# The Minuteman

Volume 27 Issue 4

March 1998


## President's Corner

**Andy Morrison, N1BHI**

In this issue I put a little humorous item about the FCC and the internet. It made me want to explore the internet phenomenon and talk a bit about it's impact on our hobby.

It looks to me as though it has had a major effect in two ways....I know that I now spend a lot of time I might have allocated to Ham Radio fooling around online, and I'll bet that's true of a lot of us. Makes me feel vaguely guilty....

Young people are wired to internet and use it extensively. It's a lot more available and easy to get access to than Ham Radio, and it's "in." The Ranks of our hobby were always filled by newcomers from the elementary, middle and high school set, but that isn't happening now to the extent that we need if we are to grow. The nocode license helped some, but the effect of that is not going to be significant over the long term.

We can see the whole phenomenon in the ranks of the MMRA. Slowly but surely, we are shrinking. It's getting harder to attract new members and keep old ones. People's interest are getting more diverse, and our group does not have the same priority in people's lives that it used to.

There's gotta be a new hook. We have to figure out some way to marry out communications technologies with the interests of more people. In a world full of innovation, we aren't doing much that's new.

Maybe there are some things that would build that link...digital radio systems are here, and here to stay. What if we were to start building digital repeater networks that could multiples voice and data communications? The technology is here, certainly...could we marshal the resources to do something like that?

It is possible anymore for Hams to get enthused about something new and begin designing and building? We did it not too long ago with linking. Could we put together a digital repeater and adapt existing existing equipment to use it?

I think we could...but we have to be interested in doing it. Without that the answers to all those questions is a resounding No.

I don't pretend that the digital radio system idea is *the answer*; but with all the brainpower we have in the hobby, we should be able to come up with some ideas that might work. The key requirement is that whatever it is, it has to bridge RF communications technology and some broadly held interests that would result in new attraction to Ham Radio. It would be even better if the new idea could be useful to the public interest as well.

Think about it.....

## How Repeaters Work

**Andy Morrison, N1BHI**

I wrote an article on this subject about 5 years ago; since then we have a whole bunch of new members. So I decided to rehash the subject for those who might be new to the hobby and want to know more about how a repeater works.

Conceptually repeaters are simple machines. You already know that when you key your FM transceiver, the radio switches from the receive frequency to the transmit frequency. When on 2 meters, the transmit frequency is either 600 Kilohertz higher or lower than the receive frequency, on 440 the difference is 5 Megahertz. The repeater is receiving on your transmit frequency, and re-broadcasting your signal on its transmit frequency - which is your receive frequency. Your transceiver operates "half-duplex" - you can't hear anything while you are transmitting. The repeater is operating "full-duplex" - it must both receive and transmit at the same time. It is this requirement that is the key to repeater operation, *along with the fact that the repeater must use the same antenna for both transmit and receive.*

To accomplish this the most important problem that must be overcome is that a receiver connected to the same antenna as a transmitter would be destroyed by the transmitter power coupling back into its front-end. We need some kind of device to filter out the transmitter's RF energy, keeping it out of the receiver. That device is the heart of the repeater, and is called a "duplexor." The problem goes beyond just keeping the receiver from being damaged....we must also keep the transmit RF power from "desensing" the receiver. Even a few microvolts of power 600 kHz

*(Continued on page 9)*

## MARCH MEMBERSHIP MEETING

**WEDNESDAY, MAR 17, 1998 - 1930 HRS**

**CAMPION CENTER, WESTON MA**

**PROGRAM:**

**Remote Meter Reading**

**Andy Morrison, N1BHI**

**HT Clinic**

**Raffle**

Other Stuff

## Walk for Hunger 1998 Needs Amateur Radio Volunteers

The Crocker Public Service Group is looking for amateur radio volunteers to provide communications for Project Bread's 1998 Walk for Hunger.

This charity walk, the largest of its kind in the United States, has an attendance of over 45,000 walkers who attempt a 20-mile route from Boston to Newton and back. The Walk raises funds for food banks, soup kitchens and food pantries in 113 communities throughout Massachusetts.

Amateur Radio is needed for a variety of assignments - communications are needed at checkpoints, on busses and vans, for walk officials, and for "marshals" who ensure participant safety. The Walk is on Sunday, May 3rd. Some shifts start early, some start late. If you are up to it, we can put you to work all day. We will be using 2 meter HTs and mobiles for communications.

There are many ways to sign up -- and you only have to do one of them: Send E-mail to kc1us@ma.ultranet.com and a form will be returned ..OR.. using your internet browser, go to www.projectbread.org/amateur-radio.html and follow the instructions ...OR... call me at (781) 275-3740 after 7:30 PM and I can take your information on the phone.

Bruce Pigott, KC1US

**Editor's Note: This is worth your time...if you can help, get in touch with Bruce.**

## MMRA VE Sessions

2nd Saturday of Each Month
Marlboro Public Library, 9AM
Contact: Bill Wade, K1IJ
617-891-9079 Evenings 6 to 10 PM,
Weekends 8 AM to 10 PM.
**Accredited - ARRL VE Program**

## A Real Antenna Farm...

In the last newsletter we showed a photo of a tower coming down , marking the death of a large HF listening site here in the U.S. The picture below comes from the HamRadio Online photo gallery; it shows the towers used to support multiple rhombic antennas in Scotland, at a listening site there.

