



AARC/OVER

Bulletin of Austin Amateur Radio Clubs

Austin Amateur Radio Club
Austin Amateur Television Club
Austin Repeater Organization

May 1994

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THE DEMISE OF THE HEATHKIT

ST. JOSEPH, Mich. A factory here is shortly to become the wailing wall of a now-graying generation of "nerds".

In reveries of adolescence, our thoughts will return to this resort town on Lake Michigan's shores, about 75 miles northeast of Chicago. For decades that nondescript industrial building was home to Heathkit, which made it a fairy castle to every man and boy who ever dreamed of becoming a new Thomas Edison or Guglielmo Marconi.

Women remember the Heathkit phase of American history differently, given that 90 percent of the customers for this company's line of electronic gadgets in kit form have been males.

Many a wife and girlfriend spent the 1950s and '60s wondering why the man in her life preferred cuddling up with a soldering iron and a bunch of vacuum tubes to taking her out for an evening of dining and dancing. Other women spent the era hectoring husbands to finish the FM radio or television set whose half-assembled components cluttered basements and closet shelves. Their daughters will suffer none of that.

Alas, Heathkit is no more.

William E. Johnson, president of Heath Co., has announced that it will no longer produce

the do-it-yourself product line. Once the factory's remaining stock of Heathkits is exhausted, electronic putterers and garage/workshop inventors will have to find alternative outlets for their creative juices.

Actuarial tables, Johnson explained, dictated the decision to abandon the kits in favour of concentrating the company's energies on its highly successful line of consumer electronic products. With each passing year, the Grim Reaper takes away

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Club Meetings
Austin Repeater Organization meets on Tuesday, May 3, 7:30 to 8:30 PM, at Luby's Cafeteria on North Loop, one block west of Burnet Rd. Everyone is encouraged to come early and have supper together.
Austin Amateur Radio Club will meet on Tuesday, May 10, 7:30 to 8:30 PM, at Luby's, North Loop.
Austin Amateur Television Club will meet on Wednesday, May 18, 7:30 to 8:30 PM, at Luby's Cafeteria.
Austin QCWA meets on Saturday, May 21, 12:00 PM, at Luby's Cafeteria.

ARO MONITOR



P.O. Box 4763, Austin, TX 78765

*Amateur Radio Club
Operators of Voice Repeaters on
146.2800, 146.3494, 223.20/224.00, and 449.1441.1 Mhz
Pocket Digital Repeater 143.01 Mhz
Sponsor of Central Texas Weather Net, ARO Transmitter Hunt and Swap Net*

CLUB OFFICERS

President	Phil Steinbach	WB5SUR	258-3215
Vice President	Jeff Schmidt	N9MNV	255-6753
Secretary	Paul Parker	N5ZLX	467-7070
Treasurer	Bill Montgomery	AB5HP	322-9035

Minutes of the Austin Repeater Organization Meeting April 5, 1994

The meeting was called to order by President Phil Steinbach [WB5SUR] at 7:30 PM at Luby's North Loop cafeteria. There were approximately 72 people in attendance.

Guests and visitors were introduced.

The minutes of the March regular meeting as published in the April 1994 ARO Monitor were approved.

Treasurer's Report:

There is \$6107.46 in the bank account.

Engineers Report:

All equipment was reported to be in operation.

Old Business: none

New Business: none

Meeting adjourned at 7:59 PM.

Submitted by Paul Parker [N5ZLX] Secretary

Next ARO Meeting

The next ARO meeting will be Tuesday, May 3, 1994 at 7:30 PM at Luby's Cafeteria at North Loop and Burnet Rd.

Information on ARO's Repeaters

All of ARO's repeaters are open access. Any amateur is invited to use them, except during nets, when a designated net control operator is in charge of repeater usage.

146.88 offset -600 KHz has a phone patch. Use "*" to bring up the patch, and "#" when you have completed the call. You can dial "911" (no star needed) for access to local emergency services. "Speed dial" 3 digit access codes are available to ARO members for frequently dialed numbers.

146.94 offset -600 KHz is used for the weather net at the request of the National Weather Service. It is also used for the Swapnet and Newslines at 9PM Sunday.

224.80 offset -1.6 MHz is available.

444.10 offset -5 MHz is available.

ARO maintains a Packet Digital Repeater on 145.01 MHz.

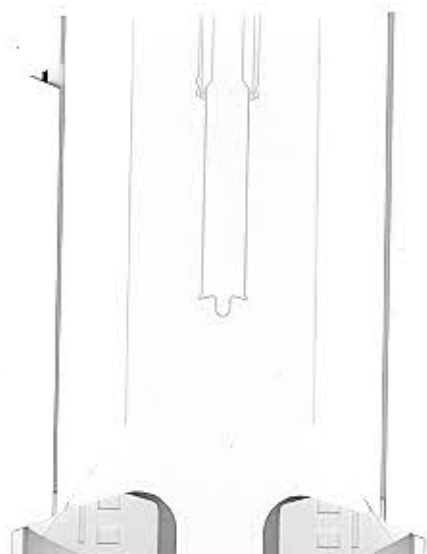
ARO Monitor

The ARO Monitor is edited by Mickey McInnis [KB5YAC] (339-0344). This is only this two page section of this newsletter. Steve Means edits the AARC/Over , which is the bulk of this newsletter.

Capital 10K Recap

I would like to thank everyone who helped out at the Capital 10K this year. We had over thirty stations active in the net. A special thanks goes to Skip KG5PA and Paul N5UXX who started the net and got things going while I got things set up, and to Mac KB5VYT, who started the Cushman Coordination net while running packet on another frequency. Who says that you can't talk and type at the same time? In addition to the old faithful core of experienced race communicators there were several "first timers" who did a good job, especially given the chaos created by 17,000 plus runners and 500 race volunteers who do not understand radio communication, net operations and message handling. The net as a hold was complemented by the medical staff and EMS. During our few moments while safety and welfare were a concern, EMS stayed plugged into our net. One doctor commented that we (the ham radio operators) were the only ones that seemed to know what was going on. Thanks again for a job well done.

