



# The WACOM HAM



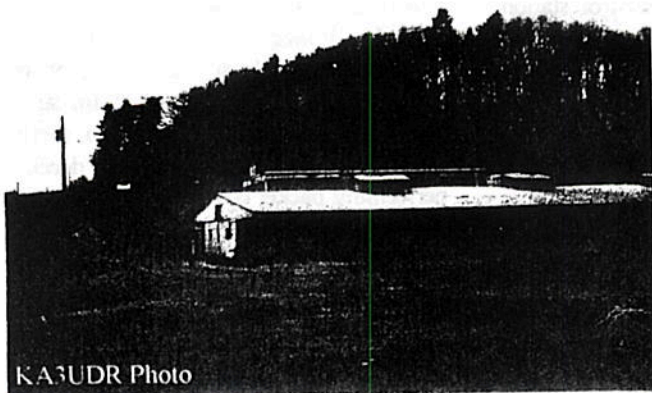
February 1997

Editor: Kevin Smith

Washington, PA

## WACOM Makes Pitch For Use of Fairground Property

*Story by Kevin Smith; Photography by Steve Elliott*



KA3UDR Photo

Use of the hilltop above this fairground building by WACOM is being requested of Washington County.

A proposal was submitted to the Washington County Commissioners to consider allowing WACOM to erect a building that will house club equipment and serve as an emergency communications center. President Paul Plants; N3WMV and Steve Elliott, KA3UDR developed and submitted the proposal after gaining the support of Jeff Yates of the County's 911

Center.

The proposal suggests that WACOM develop the property by erecting a 24 ft. by 36 ft building on the site. Utilities are available in the area, however a road will need to be built to access the property. Steve Elliott mentioned that the National Guard Engineers Unit located in Finleyville could be approached to build this road as well as clear the property for construction. The proposal needs to become an agenda item for a Commissioner's meeting in order to be considered and could be tabled until fully investigated.

The cost of materials to build the proposed building was estimated to be around \$10,000 and does not include the foundation or construction labor. Plans for the building will be put on hold until the County Commissioners consider WACOM's request.

## Dave DeMotte, N3IDH New ARES Emergency Coordinator for Washington County

Dave DeMotte was recently appointed Washington County Emergency Coordinator by Randy Krofick, AA3CI, who is the ARES District Emergency Coordinator for southwestern Pennsylvania. Dave takes over for Walt Piroth, N3BKW who will become the Assistant EC along with Bob Ketzell, KB3IN. Dave will also serve as RACES Assistant Radio Officer for Washington County and serve under Bob Ketzell who remains as RACES Radio Officer.



Dave has been the WACOM VHF/UHF Net Manager for the past year and will remain in that function until a new net manager can take over. There is currently a need for a net control station to take the slot for the second Tuesday of the month. Anyone interested in either the Net Manager position or the Net Control station, please contact Dave DeMotte at 228-8178. Congratulations Dave on your appointment.

# Speaking Out

by Kevin Smith, N3HKQ  
Newsletter Editor



I want to thank the club for allowing me to join the Amateur News Service in the club's name. As I mentioned at the last club meeting, being a member of this news service provides opportunity to receive timely news articles that are Amateur Radio related. But more selfishly for me, it will provide some feedback on this newsletter.

I explained at the club meeting that the ANS sponsors an annual contest judging newsletters from around the country and that I entered, not so much to win a prize, but to take advantage of the contest's promise to send back judge's comments on the newsletter I entered. I am looking for constructive feedback.

After the meeting, Sam Mayberry came up to me and gave me a suggestion for how I listed the net control station schedule. You will see that the Tuesday evening net is called the WACOM VHF/UHF Net and that I list all of the repeater frequencies. This was a small but very good idea from Sam and I was happy to use it.

It dawned on me, while driving home from the meeting, that only after I mentioned that I was looking for feedback on the newsletter, did Sam offer me some. Perhaps more of you have ideas about improving the newsletter, but are afraid I might take offense. Don't think it any longer! I am ready to entertain comments from anyone. Your interest in improving

this newsletter shows me that your reading it, and that is what keeps me interested in publishing this newsletter.