During the cold war, the western allies built and operated many such sites. Their use originated during World War II. It was just such an operation that was used to listen to Japanese Fleet communications, enabling the decoding of the messages that allowed us to intercept the fleet sent to attack and invade Midway.

Because the rhombic antenna is so effective, that was the antenna of choice for HF listening. But because they are so big, you need a huge facility to set up enough rhombics to listen to signals from different parts of the globe.

So you build a large network of towers, positioned so that as many of them as possible can provide support for different parts of multiple antennas. If you remember the dimensions we showed in the last newsletter, you realize that each antenna can require hundreds of meters of length, and must be well above the ground.

To buy and live on one of these old facilities - left intact of course - would be an HFer's dream. He would have the best of the best in HR arrays, and plenty of towers to put up VHF and UHF antennas as well.

Sooner or later, all these sites will be gone...there's one in New England, on the Maine coast, not too far from Machias. It has a network of towers like the one shown below. We think it's still there, and it would be an interesting place to visit while on a trip down-east.

R.A.F. Kirknewton, the U.S. intercept station southwest of Edinburgh, Scotland. This is a partial view of the antenna farm of rhombics. Photo Jul. 1965.

# Items of Interest From the ARRL Letter

## HAMS HELP IN AFTERMATH OF FLORIDA TORNADOES

Hams pitched in to help in the aftermath of intense storms and tornadoes in Central Florida that killed more than three dozen and injured hundreds of others. The tornadoes and heavy thunderstorms struck early Monday while most people were asleep, surprising the residents of the affected areas between Daytona Beach and Orlando. Many were left homeless by the storms, now being called the deadliest and most destructive in Florida's recorded history. Weather observers blamed the tornadoes on the El Nino weather system. Some families lost their homes and everything they owned. In one tragic incident, a tornado wrenched an 18-month old toddler out of its father's arms; the child later was found dead. In another miraculous one, the storm picked up a youngster on his mattress and placed him gently on an oak tree.

ARRL Northern Florida Section Emergency Coordinator Nils Millergren, WA4NDA, said the tornadoes mostly affected Florida's East Central District, while the West Central District--Sumter County in particular--experienced flooding. At least three Red Cross shelters were reported open in the days right after the storms struck. Millergren says amateurs were providing communications for shelters and had put in hundreds of operator-hours in Sumter County alone. Seminole County ARES/RACES member Allen Wilson, WB7BCI, was among dog-handler hams activated to assist in the search and rescue effort. Other hams were involved in damage assessment and in providing backup communication to relieve already-congested commercial systems. Net operations on 2 meters continued this week, and volunteers still were being solicited in Northern Florida.

Osceola County--the only county in the Southern Florida section affected by the storms--was said to have been hardest hit. Osceola County EC Christopher Hammock, KE4DUJ, spent several days at the county Emergency Operations Center. Osceola has a small ham population. Southern Florida SM Rip Van Winkle, AA4HT, reports hams from outside the county--particularly from Polk County--were helping out. Van Winkle said Osceola ham operations in support of the emergency wrapped up February 26.

President Clinton visited the affected area this week. Damage was reported to be in the tens of millions of dollars. Curfews were imposed in some areas to deter looting.--*thanks to Nils Millergren, WA4NDA, Rip Van Winkle, AA4HT, and others*

## EMERGENCY OFFICIAL PRAISES FLORIDA HAM RESPONSE

Osceola County, Florida, Emergency Management Coordinator Steve Proctor says hams bridged the gap when tornadoes and heavy thunderstorms wreaked havoc on central Florida February 23. "We had a great response," Proctor said this week. He estimated that as many as 30 hams--some of them from Brevard, Indian River and Polk counties--were directly involved in providing disaster communication and in damage assessment activities in his area. "We had ARES, RACES, and REACT in here working," Proctor said. "Emergency Management was certainly grateful for the assistance." Proctor said he hopes to have his own ham ticket soon.

In the hours right after the surprise disaster, the Red Cross did not have any communication from its four emergency shelters, Proctor said. Telephone service was disrupted when a main telephone trunking station was badly damaged by the storms. Proctor said Osceola County had to move to its secondary EOC in Kissimmee as a result.

As the bad weather moved in, Central Florida hams activated a SkyWarn net on advice of the National Weather Service in anticipation of severe storms. Storm-spotting hams stayed on duty during the evening of February 22--when the first tornado was reported in Volusia County--and into the early morning hours of February 23. At one point, SkyWarn newcomer Paul Catineau, KF4UTN, announced to the net, "The sky is boiling!"

Emergency Coordinators Bernie Farthing, NP2CB, in Orange County, Dick Fess, K4FUY, in Seminole County, and Bill Crandall, KM4AE, in Volusia County activated their EOC positions and ARES and RACES teams early on February 23. The Red Cross was among the first agencies requesting amateur support. Dozens of other hams participated at EOCs and shelters or in damage assessment and communication support.

