



PAARAgraphs



Celebrating 65 years as an active ham radio club—Since 1937
Newsletter for the Palo Alto Amateur Radio Association, Inc.



CALENDAR

- July.....12*, **PAARA Meeting, 7:30**
Menlo Park Recreation Center
700 Alma Street, Menlo Park
- July.....17*, **PAARA Board Meeting, 7:30**
Red Cross Bld., 400 Mitchell Ln., Palo Alto
- *July meetings delayed one week due to July 4th Holiday*
- August.....2, **PAARA Meeting, 7:30**
- August.....7, **PAARA Board Meeting, 7:30**
- September...6, **PAARA Meeting, 7:30**
- September..11, **PAARA Board Meeting, 7:30**
The ARRL has a code practice:
URL <http://www.pcpractice.com/CW/>
-Don KF6JMQ



PROGRAM

July 12, 2002 7:30 P.M.

Speaker:

Bart Lee, KV6LEE

He was at ground Zero when they hit the WTC in NY. He help out at the Red Cross as Ham Radio operator for 10 dys!

Join us for pre-meeting eyeball
at Su Hong Restaurant , 1039 El Camino Real, Menlo Park
Food will be served at 6:00 sharp, so guests will be on time for the PAARA meeting. Those arriving late will be responsible for their own order and bill.

—PAARA Radio NET every Monday evening at 8:30 P.M.,local time—
on the 145.230 -600 MHz repeater, PL tone off

How Hams can monitor for terrorists



Bill Pasternak WA6ITF & Joe Schroeder, W9JUV
(PAARAgraphs normally does not print long articles. Several members suggested this one is of special interest. It is from World Radio Online, June 2002 -K6URO)

Prologue

Tuesday, 11 September, is a day that changed America, and the world like never before. It proved beyond any shadow of a doubt that even the world's only super-power is vulnerable to attack from extremist elements. As this is written in early October, the United States Government has pointed the finger of guilt at a cowardly terrorist leader, hiding in caves in Afghanistan, named Osama bin Laden. President George Bush has promised full retribution for these heinous acts of terror in New York City and just outside Washington DC.

By the time you read this, there is a very good chance that the United States and our allies will be at war against bin Laden and all who follow his doctrine. This will be the kind of war never before seen by Americans because it will, in effect, be a clandestine war. A war to 'seek out and destroy' what amounts to 'ghosts' living in the desert and 'hiding under rocks.' Press coverage will be minimal or non-existent because the good-guys don't want the bad-guys to be watching CNN and knowing our next move.

Shortly after the attacks on the World Trade Center and the Pentagon, the FCC asked the nation's Amateur Radio Community to keep its ears open for any suspicious communications and report it. About a day later, the Federal Bureau of Investigation set up a toll free telephone number and a web site. It also requested that all American's use only these avenues to submit leads and other pertinent data that might have some bearing on the twin tragedies. As of 1 October, the FBI, which is the lead domestic organization investigating the terrorist attack, says it has received over 100,000 leads and the list is growing daily.

Amateur Radio holds the promise of being able to provide extra ears (and eyes) for our government as it continues the hunt for any co-conspirators or other terrorist cells still in operation. The downside is the fact is that few Hams probably know what to listen for, or where to listen. A person with experience in this area is Chicago writer and consultant Joe Schroeder, W9JUV. A Ham and SWL for over half a century, Schroeder is well aware that 'listening is an art.' In the following paragraphs, he shares some of what he has learned with all of us. How to listen:

WR: You have been a Ham most of your life. You love DXing. I would guess that to be a good DXer you also have to be a good listener. Is that correct?

W9JUV: By all means. DXing is 98% listening and only 2% transmitting.

(Continued on page 64) monitor



Technical Tip

TWEAKING THE WARBLER

By David D. Meacham

206 Frances Lane, Redwood City, CA
94062, W6EMD@prodigy.net

Here are the mods I made to my New Jersey QRP Club PSK-80 Warbler:

IMD Improvement Mods

- 1) Cut the trace (on the top of the board) that connects the emitters of Q5 and Q6. It goes between R13 and R13A. This separates the degeneration circuits.
- 2) Replace R12 with a 1N4001 diode with the cathode going to ground. Mount the diode on the under side of the board.
- 3) Above the board, solder a 100uF, 6.3V Tantalum capacitor to the same pads as the diode, negative to ground.
- 4) Change R11 to a 150-Ohm, 1 Watt resistor. Stand it up vertically. Changes 2, 3, and 4 stabilize the bias voltage on Q5 and Q6.

