the SSN could rise to perhaps 130, will affect communications.

First, compare the MUF chart of fig. 6 with the earlier one of fig. 1. The higher SSN level is the only thing that has changed. We can readily see that the maximum usable frequencies extend to include 10 meters, at least some of the time. This changing SSN value is a powerful influence on HF operation, and it affects us all the same way, whether

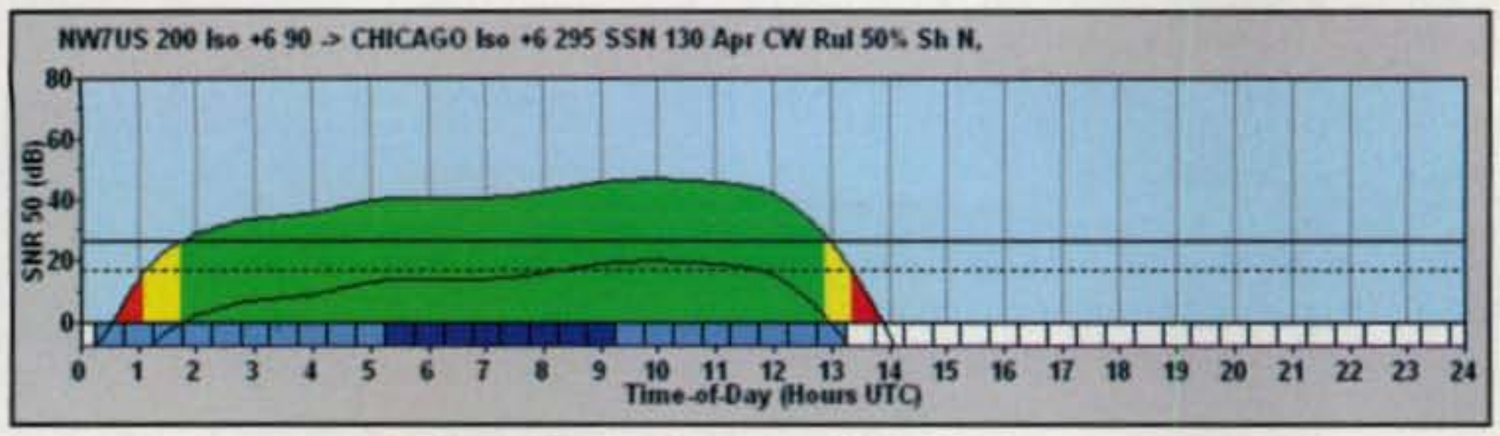


Fig. 7–SNR, 80 meters CW, SSN 130.

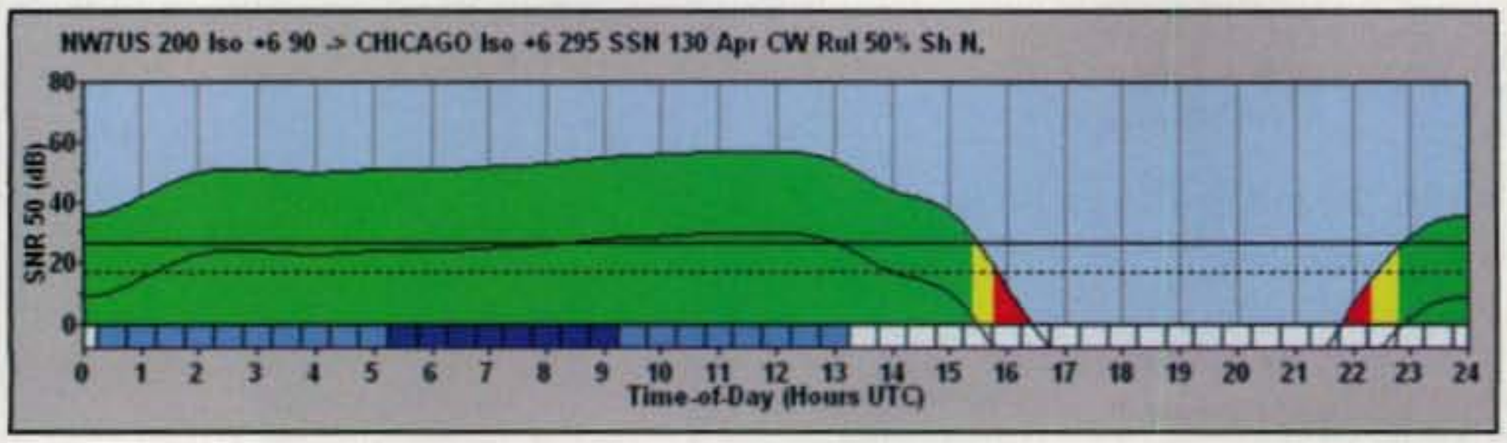


Fig. 8– SNR, 40 meters CW, SSN 130.