Army and Air Force MARS stations also assisted during the storm assessment and recovery. Army MARS Public Relations Coordinator Lorraine Matthews, N4CZF/AAA9PR, said the experience that Florida Army MARS members gained from Hurricane Andrew and subsequent storms "served well to get Florida Army MARS activated for this emergency as well." Matthews said MARS stations supplied essential information reports to Army MARS management and the Directorate of Military Support. These reports are shared "with the appropriate federal agencies who might be requested to assist," she said. Army MARS utilized existing nets, and stations remained on the air throughout the day in the storm's aftermath.--*thanks to Steve Proctor, Lorraine Matthews, N4CZF, Mike Welch, KF4HFC, Norm Lauterette, WA4HYJ, and Dave Flagg, N4BGH*

## ALL THE NEWS THAT'S FIT TO PRINT-- AND HAM RADIO TOO

Ham radio got some highly visible ink March 5 in one of the nation's most prestigious newspapers--the *New York Times*. The article, "Ham Radio, Version 2.0, for the Silicon Era," by John Verity, appears in The *Times*' new "Circuits" section, on page G9. Among those prominently mentioned in the article was AMSAT-NA Executive Vice President Keith Baker, KB1SF, who's also pictured in his shack. Baker says photographer Chris Kasson showed up at his Xenia, Ohio, home a few weeks ago and spent several hours snapping pictures of his gear, his shack, his antennas, and him. Also quoted was ARRL Advertising Manager Brad Thomas, KC1EX. ARRL Media Relations

*(Continued on page 4)*

## Items of Interest....From the ARRL Letter

*(Continued from page 3)*

Manager Jennifer Gagne, N1TDY, worked with Verity in developing the article.

Verity's premise: "A new, digitally hip generation is sweeping into ham radio and virtually reinventing it from the inside out." He talks about how much of the hobby has become computer-oriented, reliant as much on "microchips and software" and links to the Internet as on the more traditional hardware associated with hams. The article focuses on some of the more futuristic types of amateur activities such as satellites, although the pending Phase 3D is not mentioned. The article included both the ARRL and AMSAT Web sites. Also mentioned were moonbounce, ATV, and SSTV. Even the Heathkit Virtual Museum (**http://www.cyberventure.com/heath.html**) got a plug.

Baker says the article was great publicity for Amateur Radio and for AMSAT. "Mr Verity and I spent a few hours on the telephone talking about the continuing magic of Amateur Radio and what AMSAT has done to spark new ways of telecommunication over the years," he said. Baker said Verity "was quite impressed with the ease with which we regularly communicate through our fleet of AMSAT satellites," and especially that hams can hit some satellites using an H-T. "If it sparks enough interest in just one youngster to become a ham, then it was well worth the effort!"

Hams may raise their eyebrows when they come to the part where Verity cites 4000 W as "the legal maximum" for amateurs. Even though "it says so in the newspaper," the legal limit remains 1500 W PEP.

Seeing the article sparked renewed interest for at least one inactive ham. Leonard Spear, WA1LBC, of West Palm Beach, Florida, and Branford, Connecticut, called HQ to say he's now excited about getting back into ham radio, and especially finding out more about satellites and packet radio.

Those who can't get a hard copy of *The New York Times* can view the article at **http://www.nytimes.com/library/tech/98/03/circuits/articles/05ham-radio.html**.

### AMATEUR RADIO OUTLOOK COMMITTEE WANTS TO HEAR FROM YOU!

The Amateur Radio Outlook Committee wants to hear from you! The committee--appointed last fall during the International Amateur Radio Union Administrative Council meeting in Beijing, China--seeks comments from hams on their views concerning the future of Amateur Radio in the age of the Internet. The comment deadline is June 30, 1998.

IARU President Richard Baldwin, W1RU, appointed the Amateur Radio Outlook Committee. Its members are Chairman Thomas Atkins, VE3CDM; Lou van de Nadort, PA0LOU; and Yoshiji Sekido, JJ1OEY. The idea to solicit comments stemmed from a "lively discussion" at the September Council session about the Internet and its impact on the Amateur Radio Service. This prompted the Council to consider addressing concerns about the future growth and development of ham radio. In addition to reviewing the current and future state of the art in the Amateur and Amateur Satellite Services "in the light of the changing technology and the Internet," the Outlook Committee also will focus on technology, techniques, and future developments, and make general recommendations on the future growth and development of Amateur Radio.

IARU member societies already have begun to discuss the issue. Input from all amateurs is welcome. Address comments to Amateur Radio Outlook Committee, c/o IARU, PO Box 310905, Newington, CT 06131-0905; e-mail **aroc@iaru.org**; **http://www.iaru.org/outlook1.html**; **http://www.iaru.org/outlook2.html**. --*IARU*

### 1998 YOUNG HAM OF THE YEAR NOMINATIONS OPEN

Nominations are open for the *Amateur Radio Newsline* 1998 Young Ham of the Year (YHOTY). Now in its second decade, the YHOTY award goes each year to a US amateur 18 or younger who has used Amateur Radio to significantly contribute to the benefit of the hobby, to the state of the communications art, to the community or to the nation.

Nominations are due by June 30, 1998, on an official application. To obtain an application, send an SASE to 1998 Young Ham of the Year Award, *Newsline*, 28197 Robin Ave, Saugus CA 91350. Nomination applications also are available at **http://www.arnewsline.org**.

The award presentation is scheduled take place at the 1998 Huntsville Hamfest in August. The 1998 Young Ham of the Year will also spend a week at Spacecamp in Huntsville.

