



President's Corner

By Steven Bible, N7HPR, President, TAPR



The DCC, September 16 - 18

Final preparations are being made for the 30th Annual [ARRL and TAPR Digital Communications Conference](#), September 16-18, 2011 in Baltimore, MD.

Are you ready? Here's a check list to help you out:

Have you booked your travel?

Have you booked your hotel room? (see below)

Have you registered for the DCC? Go to <http://www.tapr.org/dcc> to sign up.

Below is the list of submitted papers. The DCC tentative schedule appears on page 3. We have a an exciting list of paper talks, guest speakers, and Introductory Seminars.

Hotel

Four Points by Sheraton BWI Airport

7032 Elm Road

Baltimore, Maryland 21240

Reservations: 1-800-368-7764 Phone: 410-859-3300

Submitted Papers

DATV-express: A Lower Cost Approach to DATV by Charles Brain, G4GUO and Ken Konechy, W6HHC

A Shadow Ad-Hoc TEMPn-N Network by Bob Bruninga, WB4APR

CW Mode for the NUE-PSK Digital Modem by Dave Collins, AD7JT and George Heron, N2APB

APRS and the Android Smartphone by Sagar Gupta, KC2VSG

Practical Implementations of Bluetooth in Microcontroller Circuits by John A. Hansen, Ph.D. W2FS

Public Service Event APRS Web Mapping for Wireless Devices by Ted Jacobson, W8KVK and Rob Jacobson, KB9AFT

WRC-12 Agenda Item 1.19: Regulatory Considerations for Software Defined and Cognitive Radio Systems by Brennan Price, N4QX

More experiments with Delay and Disruption Tolerant Networking over AX.25 Networks by John Ronan, EI7IG, Darren Long, GØHHW and Kristian Walsh

A Further Comparison of Different TCP/IP and DTN Protocols over the D-STAR Digital Data Mode by John Ronan, EI7IG and Cathal O'Connor

Codec 2 – Open Source Speech Coding at 2400 bit/s and Below by David Rowe, VK5DGR

PhoneSat: Balloon Testing Results by Mike Safyan

Modulation-Demodulation Software Radio (MDSR) Software for the BiLiF Computer Interface by Alex Schwarz, VE7DXW

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Introductory Talks (Saturday)

APRS by Bob Bruninga, WB4APR

Digital Data Modes by George Heron, N2APB

D-STAR Digital Voice & Data by Mark Braunstein, WA4KFZ

HF Digital Voice by Mel Whitten, K0PFX

Demo Room

Be sure to bring your projects to show in the demo room even if you are not speaking. Each year at the DCC a separate (and lockable) room is provided for people to bring and show off their latest projects. Tables and power will be provided. Bring your equipment and display for all to see, learn, and ask questions about. Be sure to bring a small sign and/or flyer naming and describing your project.

Banquet Speaker

The Village TELCO by David Rowe, VK5DGR

There are now billions of mobile phones all over the world. However in many developing countries, mobile phones are simply too expensive to use. For example, in a country where people earn \$1.50/day, a phone call can cost 21 cents/minute. This is a huge tax on communications.

David Rowe, VK5DGR, will describe how a community of people from around the world set out to fix this problem, using a mix of Wi-Fi and open source software. The result is the Village Telco - a DIY telephone company that anyone can set up.

A Village Telco is constructed from a network of "Mesh Potatoes" - small Wi-Fi boxes that are mounted on homes in a village. They form a mesh network, relaying telephone calls for each other. Each Mesh Potato connects to a regular telephone inside village homes. Phone calls on the network are free. A local person in the Village can be trained in a few hours to set up and maintain the network.

To build the Village Telco we borrowed many ideas from Ham Radio, such as sharing hardware designs and community networks.

The talk will include real world stories of how Village Telcos are helping people in several developing countries, and explain why a simple phone call that we take for granted can be so important.

Sunday Seminar:

Universal Ham Radio Connectivity by Callsign Workshop by Bob Bruninga, WB4APR

We hope to see you there!

73, Steve N7HPR

President TAPR

Board of Directors Election

Three Director positions on the TAPR board of directors are now open for nomination.

Nominations may be submitted now. Visit www.tapr.org/tapr_elections.html for information about what being a TAPR director entails and also to place your nominations (please use plain text when placing a nomination).