Filter Improvement Mods

In my rig the following filter changes gave me a very flat TX bandpass, and a lower-ripple RX bandpass. My TX 90% power points are 3.5801MHz and 3.5809MHz. My RX 70% power points are 3.5799MHz and 3.5809MHz.

- 1) Change R6 to 1.2k. This makes a better output termination for the TX filter.
- 2) Add a 5.6k, 1/8W resistor from pin 3 to pin 5 of U1, directly above the IC. This makes a better input termination for the TX filter.
- 3) Change R15 to 1.0k. This makes a better input termination for the RX filter.
- 4) Add a 2.2k Ohm resistor from pin 1 to pin 2 of U2 under the board. This makes a better RX filter output termination.
- 5) Change R17 to 330 Ohms to restore the gain lost in step 3.

TX Audio Gain Reduction

I needed to reduce the TX audio gain to suit my sound card. This mod accomplishes that in addition to providing a 600-Ohm load. Just cut the trace going from C101 to J2 on the top side of the board, and solder a 510-Ohm resistor from the ungrounded pad of C101 to the nearest pad on J2 on the bottom side of the board. Then solder a 100-Ohm resistor across C101 (Bottom of board).

Extended Rolloffs for RX Audio

Most of the original corner frequencies were too low at high audio frequencies, and too high at low audio frequencies, degrading the filter response. These changes move the rolloffs outside the filter bandwidth:

- 1) Change C21 to a 0.47uF (474) mono capacitor.
- 2) Change C20 to a 0.001uF (102) disk ceramic capacitor.
- 3) Change C22 to an 8.2pF mono or disk ceramic capacitor.

Other Mods

- 1) Change C10 to 330pF for a better match. This increases output power. (From the NJ QRP Club website)
- 2) Change R5 to 220 Ohms. This maintains 7.5V regulation under varying loads. (From Mike Gipe, K1MG)
- 3) Change D6 to a 1N5817 (1A Schottky). This reduces voltage drop by about 0.35V.
- 4) If the RX gain is not high enough to suit you, add a 0.01uF (103) disk ceramic capacitor across R17 on the bottom side of the board. If this change increases the gain too much in your system, reduce the value of R24 to suit your taste.

These "tweaks" made a great little rig even better for me. If you try them, I hope you like the results, too.

72, Dave, W6EMD

Solar Coronal Holes

by Paul Harden NA5N reprint via (Vic Black)

Coronal Holes are not all that well understood, but they are holes or "tears" on the solar surface that allow energetic particles to escape the sun's gravitational and magnetic fields and be flung into space. Occasionally you'll hear that a fairly large coronal hole has rotated into "geoeffective" position. This means it is near the central meridian of the sun, the "window" where activity on the sun will likely (eventually) hit the earth. In the case of these "geoeffective" coronal holes, the particles (Coronal Mass Ejection) flow outward to ride along with the solar wind, adding velocity and density to the electrons in the solar wind. The solar wind constantly pushes against the earth's magnetic field, distorting it into a torpedo shape with the blunt end facing the sun and the "tail" extending beyond our moon.

Sudden changes to the velocity or density of the solar wind pushing against our magnetic field cause changes in the field's shape, often causing it to "wiggle" from the arriving shock wave or constant changes in solar wind. When this happens, our moving magnetic field generates huge currents that flow between our poles, causing noise on the HF bands.

Our magnetic field is normally quiet (K index 1 and 2). The increased velocity in solar wind caused by a coronal hole pushes against our magnetic field triggering a MINOR geomagnetic storm, K index of 4, which may go higher as the day goes on. The 24-hour average (the A-index) may go as high as the 20-30 range. As the earth rotates into darkness, the solar wind pushes against our magnetic field AWAY from us, so conditions will tend to quiet down some during the evening. During daylight hours, if the solar wind is still variable from the coronal stream, the disturbance will become more evident again.

