TAPR #95 SPRING 2005

PACKET STATUS REGISTER

President's Corner

The New TAPR.ORG

By John Ackermann, N8UR, n8ur@tapr.org

After a long, painful process, TAPR's Internet presence has been upgraded. We started last fall with a move of the "lists.tapr.org" mailing list to a new system, and finished at the beginning of May by moving the web site, ftp site, primary mail server, and other services.

The new system is bigger, better, and faster than the old, and we hope you'll see an improvement in performance. It's also located at a commercial hosting facility, giving us a bit more stability than the old arrangement.

But the real news is that we've (finally) rolled out our new web site. The new **www.tapr.org** looks good and has updated content (though the updates are still in progress and some old content remains temporarily).

It took us a long, long time to get here, but the results are really excellent. Thanks to Stan Horzepa, WA1LOU, and especially old TAPR stalwart Greg Jones, WD5IVD, who appeared seemingly from nowhere and put many, many hours into the new site.

Please visit the new site and let us know what you think.

The Reflock II

I'm excited about a new TAPR project. Steve Bible, N7HPR, has been working with Luis Cupido, CT1DMK, on a sophisticated circuit that allows any oscillator, operating at virtually any frequency up through UHF, to be locked to an external reference source, like one of the GPS disciplined oscillators that have become available in surplus. Even more cool, the Reflock II can lock directly to the 1 pulse-per-second signal that many inexpensive GPS receivers

can provide.

If you're interested in VHF/UHF/microwaves, your eyebrows should be going up right about now. The Reflock II means that precise frequency control of transverters and other microwave gear is now within easy reach. With minor modifications, the Reflock II can control most local oscillators.

Steve and Luis have just finished the alpha board run and two of the three units fired up and worked just as expected (the third is sitting in my basement, waiting for some spare time...).

The Reflock II is another great project that plays to something TAPR is good at (advanced digital/analog circuitry) and reaches a new audience of hams that may not know much about TAPR (the VHF/UHF/microwave gang).

Like the VNA, the Reflock II expands our reach into both a new technology and a new group of enthusiasts. We hope to announce availability information shortly after the Dayton Hamvention.

And Speaking of the VNA...

Our partner in the production of the Vector Network Analyzer, Ten-Tec, is finalizing the pre-production test run, and we will probably see those units in the next several weeks. We hope that means the production units won't be too far in the future. We expect the VNA to be a big success for both Ten-Tec and TAPR.

And Speaking of Hamvention...

We're just a week from the Dayton Hamvention now, and it looks like it'll be another great show. The TAPR Digital Forum will feature presentations about HamDream digital voice system, and a lengthy introduction to Software Defined Radio via the GnuRadio software system.

At the Digital BASH on Friday evening, we'll hear Dave Toth, VE3GYQ, talk about a topic of interest to many hams, astronomy. Dave is a Supernova chaser, and he'll speak about how the Internet allows enthusiastic amateurs to compete with the big boys in discovering these exploding stars. As a frustrated astronomer myself, I'm really looking forward to this presentation.

Call for Nominations

In closing, the calendar (and Stan) remind me it's that time of year again, and three TAPR Board seats are up for election. If you're interested, the instructions for submitting a nomination are on page 15 this issue of *PSR*.

Until next time,

73,

John

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TAPR at the Dayton Hamvention

TAPR/Digital Forum

Room 1 - Friday, May 20 10:30 AM - 12:45 PM

Moderator: John Ackermann, N8UR

Speakers: John Ackermann, N8UR and Steve Bible, N7HPR - Introduction and TAPR Update

Mel Whitten, K0PFX - WinDRM Software Digital Voice and Data

Eric Blossom, K7GNU - GnuRadio/Software Defined Radio

TAPR's Booth Space

The TAPR booths are located in the East Hall of the Hara Arena; specifically booths 607, 608, and 615.

2005 TAPR Digital Bash!

What?

An event for the digitally-inclined ham, featuring:

* Buffet dinner

* Keynote Address: "Searching for SuperNovas with Amateur Telescopes and the Internet" by Dave Toth, VE3GYQ

* Informal "Birds of a Feather" gatherings

* Door Prizes!

When?

Friday evening, May 20, 2005

Doors open at 7:00 PM; dinner served at 7:30 PM Speaker, meetings, and door prizes after dinner

Where?

Kohler's Banquet Center, 4548 Presidential Way, Kettering, Ohio (39 40.75N, 84 08.43W).

Directions:

From Hamvention area:

Take I-75 South to exit 50. Take Route 741 South After about 2.6 miles, take left onto W. Dorothy Lane. After about 1.7 miles, take right onto Route 48/Far Hills Ave. After about 1.5 miles, take left onto E. David Rd. After about 0.1 miles, take right onto Presidential Way. Kohler's Banquet Center is at #4548 on the left.

From Downtown Dayton:

Take Route 48/Main St. South. After about 6 miles from downtown take left onto E. David Rd. After about 0.1 miles, take right onto Presidential Way. Kohler's Banquet Center is at #4548 on the left.

How?