*Newsline* editor Bill Pasternak, WA6ITF, says the purpose of the YHOTY Award is "to highlight the accomplishments of the nation's many young radio hobbyists, and to encourage the entry of more young people into the exciting and rewarding hobby of Amateur Radio." Corporate sponsors include Yaesu USA and CQ magazine. The 1997 YHOTY was Brian Mileshosky, N5ZGT, of Albuquerque, New Mexico. --*Bill Pasternak, WA6ITF*

*(Continued on page 6)*

**Give the MMRA World Wide Web Home Page a try..... let us know what you think.... any ideas are welcome. We are looking into things like an MMRA list server. We now have our own domain name - mmra.org. The Web Page keeps getting better.....**

**WWW Address:**

**http://www.mmra.org/~mmra/mmrainfo.html**

# MMRA Information - Repeaters, Officers and Board Members

**MMRA Repeaters:**

| | | | | |
|---|---|---|---|---|
| Marlboro | 146.61 | N1BHI/R | FTL P | |
| Marlboro | 449.925 | N1HBR/R | FTL P PL - 88.5 in and out | |
| Quincy | 146.67 | K1ML/R | PTL P | |
| Quincy | 224.40 | N1KUG/R | FTL L PL - 103.5 in, none out | |
| Weston | 146.82 | KA1AL/R | PTL P PL - 146.2 out, none in | |
| Weston | 224.70 | N1HBR/R | FTL L | |
| Hopkinton | 223.94 | N1BHI/R | FTL L PL - 103.5 in and out | |
| Stoneham | 146.715 | N1NVL/R | PTL P PL - 146.2 out, none in. | |
| Stoneham | 446.725 | N1NVK/R | PTL L PL - 88.5 in, none out | |
| Taunton | 449.575 | N1NVL/R | FTL L PL - 88.5 in, none out | |
| Marlboro | 53.81 | W1BRI/R | PTL L PL - 71.9 in, none out | |

[FTL = Full Time Linked PTL = Part Time Linked]
[L = Patch available via link] P = Local Autopatch]

**MMRA Officers:**

| | | |
|---|---|---|
| President: | Andy Morrison, N1BHI | To Contact Officers |
| Vice President: | Clark Conti, N1NVK | or Board Members |
| Secretary: | David Croll, KT1X | |
| | Lynne Ausman, KA1NLD | Call MMRA Voice |
| Treasurer: | Ian MacLennon, AF1R | Mail Line: |
| Clerk: | Ed Mulhern, N1NOM | |
| Directors: | Tom Qualtieri, WB1GMA | 508 - 489 - 2282 |
| | Al Kunian, KA1AL | Toll Free from |
| | Chris Conti, N1NVL | 508 and 617 Areas |
| | Bob Feltmate, WA1ZJE | |
| Newsletter Editor: | Andy Morrison, N1BHI | MMRA E-Mail |
| | | mmra@mmra.org |

**Important MMRA Club Information:**

Membership Meetings: 3rd Wed of Sept, Nov, Jan, Mar, May at Campion Center, Weston at 7:30 PM
Meeting Dates for 1997-98 Season: September 17, November 19, January 21, March 18, & May 20.
Board Meetings: 3rd Wed of Oct, Dec, Feb, Apr. Meetings are open and members are welcome. If a visiting member wants to be on the agenda, please contact Andy Morrison beforehand.
MMRA Voice Mailbox (508) 489-2282. -- This is a local call from any 508 exchange phone, and is a free call from both 617 and 508 areas.

| Newsletter Information | September issue | November issue | January Issue | March Issue | May issue |
|---|---|---|---|---|---|
| Mailing Date | Sept 11, 1997 | Nov 13, 1997 | Jan 8, 1998 | Mar 12, 1998 | May 14, 1998 |
| Submission Deadline | Sept 1, 1997 | Oct 26, 1997 | Dec 28,1997 | Feb 22, 1998 | Apr 26, 1998 |

The MMRA is dedicated to Amateur Radio and the public service. The MMRA is a registered non-profit Massachusetts corporation. Membership is open to all amateurs. Annual dues are $25.00 individual, $35.00 family.

## Minuteman Articles — Solicitation

If you have ever built anything, fixed something, or have an experience that you want to share, then you should submit an article to the MMRA Minuteman. Contact Andy Morrison, N1BHI, if you want to talk about it. We can scan artwork and schematics to make an article more interesting and useful. Give it a try!

# FCC Enacts Internet Morse Code Requirement

The FCC, under pressure to clean up the Internet, especially after the Communications Decency Act provisions regarding Internet content regulation were stricken as violating the U.S. Constitution, has decided instead to require a Morse code requirement for Internet users. Citing the success of the Amateur Radio Service and the general belief that its requirement for operators to pass a Morse code proficiency exam and other technical requirements, has kept the A.R.S. "clean", the FCC will enact a 5 word-per-minute requirement for all Internet users. They are leaving open the issue of whether there should be a "codeless" class of Internet user and are soliciting comments on this proposal.

Persons wishing to develop a web site having only links to other web sites having links to other web sites, and so forth, must pass a 13 word-per-minute test and demonstrate proficiency in HTML, the Internet authoring language.

Persons wish to develop web sites that have actual content, as compared to just links to other web sites, must pass a 20 word-per-minute Morse proficiency test, demonstrate proficiency in HTML and the Java programming language, and show that they have mastery of at least one human language, such as English.

The FCC, which lacks budgetary authority to implement the testing program, has stated that it intends to create Volunteer Examiner programs for Internet applicants.