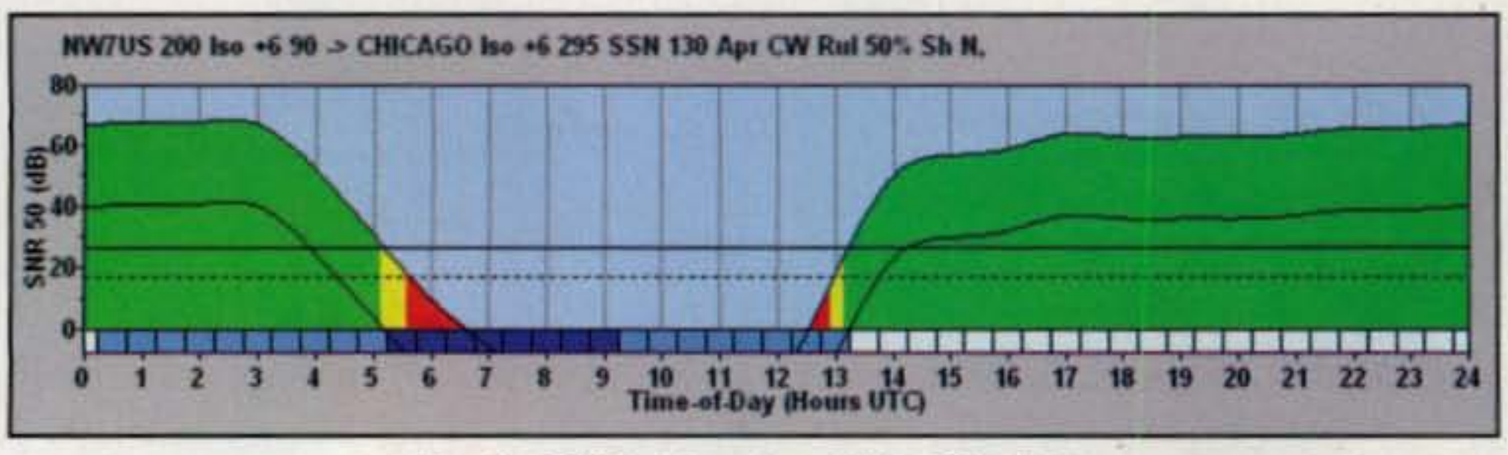


Fig. 9– SNR, 15 meters CW, SSN 130.

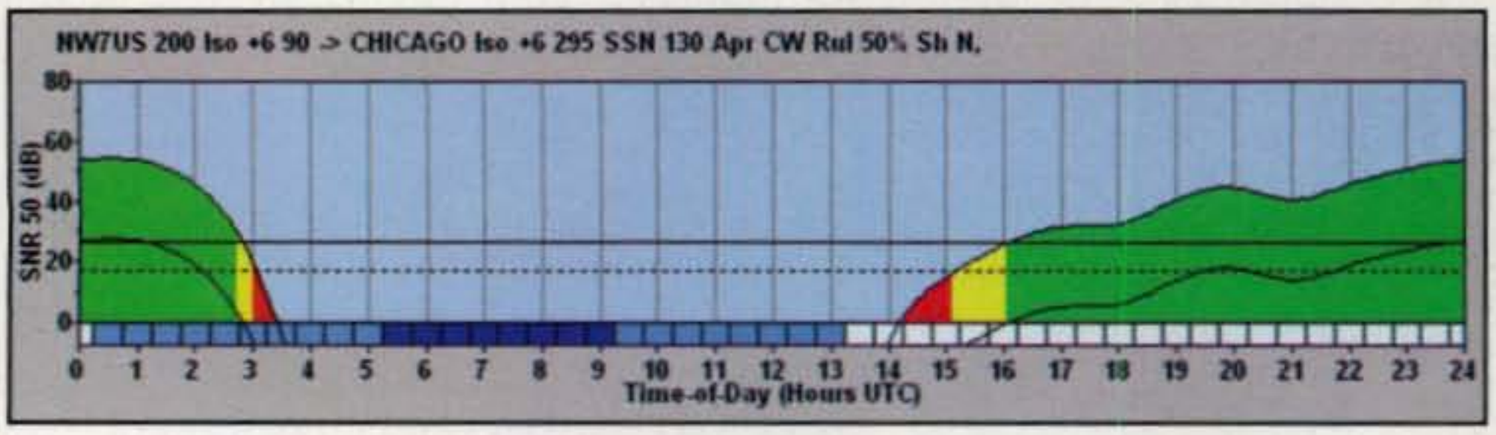


Fig. 10– SNR, 10 meters CW, SSN 130.

you are a beginning Technician Class ticket holder or are a seasoned Extra Class ham.

Let's repeat the SNR versus time-of-day charts to show the differences caused by using an SSN of 130. Figs. 7, 8, 9, and 10 show the four ham bands, and this time we see that even 10 meters will support good activity, providing you choose the best times of day. Also, it's interesting to see that at the higher SSN, the 15- and 10-meter bands are better during daytime hours, at least for this circuit. Now we begin to anticipate the real magic of HF radio: When 10 meters opens, you literally can work hams around the world! Try that with line-of-sight communications on VHF, without the internet and repeaters, across a spherical Earth!

Now compare fig. 11 with fig. 5, where again all we have changed is the predicted SSN level, changing it from the current value of 12 to the future maximum of 130. Now the green areas of good SNR extend to include the 10-meter band, and one can easily see when each band will be open. It's something to look forward to, and as time moves along and the higher bands get better, it's even more important to have a good HF system prediction model on your PC.

By the way, the new FCC rules permit Technician-class hams to use voice circuits in the 10-meter band. The 10-meter band will be open in the same

ways just discussed, but the predicted green areas of the SNR Summary Chart will be different, as shown in fig. 12. This is because the required SNR threshold for good operator-to-operator communications is higher than is true for CW operation. The ACE-HF default RSN for single-sideband (SSB) operation is 48 dB-Hz, compared to 27 dB-Hz for CW operation. This means that it is easier to make contacts with CW than with voice, but it's good to have both methods at our disposal.