-de Mike, WA5VTV



March ARES Meeting

Thirty-four members attended the Travis County Amateur Radio Emergency Service (ARES) face-to-face meeting at Luby's on March 29, 1994.

First thing, Joe, K5EJL, presented Local Net Certificates to about 10 members. Then he described a February test to try and establish a packet link between Austin and the new Weather Service office near Houston. The test was unsuccessful, because the Houston radio did not have a 145.01 crystal. This may hold a lesson for us as the New Braunfels NWS office comes on-line.

The City of Austin is rebuilding its Emergency Operations Center, at the corner of 8th and Colorado (second floor). It will have a radio room for hams, with cable routes to the roof. Completion is expected in June.

The Sunday ARES Packet Net (7:30 PM, 145.78 MHz, no offset) has too few check-ins! All our served agencies want ARES members to use packet radio. The City's Public Information Officers want to be able to send packet messages to the media. The American Red Cross wants to forward Disaster Assessments via packet.

Dave, N5RNE, announced that the Central Texas Traffic Net will hold a picnic on May 14 at Wimberley. He requested that Net Controls (NC's) remind everyone to copy along whenever a message is passed on the ARES net. According to Dave, the first thing a NC should ask about traffic is, "Where is it going?" He reminded us that any packet-equipped station is a liaison station, since it can forward traffic to and from the packet network.

Hal, W5MDL, is our Public Information Officer. If you learn of something newsworthy that hams are doing, tell him so he can tell the media. His phone number is 836-2012.

Stu, K5KVH, says that the Red Cross intends to set up a statewide emergency radio network. The March test on 80 meters linked Austin, Dallas and Houston; in April they will try 40 meters.

Rick, K5FNI, had several suggestions: Net Controls should remind all members to copy along whenever messages are passed on the net. NC's should always arrange for backup NC's. If Rick does not have the list of check-ins, mail it to him before the end of the month. We need more message traffic...send a birthday greeting to someone soon! Limit messages to 25 words if possible. And finally, stick around for the entire net, or ask permission to leave.

Pete, KB5YWL, says that Williamson County ARES is starting up, and they want to work with Travis County ARES. Their net meets Thursdays at 7 PM on the 145.13 repeater.

Joc, N5HPC, hopes that the Radio Amateur Civil Emergency Service (RACES) paperwork will soon be completed by the DPS. He says that Texas RACES has a new Operations Manual. FEMA now administers RACES. Dual membership in ARES and RACES is encouraged.

Mac, KB5VYT, is in charge of the ARES pagers. Ron, WA5RON, encouraged members to keep their ARES pagers, since they are the only pager system in town that does not depend upon the switched telephone system. In a communications emergency the phones may all be dead, but our amateur-radio pagers will continue to function.

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April South Austin Exam Report

The South Austin W5YI VE team congratulates all the following whose hard work and studying was rewarded with new or upgraded amateur radio licenses at the April 16 session:

Lloyd A. Goehring, Jr. N5HYR Extra Class
 Stephen C. Hughes KA5QWN Extra Class
 Clay L. Noren KC5DUW Extra Class
 Paul E. Ferguson, Jr. KC5APV Adv. Class
 James E. Galloway KC5EBP General Class
 Joe B. Head KC5FOR General Class
 Arthur J. Kellogg KB5RSQ General Class
 Todd M. Barckholtz -new- Technician
 David J. Becker -new- Technician
 Raul A. Besteiro III -new- Technician
 Kenneth D. Craddock -new- Technician
 Kristen L. Manning -new- Technician
 Herbert L. Tate -new- Technician
 Michael J. Tetzlaff -new- Technician
 Merrilyn K. Vaughan -new- Technician

Another applicant earned element credit without upgrading.

The administering volunteer examiners included:

Bob Basinger, AB5OC Hugh Brown, KC5EIIY Jim Greenwood, AB5EK Emil Kasprzyk, KC5IZ Tim Mathews, AB5OA Robert Mattocks, AB5ST Scott McCreight, AB5KS Mike Ruiz, WB5WPS

Our next session will begin at 2:00 PM on May 21st in room 109 of Fleck Hall on the campus of St. Edward's University. For more information, call Jim, AB5EK, at 327-6184.

SPACE SHUTTLE RADIO FREQUENCY LIST

By Rich Weinkauff, N8QLT, Farmington, MI

A Space Shuttle mission requires the coordination of thousands of individuals; both on the planet, and off. This coordination is directed largely by radio communications, both voice and digital; and supplies the communications enthusiast with several opportunities for listening. The following list includes radio voice communication frequencies reported to be in use during a typical Space Shuttle mission. This list has been gleaned from many sources, including personal communications, messages on Prodigy, Amateur Radio Bulletin Boards, Space and Astronomy Bulletin Boards, and the NASA Spacelink BBS. All of it is subject to change without notice, and reception is dependent on your location and the propagation conditions.