*Note for the humor impaired: this is satire. Please do not read this if you are not properly trained and certified in satire. Reprinted from HamRadio Online - http://www.HamRadio-online.com/humor/humor.html*

## Items of Interest.....

*(Continued from page 4)*

### FCC COMPUTER SYSTEM BACK ON LINE

The FCC got its errant Amateur Radio licensing computer system back on line February 21 and began processing the backlog of applications. The system went down February 10, and no paper or electronic applications were processed for nearly 11 days as FCC personnel in Gettysburg attempted to troubleshoot the problems with the system.

Gettysburg personnel first processed data submitted on February 11 and 12 by VECs and had an updated file available for the Internet call sign servers on February 21. Since the initial processing went well, VECs then sent on the applications they'd been holding back at the FCC's request. By February 26, it was business as usual. Gettysburg had caught up with the backlog and ran a batch of vanity applications, although a number of applications remained in the work in process (WIPs) stack.

The FCC offered no explanation for the computer breakdown--its longest ever. The situation frustrated those who have been hoping to learn their new call signs or to check on updated licensing status. Call sign servers on the Internet also were affected. The FCC apologized to VECs for the inconvenience.

### NEW ARRL BOOK--*RF EXPOSURE AND YOU*--NOW AVAILABLE

If you're worried about how to comply with the FCC's new RF exposure requirements, then you'll want a copy of the new ARRL book *RF Exposure and You* by ARRL Lab Supervisor Ed Hare, W1RFI. *RF Exposure and You* became available just this week.

As ARRL Executive Vice President Dave Sumner, K1ZZ, put it: "The new RF exposure rules are now a part of the regulatory landscape and are likely to remain so." *RF Exposure and You* is the best way available to ease the transition, Sumner said.

This book communicates one simple message: For the vast majority of Amateur Radio operators, the RF exposure rules are *not* difficult to understand and follow. At 320 pages, *RF Exposure and You* contains all the background information, suggestions and worksheets you'll need to help you comply with the new RF exposure rules and to operate your station legally and safely.

Hare said that preparing the book was "a real challenge and a real collective effort." The result is a book that's probably the first of its kind. "I have never seen this information pulled together in one place before," he said. ARRL Headquarters staff and volunteers (including the ARRL RF Safety Committee) participated fully with the FCC as the Commission determined the best advice to give amateurs on how to meet the new requirements. The League was able to persuade the FCC to reconsider its rules, and to rewrite them so that amateurs would be less affected. Hare says it took a lot of teamwork between Headquarters staff and outside volunteers to have the book printed and available in just three months.

A. J. Kruger, K7CMM, of Arizona, placed the first advance order for *RF Exposure and You* early this year. This week, Hare personally autographed the first copy out of the box--indicating it was the first copy purchased from ARRL Headquarters. The order went out this week.

*RF Exposure and You* is $15 (plus shipping and handling). Order Item #6621. To order your copy, visit your local Amateur Radio retailer or the ARRLWeb, **http://www.arrl.org/catalog/6621**, or call toll-free 888-277-5289.

### RADIO COACHES PROGRAM READY TO ROLL

The ARRL's Radio Coaches program staff reports that the League has received more than 100 requests for application materials for the new youth-oriented club program.

Radio Coaches stems from the kickoff of America's Promise, the Alliance for Youth, a national campaign to improve the lives of the nation's young people and put them on paths to brighter, more productive futures. The ARRL Board of Directors authorized the creation of the Radio Coaches program as Amateur Radio's commitment to youth.

Through Radio Coaches, we want to reinforce the idea that Amateur Radio is a "sport for the brain." Ham radio provides not only a lifetime of enjoyment, but also, potentially, a lifetime career.

Special Radio Coaches binders full of additional program information, advisor sheets and student handouts will go out soon to all those who have requested a program application.

It's not too late to get *your* club involved! For more information on Radio Coaches or to sign up your club, contact Jennifer Gagne, N1TDY, 860-594-0328; e-mail **coaches@arrl.org**.

### PHASE 3D CLOSER TO REALITY

The Phase 3D Amateur Radio satellite is approximately 90% complete, and work continues at the Integration Lab in Orlando, Florida, to get the package ready for launch later this year. AMSAT officials remain optimistic that the Phase 3D payload can hitch a ride aboard the European Space Agency's next Ariane test flight, AR-503. It's expected that AR-503 will lift off in late spring or early summer from Kourou, French Guiana.

*QST* Managing Editor and satellite columnist Steve Ford, WB8IMY, recently visited the Integration Lab. He says he was impressed by the way the AMSAT Phase 3D team has managed to keep down costs by manufacturing many expensive-to-buy items themselves. "In the best ham tradition," Ford says, "they also 'shopped smart,' getting donated gear and components whenever possible or procuring components at bargain prices."

Ford and other presenters attracted nearly three dozen satellite enthusiasts to a workshop during the Orlando Hamcation the weekend of February 13 and 14. Ford says the workshop attempted to bust the myths that satellites are hard to work and that setting up a satellite station is expensive. Other presenters in the five-hour session included Barry Baines, WD4ASW, Steve Bible, N7HPR, Dick Jansson, WD4FAB, and Keith Pugh, W5IU.