So far we have discussed only the circuit from the Seattle area to Chicago. We understand that the predictions, and the likelihood of making a contact, are different for every circuit, but what if we

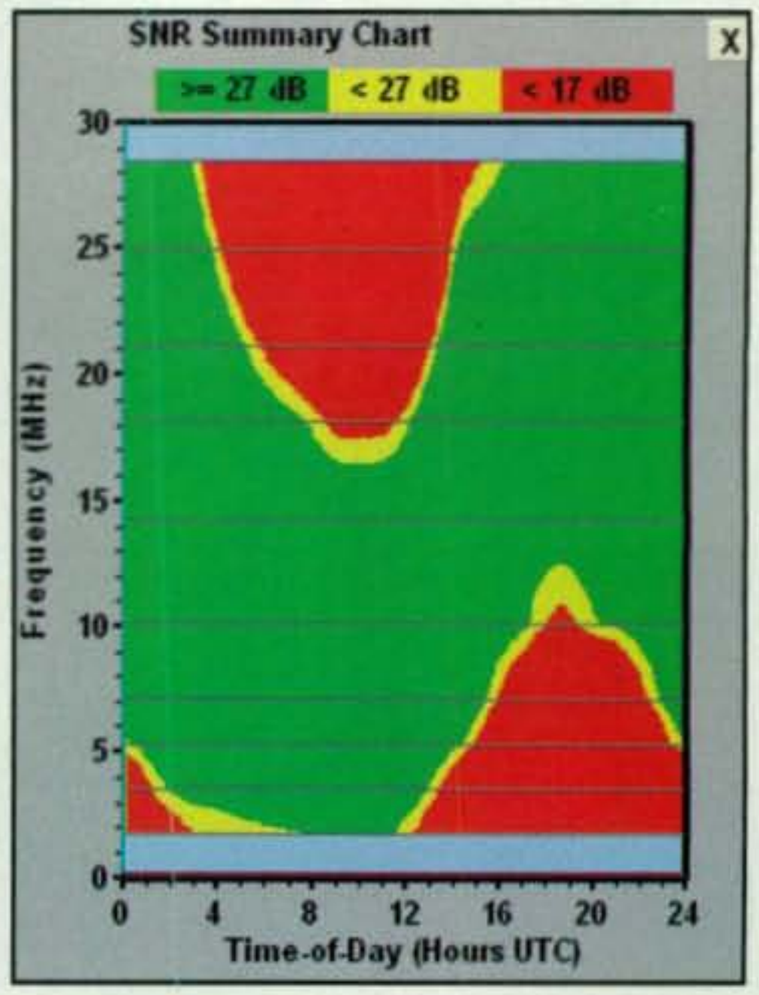


Fig. 11– SNR Summary Chart, CW, SSN 130.

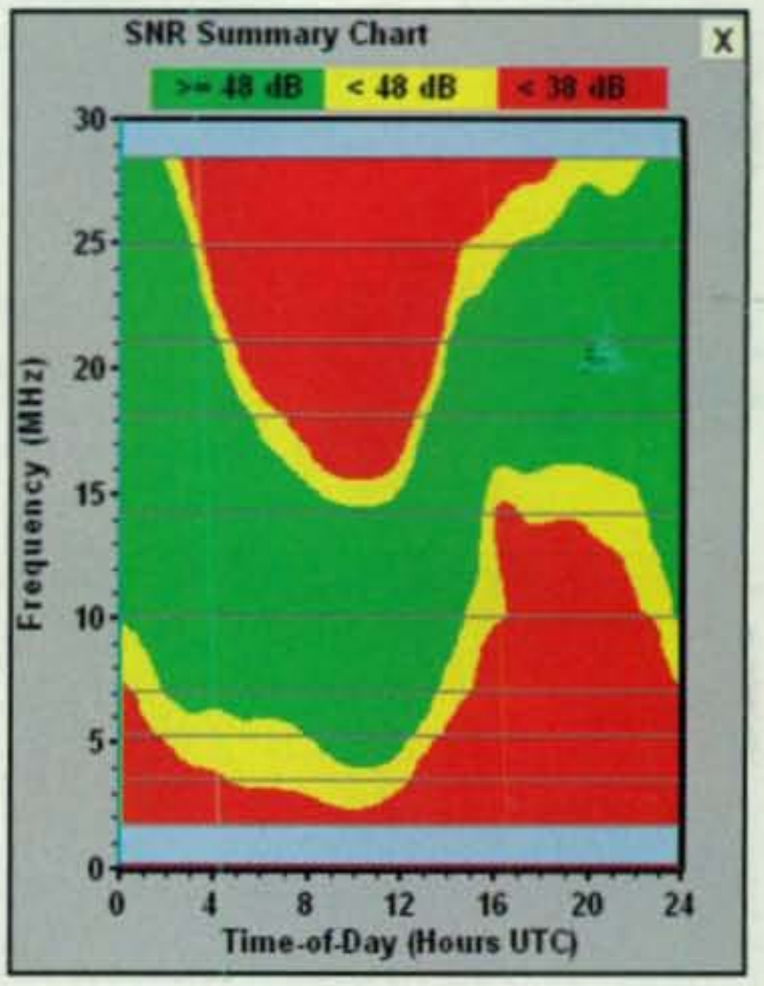


Fig. 12– SNR Summary Chart, SSB, SSN 130.

just want to call CQ? What band is best? When should we call?