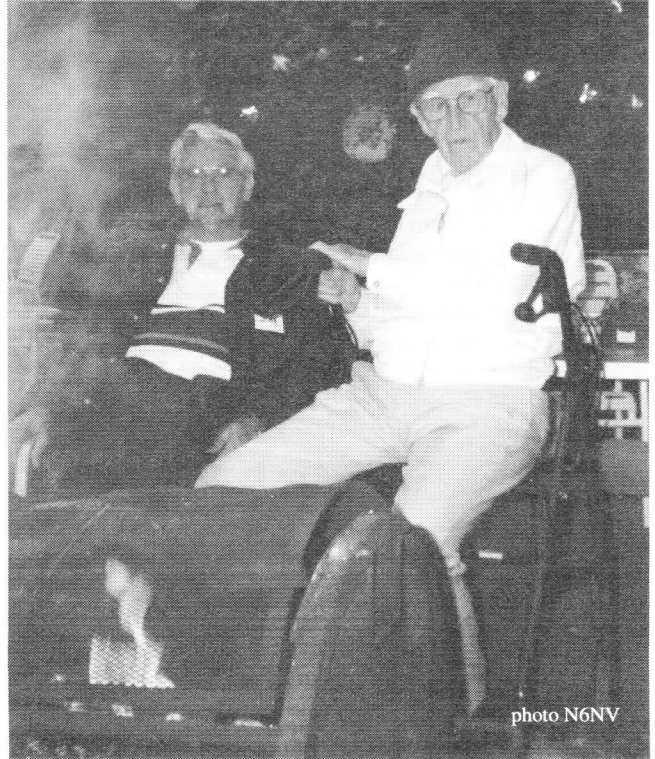
When this happens, the forecast from NOAA will suggest

(Continued on page 67) Solar



Dorsey & Art, NM6K
65th Wedding Anniversary
party

(note PAARA has also been together 65 peaceful years)