Dinner requires advance registration and payment through TAPR. Tickets will be available at the TAPR booth on Friday, though we strongly encourage registration before the Hamvention. The cost is $30.00 per person, tax, and tip included. All amateurs are welcome to attend, enjoy the speaker, and participate in the meetings, although only those purchasing a dinner can eat.

To register, contact:

Digital Bash

c/o TAPR

PO Box 852754

Richardson, TX 75085-2754

phone: 972-671-TAPR (8277)

fax: 972-671-8716

Internet: **tapr@tapr.org**

Visa/Mastercard Accepted

Who?

Digital BASH is sponsored by TAPR, the national leader in digital communication. For more information (including maps), go to **www.tapr.org/tapr/Dayton** or send e-mail to **tapr@tapr.org**.

###

University of Alabama - Huntsville BalloonSat Report

By Jason Winningham, KG4WSV, kg4wsv@eng.uah.edu

I have participated in several balloon chases over the past several semesters with the University of Alabama in Huntsville (UAH) Electrical Engineering student's design teams. Student teams spend one semester designing, building, and flying experiments for high altitude weather balloons in an effort to prepare them for building satellite experiments. Experiments on the various payloads have included: environmental sensors (temperature, pressure, gas concentration), ATV, video, still camera, motion stabilization for video camera, passive payload stabilization devices, solar power experiments, cut down mechanisms, and more. Here are some links to pictures, TNC data, and APRS maps provided by various students and volunteers from various flights **http://www.eng.uah.edu/~jdw/balloonsat/**

The program is working on an official site that I assume will contain student reports, data, etc. In the meantime, you can look at the pictures on this unofficial site.

My relationship to the project is tangential: I work as a system administrator for the department where the balloon experiments are taking place, but I have no official status with the project. I'm a ham who happens to work in the same place, so I get to see more of the projects than most. I also get to help out with ancillary aspects of the project such as building DF beacons and backup trackers.

I think on average the students do a very good job, considering they get introduced to the concept of a high altitude balloon experiment and Amateur Radio at the beginning of the semester, and then fly one that they designed and built before the end of that same semester.

Help from the Amateur Radio community has been extremely valuable. UAH has recovered 100% (I think 19 for 19) of the balloon payloads launched. This would not have happened without the help of many hams from all over the region. Hams from Alabama, Tennessee, and Georgia have participated in the chase and recovery many times.

Bill Brown, WB8ELK, has been extremely helpful in all phases of the projects, sharing his ballooning experience with students and hams and generally helping us get successful flights and recoveries. Thanks, Bill.

The April 3rd flight saw the test of Gary Dion's (N4TXI) servo based cut down mechanism. Buzz Lightyear had an accident, apparently involving high levels of radiation, and parachuted from 80,000 feet with the help of the Buzz-O-Matic release mechanism and a single APRS message sent to the WhereAVR tracker, also designed and built by Gary. If anyone in the vicinity of the Alabama-Georgia state line between Rome and Fort Payne sees Buzz, please e-mail the address on his parachute. Unfortunately, Buzz was not wearing a transmitter.

On the April 9th flight, the Buzz-O-Matic was the cut down mechanism for one of the student balloons, successfully releasing the balloon from nearly 12 pounds of payload. Bill also provided a wireless nichrome wire based cut down for another balloon that functioned perfectly.

One thing that hasn't worked well is connected mode communications with a KPC-3 on the balloon. The students typically use a TH-D7, but using a D700 has also been problematic. The successful cut downs were either triggered by a single APRS message (to the WhereAVR) or by DTMF tones. Even the DTMF tones didn't work when the students

tried it with the D7, but my D700 at 50 W did the trick. Note the students were using 1/2-wave mag-mount antennas (the Diamond 770), not just a rubber duck. Balloons usually fly a 1/2-wave dipole or twin-lead J Pole antenna.

I suspect antenna nulls were at least partly to blame for the latest problems. The balloon was traveling at a fairly high rate of speed during the initial ascent, but it slowed a great deal at higher altitudes. In their enthusiasm, the chase team caught up with the balloon and was trying to communicate while directly under the balloon.

A balloon chase is a lot of fun. Last fall, I participated in one chase where I saw the first of two balloons launch, saw the first payload descending on it's parachute, and got to the right place to see the parachute of the second launch of the day dropping over the ridge. On a clear day the balloons are readily visible at altitudes up to burst, usually between 95,000 - 105,000 feet. On the April 3 flight, I got to see the balloon burst. A white cloud of dust (I assume talcum powder and latex fragments) was clearly visible.

Ballooning and APRS are getting people interested in ham radio. I'm a ham because of what I saw with the balloon experiments, and others are gaining interest as well.

APRS is cool! We have had flights in the past where one component or another of the APRS system failed; recovery via DF techniques using a small (10 to 30-mW range) backup transmitter is not as much fun as simply driving to the coordinates on the map. Student operated primary rigs have failed in the past due to power problems (old batteries, too few batteries, etc), wiring issues (connectors that don't lock), and so forth. We have started flying backup trackers on 144.340 to help with this problem. An opentracker, Garmin GPS18LVC, and a Yaesu vx150 with a 6xAA battery pack loaded with lithiums totals 17oz with an insulated box. This is a pretty small penalty to pay for the security of a backup rig.