Again, ACE-HF comes to the rescue. The software is famous for its animated area coverage displays, where your station's coverage to entire world areas can be shown. Remember, "ACE" stands for Animated Communications Effectiveness, the copyrighted method that was developed for use by the US military and first used for submarine communications. Area coverage displays are usually made for every hour of the day. They first appear for the current hour, but can then be animated slowly or very quickly (like a movie), so you can understand how coverage will change as the day moves along. You

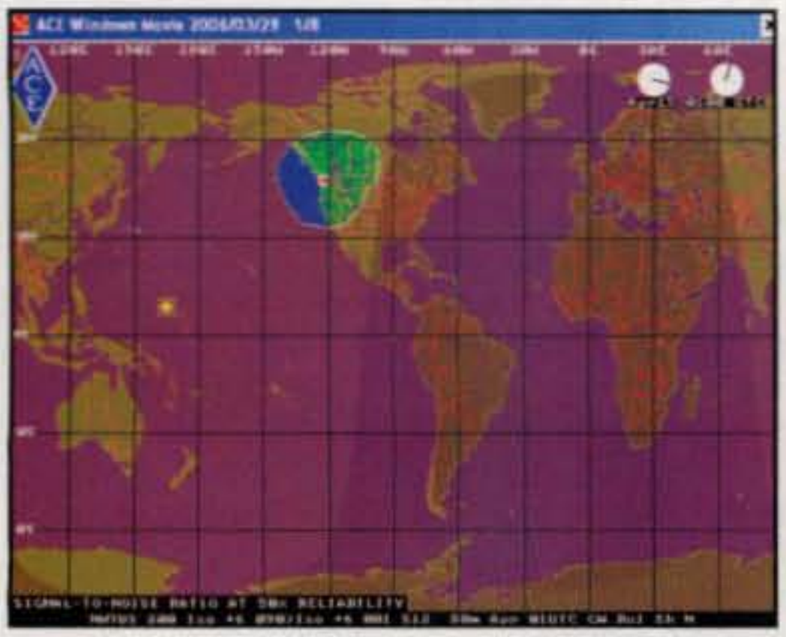


Fig. 13– Area coverage, 80 meters CW, SSN 12.

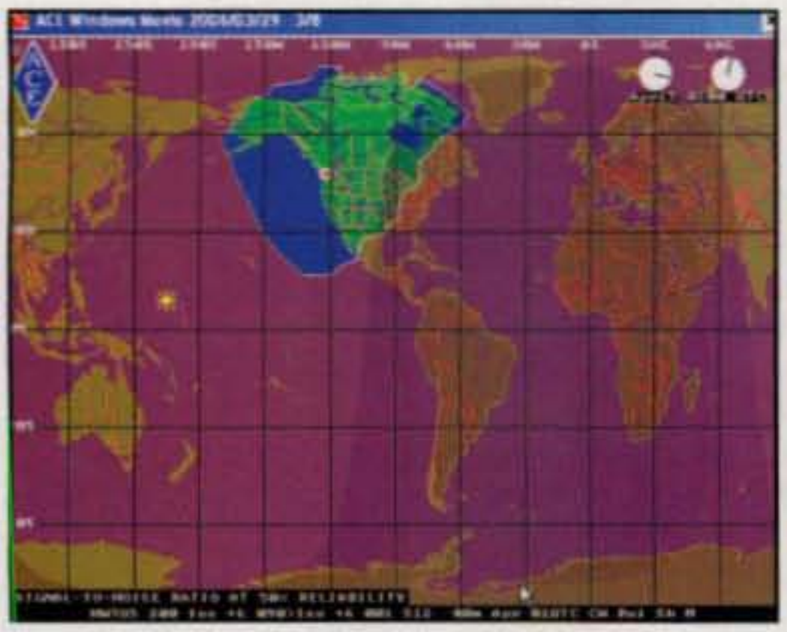


Fig. 14– Area coverage, 40 meters CW, SSN 12.

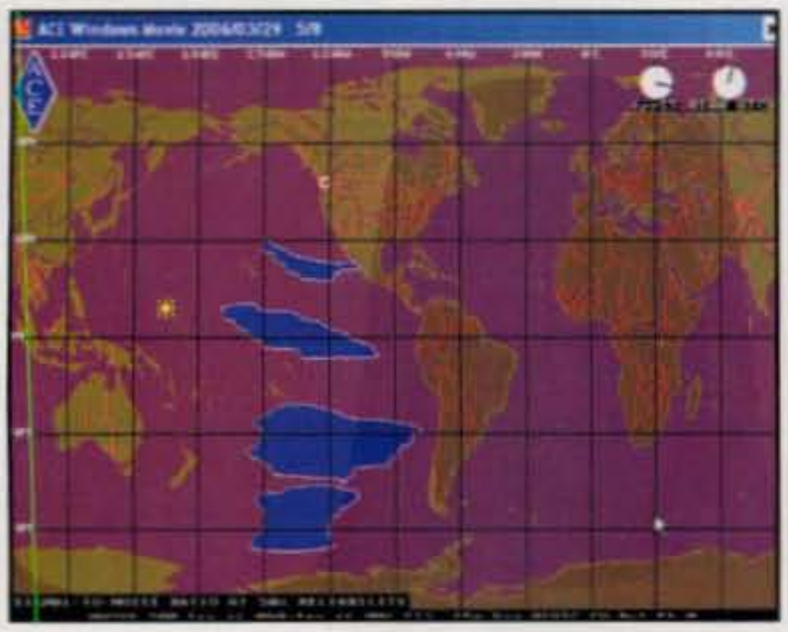


Fig. 15– Area coverage, 15 meters CW, SSN 12.