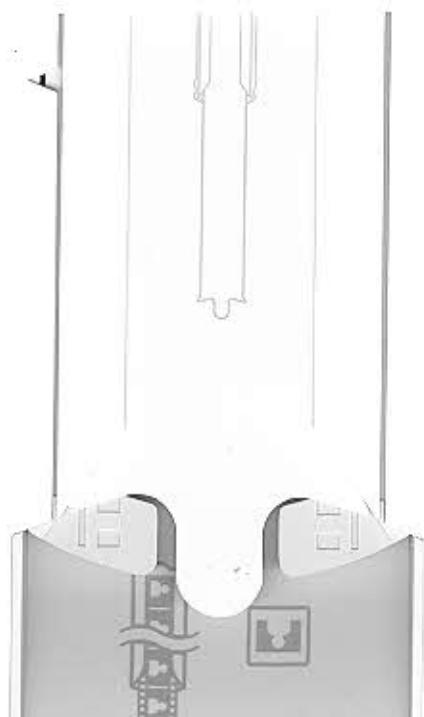
I can be reached for additions, deletions, and corrections to this list via:

Packet radio: N8QLT @ WD8DWO.#semi.mi.us.na CompuServe: 70534,227 Internet: 70534.227@compuserve.com Prodigy: BNCG39A

Launch and Landing Operations

NASA Malabar/Palm Bay, FL Nets (in KHz, USB commonly) Solid rocket booster recovery 2622 primary, 2764, 3187, 4510, 7765, 11407, 11621 NASA tracking vessels 5180, 5187 ETR range control 2678 ETR primary night channel 5190 ETR secondary night channel 5810 ETR primary day channel 10780 ETR secondary day channel 20390 Launch support ships 5680, 11104, 11252, 18009, 19303 Launch support aircraft 5350, 7676, 9022, 9043, 9132, 13227,

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The Demise of the Heathkit (Cont'd from Pg. 1)

an increasing proportion of the customer base for Heathkits, while the shifting mores of young North Americans prevent the company from finding sufficient replacements.

"Do your kids have the patience to sit down and build their own stereo set over the course of several evenings or a weekend?" Johnson asked. "Mine don't. They want to buy one at the store, so they can listen to it the very same day."

But to lots of males born before the age of instant gratification, a stereo or a radio was not just a source of entertainment. In a kit form, it also provided the even sweeter music of what Johnson calls the "Eureka Complex".

It was an experience Johnson himself never tasted before coming to Heath as a marketing director about 30 years ago. He didn't think of himself as particularly handy. So he was sceptical when his boss suggested that the best way to get a feel for the company's products was to take a kit home to build.

"My neighbour laughed when he saw me sitting at the kitchen table assembling electronic parts on a circuit board," Johnson said. "But I was so excited when I finished, I pounded on his door at midnight to come hear a transistor radio I'd made with my own two hands."

The afterglow of such a personal triumph is long lasting, Johnson added, noting that he went on to assemble more than 200 more Heathkits. The little curl of smoke that rises from a soldering iron as it joins resistors, capacitors, and inductors can induce an intoxicating habit.

So Johnson wasn't suprised by the results of a consumer survey he once commissioned. The

consultant firm he hired reported: "You don't have customers. You have fanatical loyalists."

"The consultants also said that they lost money working on our account," Johnson recalled. "They were used to spending 15 minutes on each customer interview. But Heathkit fans would talk their heads off for an hour or more, pointing out the virtues of all the TV sets and weather monitors they had built over the years."

"Tell you the truth, I've lost count of how many Heathkits I've built," observed Parrish, 65, an insurance premium auditor. "But for many years there, I built every new kit as soon as they put it in their catalog."

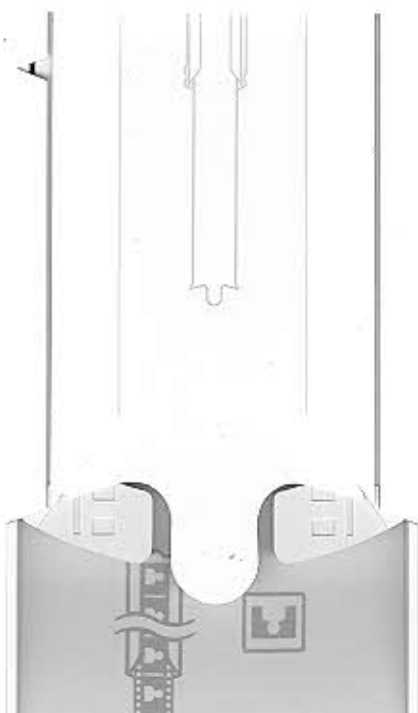
Johnson noted that Heathkit's partisans came from all walks of life. Former Sen. Barry Goldwater, a long time amateur radio buff, has assembled 75 to 100 kits, Johnson reported.

"Once Christmas, Sen. Goldwater built six of our Trashmasters to give us as presents," Johnson remarked.

Given such loyalty, Johnson dreads having to sit down this June to write his customers a Dear John letter. In it, he will tell them they will no longer receive the catalogs through which the company periodically announced wonders of modern electronics available by return mail in kit form.

Time was when lots of North American households measured the passing by arrival of the Heathkit catalog. Spring, summer, fall, and especially as Christmas drew near, the postman would deposit in their mailboxes a 100 page brochure with colourful renderings of families gathered around a big-screen projection TV or a pinball machine that Dad had built. A 1983 catalog cover showed the proud parent of a Heathkit robot diabolically grinning at the

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AUSTIN AMATEUR RADIO CLUB MEETING

President Jim Neely, WA5LHS, brought the meeting to order at 7:30 pm on April 12, 1994, at Luby's on North Loop.

VISITORS: The following visitors were introduced: Mike Tetzlaff, new ham, Philip White, K5GJV, and Marty Ringuette, KG5RU.

MINUTES: The minutes of the March 8, 1994, meeting were approved as printed in the AARC/OVER.

OFFICER REPORTS: Dave Marschall, KG5ND, Treasurer, reported that the checking account balance was \$877.82 and the postal account balance was \$371.12. Ed Golla, K3AHS, Technical Committee Chairman, was absent, but the Club's 146.78 MHz repeater is working anyway. Steve Sparks, KB5RSY, Activities Manager, was absent but President Neely announced that the spring swapfest was April 9, 1994, at the Manchaca Fire station. Although attendance seemed a little less than at previous swapfests, this one was nonetheless a success.

NEW MEMBERS: It was voted to accept the following new member: Mike Tetzlaff, a new ham awaiting his call.

OLD BUSINESS: None.

NEW BUSINESS: Pete Jordahl, K5GM, asked if the Club was still receiving a list of new hams from the ARRL and sending copies of the AARC/OVER to them. President Neely said the Club is doing that.