Another benefit of the opentracker is the ease of configuration; novice APRS operators have trouble with the KPC3. The thing is just too complicated for basic tracking. I suspect in the future we will use the opentracker as the primary tracker, and fly the KPC 3 only if telemetry is required, or if connected mode communication is part of the experiment.

The Garmin 18LVC is a mouse type GPS that come with bare wires. Because of packaging logistics for the backup tracker, I wanted to mount this GPS with the antenna facing the horizon (instead of the traditional and more sensible straight up), so I attached it to a test fixture (involving my daughter's swing set and a drill) so that pointed toward the horizon, powered up from a cold start and spun it at about 100 RPM. The GPS locked and maintained lock under these conditions for about 10 minutes, at which point the test fixture failed. I have since flown three GPS18s where the GPS was mounted vertically, top of the unit pointing toward the horizon, with zero problems. I have also verified that if you get a GPS18PC and chop off the connectors, you have an 18LVC. I understand this is not the case for the GPS18USB model, but can't confirm.

Getting to the payload doesn't mean the end of the retrieval. Many times the payload train ends up in the top of a tree, and sometimes the tree is rather inaccessible. A slingshot/ fishing reel rig, used to string wire antennas, is a vital piece of chase equipment.

Landowners have been very cooperative and supportive during our retrieval efforts. We certainly appreciate their help. *Xastir* rocks! On the last chase, we had backup and experimental APRS stations on 144.34 and 433.750 in addition to the primary tracker on 144.39. My chase rig is *Xastir* running on a Fedora Core 2 laptop tracking three different frequencies as follows:

144.390 - the Kenwood D700 was using its own TNC/APRS application on this frequency. I connected an N0QBH ax.25 decoder **(www.ringolake.com/pic_proj/decoder/rx_206.html)** to the audio output of the D700 and fed 144.39 data to *Xastir*.

144.340 - a TNC-X connected to separate a 2m mobile received this data.

433.750 - a Kenwood TH-D7 with its built-in TNC fed *Xastir* this data. Using *Xastir*, National Atlas and TIGER data, and GNIS data from USGS (and a Garmin MAP60C, so we knew where we were), it was trivial to find our way to the position reported on the map. All the students who saw my *Xastir* rig asked, "Why aren't we using this?"

I may be in the minority, but I don't like USB. I don't like the way the drivers work with the USB to serial devices, simply because it's hard to be sure where they're going to show up. A pair of these devices could be /dev/usb/ttyUSB0 and 1 when I hook them up, but swap places when I reboot. This is problematic. There should be some way to identify a specific serial port on a specific USB device that is consistent across reboots, and no matter where or when it is plugged into the USB bus (or tree). USB also lacks a connector with a positive lock. Friction fit doesn't cut it in a mobile (or server room) application! In case you're wondering I had a total of three USB/serial devices and a total of four serial ports in use during the chase.

It's cold up there. Beacons and trackers have stopped working, evidently because the batteries stopped when the temperature dropped below 0 C. I was irritated when this happened to me, since the manufacturer's spec sheet said they were good to -40 C. Uninsulated packages are not reliable.

SAW stabilized oscillators do not work well for APRS. I spent a large amount of time trying to find where the little 70-cm transmitter's frequency had drifted off. Temperature and voltage variation made this drift worse than normal. When it flies again it will be a simple CW over FM beacon.

Those are some observations, notes, and random thoughts. If you have a chance, check out a balloon flight some time - it's a lot of fun.

###

Eliminating Source Routing from APRS, Part 2

By Pete Loveall, AE5PL, pete@ae5pl.net

As stated in the previous paper (Winter 2005 *PSR*), the no-source-routing algorithm was presented to initiate discussion and to provide a basis for further development. It has and this article attempts to bring these discussions into focus.

First, a review of the basic digipeater algorithm is necessary:

1. The digipeater repeats everything it sees directly (no digipeated packets), stripping the entire path away and replacing it with just the digipeater's call sign with the H-bit set.

2. The digipeater repeats any packets it sees digipeated by digipeaters on its "ok" list. This allows remote areas to make it into the "metro" LAN as deemed proper by the digipeater sysop. The digipeater will modify the path by simply appending its call with the H-bit set after the "ok" list digipeater call.

RELAY can be on the "ok" list allowing people to set up low-level RELAY alias digipeaters. Packets with RELAY in the path would only be digipeated if RELAY is in the first position and no place else.

3. The digipeater does full dupe checking (CRC or checksum) based on from call, unproto, I field length, I field data. The digipeater will not digipeat any packet where its call sign appears before or including the call with the H-bit set in the path. The depth of this dupe check would only need to be about 30 packets long.

This is a very simple algorithm. The decision of "what makes up the local area" would now lie in the hands of the wide-area digipeater sysops. The users could still use a path, for instance, of RELAY,WIDE2-2 for areas not covered by such a digipeater yet they would be properly digipeated in areas where these types of digipeaters would exist.

For simplicity sake, let's call these digipeaters UI no-source digipeaters. One of the biggest benefits to the UI no-source digipeater: NO user ever needs to know the network topology again. The digipeater sysops take care of this just as the Internet service providers make it so no user of the Internet needs to know the actual network topology.