*(Continued on page 7)*

## Items of Interest.....

*(Continued from page 6)*

The Phase 3D satellite package is nearly ready for launch. Here it sits at the Phase 3D Integration Lab in Orlando, Florida. [Photo by Steve Ford, WB8IMY]

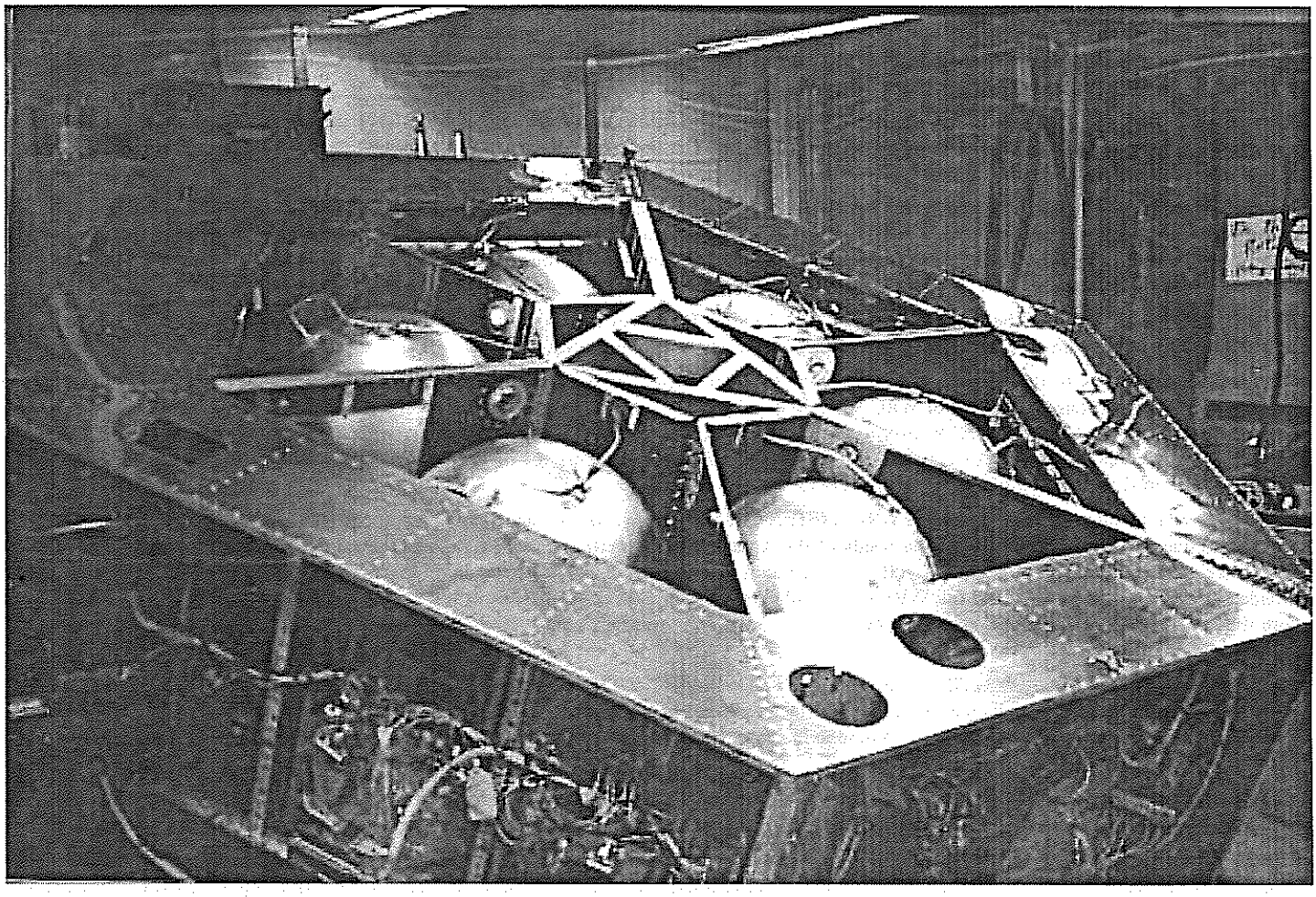


Photo from ARRL Letter.

**Editor's Note:** Amateur satellite enthusiasts who are directly involved with AMSAT as volunteers are at the leading edges of communications technology. That's in the true spirit of Ham Radio, and it would be interesting to know more about the history of this aspect of the hobby. Consider this a specific newsletter article solicitation....if any of you are satellite buffs, and know or could research the history of amateur satellites, it would make a great article. If you are interested, drop me a line at alm@mmra.org, or call on the hotline.

# The Boston Marathon Needs Amateur Volunteers.....

**102nd Boston Marathon April 20, Hopkinton to Boston MA**

For course duty: Bob WA1IDA 508-650-9440 erc@world.std.com

For finish line duty: Paul W1SEX 978-632-9432 ptopolski@net1plus.com

*The MMRA supports the Marathon, allocating needed repeater facilities for backup command and control communications. It's a classic event, and is a lot of fun to work. Give Bob or Paul a blast and sign up.*

Dear ARRL Member:

Remember how things looked this time last year? Things looked bleak for Amateur Radio.

For the first time ever, we faced a threat to two meters -- our most popular frequency band. Low-capacity, low-Earth orbit satellites (Little LEOs) were but one of a host of serious challenges to our radio spectrum.