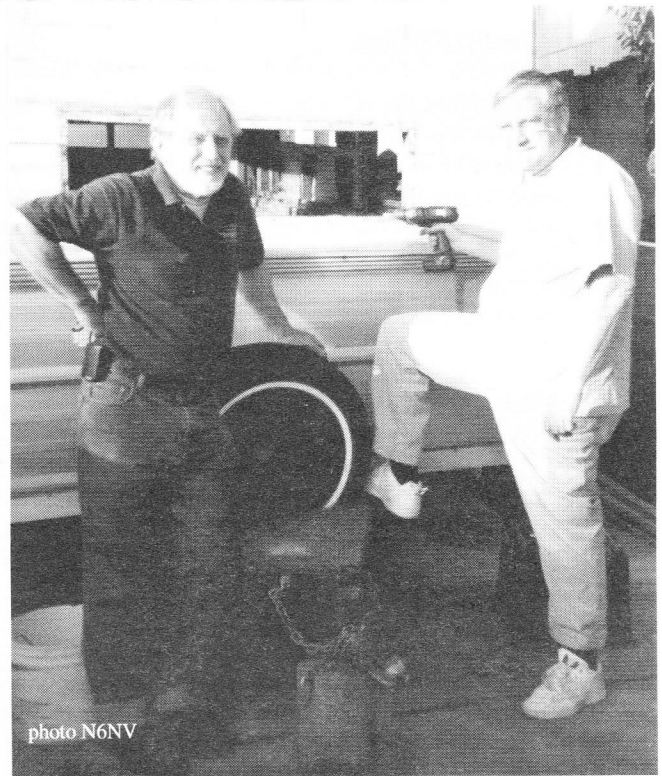


Stanley WA6ZGI & Art NM6K



Gerry N6NV
Stanley WA6ZGI

Charles K4KYU
Art NM6K

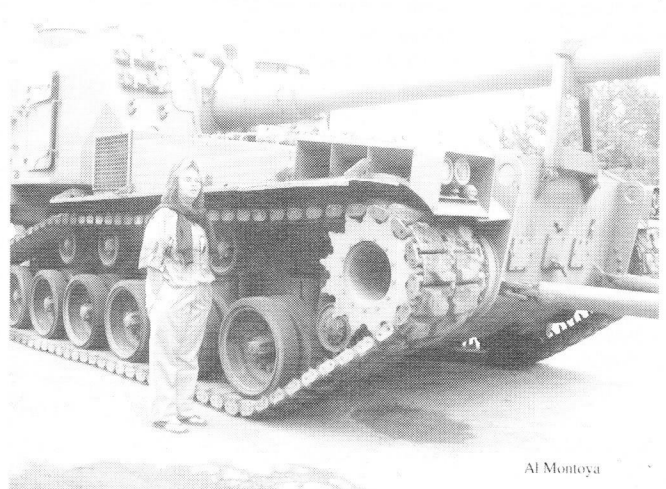


Gerry N6NV & Bob KD6KYT
at work on the PAARA Trailer

PAARA TOUR & PICNIC DAY



N6NU



Al Montoya



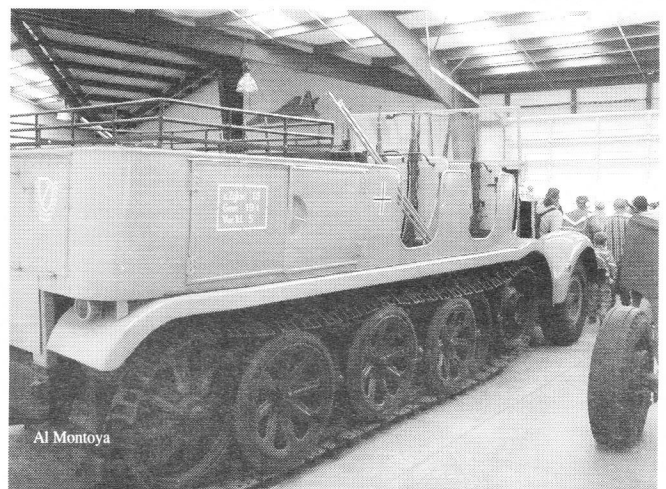
N6NU



N6NU



Al Montoya



Al Montoya

PAARAgaphs July 2002
Celebrating 65 years as an active ham radio club—Since 1937

(Continued from page 59) monitor

WR: Do you think terrorists in need of communications will even bother with the Amateur Radio or CB bands?

W9JUV: We Hams do listen to one another as we tune around listening for DX, friends or just a chat. So if this communications is actually in-band and is enough of an unusual nature it would attract attention. So if I were a terrorist operative or such, I would probably set up outside of the Amateur Radio bands.

WR: So if you were a terrorist trapped without any other way to communicate, and were scared that Hams might discover you, where would you go?

W9JUV: Well, he would want to put it at a frequency where the equipment is still going to work pretty well. Of course, nowadays, most modern Amateur Radio equipment will work most of the way throughout its design range with the necessary modifications that are made for such services as Civil Air Patrol and MARS.

Back in what we might want to call the early days, I used to do some listening up above 14.500 MHz, and I heard many interesting things which I will guess was drug trafficking. Or at least suspected drug traffickers. So, I would say out of band — but not way out of band.

This could be an interesting exercise for someone with the time to tune up above 14.350 MHz. In major cities like Los Angeles or here in Chicago there is always the possibility that there could be a terrorist group with a small, inconspicuous, antenna trying to maintain contact with others of the same ilk.

WR: Our government believes there could be several clandestine terrorist cells still lurking. With all normal means of communications (telephone, cellular, e-mail, the Internet, etc.) being so tightly monitored, let's suppose that the bad guys need to communicate. They will need alternate and perhaps rudimentary routes and may take to the ham bands or nearby frequencies. Starting with the HF bands, what type of communications might that be?

W9JUV: That's a tall question because there are so many variations to it. But anyone who is an active Ham pretty well knows what a normal Amateur Radio conversation is. Whether it's a group that gets together every morning to chat on 20 Meters or a DXer exchanging a quick report with another DXer. So, anything that seems to depart from that obviously is worth listening to.

WR: What about languages?

W9JUV: Yes, coming across people who are speaking in an unusual language. Note that I say "unusual." Let me explain. I suspect that just about anyone who listens to the DX bands has heard stateside stations talking to friends in places like Germany and speaking German. Or, stations talking to South America or Spain in Spanish. Or France in French, or the other many well-known languages. But the various Middle-Eastern languages we do not hear very often — unless you are listening on the low-end of 10 Meters to the cab drivers [unlicensed illegal stations]. Those deserve our attention — even if we do not understand the words being said.

WR: What about signal strength and time of day?

W9JUV: Any time you run across an unusually loud signal at a time when the propagation should not be available in the direction the station indicates he is talking to, or is using prefixes that do not fit the time of day, I would say that would be an indicator.

Also, a station that is extremely loud at a time when a given band is not open in the indicated direction and who is talking in a language that you cannot identify. Most of us who are DXers can identify the common Asian languages, the various Russian based languages even though we might not understand what is being said. At least you have an idea of who it is.

WR: Anything special they might try?