You will recall that in last month's column, I brought up getting a packet BBS on the air again. I would like to sweeten the deal a little by offering to give a 386DX40 motherboard (with a floating point math card), a 5 $\frac{1}{4}$  inch disk drive, and a 230 MB harddrive to upgrade the computer, sitting in the club room now. This mother board I am offering will require 8 - 1 meg SIMMs, a video card, serial/parallel card, etc., and is meant to be mounted in a mini tower. I am sure that between the club membership, there are enough computer parts that a decent performing packet computer could be put together on the cheap. Does anyone else have something to offer?

Speaking of packet the Greater Pittsburgh VHF Society has something going on in our back yard. The following packet bulletin was put out by KD3AI in early January: "*The Greater Pittsburgh VHF Society's pbbs WA3BAK-1 and node WA3BAK-7, located in Canonsburg has been moved to 144.910. This will be the frequency for the clubs 1200 bps operations. The clubs PITTS digipeater and pbbs WA3BAK located in Carrick will be moved on February 1st to 145.750 in preparation to be converted to 9600 bps operation. On January 18th, the KD3AI bbs will be moved to 144.910. This will free up 145.790 for APRS use.*"

When you check into WA3BAK-1, you get the following:

*Welcome to the Greater Pittsburgh VHF Society's Canonsburg PBBS. This PBBS is Located in Canonsburg at the site of the 443.650 n3ffp repeater. This PBBS is used for the Swap & Shop listing, EXAM information and other bulletins related to the GPVHFS. The PBBS is NOT a full service BBS. Do not post any messages that require BBS routing. If you post a message you must delete it when it gets old. This PBBS is maintained by the members of the GPVHFS. There is also a node available for use. The callsign is WA3BAK-7 The digipeater alias is CANON. I hope you enjoy using this system.*

## WACOM Committee Phone Directory

A.R.E.S.	Dave DeMotte, N3IDH	228-8178
RACES	Bob Ketzell, KB3IN	228-0425
EMA	Dave Smith, N3LIK	225-0346
President	Paul Plants, N3WMV	225-8637
Vice President	Joe Musante, WB3GTE	223-0897
Secretary	Patty Marshall, N3XAR	225-8637
Treasurer	Kevin Smith, N3HKQ	258-4153
Education	Jim Burtoft, KC3HW	228-0546
2mtr Net Mgr.	Dave DeMotte, N3IDH	228-8178
10mtr Net Mgr.	Joe Musante, WB3GTE	223-0897
Newsletter	Kevin Smith, N3HKQ	258-4153
Repeater	Sam Mayberry, W3CYO	222-0367
VE Testing	Stan Cole III, NX3P	223-0104



## February Western Pennsylvania VE Test Opportunities

(A) = ARRL/VEC, (L) = LAUREL/VEC, (M) = MOUNTAIN/VEC,

(5) = W5YI/VEC, \*P\* = Pre-registration requested, \*N\* = No walk-ins, WI = walk-ins

Date(s)	Location	Time	Club	Contact	Telephone
1	Erie		Radio Assn of Erie	Norma Vanderhoff	814-665-9124 (A)
1	Pittsburgh	8:30 AM	Grtr Pittsburgh VHF	Jim Cottrill	412-563-2379 (A)
1	N.Hills	12:Noon	NHARC		WI
8	Butler	9:00 AM	BCARA		2dPR
13	BeaverCty	6:15 PM	AAA		WI
15	Elco Boro	6:00 PM	EARS		PR
16	Uniontown	1:00 PM	UARC		WI

### LITTLE LEOs NARROW 2-METER FOCUS TO 146-148 MHz

from the

*The ARRL Letter Online*

*January 17, 1997*

*(Volume 16, Number 3)*

In their effort to secure spectrum space that includes the 2-meter and 70-cm ham bands, the Little LEOs have narrowed their focus on 2 meters to the 146 to 148-MHz segment. The industry also appears to be attempting to reposition itself as a potential emergency communication adjunct to ham radio.

The little LEOs will use low-Earth-orbiting satellites to provide position-location and two-way data-messaging services to potential customers around the world. Customers would use small, inexpensive transceivers to communicate with satellites. According to the FCC, potential uses of this service include emergency location in remote areas, environmental data collection, vehicle tracking, and time-sensitive business and personal data communication.