ANNOUNCEMENTS: Jim Bennett, WB5IMB, announced that the QCWA will meet April 16, 1994 at 11:30 am at Luby's on North Loop. The QCWA meets regularly on the third Saturday of each month.

Marty Ringuette, KG5RU, who lives in Texas Oaks Sub-division at 717 Shade Tree Drive, Austin, TX, 78748, reported on a lawsuit he had with the homeowners association regarding the construction of a sixty foot tower and deed restrictions. Marty had received written permission to erect the tower, but then the association claimed he was a nuisance and was causing TVI to both CABLEMAXX and Austin CableVision. His case was set for a jury trial but then the association decided it did not want a jury trial. The resolution of the case is still pending.

It was moved, seconded and passed to adjourn. President Neely adjourned the meeting at 7:48 pm.

PROGRAM: Rod Moag, W0NDS, Vice-President, again introduced a featured speaker who needed no introduction: Dave Harper, WD5N, a renowned DX contester, former president of both Austin ham radio clubs, and net control of the Sunday night swapnets for several years. Dave showed slides of the DXpedition he made at Thanksgiving, 1993, to the Galapagos Islands which are owned by Ecuador. The slides included many pictures of giant turtles, iguanas, blue booby birds and finches as well as antennas and rigs. Dave made several hundred QSOs during this expedition mostly with hams in the Americas as he had difficulty working Europe.

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The Demise of the Heathkit (Cont'd from Pg. 6)

electronic slave he had just wired together.

For awkward adolescents of yesteryear, the Heathkit catalog was a kind of electronic-age equivalent of the book of Psalms: Something to be read in moments of despair and discomfort. When word of the Heathkits demise started seeping out, a number of long time fans called the factory to express their regrets, notes company spokesperson, Paula Hancock. Some recalled how they used to take the catalog to high school dances.

"They explained that they would bury their noses in the Heathkit catalog," Hancock said, "because they were too shy to speak to girls."

The Heathkits origins can be traced back to the dreams of Ed Heath, perhaps the ultimate partisan of the do-it-yourself way of life. A barn storming pilot in the early days of flying, he founded the Heath Airplane Co. in a factory on Chicago's Sedgwick street in the early 1920s. There he designed a small, affordable airplane, which he christened the Parasol.

"Heath sold both fully assembled planes and kits for folks to build in their garages," Johnson said. "Some customers would build their Parasol a wing at a time, for say \$100 each, until they had all the parts necessary to get their airplane up and flying."

In fact, Heath's kits were assembled by thousands of amateur aviators across the country. But in 1931, Heath died in a test flight crash. Shortly afterward the United States federal government enacted strict regulations governing home-brewed aircraft, which bankrupted the company. Its surviving assets were moved to Michigan, where the company was acquired by Howard Anthony in 1936 for a few hundred dollars. Anthony added two-way radios to Heath's airborne offerings, and the company's fortunes improved during

World War II when it got government contracts to produce airplane parts for the military.

One day shortly after the war, Anthony got a call from an electronics parts dealer who was helping to liquidate the governments surplus stocks. Sight unseen, Anthony agreed to buy three box-car loads. Then he rushed to his banker to borrow the money he needed to consummate the deal. When the railroad cars arrived at his factory, Anthony found among the other gadgets he now owned were 1,000 oscilloscope tubes.

An oscilloscope displays the mathematical curve corresponding to a given electronic circuit, which makes it an invaluable diagnostic tool for repairmen and technicians. At the time, an oscilloscope tube sold for \$50 or more. But Anthony had bought his for about 50 cents each. That allowed him to package a tube plus all the other components necessary to build an oscilloscope and sell the lot, along with a schematic diagram of how to assemble the device, for \$39.50 each.

From Ham on Disk, March - 1994

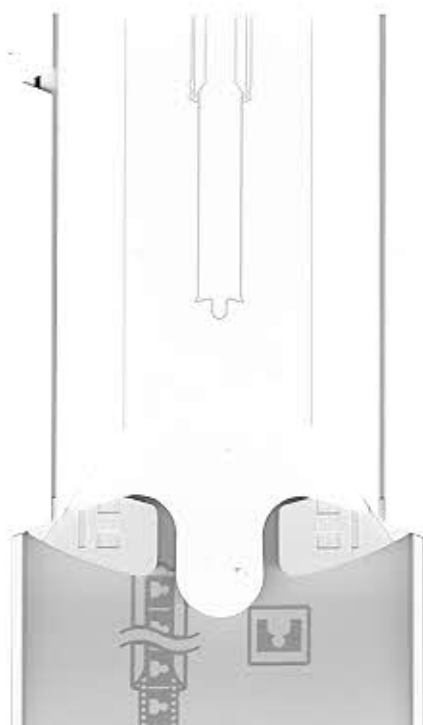
AN INTRODUCTION TO AMATEUR SATELLITES AND EARTH-SPACE COM- MUNICATIONS

The following text was compiled from the following sources:

* "How to use the EZSATS pas tables by N9LTD" reprinted without permission. Full text, tables, and lots of other useful information can be obtained by sending a SASE to David Mullenix N9LTD, 2052 Brentwood Pky, Madison, WI 53704

* "Amateur Radio Satellite Frequencies" This file can be obtained from the ARRL

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Huck's Country Store

By Huck Huckabee - AA5BU

When Too Much Radio Equipment is Not Enough

At the end of WW-II, all of the Radio Broadcast Equipment in Germany was damaged and out of operation. The Occupation Forces desperately needed a means to convey "The Official Voice of the Armed Forces" to the German people.

Southern Germany has an area that approximates the distance of Dallas to San Antonio. The plan was to saturate the area with a powerful radio signal in the center of the AM radio dial.