W9JUV: Frequency hopping comes to mind. If they have any sense at all, they are not going to sit on 14.225 or 14.425 day after day. Rather, they may have a pattern between transmissions to shift frequencies. But, as I said earlier, if you hear someone who is so loud that he is obviously in your neighborhood, and he is not understandable — and particularly if he is outside the Amateur Radio bands — I would say that is a real flag that you should respond to and report.

WR: I would think that a terrorist cell or a spy would want to be as inconspicuous as possible. I might want to bury myself in low power CW. Or use a place such as 'Freeband' or 11 Meter Class D CB where I might go unnoticed. But you are saying to listen for high power voice. Why not low power Morse?

W9JUV: That gets you into an entirely different area. I would not be concerned with CW at all for two reasons. The first is that it requires a skill that I do not see these people using. And two, frankly as a communications means in this day and age, Morse is simply too slow.

If I were interested in communicating other than by voice I would use PSK-31 or one of the other digital modes. Some of the results we see Hams getting with extremely low power transmitters and the capability of the computer controlled data communications systems to pull signals out of the noise that the ear cannot even detect — and do so with 100% copy — doing it at the speed of manual typing or RTTY would be an ideal means for terrorists to use.

Most Hams running across it might not realize what it was. But, if Hams familiar with digital communications modes were to run across something that really sounds suspicious, it should be reported.

Let me add that as a consultant, I have long been involved with law enforcement people. There is one thing that they always say — any time you see anything that you believe may have any suspicious character to it, let them know. They would rather get hundreds of alarms and possibly catch the one that's real than not get any alarms at all. And I think that's the case here.

WR: So far we have been talking of a spy or covert operative trying to contact home base. What about the terrorist leadership trying to contact the operative — like those number stations nobody seems to understand the meaning of.

W9JUV: What you are talking about are called blind transmissions. That's where the transmitting station expects no response but the message is transmitted on a variety of frequencies and possibly, at a variety of times. The clandestine operative at this end merely has to be listening at one of the right times on one of the right frequencies and he gets the message.

It's certainly a possibility, but I have to ask how one determines a particular transmission is the case. We all know that you can be sitting there on 20 Meters and listen to a signal from the Middle East, Australia, Europe or wherever. He is talking to a stateside station with a 40 over S9 signal. He stands by and even if there is no QRM on the frequency, you do not even hear a whisper from the stateside station due to propagation characteristics. How amateurs in different geographic areas would be able to determine that we are listening to a blind transmission may not be feasible.

WR: What frequency or band would you start with?

W9JUV: In my case, I would start in or near the 20-meter band — mainly because I have good antennas there. But you really need to think in terms of international vs. inside the United States communications. For example, inside the United States it could take place inside or near the 75-meter band. For international, certainly the 20-meter band and adjacent spectrum is the place to begin. Then listen up or down about one half megahertz from the band edges. I

(Continued on page 65) monitor

(Continued from page 64) monitor

would also listen around the 10 MHz band and possibly the 18 MHz band, not 21 MHz or above. These bands are just not that reliable for people who really want to get a message through and do it quickly.

WR: So far we have talked about the HF bands, 2 MHz through 30 to 35 MHz. What about terrorists who need local communications? Where would they bury themselves? FRS? CB?

W9JUV: CB on 11 Meters I do not see as an option. FRS probably not an option either because there are just too many people using it. It's not so much the chance of being overheard and having the whistle blown. More likely, some kid is going to inadvertently break in and break up the communications — especially in a mall or some downtown area.

“I wouldn't be surprised to learn that terrorists were caught using FM on 144.000 MHz”

I would also say that the Amateur Radio bands are not a good alternative because there is too much of an opportunity for radio amateurs to come across such communications and recognize that it is not normal Ham radio talk. What goes on in the amateur VHF and UHF bands is has such a conventional pattern. In many areas the regulars on VHF/UHF can recognize each other's voices. Something unusual in content or accent would stick out much more than on an HF band like 20 or 40 Meters.

This being said, I would suspect that they might get some Ham equipment, but they would modify it for out-of-band operation.

Possibly use 2-meter equipment below 144 MHz or above 148 MHz on a channel they've found inactive by monitoring. The same rule would apply to the 70 cm. band or even the 222 MHz band. The 222 MHz band would be of definite interest because of its relatively low usage even by radio amateurs. As I said earlier, if you are going to do any monitoring, also tune either side of any VHF Ham band just as you might do on HF.

WR: Is using a scanner a good idea for monitoring the world above 50 MHz?