For Region 1, a draft little LEO frequency allocation table has proposed adding a primary mobile-satellite allocation of 146 to 148 MHz to the existing allocations for fixed and mobile (except aeronautical mobile [R] services). The table was contained in a working paper--Document IWG-2A/86 Rev. 3, entitled "New Allocations for the Mobile-Satellite Services Operating Below 1 GHz"--submitted by representatives of the Little LEOs industry to Informal Working Group-2A (IWG-2A) January 7.

The 146 to 148-MHz segment is not a ham band in Region 1, but in Regions

2 and 3, a footnote would be added to state: "Additional allocation: the bands 146-148 and 430-440 MHz are also allocated to the mobile-satellite service, limited to non-geostationary satellite systems, for use only during emergency communication situations as a complement to the amateur service in accordance with Resolution No. 640."

The little LEO proposal also calls for a new primary allocation for the mobile-satellite (space-to-Earth) service for 430-440 MHz in Regions 2 and 3 (ham radio is primary in Region 1), and offers this rationale. "The allocation for the mobile-satellite service within the bands allocated to the amateur service is intended to be a complement to that latter service in situations involving emergency communications as provided for the [sic] Resolution No. 640."

As currently drawn, Resolution 640 covers only the 144 to 146-MHz segment of 2 meters and does not apply at all to 70 cm. In the 440 to 450-MHz band, where the Amateur Service is not listed in the international table of frequency allocations except by footnote (ham radio is secondary in Australia, the US, Jamaica, the Philippines, and Canada), the little LEOs proposed a new worldwide primary mobile-satellite (space-to-Earth) allocation.

Calling their service "inherently global" the little LEO group said the industry needs "frequency allocations that can be used anywhere in the world," for nongeostationary, nonvoice mobile satellite service through the year 2002. "ITU-R studies indicate sharing is possible," the industry said.

"If the demand for Little LEO

spectrum cannot be satisfied by allocations that could be used on a worldwide basis, one solution is to assign different frequencies for use in the various regions of the world from within the allocations to the mobile satellite service," the working paper's preamble said.

Little LEO firms CTA, E-Sat, Final Analysis, GE Starsys, and LEO One submitted the third revision of the lengthy paper--which drew criticism from the ARRL as well as from military and land-mobile interests and the National Telecommunications and Information Administration--at the January 7 session. The ARRL continued its objection to the inclusion of amateur bands and to the misapplication of Resolution 640. For now, Document IWG-2A/86 Rev. 3 is tabled, but it's expected to come up again at future meetings. IWG-2A meets on January 21 and February 4.

Overall, the little LEOs proposed the following bands for additional allocation to nongeostationary data-only mobile satellite service systems: 138-144, 146-148, 149.9-150.05, 150.05-156.7625, 380-387, 387-390, 390-399.9, 399.9-400.05, 400.15-401, 430-440, 440-450, 470-608 and 614-806 MHz. The paper notes there are proposals concerning 401-406 and 450-470 MHz and for feeder links at 1390-1400 and 1427-1432 MHz in other papers, and that "additional allocation proposals are under construction for the 174-230 MHz band."

For additional information on the little LEOs situation, read the editorial "It Seems to Us ..." in by ARRL Executive Vice President David Sumner, K1ZZ, in February 1997 QST.

## Highlights From The January WACOM Club Meeting

**Board of Directors** - The BOD Study Group will meet on Tuesday, January 7, in the club room at the George Washington Hotel at 7:00 PM. The group will consist of the club officers, Bill Hill, Jim Burtoft, and Steve Elliott.

**Hamfest** - Steve Elliott, KA3UDR, gave a final report on the hamfest. Overall a good effort was made by the club but attendance and the profit realized was modest. Steve recommended that WACOM seriously consider moving the hamfest to a new time of the year and location. Steve will transfer to a new post on April 14, 1997 in Johnstown, PA. The club's best wishes go with him.

**W3CYO Repeater** - Sam Mayberry reports that new transmitters and antennas have been installed on the 440 and 145 portion of the repeater. Please let Sam know how the new equipment is doing.

**ARES** - Dave DeMotte, N3IDH has officially been appointed Washington County EC. See front page story.

**Education** - Jim Burtoft, KC3HW needs club members to demonstrate various types of equipment. Please call him to volunteer.