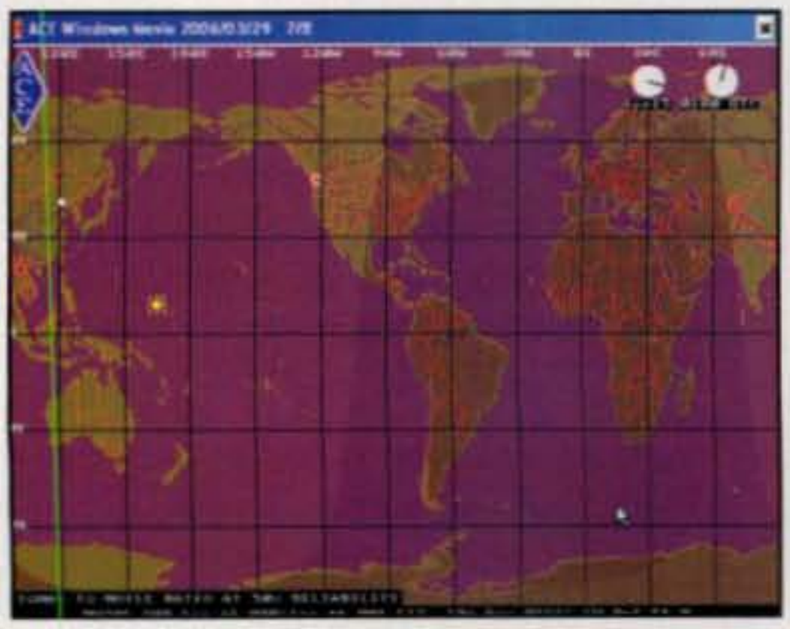


Fig. 16– Area coverage, 10 meters CW, SSN 12.

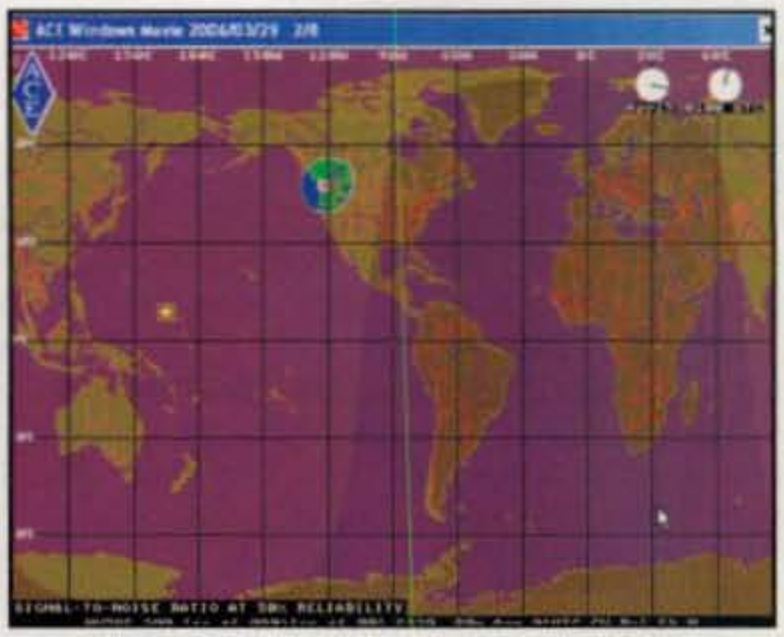


Fig. 17– Area coverage, 80 meters CW, SSN 130.

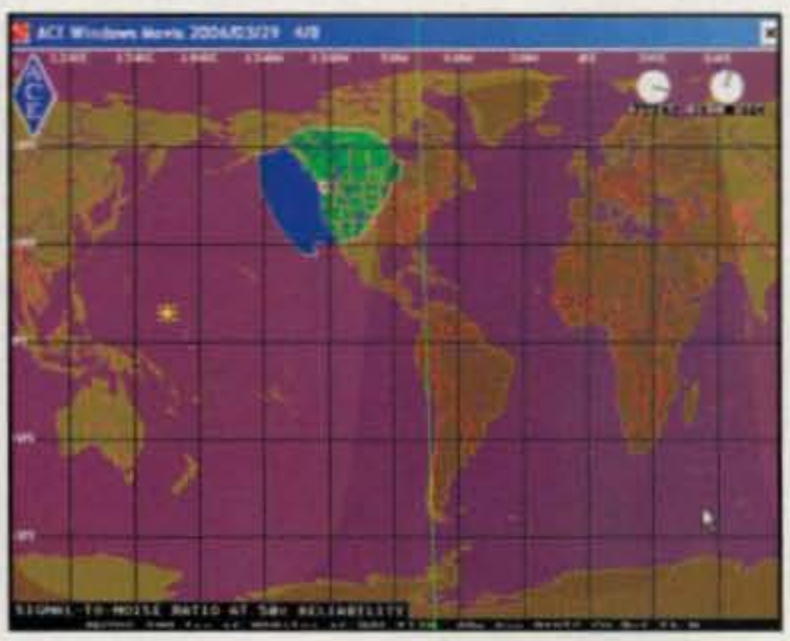


Fig. 18– Area coverage, 40 meters CW, SSN 130.

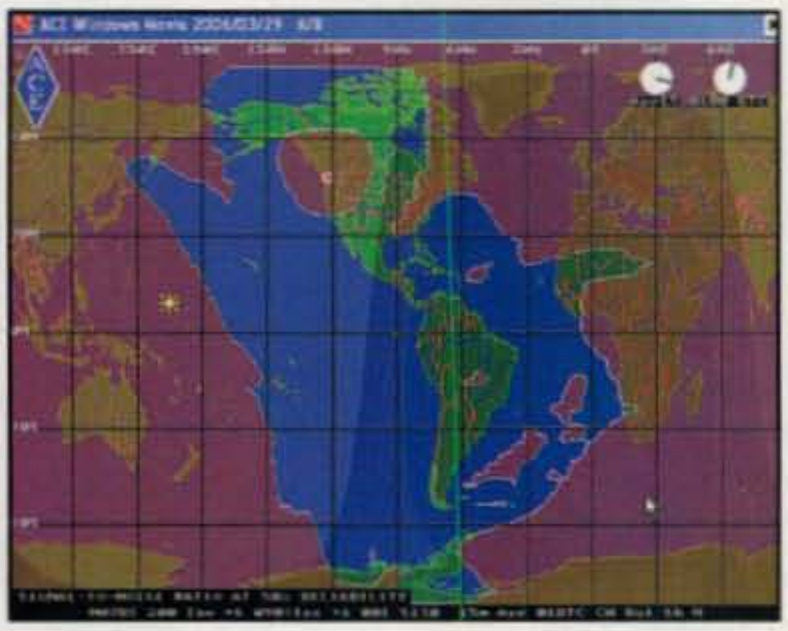


Fig. 19– Area coverage, 15 meters CW, SSN 130.