Nominations close with the call for nominations from the floor the TAPR Membership Meeting on September 17, 2011, and an online election will be held at http://www.tapr.org/tapr_elections.html from September 24 to October 7, 2011.

The three Director positions that are up for election are currently held by Steve Bible, N7HPR, Stan Horzepa, W1LOU, and Darryl Smith, VK2TDS.

###

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DCC Schedule**Friday, 16 Sept.**

08:00 AM Conference Registration
 08:00 AM Demonstration Room Open
 09:30 AM Welcome
 09:45 AM Technical Presentations
 Noon Lunch
 01:00 PM Technical Presentations
 04:00 PM Break
 07:00 PM Friday Night Social
 11:00 PM Demonstration Room Closed

Saturday, 17 Sept.

08:00 AM Conference Registration
 08:00 AM Demonstration Room Open
 09:30 AM Welcome
 09:45 AM Technical Presentations
 Noon Lunch
 01:00 PM Technical Presentations
 04:00 PM TAPR Membership Meeting
 04:45 PM Break
 07:00 PM Dinner Banquet
 11:00 PM Demonstration Room Closed

Sunday, 18 Sept.

08:00 AM Sunday Seminar

DCC Speaker Schedule**Friday, 16 Sept.**

09:45 AM **HPSDR Update** by Scotty Cowling, WA2DFI
 10:30 AM **ARISSat-1 Update** by Steve Bible, N7HPR
 11:15 AM **PhoneSat: Balloon Testing Results** by Mike Safyan, KJ6MVL
 01:00 PM **Modulation-Demodulation Software Radio Software for the BiLiF Computer Interface** by Alex Schwarz, VE7DXW
 01:45 PM **A Shadow Ad-Hoc TEMPn-N Network** by Bob Bruninga, WB4APR
 02:30 PM **CW Mode for the NUE-PSK Digital Modem** by Dave Collins, AD7JT and George Heron, N2APB

Saturday, 17 Sept.

09:00 AM **Catastrophic Communications—Which Digital Emission Type Would YOU Use?** by Curt Bartholomew, N3GQ
 09:00 AM **Introductory Session: Digital Data Modes** by George Heron, N2APB
 09:45 AM **WRC-12 Agenda Item 1.19: Regulatory Considerations for Software Defined and Cognitive Radio Systems** by Brennan Price, N4QX
 10:30 AM **Practical Implementations of Bluetooth in Microcontroller Circuits** by John A. Hansen, Ph.D., W2FS
 10:30 AM **Introductory Session: HF Digital Voice** by Mel Whitten, K0PFX
 11:15 AM **Recent Developments in Software Radio at Flex Radio** by Bob McGwier, N4HY
 01:00 PM **DATVexpress – A Lower Cost Approach to DATV** by Charles Brain, G4GUO and Ken Konechy, W6HHC
 01:00 PM **Introductory Session: D-Star Digital Voice & Data** by Mark Braunstein, WA4KFZ
 01:45 PM **FUNcube Dongle - Amateur Radio from Kitchen Counter to Mass Production** by Howard Long, G6LVB
 02:30 PM **Practical Digital Radios and Dealing with Non-Ideal Components** by Matt Ettus, N2MJI
 02:30 PM **Introductory Session: APRS** by Bob Bruninga, WB4APR
 03:15 PM **Codec 2 – Open Source Speech Coding at 2400 bit/s and Below** by David Rowe, VK5DGR
 07:00 PM Banquet Speaker: **The Village Telco** by David Rowe, VK5DGR

Sunday, 18 Sept.

08:00 AM Sunday Seminar: **Universal Ham Radio Connectivity by Callsign Workshop** by Bob Bruninga, WB4APR

Bible's Blog

TAPR President Steve Bible, N7HPR, now has a blog on the EE Times website. Steve's blog is called Chips in Space - The Building of an Amateur Satellite and you can find it [here](#).

###

Digital ATV Yahoo Group

Digital ATV is a new and active Yahoo Group moderated by Ken Konechy, W6HHC, and Mark Thompson, WB9QZB.