There are some misconceptions out there such as "this is an entirely new network." This is completely false. This is a proper implementation of AX.25 that can be implemented within today's APRS RF network. I will attempt to demonstrate this later in this paper.

Some people believe that this prevents people from specifying how their packets will be used. This is Amateur Radio. When you transmit, everyone hears you and you should expect that. When you transmit, you occupy the frequency for the period of your transmission (and all digipeats) to the exclusion of everyone else. This is a principle of AX.25 UI. The no-source algorithm enforces this concept.

Some people have come forth with some very good recommendations to expand the no-source-route (NSR) algorithm and make it more compatible with today's network. The first concept is to add specific paths dependent upon where the packet was heard. This allows appending a path to the digipeater's call that will allow proper digipeating by non-NSR digipeaters. This allows conversion of a single digipeater in a network where there is mixed NSR and non-NSR digipeaters. This adds to #1 and #2 above as it changes what is actually put in the path.

The second concept is to digipeat based on whom the packet is from. This allows a NSR digipeater in a mixed network to digipeat

a packet from a specific station regardless of how it is heard. This also supports the specific path concept from above. This allows digipeater sysop to specify a station, such as an emergency operations center, in a "distant" RF area to be heard locally. This would be an addition to #2 above as it adds new digipeat criteria.

With these changes, the algorithm now reads:

1. The digipeater repeats any packets it sees from a station on its "must digipeat" list. This allows specific remote stations to make it into the "metro" LAN as deemed proper by the digipeater sysop. The digipeater will modify the path by simply appending its call with the H-bit set after the "ok" list digipeater call plus any path defined by the sysop.

2. The digipeater repeats everything it sees directly (no digipeated packets), stripping the entire path away and replacing it with just the digipeater's call sign with the H-bit set plus any path defined by the sysop.

3. The digipeater repeats any packets it sees digipeated by digipeaters on its "ok" list. This allows remote areas to make it into the "metro" LAN as deemed proper by the digipeater sysop. The digipeater will modify the path by simply appending its call with the H-bit set after the "ok" list digipeater call plus any path defined by the sysop.

RELAY can be on the "ok" list allowing people to set up low-level RELAY alias digipeaters. Packets with RELAY in the path would only be digipeated if RELAY is in the first position and no place else.

4. The digipeater does full dupe checking (CRC or checksum) based on from call, unproto, I field length, I field data. The digipeater will not digipeat any packet where its call sign appears before or including the call with the H-bit set in the path. The depth of this dupe check would only need to be about 30 packets long.

Now that we have that defined, the question needs to be answered, "How do I change out our current digipeater with a NSR digipeater and not break the network?"

First, it needs to be understood that changing to a NSR digipeater with no settings other than the basics (no special paths, no "ok" list, no "must digipeat" list) will only enhance, not break the network. So you start with the basic configuration, identify those digipeaters to add to the "ok" list, identify any special paths and/or a default path, and finally identify any "special" stations to add to the "must digipeat" list.

How does this affect path settings on individual stations? It doesn't! I would recommend using whatever is the "flavor of the day" path for your area, station type, and operation type. Under the current recommendation for the "new n-N paradigm," this would mean you should probably use WIDE1-1,WIDE2-2 for your mobile operation in most parts of the country. But, as you can see from the NSR algorithm, the user's path has no effect on how the NSR digipeater performs and is therefore inconsequential.

javAPRSDigi now supports the full algorithm. We encourage the developers of new TNCs, *ui-digi*, and *Digi_ned* to expedite implementation to clean up the APRS network worldwide.

###

Call For Papers: Digital Communications Conference

The 2005 TAPR/ARRL Digital Communications Conference will be held September 23-25 at the Embassy Suites Hotel - Orange County Airport North in Santa Ana, California. You'll find more conference information on the Web at **www.tapr.org/dcc.html**.

We are now accepting papers for the conference proceedings with an August 9 deadline for submissions. You do not have to be present at the conference to have your paper included in the proceedings.

Please send your submission by August 10 to:

Maty Weinberg
ARRL
225 Main St.
Newington, CT 06111

or via the Internet to:

maty@arrl.org

###

High Speed Multimedia Networks Working Group Technology Task Force Report to ARRL Board of Directors

John Champa, K8OCL, Chairman
January 19, 2005

Executive Summary

It has been another exciting and productive time for the HSMM Working Group since our last report to the Board. We have developed a specification for an HSMM Orthogonal Frequency Division Multiplexing (OFDM) Modem that will allow Radio Amateurs to have all –mode voice, text, data, and video (i.e., multimedia) high-speed digital communications on the VHF, UHF and SHF bands. We hope to begin alpha testing of our OFDM modem this year in at least four locations (Racine, San Antonio, Tampa, and Livingston County) using an ATV channel in the 70cm band operating in a digital "image mode" we call Amateur Digital Video (ADV).

The HSMM Working Group has also prepared two recommendations for Board consideration:

- A new all-digital license scheme to attract Internet-savvy technical individuals to ham radio, and
- A frequency bandwidth plan that will allow for adequate digital development of Amateur Radio into the 21st Century.