**Proposal to Washington County Commissioners** - See the front page story.

**Newsletter** - The club members authorized the newsletter to join the Amateur News Service for an annual fee of \$15. The newsletter was enrolled in the ANS' annual contest. Feedback on the newsletter should be available in February or March.

**501-c3** - The accountant retained by WACOM to advise the club on obtaining 501-c3 status, has read the club by-laws and made recommendations on their amendment to meet 501-c3 requirements.

The recommended changes were read by President Paul Plants. According to current by-laws, any changes to the by-laws require two separate readings at meetings having a quorum of members present prior to voting. It was determined that a quorum of members were in attendance at the meeting, therefore the first reading was judged to have taken place.

The second reading will take place at the February business meeting after which a vote will take place.

### Miscellaneous Items -

- President Paul Plants has contacted the internet access provider Pulsenet about sponsoring a WACOM website. More information about the website will be available next month.
- The Washington Library display window is available for one week in February. A WACOM display for the window was authorized. President Paul Plants will pull

together the display articles and determine the date of the window availability.

- A bus to the Dayton Hamvention will be arranged by Dave DeMotte. Interest by club members will need to be determined early for the bus to be reserved.
- The club Certificate of Deposit was changed from 6 months to 12 months with the appropriate increase in interest to be earned.
- The club authorized a check, in the amount of \$100, be paid to the South Strabane Township VFD #1 for use of the social hall by the club for another year.
- President Paul Plants made the observation that 111 licensed amateur radio operators lived within the 15301 zip code. Of the 111, 33 were members and 3 were known SK's. An effort will be made, in the next two months, to contact all nonmembers of WACOM about the club. Similar efforts will be made to recruit licensed hams from near-by zip codes.



## Man Portable PacSat Operation

### Chas Richard, W4HFZ (former KM4EM)

This is a collection of notes about my efforts to construct and operate a man portable PacSat station. Although the results to date have not been as successful as I had expected, I hope my experiences will be of benefit to others attempting similar operations. I am continuing in my efforts, and hope to shortly be able to report the details of a fully functional station capable of useful communications.

#### Background:

Having been bitten by the PacSat bug, I successfully constructed a fully automatic digital satellite station, operating on both types of PacSat birds (1200 bd BPSK downlink, LO-19 and AO-16, and 9600 bd FSK, UO-22, KO-23, KO-25). After being reassigned and selling the house, I was interested in maintaining access to the birds, and put together a portable station. I have attempted man-portable PacSat operations from a variety of locations, including an apartment in Washington, D.C, aboard ship from 3 U.S. locations, Key West, FL, Ft. Lauderdale, FL, and Groton, CT, and from temporary quarters in Pearl Harbor, HI. My equipment was designed so that it would fit in the luggage allowed by a commercial airliner.

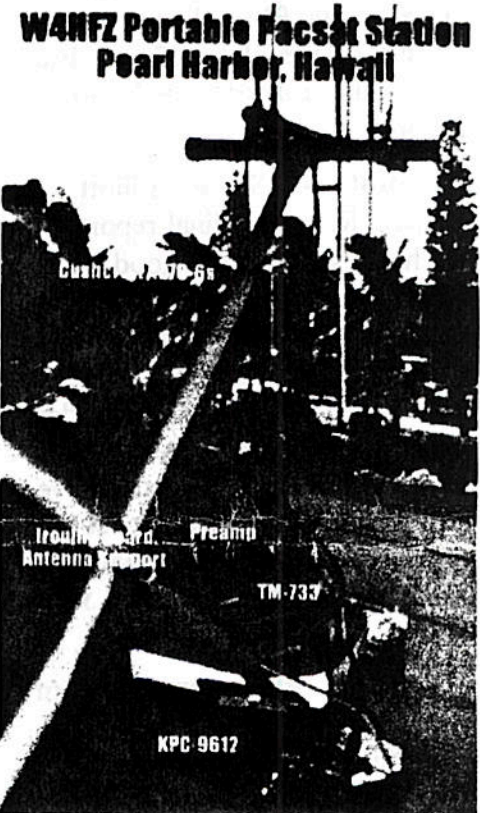
#### Satellite Selection:

My goal was PacSat operations, so I did not consider MIR or other similar options. I looked at two choices: 1200 bd BPSK, and 9600 bd FSK. Both require a full duplex 2M/70 cm capability. The 1200 bd birds require a SSB rcvr on 70 cm, FM on 2 meters for the uplink. The 9600 bd birds require a 9600 bd FM radio for both. I didn't know of any really small, SSB capable dual band radios, the closest being the ICOM -820 and 821s. I do not own one of these radios, and desired to use my existing equipment, therefore, I did not pursue this option. However, they are candidates for this type of station, and I am considering use of one for future operations. Other commercially available SSB capable radios (such as my FT-736) were considered too large to fit in the luggage. I would submit that the 1200 bd BPSK birds are the better choice for a station with limited capability, as they require less signal strength to hear, and have less uplink contention. However, the size of current commercially available SSB equipment and my budget ruled them out for my station. Homebrewing is an option I did not pursue because of time constraints, but is a way to overcome the limitations of commercial equipment.

The other possibility was the 9600 bd FSK birds. There are a number of small, dual band, 9600 bd capable mobile radios commercially available. I am currently using the Kenwood TM-733A. A caution with these radios: They will be advertised as full-duplex capable, a requirement for these operations. However, the radio may only be capable of voice full duplex, not digital. My TM-733 required modification to allow it to go full duplex via the packet port. Another problem is the tuning step size. The minimum step size of the TM-733A is 5khz, which does not allow for fine Doppler correction of the downlink signal. My experience shows the up to 2.5khz tuning error often resulted in missed data. Another issue is the relatively poor transmit Bit Error Rate (BER) at 9600 bd on these radios. My FT-736 at 25 watts out easily outperforms the TM-733 at 50 with similar antennas, even in areas such as Hawaii, where there is little uplink contention. The May 1995 issue of QST contains a good discussion on this subject, worth reading prior to purchasing one for PacSat use. Dual Band HTs have been suggested, however, the advantage of mobile radios over HTs is greater power out, and a better receiver, in a not too much bigger package. My efforts centered on the use of the TM-733A.

#### Antennas:

I desired to use a dual band mobile vertical for my antenna, again for space and weight saving. I desired a groundplaneless design, and wanted no more than 3 db gain to preserve vertical coverage. I did some work with both the Diamond NR-770SA, and the NR-770RA. What I found with dual band antennas is that the patterns don't complement each other very well. The NR-770A does not require a ground plane on either band, but has two collinear 5/8ths elements on 70 cm, resulting in a too narrow vertical coverage. The 770SA is a 1/2 on 70 cm, just right, but requires a ground plane on 2 meters. If a ground plane is not used, the SWR on 2 meters is unacceptably high. If a ground plane is used the vertical coverage on 70 cm is too narrow, as



the antenna acts like a collinear with the image of the upper element in the ground plane.

Another option is separate 2m and 70 cm antennas. I've done this, also. Performance was improved, but at the cost of carrying 2 antennas and feedlines. My latest effort was to attempt use of a Cushcraft A270-6S. This is a dual band, 3el yagi. With this arrangement, supporting and aiming the antenna was required. However, since I had to be present during the pass to correct for Doppler, it was little extra effort to go move the antenna once or twice during the pass. The advantages are the gain, and I've found some better intermod rejection in urban areas. The max dimension is about 4 ft, so it fits in the luggage.

Of all of these, the beam performed the best, as expected. I have only limited experience with circularly polarized omnidirectional antennas, such as the eggbeater and the quadifilar helix. While I would expect a circularly polarized antenna to outperform a linear one, in all my testing of omnidirectional antennas, nothing has outperformed a simple halfwave vertical for both uplink and downlink. Although I'm continuing to pursue a rugged, small, CP antenna, and am following closely the good work being done in this area by several others hams, my recommendation for man-portable work is to use the vertical.