The link to the group is <http://groups.yahoo.com/group/DigitalATV/>

Ken, W6HHC, is very active in Digital ATV in Orange County, CA and has presented DTV at the 2009 and 2010 DCCs. He will also be presenting at the 2011 DCC.

Mark, WB9QZB is on the TAPR Board of Directors.

###

What's With the ### ?

People ask what is the significance of the ### at the end of articles in PSR. Here is the answer: ### is shorthand that proofreaders and editors use to indicate the end of an article.

###

Hermes on YouTube

TAPR is funding the development of Hermes, a single-board DUC/DDC transceiver. This HPSDR project includes the following features:

- * Direct Sampling RX and Direct Up Conversion TX on single board
- * Mercury front end/sampling section: continuous 50kHz – 54MHz coverage
- * Penelope CODEC and TX section with modified 500mW PA
- * Single Altera EP3C40 Cyclone III FPGA for filtering and data processing
- * Diode protected USB 2.0 interface to PC
- * SPI Interface to Apollo
- * Digital I/O: 7 - OC digital outputs, 3 - digital inputs, 4 - 12 bit analog inputs
- * Key, paddle and PTT inputs, jumper selectable electret microphone bias
- * Input attenuator: 20dB software switchable
- * Preamp: -135dBm noise floor (@500Hz BW)
- * On-board low noise SMPS: typical 400mA from 13.8V supply
- * Standard 100mm x 160mm EuroCard
- * Full-duplex operation, any frequency/mode split



- * 122.88MHz master clock, can be locked to TCXO or external reference (GPS)
- * Stereo audio: 1W speaker out, headphone out, line out
- * Dedicated 0dBm transverter output
- * TX/RX image rejection: greater than 110dB
- * Blocking Dynamic Range (BDR): typical 125dB
- * Eight independent receivers will fit can be implemented within FPGA
- * Software support: KISS Konsole, PowerSDR, GHPSDR

YouTube has a video [here](#) of a Hermes prototype up and running with *PowerSDR* software.

###

Time for More Time

Stan, it is a big disappointment to see yet another *PSR* filled with SDR stuff and not a single word about other projects in the time/frequency arena. Can't we get an article that explains what is in development?

The digital world of amateur radio does not begin and end with SDR. But, that seems to be the only thing TAPR is interested in promoting. We have lost track of our roots...

Larry W6FUB

Hi Larry,

Sorry you are disappointed.

As I prepare each issue of *PSR*, I put out a general call for articles and I have not received anything in the time/frequency arena in ages. That is the main reason for the dearth of articles in that arena, not because TAPR has an agenda of promoting SDR over everything else. On the other hand, see N8UR's recent comment below.