Both of these recommendations are included in this report.

OFDM Modem

The 70 cm band is ideal for HSMM and, using the following interpretation of FCC regulations, we should be able to use OFDM modems with an occupied bandwidth up to 9 MHz (at least) on the 70 cm band. HSMM would be classified as an image emission type. This interpretation also allows 6 kHz (or more) bandwidth OFDM modems on the MF and HF amateur bands.

In 47 CFR 97.315 the emission type "image" is defined as including "emissions having B as the first symbol; 7, 8 or 9 as the second symbol; W as the third symbol".

In 47 CFR 2.201 (c) (2) a first symbol of B defines the type of modulation of the main carrier as an "emission in which the main carrier is amplitude-modulated (including cases where sub-carriers are angle-modulated) with independent sidebands". The OFDM modem fits this description as it has a central carrier with multiple subcarriers in the upper and lower sidebands that are angle (phase) modulated. In 47 CFR 2.201 (d) (5) a second symbol of 7 indicates that the nature of the signals modulating the main carrier are "two or more channels containing quantitized or digital information". 47 CFR 2.201 (d)(2) and (3) indicate that time-division multiplex is excluded for a single channel so the time division multiplex inherent in HSMM communications creates two or more channels. In 47 CFR 2.201 (e) (8) a third symbol of W indicates that the type of information to be transmitted is "a combination of the above" and that includes (4) "facsimile", (5) "data transmission, telemetry and telecommand", (6) "telephony" and (7) "television". HSMM fits this definition as it includes data, speech and image components.

In 47 CFR 97.305 "a station may transmit the following emission types on the frequencies indicated, as authorized to the control operator, subject to the standards specified in 97.307(f) of this part". The

following table includes the "image" type for all bands and references 47 CFR 97.307 (f) (2) for the 160 m through 1.25 m bands but does not reference it for the 70 cm through 1 mm bands.

This is the only restriction on the image emission type and states that "the total bandwidth of an independent sideband emission (having B as the first symbol), or a multiplexed image and phone emission, shall not exceed that of a communications quality A3E emission". I can't find a definition for "communications quality" but it seems to be taken as 3 kHz on the MF and HF bands.

Thus OFDM modems using 6 kHz or less should be authorized on 225 MHz and below and OFDM modems with no bandwidth restriction on 420 MHz and above. If the emission must fit within the bandwidth used by existing analog image communication devices, that bandwidth would be 9 MHz for DSM AM ATV with a 4.5 MHz sound subcarrier.

The HSMM Working Group specifically requests that the ARRL legal counsel, Chris Imlay, review this plan.

Submitted by John Stevensen, KD6OZH, HSMM WG, and RMAN-UHF Project Leader.

Licensing Scheme Recommendation

Improving and Expanding Amateur Radio in the 21st Century

50 years ago, amateur radio service gave its licensees access to wireless voice communication services that were otherwise unobtainable and trained people for careers in industry. It should be doing the same for today's wireless communication but isn't. This is a proposal for a 21st century novice license oriented towards HSMM. It would change amateur radio somewhat, but would ensure its existence by attracting younger users and make it more relevant to today's technology. First, let me explain why new novice licenses are needed.

The current amateur radio licensing system assumes that everyone wants HF access and they proceed along an upgrade path to get it. License classes are hierarchical. However, there are several groups of users within the ARRL that have different interests. Some are interested in having the best HF station and contesting or chasing DX. Others are interested in weak signal communication using portable stations on the microwave bands. One large group is interested in personal communication and emergency communications with VHF and UHF repeaters.

Another group is interested in digital communication using computers. The "one size fits all" arrangement does not serve any group well and creates unnecessary contention among groups.

If license classes were organized by area of interest and new hams just picked the licenses that fit their needs, each license could better fit the interests of each ham. Rather than acting as an unnecessary impediment that is shrinking the ranks of the hobby, licenses could encourage new growth. Licensing that fits user needs could be more restrictive for HF spectrum where the number of users that can be supported is small and become less restrictive as the frequencies go up and large numbers of users can be accommodated.

Many amateur HF users prefer the traditional form of FCC regulation with highly structured bands and a Morse code requirement for their portion of the spectrum. The existing license structure largely fits their needs. However, hams interested in

buying HTs and using voice repeaters face a lot of examination requirements that are unnecessary for their purpose. They should have a simpler license where they learn how to set up a limited station and agree to certain operating procedures and frequency ranges. This would encourage new membership and build the pool of emergency communicators.

Hams who want to set up repeaters or do high-power weak-signal communication on the VHF and UHF bands require more knowledge as they will be setting up larger, more complex stations. The current license examination system with an exam that stresses design requirements and RF safety fits these needs. However, a new license class for HT users would benefit the radio clubs setting up and maintaining repeaters by providing more members.