W9JUV: Scanners will provide a problem because there is so much legitimate activity in these frequency ranges. If you do use a scanner, use the mode where it stops on a busy channel for a few seconds and then, if you do not manually stop it, it resumes scanning. In the first few seconds of any transmission you will be able to determine if it's police, fire, taxi-cabs or whatever.

Also, many new radios, HF, VHF and some scanners have a panoramic visual display of band activity. This capability could prove to be very handy around the Amateur Radio bands if set to about 100 kHz bandwidth on the HF bands. On VHF and UHF you would want a wider display bandwidth. Either way you will soon get to know the regular signals in a given band and know to ignore them.

WR: In contrast to HF, what would you listen for on VHF?

W9JUV: People coordinating a terrorist attack would probably be communicating in the native language just from the standpoint that all of those in the plot understand it and those who might be listening in and are not in on the plot will not understand it at all. I cannot imagine, for example, a group of Middle Eastern terrorists whose native language might be an Afghan dialect communicating with one another in some form of broken English.

WR: How important is it for Hams, SWL's, CB operators, etc., to be alert for outgoing or incoming clandestine transmissions?

W9JUV: I think it is pretty important. I characterize it in the same way I do SETI, the Search For Extraterrestrial Intelligence. Literally, hundreds of thousands of hours have been invested in listening for signals from outer space. Those of us who truly believe that we are not alone in the universe do not consider it a waste of

time — it's invested time.

I think that the probability of one of us actually intercepting a terrorist's message that leads to thwarting of some future terrorist's act is relatively small. But it's absolutely not zero percent. I think that it behooves those of us who have the time, equipment and the opportunity, to invest some of that time — 100,000 radio amateurs listening just a few hours a week adds up to monitoring a sizable portion of the spectrum that our government might not have the time to look at. Bottom line — anyone who would like to try it, should. How to record audio transmissions

One thing suggested by law enforcement is to tape any suspicious communications. Doing so eliminates the problem of relating second hand what you may have heard and accidentally adding your own interpretation.

If you do record, we would suggest using fresh tape and also using a direct connection to your recorder from your station receiver. This will eliminate the chance of room noise obscuring what you are trying to record.

Also, use simple cassette recorders and good quality normal bias cassettes.

Stay away from exotic recording modes like Mini-Disc, DAT, CD, .wav files and the like. The reason is simple. There are millions of cassette tape recorders in the hands of all mankind but not every investigatory agency has the latest home entertainment type gear.

Keeping it simple will deliver the message with the greatest speed.

How and where to report suspect activities

If you do happen across something that needs to be reported, the best place to forward it is directly to the Federal Bureau of Investigation. The FBI has set up a toll free number for leads or other information on the terrorist attack. It's at area code **866/483-5137**. Leads can also be sent via a special website at: www.ifccfbi.gov.

Some final thoughts:

On Sunday, 30 September, Attorney General John Ashcroft appeared on the CBS news program “Face The Nation.” During that broadcast, he warned the American public that additional attacks were likely and the risk of such strikes could increase following any military action taken by the United States and its allies in the “War on Terrorism.”

There is one thing that we as amateurs (or SWLs or CB, GMRS, FRS operators) should remember as we listen for possible terrorist communications. Though these are pretty bright people, many from well-to-do backgrounds and holding college degrees, they are not likely to be at all sophisticated about radio. Consider how little your sharpest non-Ham friends understand about radio communications!

So it's well within reason that, needing some form of wireless communications, they've simply walked into a local two-way radio provider or retailer and bought equipment off the shelf. The manuals provide enough information to make it work, but where? I wouldn't be surprised to learn that terrorists were caught using FM on 144.000 MHz, since that's the default frequency on some 2-meter rigs! Or find them on SSB on 14.080 MHz because there is less voice QRM there!

They may well have been provided with professional advice, but that doesn't mean they'll be as crafty as we might be and always follow it. This is especially true now that the FBI is hot on their trail.

Let's keep our ears open. “It might be one of us who foils the next terrorist plot!”

AMERICAN RADIO RELAY LEAGUE'S FIELD DAY

June 22-23, 2002

NEWS SUMMARY: Mid-Peninsula Hams Gear Up to Set Long Distance Contact Records and Practice Emergency Communication Skills

Mid-Peninsula, June 22, 2002 --- Hundreds of Bay Area Amateur Radio operators will work 'round the clock this weekend to set up field radio communication stations, get on the air, and contact thousands of other operators in the US and Canada as part of participation in the American Radio Relay League's Field Day.