Adolph Hitler had a 100 KW station in Stuttgart and in Munchen (Munich). These two cities are just 125 miles apart. The stations were repaired and placed on 1.0 MHz in the AM radio dial center. Each operated on the same frequency, with the same program. Everyone in Europe was to hear these giants! But alas, it did not work. Due to received phase differences in RF and audio frequencies it was a mess. In some cases the RF signals added in power; in others the signals cancelled each other and audio was worse than poor-grade Ham SSB.

The next step was to add another station, rated at 10 KW, to fill in the shadow-area. This was placed at Bayreuth. Now we have three stations in a triangle of approximately 125 miles per side. Now what happens? The shadow-area of poor-to-no-reception grew larger.

Extensive testing of field strength and reception reports were confused by garbled audio in high signal strength areas. Then the audio was linked by VHF gear, rather than telephone lines.

Further testing proved that the Stuttgart station alone gave better coverage than any two or three stations of the group. That station was more centrally located in the area targeted for coverage.

This venture was a great disappointment to our armed Forces and the engineering ability of our nation; and of the German engineers. When I left Germany 1-1/2 years later, the problem was still unresolved, though in continuous operation. This taught a young sergeant that small equipment is plagued with little problems; but the big boys also have problems in proportion to the size of their Big Guns!

From memories of M. Sgt. J.M. Huckabee, D4AFR Ansbach, Germany 1945-46

South Austin Exam Session Report

The South Austin W5YI VE team congratulates the following people who earned new or upgraded amateur radio licenses at its March 19th session:

Robert H. Gould N5OCK Advanced Class, Joseph E. Brown KA5LLL General Class, Lawrence J. Matus, Jr. -new- Technician Plus, Joe L. Foster -new- Technician, Thomas C. Harkins -new- Technician, Henry A. Roerber -new- Technician, Jason P. Sparks -new- Technician.

Four others earned element credits without upgrading.

The administering volunteer examiners were: Bob Basinger, AB5OC Hugh C. Brown, KC5E1Y Jim Greenwood, AB5EK Emil Kasprzyk, KC51Z Tim Mathews, AB5OA Lloyd Walls, WA1PRY Mike Williams, AA5KW

The Manchaca Swapfest is almost here and the South Austin VE team will be there! That session will begin at 9:30 AM on April 9th in the meeting room above the fire hall.

On the Saturday following Manchaca, April 16th, we will present our regular VE session at 2:00 PM in room 109 of Fleck Hall on the campus of St. Edward's University. For more information on either session, call Jim, AB5EK, at 327-6184.

Please note that the GENERAL class written element question pool will change on July 1 of this year. Before purchasing a study guide for element 3B, please check its effective date, if you plan to take the general class written exam on or after July 1st.

Results of the ARRL/VEC Exam

The regular semi-monthly ARRL/VEC test session was held on Saturday, March 5, 1994 at Murchison Middle School. There were a total of 24 candidates taking exams, with 11 upgrading or earning a new license. In addition, there were 6 candidates that passed one or more exam elements toward upgrading their license.

VE EXAMINERS

Joe Makeever W5EBJ Roy Miller W5FOZ
Jim Huckabee AA5BU Curt Goodson
W4QBU Dick Ber KB5BBU Ben Menke
AA5NC Bill Pierson K5TMS Larry Gunter
WB5BEK

THE NEXT ARRL/VEC EXAMS WILL BE HELD AT MURCHISON MIDDLE SCHOOL, 3700 NORTH HILLS DRIVE, AUSTIN, TX ON:

Saturday, May 7, 1994 @ 9:00 am
(please arrive by 8:30 am)

If you have any questions regarding the upcoming exams, please contact me at 473-3200 (work) or 345-7281 (home).

Please note that the next W5YI/VEC exams will be given at the same location and time as shown above on April 9, 1994.

PLEASE NOTE THAT THIS APRIL DATE IS ONE WEEK LATER THAN PREVIOUSLY POSTED.

If you have any questions about the next W5YI/VEC exams, please contact Mark Johnson, KJ5AN at 335-4327.

Larry Gunter, WB5BEK

Introduction to Amateur Satellites... (Cont'd from pg. 8)

e-mail server. For information on the server, send an e-mail message to info-serv@arrl.org with 'HELP' in body of message.

* "Summary - Getting onto the Hamsats"
This was an article posted to [rec.radio.amateur.misc](mailto:rec.radio.amateur.misc@access.digex.com) newsgroup by Stephan Greene (sgreene@access.digex.com) on 20 Mar 1992. The article is also available via anon ftp from [ftp.cs.buffalo.edu](ftp://ftp.cs.buffalo.edu) or Australian mirror at [grivel.une.edu.au](ftp://grivel.une.edu.au) as file `pub/hamradio/ham_sat_sum`.

* "An Amateur Satellite Operation Upgrade Path" from the AMSAT Journal, September/October 1993, pp. 24-26.

FORWARD:

Having recently started to get into Satellites, I asked MANY people what it took to get started and what to do. I found few people who could offer all the information necessary to start. I have attempted to compile this information for future newbies. If I have missed something, please ask and I will attempt to add it to the collection.

Also, if you really want to get serious about satellites, I would STRONGLY recommend joining AMSAT to help promote the satellite hobby. AMSAT is a volunteer organization that works for the interests of amateur satellites. Dues are only US \$30 per year and you will receive a subscription to "The AMSAT Journal". For US \$80, you will receive first year dues and a copy of Instant Track computer tracking software which is a top-notch program. Instant Track was donated to AMSAT by its author and its sales account for a considerable portion of AMSAT's income. AMSAT-NA, 850 Sligo Avenue, Silver Spring, MD 20910-4703. (301) 589-6062. Credit cards welcome. NOTE: I am in no way connected with AMSAT-NA, other than I have found their publications quite

useful.

MODES:

The combination of uplink freq, downlink freq, and transmission mode are all lumped together into standardized satellite MODES. Here is a list of common satellite modes used by satellites covered by this article:

A - This mode requires a 2 meter SSB/CW transmitter and a 10 meter SSB/CW receiver and supports CW and voice.