Those interested in computers and digital communication are under-represented in amateur radio ranks. They are technophiles as we are, but the current system does not serve them well. This is disturbing, as digital communication is the future. In particular, amateur radio should encourage the participation of those interested in software as all electronic communication now depends upon it. There should be a license class where they agree to certain frequency ranges and non-interference provisions. This type of license would expand the use of new technology, make the learning experience of amateur radio more relevant to ham's personal lives, increase the use of our microwave bands and allow the development of and experimentation with new high-speed multi-media applications. It also assists us in supporting public safety, health and welfare agencies during times of emergency as the majority of the information that must be communicated becomes digital.

This new license wouldn't be called a "novice" license (as that might discourage its use) but a "digital communication" license and would authorize use of the following frequency bands:

6 m band: 51.1-51.5 and 51.6-52 MHz

70 cm band: 420-426 MHz

9 cm band: 3300-3400 MHz

3 cm band: 10.0-10.2 GHz

4 mm band: 78-80 GHz

MINORITY REPORT: This clause was rejected: "The 33, 13 or 5 cm bands are not included as that would impact ISM users and create congestion and interference." Rationale: The Radio Amateur service should not cede frequencies to another service such as Part 15. The counter argument was why directly take on the commercial interest?

The frequencies were selected to avoid weak-signal and voice repeater segments. There would be no restrictions on emission type. Maximum emission bandwidths would be:

6 m band: 200 kHz

70 cm band: 2 MHz

9 cm band: 25 MHz

3 cm band: 50 MHz

4 mm band: 500 MHz

Maximum power levels would be 50 W on all bands and the license would be for personal use only. There would be no antenna gain restrictions. The licensed equipment must include energy-sensing and transmission-deferral logic to avoid interference with existing services. The license examination is an agreement on operating privileges and

practices and a series of multiple-choice questions that is signed by the user and processed by either the FCC or ARRL before issuance of a call-sign.

The license restricts equipment to a digital interface to prevent the creation of another FRS or CB service and prevent competition with wireless telephone services. Holders of higher-level amateur licenses are permitted to design, construct, install, test, repair and operate equipment on these frequencies via their current licenses. Holders of this new license are permitted to install and operate equipment certified for compliance by its manufacturer or equipment assembled by them and certified by a higher-level amateur radio service licensee.

For the FCC, the existence of this new license would ease congestion on ISM bands and encourage the development of new technology in the U.S. Hams get new technology and a new pool of users that will become interested in other aspects of ham radio. Packet radio and HSMM enthusiasts get the possibility of creating large, useful, networks and the ability to attract software developers. The general public gets a means of encouraging technical education, promoting volunteerism and improving public safety.

Band Plan Recommendation

The ARRL High Speed Multimedia Working Group is extremely concernedregarding the nature many of the current proposals for band plans. Wethink that most such proposals, as progressive as they may appear to be atthis time, will ultimately, in the future, severely restrict the growth anddevelopment of Amateur Radio into the digital age of radiocommunications of the 21st Century.

Any change in FCC regulations will freeze band plans in stone for the next 20 years. To allow for future development, the HSMM working group recommends that FCC regulations should be simplified with only a single maximum allowed emission bandwidth for each amateur band:

160m: 10 kHz

80m-10m: 20 kHz

6m-2m: 200 kHz

125cm+: within band

The ARRL can then issue band plans that create segments with lower emission bandwidths and these can change over time as different operating modes become popular. On the 160 through 10 meter bands, one band plan must cover the U.S. to prevent interference. Above 30 MHz, the band plans may be regional.

The 10 kHz bandwidth limit on 160 meters allows the use of DSB AM. Many amateurs are using converted AM broadcast transmitters that were designed for this bandwidth.

On HF, the 20 kHz bandwidth limitation aligns amateur standards with shortwave broadcasting standards. 20 kHz is the maximum bandwidth of DRM (Digital Radio Mondiale), the worldwide standard for digital audio broadcasting between 0.1 and 30 MHz. This is also the minimum bandwidth that would allow HSMM applications as defined by the ARRL Technology Task Force (56 KBPS minimum data rate).

One goal of the new HF allocations is to encourage development of new higher-speed digital modes and this can only be accomplished by giving developers the flexibility of using wider bandwidths. This would allow sharing of the sub-band by numerous stations with bursty traffic and be more efficient than multiple lower

speed connections. High-speed links will be invaluable during emergency situations by allowing very efficient simultaneous transfer of voice mail, e-mail and facsimile traffic from the affected area to the outside world.

We understand that amateurs using the existing HF CW and phone bands want protection, and if the ARRL must reflect that we recommend 200 Hz statutory limits at the lower for CW and low-speed data, and 6 kHz statutory limits at the upper end of each band to allow existing SSB, ISB and DSB AM operation plus any other modes that fall within the bandwidth limitations. At a minimum, 20 kHz wide emissions should be allowed in the following segments:

3.58 - 3.725 MHz

7.035 - 7.125 MHz

14.065 - 14.15 MHz

21.08 - 21.2 MHz

29 - 29.7 MHz

In the VHF bands, a 200 kHz bandwidth limitation matches VHF audio broadcasting standards. The 100 kHz bandwidth limitation is too restrictive as it unnecessarily raises the cost of equipment by preventing the utilization of mass-produced technology. Inexpensive SAW and ceramic filters suitable for data radios in these bands have a 160-180 kHz bandwidth as this bandwidth is used for GSM phones and FM broadcasting.