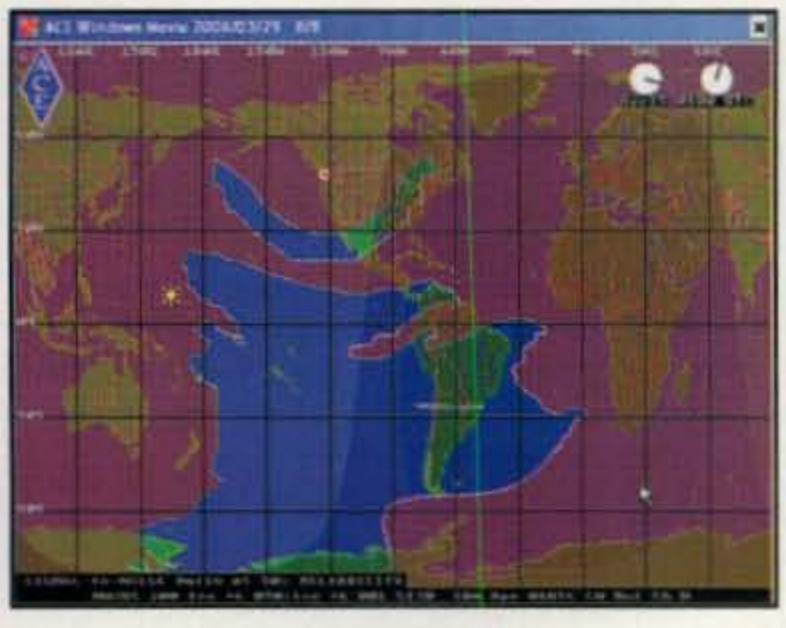


Fig. 20– Area coverage, 10 meters CW, SSN 130.

can construct ACE-HF movies that animate as a function of time of day or frequency, and we used the last method in figs. 13 through 20 to show sequential maps in the four Technician Class bands. These figures show the area that can be covered from our Seattle-area 200-watt CW transmitter. (The open areas show where our signal could be received, and the red-shaded areas show where we are unlikely to make a contact.)

The figures in the left-hand column show coverage at the SSN 12 level, while the right-hand column shows the effect of SSN 130. The effect of the solar condition is profound on the higher frequency bands, but even the 80- and 40-meter coverage is different. (On the lower ham bands, low SSN levels actually favor communications.)

These area coverage displays are for just one time of day. We selected 01 UTC for our examples after reviewing the SNR curves in figs. 11 and 12. However, imagine what happens in a real 24-hour movie! The coverage swells and fades, islands of coverage appear and disappear as time moves forward, and the area coverage changes as the day-night terminators move across the globe. These displays show the remarkable variations that occur in HF communications, and the effects are sometimes rather astounding. It is small wonder that ACE-HF is often used in teaching the mysteries of HF communications to new operators!

Earlier we spoke of using generic isotropic antennas for these illustrations. Of course, such theoretical antennas don't really exist. We HF hams use practical constructions such as horizontal dipoles and vertical monopoles, and even build elaborate arrays of highly directional antennas that can be pointed at desired countries. ACE-HF Pro includes many software models of HF antennas, but it is impractical to show them all in this article. The radiation patterns of all such antennas are handled automatically by the software, and your coverage will vary somewhat according to the antenna you select. ACE-HF Pro, Version 2.05 includes some new analysis charts that enable you to compare different antennas, show their relative patterns and gains, and then use them in the system calculation to show their effectiveness, an easy "try-before-buy" method when you are in the market for a new HF antenna.

This is a most exciting time to gain HF operating privileges. Since Solar Cycle 23 is at its end and a new cycle is just beginning, the next few years will see

The *Ap*-index and Understanding Propagation Terminology

The *Ap*-index, or Planetary *A*-index, is a 24-hour averaging of the Planetary *K*-index. The Planetary *K*-index is an averaging of worldwide readings of Earth's geomagnetic field. High indices (*Kp* > 5 or *Ap* > 20) mean stormy conditions with an active geomagnetic field. The more active, the more unstable propagation is, with possible periods of total propagation fade-out. Especially around the higher latitudes and especially at the polar regions, where the geomagnetic field is weak, propagation may disappear completely. Extreme high indices may result in aurora propagation, with strongly degraded long-distance propagation at all latitudes. Low indices result in relatively good propagation, especially noticeable around the higher latitudes, when transpolar paths may open up. Maximum *K*-index is 9, and the *A*-index can exceed well over 100 during very severe storm conditions, with no maximum.

Classification of *A*-indices is as follows:

A0–A7 = quiet	A30–A49 = minor storm
A8–A15 = unsettled	A50–A99 = major storm
A16–A29 = active	A100–A400 = severe storm

Solar Flux (SFI): This flux number is obtained from the amount of radiation on the 10.7-cm band (2800 MHz). It is closely related to the amount of ultraviolet radiation, which is needed to create the ionosphere. Solar-flux readings are more descriptive of daily conditions than the sunspot number. The higher the solar flux (and, therefore, the higher the sunspot number), the stronger the ionosphere becomes, supporting refraction of higher frequencies.

Ionosphere: A collection of ionized particles and electrons in the uppermost portion of the Earth's atmosphere, which is formed by the interaction of the solar wind with the very thin air particles that have escaped Earth's gravity. These ions are responsible for the reflection or bending of radio waves occurring between certain critical frequencies, with these critical frequencies varying with the degree of ionization. As a result, radio waves having frequencies higher than the Lowest Usable Frequency (LUF) but lower than the Maximum Usable Frequency (MUF) are propagated over large distances.