According to Andreas Junge, President of the Palo Alto Amateur Radio Association, Field Day is the annual "shakedown run" for the ARRL's National Field Organization.

"Field Day is a way for hams to get outdoors and have fun under some difficult conditions," Junge says. "But it's also a chance to fine-tune emergency communication skills. We use generators and battery power, and we set up antennas in the field. The idea is to put together a self-sufficient, working station quickly and begin making contacts." The ARRL Field Organization has been effective in establishing emergency communications nets during floods, hurricanes, fires, earthquakes and other major disasters. Members of formal emergency organizations such as the Amateur Radio Emergency Service (ARES) and the Radio Amateur Communication Emergency Services (RACES) regularly participate. The League estimates that more than 35,000 hams participate in Field Day every year. Palo Alto's Field Day operations will be at Bay Front Park. Set up begins at Saturday, June 22 10:00 AM. The public is invited. For more information, contact: Andreas Junge, N6NU, 650 233 0843.

SUMMARY: Mid-Peninsula Amateur Radio operators to contact thousands of other hams throughout North America in the nation's largest ham radio on-air event.

WHO: Licensed Amateur Radio Operators in the Mid-Peninsula area.

WHAT: Hams will set up and operate field radio stations to contact other hams throughout the US and Canada over 24 hours. Objective is to see who can make the highest number of contacts during the contest period.

WHERE: Bay Front Park. At the end of Marsh Road, Menlo Park.

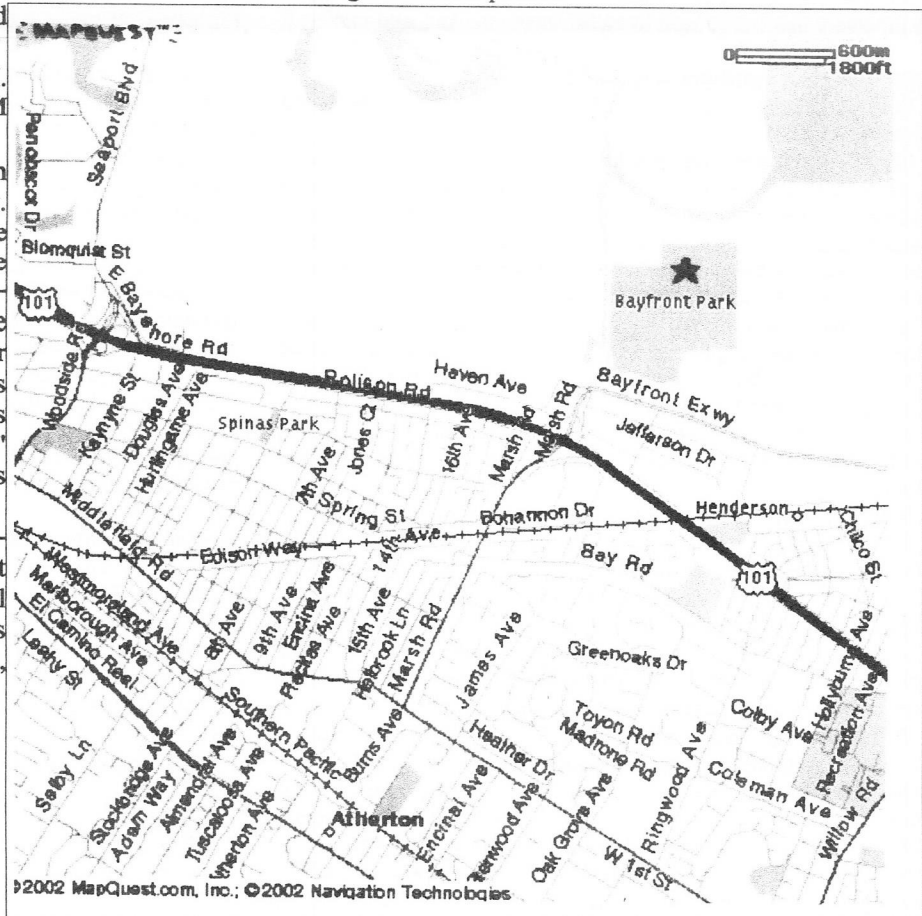
WHEN: Saturday, June 22, 10:00 AM. Operation continuous until 10:00 AM Sunday, June 23.