Existing equipment for 76.8 KBPS FSK data links sold in Europe by companies such as Symek utilize these bandwidths. They would be easily adaptable to VHF bands and encourage new digital applications. Newer equipment using OFDM could expand the data rate to 230.4 KBPS allowing low-resolution compressed video or high-resolution SSTV with frame transmission times of a few seconds. High-speed VHF data links would be invaluable for emergency communications in rural areas where commercial services don't exist and our VHF bands are under-utilized. High speed digital operation is also more efficient with wider bandwidths as more stations can share a common frequency.

If bandwidth limits are required above 148 MHz, we recommend a 200 kHz limit up to 225 MHz, a 10 MHz limit up to 1300 MHz (to allow continued use of DSB AM TV transmitters with 4.5 MHz sound subcarriers), a 45 MHz limit up to 5,925 MHz (to allow use of 802.x equipment) and no limit above 10,000 MHz. All emissions must be within the allocated amateur bands.

Activities

The HSMM Working Group has provided an ARRL Representative to the IEEE 802.22 Working Group: Gerry Creager, N5JXS, is our HSMM WG Network Infrastructure Specialist. In addition, Gerry spoke at a total of 6 sessions at HamComm/ARRL National on HSMM activities and infrastructure. He installed 2 point-to-point links in the local community to begin support of EMCOMM activities between one of the local hospitals, the University, and an EOC. Gerry also acquired IEEE 802.16 hardware for evaluation. Anticipated installation will be February 2005, pending network access to the installation site at the Texas A&M University. This equipment will be operated under Part 97.

Jeff King, WB8WMA, our HSMM Regulatory Affairs Specialists reports that he is setting up a community network in downtown Hillsdale, MI. They have three nodes so far. He has attended the Lansing MI

"Cool Cities" conference, and formed a local chapter in Hillsdale to help support their hotspot initiative. He has also involved some of the local ham club members in this effort too. Jeff also got a lot of creditability for our HSMM Working Group with City Council, when a resolution supporting our efforts was passed. He also got a front page article about our WG in the local paper last week. Jeff has conducted an evaluation of SVEASOFT WRT54G linux distro for us. Finally, WB8WMA made an HSMM presentation at his local ham club, last May, and expects to do another one shortly.

NTX HSMM highlights for '04

Dallas based HSMM group created, merged into the North Texas Microwave Society and new Yahoo group set up. Group now contains 72 members.

Ten HSMM presentations held at Hamcom in June '04 (Hamcom is a multi-day NTX regional event with a draw of about 4000 attendees). Particular thanks to Gerry Creager N5JXS, Joe Jurecka N5PYK and Brett Neilson KC7IIB.

Introduction to HSMM presentations given to the North Texas Microwave Society, Richardson Wireless Klub, Garland Amateur Radio Club. Upcoming presentations planned for 2005 include the Irving Amateur Radio Club and the Plano Amateur radio Klub. Thanks to Doug Kilgore KD5OUG and Ken Peter KD5ZXG.

HSMM deployments performed at the 2004 Wild Ride (a Richardson, TX area bike rally), Hamcom, the Plano Balloon Festival and Mentorfest. Thanks in particular to Doug Kilgore KD5OUG, Tony Campbell W5ADC, Bob Kmak K5WO, Joe Jurecka N5PYK and Ken Peter KD5ZXG, Fred Varian W45ERD and Ronnie Franklin WD5GIC

Ongoing activities include developing equipment resources, building up field deployable equipment and working on bridging and mesh networking techniques. Special view is given to Randy Dunning KC5QHH, elected councilman for the City of Garland. Randy has built up a fairly impressive set of equipment for use by the Garland RACES organization and is actively exploring interoperability opportunities with Garland's new city mesh network.

Thanks also to the NTX section manager Roy Rabey AD5KZ for his help in publicizing our activities.

Submitted by John Beadles, N5OOM.

###

Call for Nominations

Nominations are now open for TAPR Board of Director seats expiring this year, i.e., the seats held by Steve Bible, N7HPR, Stan Horzepa, WA1LOU, and Darryl Smith, VK2TDS.

Board members serve three-year terms and their responsibilities include:

1) Attendance at both board meetings each year. (One is held at the Dayton Hamvention in May, the other at the Digital Communications Conference in September.)

2) Regular participation in the continuous board session, which is conducted over the Internet.

3) Active engagement in TAPR's management.

To place a person in nomination, please remember that he or she must be a member of TAPR. Also, confirm that the individual is willing to have his or her name placed in nomination. Send that person's name (or your own if you wish to nominate yourself), call sign, mailing address, e-mail address, phone number(s), and a biographical sketch (100 words maximum) via e-mail to **tapr@tapr.org** or to the TAPR office (P. O. Box 852754, Richardson, TX 75085-2754) no later than August 10, 2005. If you submit a nomination via e-mail, we strongly encourage you to follow up by regular mail.

###

FCC's Broadcast Flag Struck Down In Federal Court

By Declan McCullagh

Court says FCC's 'broadcast flag' is toast

In a stunning victory for television buffs and hardware makers, a federal appeals court has tossed out government rules that would have outlawed many digital TV receivers and tuner cards starting July 1.