Smoothed Sunspot Number (SSN): Sunspots are magnetic regions on the sun with magnetic field strengths thousands of times stronger than the Earth's magnetic field. Sunspots appear as dark spots on the surface of the sun. Temperatures in the dark centers of sunspots drop to about 3700° K (compared to 5700° K for the surrounding photosphere). This difference in temperatures makes the spots appear darker than elsewhere. Sunspots typically last for several days, although very large ones may last for several weeks. They are seen to rotate around the sun, since they are on the surface, and the sun rotates fully every 27.5 days.

Sunspots usually occur in a group, with two sets of spots. One set will have positive or north magnetic field, while the other set will have negative or south magnetic field. The field is strongest in the darker parts of the sunspots (called the *umbra*). The field is weaker and more horizontal in the lighter part (the *penumbra*).

Galileo made the first European observations of sunspots in 1610. The Chinese and many other early civilizations have records of sunspots. Daily observations were started at the Zurich Observatory in 1749; continuous observations were begun in 1849.

The sunspot number is calculated by first counting the number of sunspot groups and then the number of individual sunspots. The "sunspot number" is then given by the sum of the number of individual sunspots and 10 times the number of groups. Since most sunspot groups have, on average, about 10 spots, this formula for counting sunspots gives reliable numbers even when the observing conditions are less than ideal and small spots are hard to see. Monthly averages (updated monthly) of the sunspot numbers show that the number of sunspots visible on the sun waxes and wanes with an approximate 11-year cycle.

For more information, see <http://prop.hfradio.org>.

an ever-increasing improvement in the HF spectrum, since the sunspot activity will steadily rise. As discussed in recent editions of this column, solar Cycle 24 is going to be very exciting, as the predictions call for record levels of solar activity. That translates into a very strongly energized ionosphere and around-the-clock HF propagation on most of the HF amateur bands. Now is the best time for you to raise an HF antenna, install your HF transceiver, and begin using the software tools to assist your on-the-air adventure.

HF Propagation in April

April is one of the most interesting months for propagation. The seasonal change plays out on HF with activity moving up from 40 meters and down from 10 meters.

Ten- and 15-meter propagation suffers during April and the summer months due to lower MUFs in the Northern Hemisphere. MUFs peak very late in the day during summer. Summertime MUFs are lower due to solar heating, which causes the ionosphere to expand An expanded ionosphere produces lower ion density, which results in lower MUFs. Short-path propagation between countries in the Northern Hemisphere will drop out entirely. Ten-meter propagation peaks in the fall. April and May are fall months in the Southern Hemisphere, making long-path DX possible. Short-path propagation to South America, South Pacific, and other areas south of the equator will be strong and reliable when open. However, with the decline of the current solar cycle, solar activity is not supporting the higher HF band propagation, so don't expect a lot from 10, 12, and 15 meters, except on short-path runs such as occur via sporadic-*E* propagation.

From April to June, fair to good propagation occurs on both daytime and nighttime paths on the middle high-frequency bands. The strongest propagation occurs on paths that span areas of both day and night, following the MUF. During April, peaking in May and still during June, the 17- and 20-meter bands may offer occasional 24-hour DX to all parts of the world. If you hear a lot of echo on a signal, you might be beaming in the wrong direction. Try the opposite azimuth. The 20-meter band is more stable at night, with propagation following gray-line and nighttime paths.

Low-band propagation is still hot on 40 meters, with Europe in the evening and Asia in the mornings. Occasional DX openings will occur on 80 meters around sunrise. However, these bands are quickly being degraded by the seasonal increase in noise.

VHF Propagation

The April *Lyrids* meteor shower occurs from April 16 to 25, peaking on the UTC night of April 22. The hourly visual meteor rate is expected to be only 15 or so, with average meteor velocities of about 48 kilometers per second with broad outbursts.

The debris expelled by comet Thatcher as it moves through its orbit causes the *Lyrids*. It is a long-period comet that visits the inner solar system every 415 years or so. Despite this long period, there is activity every year at this time, so it is theorized that the comet must have been visiting the solar system for quite a long time. Over this long period, the debris left with each pass into the inner solar system has been pretty evenly distributed along the path of its orbit.

This material isn't quite evenly distributed, however, as there have been some years with outbursts of higher than usual meteor activity.The most recent of these outbursts occurred in 1982, with others occurring in 1803, 1922, and 1945. These outbursts are

unpredictable and one could even occur this year. The best time to work this shower should be from midnight to early morning.

The unpredictability of the shower in any given year always makes the *Lyrids* worth watching, since we cannot say when the next unusual return may occur. If this year's event is average or better (30 to 60 good-size meteors entering the Earth's atmosphere every hour), this should make possible meteor-scatter type openings on the VHF bands. Check out <http://www.meteorscatter.net/metshw.htm> for a very useful resource covering meteor scatter and up-coming showers.

A seasonal increase in sporadic-*E* ionization usually begins during April and continues through the spring and summer months. Expect an increase in short-skip openings on both 15 and 10 meters during April, as well as a possible occasional opening on 6 meters. While sporadic-*E* openings may occur at any time, they tend to peak between 8 AM and noon, and again between 5 and 9 PM local time.

Widespread auroral displays can occur during April, bringing with them unusual ionospheric short-skip openings on the VHF bands. The best times for these to occur are during periods of radio storminess on the HF bands. Check the Last-Minute Forecast at the beginning of this column for the days in April that are expected to be Below Normal or Disturbed. Don't forget to check out the propagation column in *CQ VHF* for more details on VHF propagation and conditions.