Mounting a strong defense would not be easy. Sunspot numbers were at rock-bottom, giving amateurs less reason to get on the air and more reason to devote their time and money to other pursuits. While the year still had a few months to go, it was already clear that during 1996 the League was going to spend more for the protection, promotion, and advancement of Amateur Radio than it would take in.

When *QST* advertising drops off, we can print fewer pages. When we sell fewer ARRL publications, we can tighten our belts until sales pick up. But there's one thing we can never afford to do: **We can never afford to do less than what is necessary to protect the future of Amateur Radio.** In Washington, Geneva, and other places, decisions are being made that will affect us five or ten years from now. We can't wait for the sunspots to return before mounting our defense; tomorrow is too late.

Last year we knew that the agenda for the 1997 World Radiocommunication Conference (WRC-97) included items such as the Little LEO allocations that could pose significant threats to Amateur Radio. The time to address those threats was during the national preparations for the conference, in 1996 and early 1997. The funds had to be there to do what needed doing.

So, last September I wrote to every ARRL member. I outlined the spectrum challenges we faced and asked for a voluntary contribution to the Fund for the Defense of Amateur Radio Frequencies. League members responded generously. More than 11,000 members contributed more than $400,000 to the Fund, ensuring that the work of preparing for WRC-97 could go forward. If you were a contributor then, please allow me to thank you again for your encouragement and support. You made a difference!

Now it's a year later. WRC-97 begins in Geneva on October 27. Thanks to this support and the work that it made possible, things are looking brighter. A few sunspots are even beginning to show up (not that we're taking credit for them)!

Last year's contributions to the Fund for the Defense of Amateur Radio Frequencies meant that we could pursue an aggressive defense of your interests as the United States proposals for WRC-97 were developed. The ARRL team in Washington was expanded, and has been working hard for you. As a result, *preliminary U.S. WRC-97 proposals for additional allocations for Little LEOs do not affect Amateur Radio in any way.* There's still n outside chance that such a proposal might surface at WRC-97, but representatives of the ARRL and the International Amateur Radio Union IARU) will be in Geneva to guard against any last-minute assaults.

.ittle LEOs aren't the only issue facing us at WRC-97. There are some proposals to make greater use of our shared bands at 430 and 1240 MHz for .cientific research. **Who will make sure the needs of the Amateur and Amateur-Satellite Services are kept in mind?** The agenda for the 1999 conference, will be finalized at WRC-97, and may include a realignment of the 40 meter band to eliminate the overlap between amateurs and broadcasters. **Who will see to it that the WRC-99 agenda gives us the best possible shot at improving our 40-meter allocation?** Two questions with the same answer: **the ARRL and the IARU.** Thanks to the Fund for the Defense of Amateur Radio Frequencies, the money is in the bank to ensure good representation for Amateur Radio at WRC-97.

But there won't be much left over -- and the story does not end with WRC-97. If the Little LEOs don't get what they want this year, they'll be back at the trough in 1999. Winning an adequate worldwide 40-meter allocation will be a difficult challenge; we face powerful government and broadcasting interests. Pressure on our microwave bands is bound to increase. No doubt there will be new threats surfacing at WRC-99 that we can't even imagine today.

That is why I am writing to you today, to ask you to help us **replenish the Fund for the Defense of Amateur Radio Frequencies** in anticipation of WRC-99. Just as preparations for WRC-97 began in 1996, our work for WRC-99 must begin early next year.

Thanks to cost-cutting, a dues increase, and some improvement in publication sales, the League's finances are in better shape today than they were a year ago. We expect to end 1997 with a small surplus instead of a large deficit. Even so, the budget for 1998 is going to be extremely tight. Once again, we're counting on your support of the Fund to ensure that Amateur Radio continues to have a strong voice in Washington and Geneva in the months to come.

Please be as generous as you can. The access to the radio spectrum that we enjoy is a priceless national and international resource. If we lose it, we lose it forever.

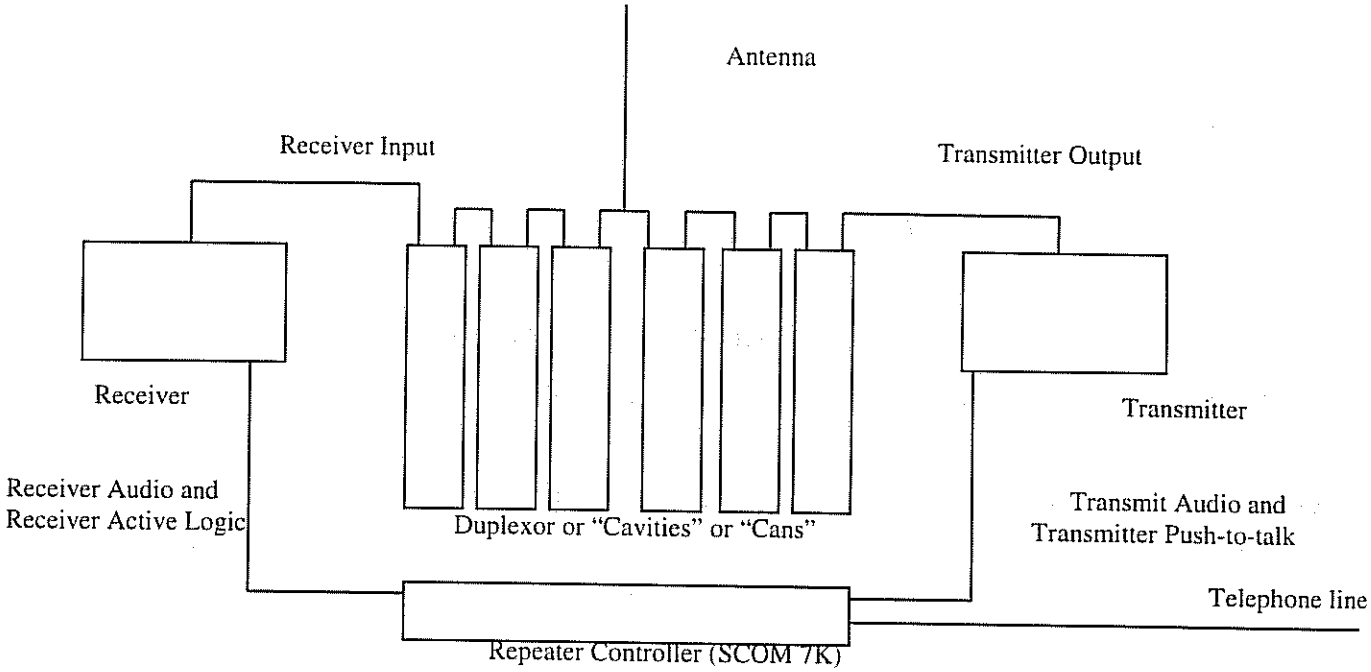
73,
Sincerely,
David Sumner, K1ZZ
Executive Vice President