#### **Power:**

This was the real hard part. I desired to be completely independent from commercial mains. I purchased a "DC Power Pack" from Innova. From full charge, it can support one, possibly two passes when powering the radio, TNC, preamp, and computer, with the computer being the largest load. This is at 10w output on the radio. I have been successful uplinking at 10w, but it is marginal. 30 or perhaps 50 watts is a lot more reliable, but costs battery lifetime. I have a larger 15 A-H pack that can support 4 or 5 passes at 50w on the uplink, but it is too large to carry in the luggage. Access to commercial mains helps significantly, however, to run the TM-733 at 50 watts out still requires 12-15 amps at 12 volts. A 12 amp power supply takes up a lot of room, and is heavy. I settled on the Innova battery with an accompanying 5 amp 12 volt AC supply, and charged the battery from the power supply between passes. This combination is slightly smaller and lighter than either the 15 A-H battery, or a 12 amp AC supply, and does permit some operations completely independent from AC mains.

#### **Computer:**

PacSat operations require a computer capable of running DOS. This will be the biggest power consumer (unless you are doing long uploads at high power), and a big chunk of the weight. Palmtops such as the HP 200LX are probably the best choice. I already owned a small 486/25 laptop, which has worked fine.

#### **Other notes:**

I use the Kantronics KPC-9612 TNC. This small unit allows both 1200 bd and 9600 bd operation, allowing terrestrial packet between passes. Initially I had trouble getting the 9612 into KISS mode, required by the PacSat groundstation software. A RESET command is required after changing to KISS mode (INTF KISS), which was not obvious to me from the documentation. I used the PaKet 6 shareware packet program as a convenient method to issue the KISS OFF command when changing to terrestrial operation. There are several similar TNCs on the market to choose from. I also use a preamp. This is additional weight, extra power cables, etc., but the preamp has often made the difference between getting some data and getting nothing. My next planned improvement is a better preamp, with the capability of powering it off the feedline, or the use of a receive only antenna with an embedded Mini-Circuits MAR-6 or ERA-3 preamp.

I strongly recommend carefully adjusting all drive levels, deviation, etc. between components of the station to ensure it is fully optimized. I didn't have time to do this, and as I was often right at the margin to decode data, I wished I had. Familiarity with PacSat operations is helpful, and some test passes at home will help ensure data is not lost in the field based on equipment line up problems.

To date, my results have not been very encouraging. My best passes have been just over 150K, but the average is far lower, closer to 25k. Getting the antennas into the clear with limited feedline runs is a big problem. Although the station is not yet providing useable communications, it has been a lot of fun attempting to get it set up.

For comparison, after moving into the new house, I quickly set up the home station on omni antennas. Equipment used was an FT-736, SSB Electronics preamp, 1/2 wave vertical on 70 cm, and a separate 1/2 wave on two meters. Although I'm horizon blocked below about 20 degrees, the best 9600 bd passes were approaching 350k, with an average around 175k. Others have reported even better performance with similar equipment. I think these figures represent an achievable goal for a man-portable station. I've got some improvements planned, getting for extended man portable operations next summer when I'll be spending 5 months in the Mediterranean. I invite others who are working on portable and maritime mobile PacSat stations to share their results, and hopefully you will see me "in the queue" this summer from my man portable station!

The WACOM HAM  
Editor: Kevin Smith, N3HKQ

**WACOM Officers**

President: Paul Plants, N3WMV  
V. President: Joe Musante, WB3GTE  
Treasurer: Kevin Smith, N3HKQ  
Secretary: Patty Marshall, N3XAR

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**WACOM VHF/UHF Net**  
**145.49/224.4/443.3 Mhz**  
**8:30 PM Local Time**

	Date	NCS
February	4	KA3KSP
February	11	N3TKR
February	18	N3HKQ
February	25	N3IDH
March	4	KA3KSP

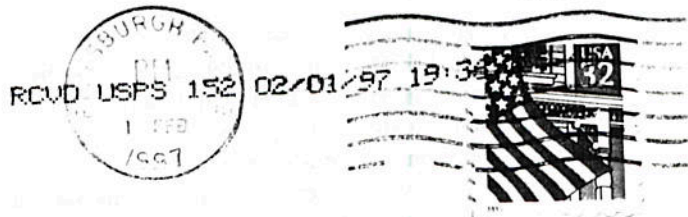
**WACOM 10 Meter Net**  
**28.340 Mhz**  
**9:00 PM Local Time**

	Date	NCS
February	4	W3WH
February	11	KA3VOM
February	18	KA3KSP
February	25	WB3GTE
March	4	W3WH

# The W.A.COM HAM

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