B - This mode requires a 70 cm SSB/CW transmitter and a 2 meter SSB/CW receiver and supports CW and voice. Some satellites also support RTTY and SSTV in this mode.

K - This mode requires a 15 meter SSB/CW transmitter and a 10 meter SSB/CW receiver and supports CW and voice. This mode is unique in that it can be done with a simple HF rig.

JA- This mode stands for J Analog and requires a 2 meter SSB/CW transmitter and a 70 cm SSB/CW receiver and supports CW, voice.

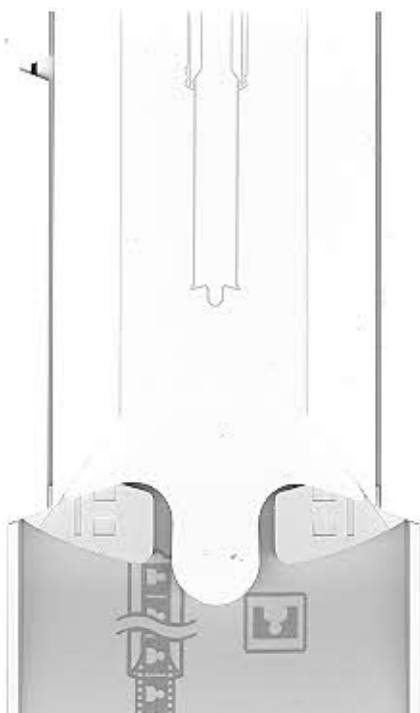
JD- This mode stands for J Digital and requires a 2 meter FM transmitter and a 70 cm SSB/CW receiver and supports packet.

S - This mode requires a 70 cm SSB/CW transmitter and a 2.4 GHz SSB/CW receiver and supports CW and voice. Many people use a 2.4 GHz to 2 meter converter with a 2 meter SSB/CW receiver instead of buying a 2.4 GHz SSB/CW receiver.

Also, satellites have 3 basic types of retransmissions: beacon, transponder, and repeater.

Beacon - Most satellites have a fixed Morse beacon at the lower end of the satellites band-pass transponder. This is useful to detect when the satellite has crossed the horizon and is in range for operation. It can also be used to determine doppler shifts.

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Introduction to Amateur Satellites...(Cont'd from pg. 11)

Transponder - A transponder is a band-pass repeater. It accepts a range of frequencies on the input and retransmits the entire range on the output. All offsets within that range are preserved. NOTE: since the satellite is transmitting many signals at the same time, it is dividing its output power amongst all of these signals. If someone transmits a very powerful signal into the satellite, it will spend most of its power retransmitting that signal and all of the other signals will drop in power. This is NOT a way to earn friends and people who overpower the satellites input are called "alligators" and are not very popular.

Repeater - This closely resembles a land-based repeater. It listens for signals on one frequency and retransmits it on another frequency. All satellite repeaters (and transponders) are full duplex, meaning you can (and should) listen to your signal on the downlink (with headphones) while you are transmitting.

SATELLITES:

Some satellites are easier to work than others. The satellites that follow can be operated fairly easily and are referred to by some as the Easy Sats. What follows is a brief description of each satellite. A summary list of operating frequencies is included later.

Mir

Mir (pronounced "mere" - "Peace" in Russian) is the Russian Space Station. It's been in orbit since 1986. All recent Russian Cosmonauts have been hams and have call-signs with "MIR" in them, such as U2MIR. Mir has 2-meter equipment on board and they operate packet and voice on 145.55 MHz. (This is the same freq as the Space Shuttles.) The cosmonauts also have a digital voice recorder which can repeatedly transmit voice announcements.

The best way to get a QSL card from Mir is to connect to their TNC's mailbox, R0MIR-2, (That's R Zero MIR) leave a message AND GET A MESSAGE NUMBER. You must have the message number to qualify for a QSL. The TNC is often busy because amateurs forget to disconnect before Mir goes under their horizon. In a case like this, try connecting to yourself or a friend VIA R0MIR. And if you hear a heavily accented voice calling CQ, by all means say hello!

70 cm and ATV gear is being prepared for future flights!

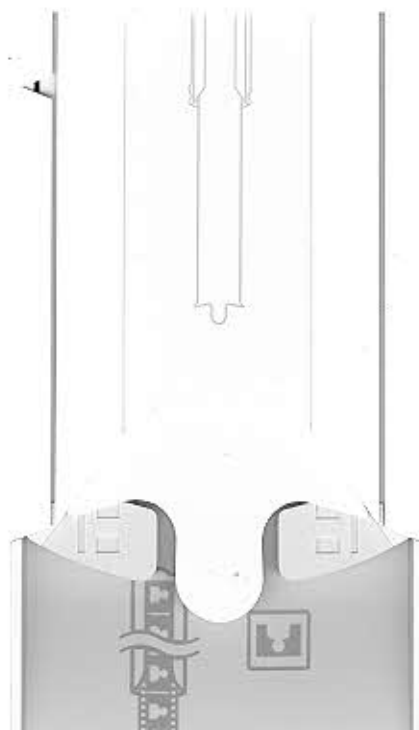
QSL Address: Sergei Samburov (RV3DR)
Prospect Kosmonavtov. d.36, kw.96 Kaliningrad City, MOSCOW 141070, RUSSIA.

Sergei can also be reached via packet radio as RV3DR @ RK3KP.#MSK.RUS.EU

A special note on calculating Mir's orbit: Mir is big and it's in a low orbit. This means that there's a lot of atmospheric drag and it has to fire its rockets every month or two to boost itself back up or it would have re-entered and burned up long ago. Unfortunately, whenever this happens, it throws off all pass predictions. When this happens, Mir will arrive LATER than predicted, so if you tune to 145.55 and nothing happens at the predicted time, keep waiting, it may be along in 10-30 minutes.