P.S. So you can let others know that you supported the defense of Amateur Radio this year, we will send you an attractive and distinctive lapel pin in recognition of any contribution of $50 or more. To recognize contributions of $100 or more, we will also send a specially designed coffee mug. You will be proud to display them both.

**Editor's Note:** I reprinted this letter because it makes a plea for a worthy cause. The pressure to take spectrum from Amateur Radio for allocation to commercial interests is constantly increasing. K1ZZ is right...we need to support ARRL efforts to preserve spectrum - that organization is the only game in town for us.

*(Continued from page 1)*

away from the receiver frequency will cause that receiver to be deaf as a post. So the duplexor must provide a whole lot of isolation. Take a look at the block diagram below.




The duplexor has two sections, each formed by a series of resonant cavities that form filters. The cavities are cylindrical, and their dimensions are controlled by the frequency you want filtered. They can be adjusted over a narrow range. The section connected to the receiver is configured as a notch filter. They block the transmitter frequency and allow signals on the receive frequency. The section connected to the transmitter is configured as a bandpass filter, blocking any RF that falls near the receive frequency, but allowing the transmit frequency through. Both are connected to the antenna, and the end result is that we achieve about 92 decibels of isolation between the transmit and receive frequency. In our system this allows full duplex receiver sensitivity good enough so that the receiver hears signals as weak as .2 microvolts.

The other key component is the controller. In today's repeaters controllers are fully programmable computers with logic inputs and outputs that allow them to sense what is going on and control both receiver and transmitter operation. We use SCOM 7K controllers that use a special macro programming language that allows us to customize how they control the system. They handle the phone patch, repeater CW/voice identification, and linking .

Here's how it works....when you key your transmitter, the repeater receiver senses your signal and sends a logic signal called "COR" referring to Carrier Operated Relay. The controller sees this signal and sends a PTT logic control signal to the transmitter. It also connects receiver audio to transmit audio. The transmitter broadcasts on it's frequency, with your audio.

The controller is keeping time on various events. From the first time it repeats it keeps an activity timer that will ensure that proper identifications are made. When you begin transmitting it starts timing you....if you keep your transmitter keyed for more than 2 minutes, it will send a repeater timeout indication and shut down the transmitter. If you keep transmitting when the controller realizes that it is time to ID to remain legal, it plays a "polite ID"...you may notice that when this happens the CW ID frequency is different to minimize interference with the audio of the person talking.

The repeater controller is constantly listening for touchtone signals. When it hears one, it mutes transmit audio for that tone and any that follow. After it hears no more tones for a short interval, it compares what it decoded with pre-programmed tone combinations to see if someone issued a valid request, like the phone patch code. Each tone code sequence represents a set of commands that the controller will execute. When you enter the patch code the controller plays the message asking you to enter the phone number. After you enter the number, it compares it to a set of legal/illegal numbers in a table, and if the number is okay opens the telephone line and dials the number. When a ring signal starts, it pipes the telephone audio to the transmitter while the call is in progress.

That's it in a nutshell...remember that while it may seem simple here, in practice it's a lot of work to build a repeater and maintain it. While you can buy them, we build 'em. They are almost all based on GE commercial radio systems and play well, thanks to the efforts of the guys you see named all the time in the newsletter. If you want more info, check in to the MMRA net on Tuesday nights, there are usually guys on who can answer questions. And you can visit sites to see the repeaters...just ask.

# The Minuteman

Volume 27 Issue 4 March 1997


## In this issue.....

- **How Repeaters Work**
- **Items of Interest**
- **A Real Antenna Farm**
- **FCC Action (Humor)**
- **Walk for Hunger - Solicitation for Volunteers**
- **Open Letter - Support Spectrum Defense**

Remember that we are always looking for newsletter articles....so if you have a good construction project, or anything else that might be of interest to your fellow hams, send it in. You can Email the editor at alm@mmra.org, of leave a message at 508-489-2282.

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