The U.S. Court of Appeals for the D.C. Circuit ruled Friday that the

Federal Communications Commission did not have the authority to prohibit the manufacture of computer and video hardware without copy protection technology known as the "broadcast flag." The FCC's regulations, which it created in November 2003, had been intended to limit unauthorized Internet redistribution of TV broadcasts.

"The broadcast flag regulations exceed the agency's delegated authority under the statute," a three-judge panel unanimously concluded. (Click here for a PDF of the decision). "The FCC has no authority to regulate consumer electronic devices that can be used for receipt of wire or radio communication when those devices are not engaged in the process of radio or wire transmission."

Under the FCC rules, starting in July digital TV tuners manufactured would have had to include copy-protection technology--called the broadcast flag--that's backed by the Motion Picture Association of America. The broadcast flag limits the TV recipient's ability to redistribute video clips made from the recorded over-the-air broadcasts.

Friday's ruling represents a sizable setback for the MPAA, which had lobbied for the broadcast flag rules and had intervened in the lawsuit to defend them. It's also a reprieve for makers of HDTV sets, PC tuner cards, and USB and Firewire tuners--which will no longer have to redesign their products to comply with FCC rules.

In January, the advocacy group Public Knowledge filed suit against the

FCC's broadcast rules, arguing that the regulations would sharply curtail the ability of librarians and consumers to make "fair use" of copyrighted works and would curb interoperability between devices.

One result of Friday's ruling is that, if upheld on appeal, the fight over digital TV piracy will return to Capitol Hill. The court noted that the FCC "has no power to act" until "Congress confers power on it" through enacting a law explicitly authorizing the broadcast flag.

###

Having Hamvention Moments

By Stan Horzepa, WA1LOU

We recount our trip to the Dayton Hamvention and discover another big antenna farm upon our return home.

At the last minute, my daughter, Hayley, decided that she would accompany me to the 2004 installment of the Dayton Hamvention. We had APRS up and running and began making tracks at 5 AM Thursday arriving in Dayton 13 hours later. (Some issues with the land barge 250 miles into our journey prevented us from completing the trip more quickly.)

The excitement of 710 miles of asphalt was too much for Hayley, so she slept most of the trip and missed the sights along the way (the Mobil station on I-84 with the worst restrooms in Pennsylvania, the K3LR antenna farm on the Pennsylvania-Ohio border, the empty steel mills in Youngstown, etc).

Dayton was hot and humid and I wondered if I should use a knife to make homebrewed shorts out of my jeans as I had during a previous 95-degree, 95% humidity Hamvention. However, on schedule, it rained Saturday, cooling things down, as well as cooling our plans to check out the flea market.

My "Introduction to APRS" presentation ("APRS for Dummies") went well and we spent most of the rest of the weekend talking with people while working the TAPR booth. Hayley helped out in the booth taking customer orders and in the process, she caught the ham radio bug.

She decided immediately to take the codeless Technician exam, so we worked our way through the crowd over to the ARRL booth and bought a study guide. She studied Saturday morning and took the exam Saturday afternoon. She missed passing by two questions, which isn't bad considering she only studied for the exam that morning. (She plans to retake the exam here in Connecticut next month.)

We had a wonderful weekend, headed home at 2 AM Sunday, and turned into the driveway at 1:45 PM, 15 minutes under 12 hours. But for an accident that shut down I-71 for 45 minutes, we would have made the trip in 11 hours, which would have been an all-time record for the land barge.

Opening my e-mail upon returning to Downtown Wolcott, I found a missive from an old friend Rich Zwirko, K1HTV. Rich wrote, "Enjoyed the latest Surfin' (Solving a Radio Mystery) discovering K3LR's place in western PA. Being one of the ops for Tim's competition, W3LPL, I thought that you would like to see an antenna farm picture that will top the one you posted." Rich attached some photos he had taken including one of a double rainbow hanging over W3LPL's antenna farm. I don't know if I was more impressed by the double rainbow or by all the aluminum in W3LPL's back yard.

I Googled "W3LPL" and found some pertinent web sites that document the antenna hardware of Frank Donovan, W3LPL. The Daily DX Web site (www.dailydx.com/w3lpl.html) has a page that delineates the contents of the farm, while KM4ML, Dick Rucker, has a slideshow tour of the W3LPL complex on the QCWA Chapter 91 News, Photos, & Files Web site (**http://homepage.mac.com/rrucker/PhotoAlbum32.html**).

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Submission Guidelines

TAPR is always interested in receiving information and articles for publication. If you have an idea for an article you would like to see, or you or someone you know is doing something that would interest TAPR, please contact the editor **(wa1lou@tapr.org)** so that your work can be shared with the Amateur Radio community. If you feel uncomfortable or otherwise unable to write an article yourself, please contact the editor for assistance. Preferred format for articles is plain ASCII text (Microsoft Word is acceptable). Preferred graphic formats are PS/EPS/TIFF (diagrams, black and white photographs), or TIFF/JPEG/GIF (color photographs). Please submit graphics at a minimum of 300 DPI.

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