WHY: Participation in the American Radio Relay League's Field Day. Amateur Radio operators practice communication skills under primitive conditions, with generator and battery-powered equipment and portable antennas. Special awards are given for "alternative" power sources such as solar, wind and methane. Field Day is a competition as well as a "trial run" for emergency communication skills used during disaster situations.

Photo opportunities, interviews, activities of local participants in important national Amateur Radio event. See all Amateur Radio communication modes in action, including voice, code, packet radio, teletype, and satellite.

CONTACT:

Andreas Junge, N6NU, 650 233 0843



SEMINAR & EXAM: AMATEUR ("HAM") RADIO

WHAT: Amateur Radio ("Ham") License & Communications Course for entry-level Technician & General & Extra Class (No Morse code.)

WHEN: Saturday, July 20, 2002; 8:00 am - 5:00 pm

WHERE: Foster City, CA

FEE: \$25.00

SIGN UP: Ross Peterson: 650-349-5349;
wb6zbu@arrl.net (preferred)

Sponsored by: Foster City Police Department; Union City Police Department; The City of San Mateo, Office of Emergency Services; South County Amateur Radio Emergency Services (SCARES); San Leandro Amateur Radio Club

This course is open to the public. This one-day "cram" course is designed to help you obtain your Technician-Class Federal license [no Morse code] --the (EASY - 35-question, multiple-choice!) Federal exam is administered as part of the class. You can practice for the exam on the Web: <http://www.aa9pw.com/radio/exam.html>
Afterwards, you can attend training conducted by the Amateur Radio Emergency Service (ARES) - see below.

NEW RADIO OPERATOR TRAINING SESSION

WHAT: Training on: using your radio, emergency communications

WHEN: Saturday, July 27, 2002; 1:00 pm - 3:00 pm

WHERE: Menlo School, Stent Hall #211

50 Valparaiso Ave. (off El Camino Real)

Atherton, CA (map on www.menloschool.org)

FEE: \$10.00

SIGN UP: Ken Dueker: kdueker@w6yx.stanford.edu

(Continued from page 61) Solar

erratic minor storm conditions as a result of this coronal stream riding along the solar wind. These conditions usually persist over the next 2-3 days. This does not mean conditions will be lousy 24-hours a day, but will be "on and off" for 2-3 hour periods as our magnetic field responds to variations in the solar wind.

A minor storm does not shut down HF communications. It just makes the lower bands, like 40M, a bit noisier than normal, and may be accompanied by bursty static crashes as our magnetic field "wiggles." Levels may also be ACTIVE or just shy of minor storm activity. Current conditions, including the 3-hour K-index numbers, are broadcast on WWV at 18 minutes past the hour, and at several Internet sites. K Index of 4 or higher indicates disturbed conditions.

-73, Paul NA5N

Join us for pre-meeting eyeball

QSO July 12th

gab & gobble

Food will be served at 6:00 sharp, so guests will be on time for the PAARA meeting. Those arriving late will be responsible for their own order and bill.

6 pm— at Su Hong Restaurant
1039 El Camino Real
Menlo Park
—across from Kepler's Book Store—

PAARA Radio NET

every Monday evening
8:30 P.M., local time
on the
145.230 -600 MHz repeater

PL tone off

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PAARAgaphs Ad Rates

PAARAgaphs accepts paid advertisements from non-members.
(short personal ads remain free for members in good standing.)

All ad rates listed are per issue only.

1. Not for profit ads by association members for ham-related items and wants. No cost for business card size ads (additional space at \$2.50 per business card size).
2. For Profit organizations and/or individuals: \$5-business card size, \$25-half page, \$50 full page or back cover.

These fees may be reduced or waived in exchange for a valuable consideration that is given to the Association or its general membership. Such consideration must be in addition to any existing arrangements with the association.

The PAARAgaphs editors reserve the right to reject any ad deemed to be not in the best interest of the Association. All fees payable in advance by the year with "scanner-ready" copy or text-only ads. Give payment and copy to Bob Korte

PAARA • Palo Alto Amateur Radio Association • P.O. Box 911, Menlo Park, California 94026-0911

- Club meetings are on the first Friday of each month, 7:30pm at the Menlo Park Recreation Center, 700 Alma Street, Menlo Park, CA. •
- Radio NET every Monday evening, at 8:30pm, on the 145.230-600 MHz repeater, PL tone off. •

Membership in PAARA is \$12.00 per calendar year which includes a subscription to PAARAgaphs, \$6 for additional family members (no newsletter).
Make payment to the Palo Alto Amateur Radio Association.

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