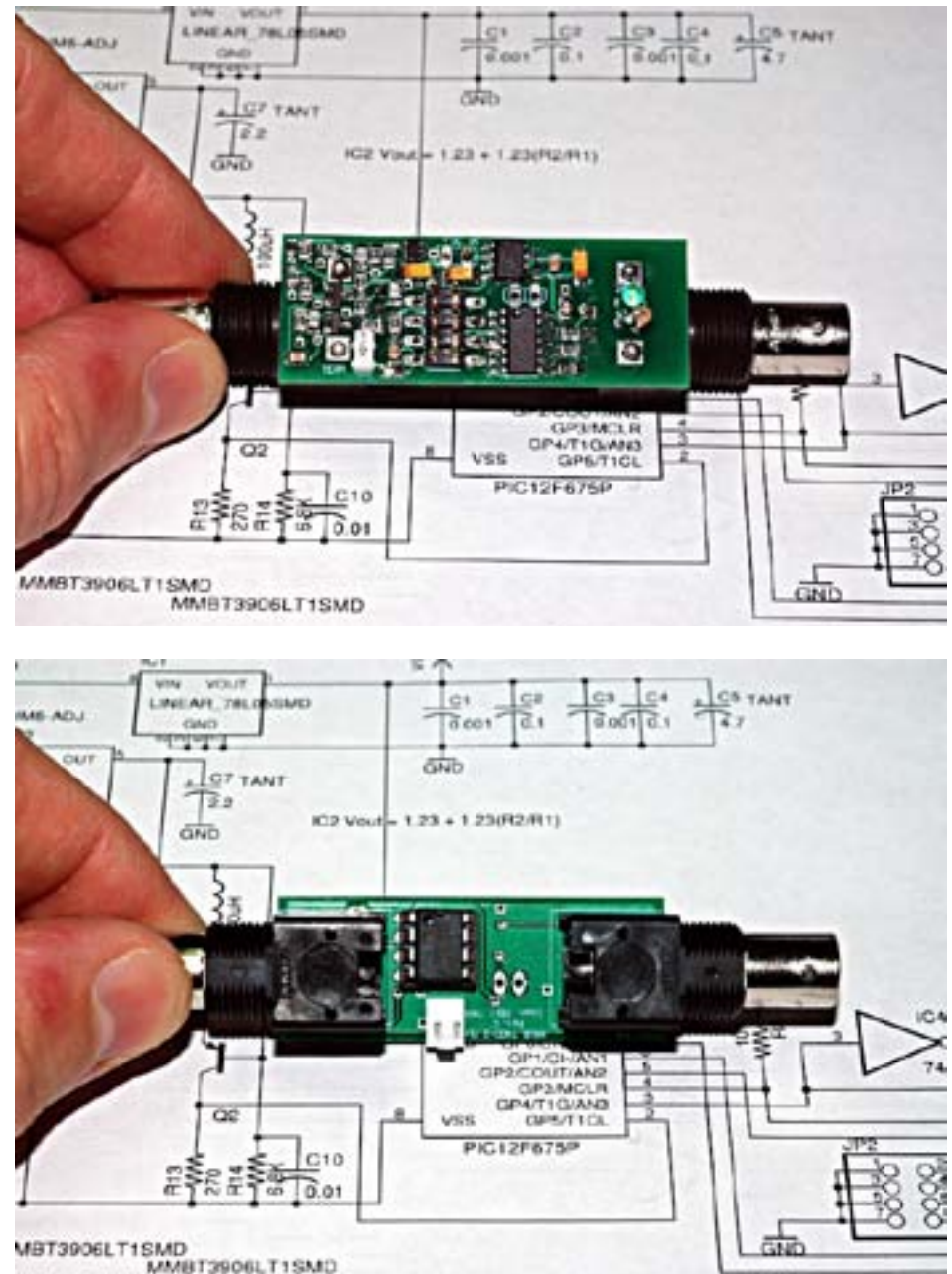
73,

Stan, WA1LOU

PSR Editor

John Ackermann, N8UR, writes, "I finished assembling the first beta of the TADD-2 Mini and amazingly enough it works -- at least, when you shove 10 MHz in, you get 1 PPS out. I need to do a bunch more testing to make sure it works *properly*. A couple of photos are attached."

###



The advertisement features a green header with the text "2011 ARRL / TAPR Digital Communications Conference" in yellow and white. On the left, there is a diamond-shaped ARRL logo and a blue TAPR logo. The background is a photograph of a modern building with a glass facade and a red section, situated near a waterfront with a large ship and several small boats. The text on the right provides the dates, location, and details of the conference.

2011 ARRL / TAPR Digital Communications Conference

September 16-18 in Baltimore, Maryland

Make your reservations now for three days of learning and enjoyment at the Four Points Sheraton Hotel at BWI airport. The Digital Communication Conference schedule includes forums, demonstrations, a Saturday evening banquet and an in-depth Sunday seminar. This conference is for everyone with an interest in digital communications—beginner to expert.

Call Tucson Amateur Packet Radio at: **972-671-8277**, or go online to **www.tapr.org/dcc**

TAPR is a community that provides leadership and resources to radio amateurs for the purpose of advancing the radio art.

TAPR at Dayton Hamvention

TAPR had a multi-faceted presence at the Dayton Hamvention (May 13-15, 2011).

As usual, the TAPR Digital Forum packed them in on Friday morning. Astronaut Doug Wheelock, KF5BOC, joined the throng at the TAPR-AMSAT annual banquet on Friday evening, where after-dinner speaker Bob Bruninga, WB4APR, explained the fine points of getting off the grid.

And all weekend long, booths 455 through 458 in the Hara Arena were the focus of the state of the ham radio arts with TAPR presenting its latest developments.

###



Bob Bruninga, WB4APR, was the after dinner speaker at the Hamvention TAPR-AMSAT banquet.