SEEING MIR: Mir is also the only EZSAT that can be seen. Mir is very big, about the size of a semi-trailer, and when it comes over just after sunset or just before sunrise, you can often see it go by. This is because Mir will still be in sunlight while you're in the earth's shadow. In these cases, Mir looks like a very bright star gliding across the sky. It's a beautiful sight and well worth looking for. It's best to use a tracking program set to VISUAL to find visible passes. The best such programs will even draw you a star map and show you Mir's path across it. Don't forget to tune to 145.55

(Continued on Page 15)



Space Shuttle Radio Frequency List...
 (Cont'd From Pg. 5)

13878 Cape Radio/Leader 4856 Cape radio/Coast Guard Ships 4992 Cape Radio/Launch support A/C 7461 Cape radio 6896, 6837, 11414, 11548, 19640, 23413 S&R Coast Guard primary 3024 S&R Primary recovery zone 4376 S&R Primary Atlantic 6720 S&R comm with Bahamas 7412 Backup mission audio 2664 Navy harbour control 2716 Launch tracking net 7525, 20186 Space missile tactical net 10305 OCC Shuttle mission audio 20198 NASA CB radio channel 9 27065 AM Data buoys 2405 Data channels 7919, 7985, 13237, 13495 Malabar-Ascension Island MUX 10310, 13600, 20192 Ascension Island-Malabar MUX 14937, 19966, 22755 USAF/NASA communications 4510, 4760, 4855, 4992, 5350, 5810, 6727, 6740, 8993, 9315, 9974, 10780, 11104, 11414, 11548, 14615, 19303, 19984, 20191, 20475

Edwards AFB: (frequencies in MHz) 116.4 00 ATIS 120.7 00 control tower 121.8 00 ground control 126.100, 127.800 approach control 133.650 approach/departure control 138.450 commandpost 149.925 security 162.6125 NASA ops 164.1 00 NASA 173.5875 fire 236.6 00 control tower 269.9 00 ATIS 290.3 00 departure control 318.1 00 tower 348.7 00 approach control 372.2 00 dispatchers 390.1 00 ground control

Kennedy Space Center Operations (KHz) 2182, 3023

Kennedy: (MHz) 117.8 00 shuttle control 121.750, 126.300 ground control 126.650 weather 142.500, 143.040 cranes 148.455 NASA booster recovery 148.485 launch countdown/status 148.500, 149.100 Search and Rescue ships 149.175 shuttle crawler 162.000 Search and Rescue ships 162.0125 NASA vessels 162.6125 NASA ops 163.4625, 163.4875 security 163.5125 security 163.5625 fire - primary 164.0 00 radiation checks 164.800 Search and Rescue aircraft 165.1875

check points 170.150 base operations 170.175 transportation 170.350 public relations 170.400 General Services Administration 171.150 maintenance/fuel 171.2625 camera tracking 173.175 security - gates 173.4375 medics 173.5625 fire/rescue 173.6625 safety units 173.6875 security - vans 173.7875 fire - secondary 284.0 00 ground control

Kennedy Space Center Ground Support (MHz) 148.480, 149.170, 162.610, 163.460, 163.480, 163.510, 163.560, 165.190, 170.150, 170.170, 170.350, 171.150, 171.260, 173.560, 173.680

Patrick AFB: (MHz) 118.400 approach/departure control 121.700 ground control 125.100 approach control 126.200 control tower 128.800 dispatcher 138.300 command post 273.500 ATIS 335.800 ground control 340.900 approach/departure control 344.600 weather 348.400 control tower 358.300 approach control 372.200 dispatchers

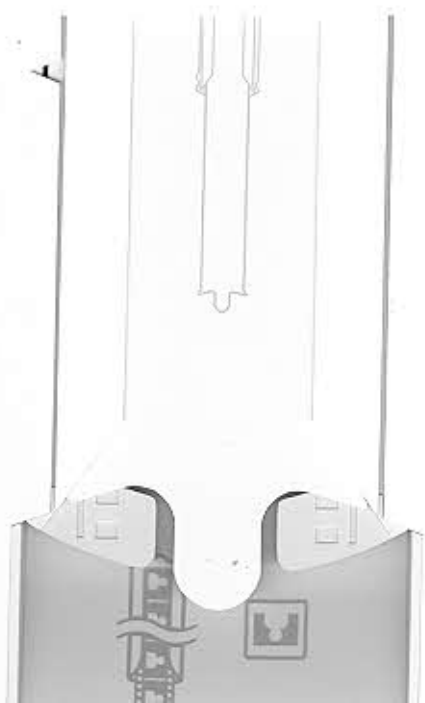
International emergency air frequencies (MHz) 121.500 243.000

Shuttle frequencies: (MHz) 296.800 primary, air-to-ground or orbiter-to-suit 259.700 air-to-ground or suit-to-orbiter 279.000 suit-to-orbiter or suit-to-suit

Communications and other stuff: S-band (MHz) 2205.000 Air-to-ground 2217.500 Air-to-ground secondary 2287.500 Air-to-ground primary digital downlink 2041.900 Ground-to-air 2201.400 Ground-to-air 1831.800 primary (USAF uplink, phase modulation) 1775.100 secondary 2250.000 wide band FM with main engine analog telemetry during launch, or TV during orbit operations.

Note from Ron Parise, WA4SIR, on above S-band frequencies: "The S-band system is one of the primary orbiter downlink bands. The voice channels are digital slope delta modulation and are MUX'ed in with the rest of orbiter telemetry very difficult to copy."

(Continued on Page 15)



Austin Amateur Radio Club, Inc.

Officers

Jim Neely, WA5LHS, President442-4812
Rod Moag, W0NDS, Vice Pres.467-6825
Dave Marschall, KG5ND, Treasurer 834-1779
John Weber, KF5OY, Secretary 280-1082
Steve Sparks, KB5RSY, Activity Mgr. ... 251-7791

The Austin Amateur Radio Club, Inc., maintains a repeater with open autopatch and emergency power on 146.78 MHz, and an emergency HF/VHF station at the American Red Cross Building. Membership dues are \$6 per calendar year (\$10 for a family). Please contact an officer if you would like to join the club. Come on down to the next meeting!