Current Solar Cycle Progress

The Dominion Radio Astrophysical Observatory at Penticton, BC, Canada, reports a 10.7-cm observed monthly mean solar flux of 83.5 for January 2007. The 12-month smoothed 10.7-cm flux centered on July 2006 is 80.3. The predicted smoothed 10.7-cm solar flux for April 2007 is 75, give or take about 15 points.

The Royal Observatory of Belgium reports that the monthly mean observed sunspot number for January 2007 is 16.9, a jump up from December's 13.6. The lowest daily sunspot value recorded was 7 on January 26 and 27. The highest daily sunspot count was 30 on January 8. The 12-month running smoothed sunspot number centered on July 2006 is 15.3. A smoothed sunspot count of 11, give or take 11 points lower to 12 points higher, is expected for April 2007.

The observed monthly mean planetary *A*-index (*Ap*) for January 2007 is 5, much quieter than December's 15 (this number is adjusted up from the reported 14 in last month's column). The 12-month smoothed *Ap*-index centered on July 2006 is 8.7. Expect the overall geomagnetic activity to vary greatly between quiet to disturbed during most days in April, especially as we near the spring equinox.

Signing Off...

Please take a look at what's new at my propagation website, <http://propagation.hfradio.org/>. Included on the site is an up-to-the-day Last-Minute Forecast for you to use to get the very latest forecast for the month. If you have a cell phone with internet capabilities, try <http://wap.hfradio.org/>.

Drop me an e-mail or send me a letter if you have questions or topics you would like to see me explore in this column. I'd also love to hear any feedback you might have on what I have written. Until next month . . .

73, de Tomas, NW7US

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our readers say

Varying Views on Code Tests

Editor, *CQ*:

I never thought it would happen, but it did. Our esteemed editor is absolutely correct (in) "an ending and a beginning." "Zero Bias" (February 2007) is apparently zero tolerance on going back to the way it used to be concerning what was until now (for American hams, but a joyful experience for us Brits a while ago) an obligatory rite of passage to access the "joys" of operating on HF, USA style.

As W2VU rightly says, "Let's get on with it!" Forget looking back; be brave and look forward instead. We all know it makes perfect sense. So ignore those evangelistas of CW who use fervour, zeal, and anything else available to convince the rest of us who don't happen to like using it to communicate that it's the best thing since sliced bread! It ain't and it never was! Don't get me wrong, though, because I still like CW and use it occasionally—because I want to rather than as a consequence of this or that regulation. The "accomplishment" of learning CW (ancient digital) will be embraced as a fun mode, not a manic distraction by force.

No need to feel guilty now holding up the crucifix to ward off the vampires who willingly represent the CW lobby. Common-sense and the future have delivered all those who seek entrance into the world of amateur radio a free choice and a welcome retreat from the tyranny of Morse telegraphy.

Ray J. Howes, G4OWY
Weymouth, Dorset UK

Editor, *CQ*:

Here's an idea: Those who didn't want to learn Morse code, well, they can stop their whining now. No more code test. So we can have more questions on the written exam now. Fair trade? Technician: 50 questions; General: 75 questions; Extra: 100 questions. Or will they whine about this, too?

(Anonymous)

CW Can Be Fun

Editor, *CQ*:

I enjoyed the article, "CW Can Be Fun!" by Bob Shrader, W6BNB, in the January 2007 edition of *CQ*. There is a lot of great information in the article, but I take exception to one thing. I agree that amateur radio activities can fall into four basic categories (DXing, Contesting, Rag-chewing, and Net Operating), but there is some incorrect advice being passed along. In the paragraph describing contesting, the author states, "If a station calls CQ and says 'Up,' it means he will be listening for answers higher in frequency than he is using." While this practice of "working split" is very common when working DX, it is almost never used in contesting and it would have been more appropriate to address this in the discussion about working DX.

Scott Schultz, NØIU

W2VU replies:

Scott,

Generally speaking, you're right; working split is more common for DXing than contests. However, there are more and more contest DXpeditions, and a pile-up is still a pile-up and a good operator is going to want to spread out the pile-up so there's a remote chance of picking out a signal. Of course, on phone, working split on 40 meters in DX contests is virtually mandatory. But the article WAS about CW! Tnx for your input.

The following letter was addressed to author Bob Shrader, W6BNB:

Bob,

Absolutely *excellent* article ! I've been at this game almost 50 years, between practicing to learn the code, and then being licensed, and I still learned some new ideas from it, along with verifying or agreeing that what you are writing is true! From an experienced operator standpoint, this brought it all together in one convenient article.

We want to encourage CW operation, as part of the hobby, no more distinct than RTTY, packet, or voice—just another mode, that if given a chance, can prove to be just as enjoyable as any other part of ham radio. Now that we won't be tested on it, it should not make a difference in a decision to be made whether we are going to learn how to use CW or not. It just takes a different kind of preparation than, say, if one were to get set up to use the satellites, or download some software to another application. Prepare, get on the learning curve, and it can be done! Keep up the good work!

Dennis Kopecky, WJ2R

An Inspiration...

(The following letter was addressed to February author John Whitt, AI4FR)

Hi John,

I really enjoyed reading "Ten Thousand QSOs (and a little bit of magic)" in the February 2007 issue of *CQ*. It was beautiful and an inspiration.

Art Tan, AB4RL/6

Oops...

We described the "multi-single" (multi-operator, single-transmitter) contest class incorrectly in February's "On the Cover." A multi-single station can have two transmitters on the air at one time, subject to the following restrictions: The second transmitter, known as a "mult station," must be on a different band from the primary, or "run," station and may be used *only* to work new multipliers.—*Tnx K1AR*

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