Committees and Positions

Ed Golla, K3AHS, Technical 255-4818
Joe Fisher, K5EJL, ARES Coord.926-4689
Steve Means, N5PSW, A/Over Ed.452-7240
4800 Caswell.....Austin,TX..78751

AARC Meeting Minutes...(Cont'd from Pg. 7)

Rod announced that the program at the May meeting will be concerned with designing and constructing loop antennas for small and limited areas.

Respectfully submitted,

John Weber, KF5OY

AARC Secretary

Viewpoints expressed in The AARC/Over do not necessarily reflect those of any club or its members, directors or officers.

Members are encouraged to submit material for publication... send material to the Editor at 4800 Caswell, Austin 78751, by packet on the N5PSW BBS - 145.09 MHz or by connecting to the Balcones Fault Line BBS (452-2135). Submissions maybe edited for format, style and suitability. **Deadline for the next issue is the 14th of this month.** Late material will be saved for later months. Permission granted to reprint AARC/Over.

Calendar

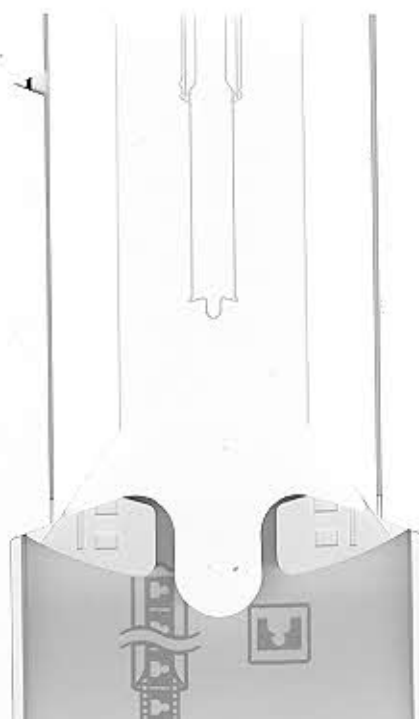
May 3... Austin Rptr. Org. meets at Luby's
May 10... Austin ARC Meeting, Luby's
May 18... Austin Amateur TV Club - Luby's
May 21... QCWA meets at Luby's - 12:00

Weekly Events

ARES Net... Sun., 6:30 PM, 146.94 MHz
ARES Net... Sun., 8:30 PM, 146.78 MHz
SwapNet, NewsLine... Sun., 9 PM, 146.94
Lunch... Thurs. @ Holiday House #4
U.T. Net... Thurs., 7 PM, 145.21 MHz
QCWA Net... Thurs., 8:15 PM, 147.18
Breakfast... Sat., Simon David Deli
521 Trade/Tech Net... Sat., 9 PM, 145.21
WeatherNet... as needed, 146.94 MHz

AARC Meeting - May Program

Chuck Templeman, W2EHE, from Kingsland, TX, will speak about building high efficiency small loop transmitter antennas. He will also show a computer program that aids in modeling the loops.



**March ARES Meeting..
(Cont'd from Pg. 4)**

Dave, N5RNE, noted that ARES has no policy on when pagers should be set off. After discussion by several members, Joe said that the Planning Committee will come up with something.

In light of the City of Austin's upcoming new cellular radio tower laws, Joe reminded us that ARES needs someone to volunteer to be our Local Government Liaison. Ron recommended that everyone join and participate in their neighborhood association, to help head off anti-ham laws.

Roger, KB5VHN, is helping start a Scout Specialty Explorer Post at 2200 Justin Lane, complete with ham radio station.

Travis County ARES meets every Sunday at 6:30 PM on 146.94 MHz, at 7:30 PM on 145.78 (packet) and at 8:30 PM on 146.78.

de Miles, N5KOB

**Space Shuttle Radio Frequency List...
(Cont'd From Pg. 5)**

Much of the downlink TV is S-band wide band FM and should be easy to copy.

The Ku-band system is used in conjunction with the TDRS satellites, and is used more heavily during Spacelab flight than others. The data rate is very high digital (50 Mbits/sec), and will be nearly impossible for you to demodulate and decommutate in your basement. Nevertheless, the shuttle transmits on 15.003 GHz. These transmission are directed toward the TDRS satellite with a high gain antenna, and cannot be copied from the ground.

The UHF frequencies are fun to listen to, but are not heavily used except during EVA's.

You will almost always hear some activity on them during a mission, just be patient."

Ron WA4SIR

Contractors Rockwell (Edwards) 2995.5, 3282.5, 3475.5, 5597.5, 10010.5, 17966.5 (kHz, USB) 122.800, 123.050, 123.350, 123.525, 462.925 (MHz)

Rockwell (Edwards/Kennedy) 123.475 (MHz)

McDonnell Douglas (Edwards) 123.300, 123.550 (MHz)

Com-Tech Associates (Kennedy) 151.955 (MHz)

IBM & Harris Corp. (Kennedy) 152.480 (MHz)

TWA (Kennedy) 154.515 (MHz)

-From Ham On Disk - March - 1994

**Introduction to Amateur Satel-
lites...(Cont'd from pg. 12)**

when you see it. Also, don't forget to get on the local repeater and tell people when you spot it so that others can share in the fun.

OSCAR-21, RS-10/11, RS-12/13

These three satellites are all in 600 mile high polar orbits, which carry them over the US six to eight times a day for 10-18 minutes at a time. They all have orbital periods of about 95 minutes and we typically get two sets of three or four passes spaced 95 minutes apart. The two sets of passes are spaced 12 hours apart and their passes come a little earlier each day because their orbits don't take quite exactly 95 minutes.

(Continued Next Month...)

-From Ham on Disk, March - 1994