The gang manning the Hamvention TAPR booth during a lull in the festivities; left to right, Eric Ellison (AA4SW), Kjell Karlsen (LA2NI), Scotty Cowling (WA2DFI), Jeremy McDermond (NH6Z), and John Ackermann (N8UR).



Astronaut Doug Wheelock, KF5BOC, spoke briefly at the Hamvention TAPR-AMSAT banquet.

TAPR Board of Directors Meeting Minutes

May 17, 2011, Dayton, OH

Attendees: John Ackermann (N8UR), Dan Babcock (N4XWE), Steve Bible (N7HPR), Scotty Cowling (WA2DFI), Tom Holmes, (N8ZM), Stan Horzepa (W1LOU), John Koster (W9DDD), Laura Koster, Jeremy McDermond (NH6Z), Tim Shepherd (KD1KY), Mark Thompson (WB9QZB)

WA2DFI: Phil Harman looking for help to build Hermes. Phil will put together an estimate of what he needs to be voted on by BOD.

W9DDD: Wondered about the stock of unsold Nokia radios; look for a project to make this radio interesting

W9DDD: Wondered about the stock of 4707 tuners; DCC contest to do something with the 4707

W9DDD: Financing next HPSDR project

General discussion of HPSDR projects that are in the works. Lots of development to be done; looking at November-December time frame.

N8ZM: End of year report, \$139k in assets as of end of 2010; \$163k in assets through end of April. (The assets include checking account, savings account, and inventory.)

N4XWE: Asked to add inventory report to W9DDD's monthly report

General discussion of HPSDR inventories.

N8UR: We need new shirts

Action item: Laura Koster will look into new shirts

N8UR: TADD-2 mini: single-channel version of the TADD-2; will be a popular item for the Time-Nuts; partial kit; discussed costs and best way to buy (quantities, blanks, etc.); will finish testing and create BOM; if this works, two TADD-1 products to be developed

WB9QZB: Membership apps ?

WB9QZB: Reach out to manufacturers for DCC door prizes

General discussion about location for 2012 DCC: Atlanta, Chicago, St. Louis

WB9QZB: Updating Twitter and Facebook

Action item: W1LOU: publicize Twitter and Facebook

N4XWE: Software promotion: GUI's for Winradio, GNUradio; bounty with open source

requirement; TAPR wants this, what do you want? A bounty vs. a prize. Who is deciding what needs to be done? We need to go outside ham radio to find software programmers. Have a booth at Maker's Fair.

Action item: N4XWE, NH6Z, and N8UR: to come up with an objective for software promotion

NH6Z: New membership reminder system in the works

NH6Z: Why don't we do multi-year memberships? Just bookkeeping

W1LOU: What about life membership?

Action item: N8ZM: to look into life memberships

KD1KY: Get the right people together to look into something new; (sponsor a small workshop?)

KD1KY: Open source HT ?

Action item: KD1KY: Write DCC paper about vision of the future.

###

Join TAPR on Twitter & Facebook

By Mark Thompson, WB9QZB, e-mail wb9qzb@tapr.org

We encourage everyone to follow TAPR on Facebook and Twitter to learn about:

- What's new at TAPR.
- Upcoming events at the Dayton Hamvention and the Digital Communications Conference.
- Other updates like *PSR*, projects, etc.

Access the TAPR Twitter account at <http://www.twitter.com/taprdigital>

Access the TAPR Facebook account at <http://www.facebook.com/pages/TAPR/116614778354245>

###

VK6APH Receives Award

By Bob Bristow - VK6POP

On Sunday the 7th of August at the NCRG Hamfest, it was my pleasure to present to Phil Harman, VK6APH, the Ron Wilkinson Award certificate.

Phil received the award in recognition of his contribution to Amateur radio, especially in digital techniques, and for his contributions to Amateur radio literature.

Phil said he was honoured to receive the award.

The presentation of the certificate was done live, on-air, during the NewsWest broadcast.

(Source: [The Wireless Institute of Australia](#))

###



APRS Supports Bicycle Riders Public Service Event

By Jim Alles, KB3TBX

On the weekend of July 23rd and 24th, amateur radio operators from Centre, Blair and Huntingdon Counties in the Commonwealth of Pennsylvania provided communications facilities for the [Keystone Country Ride of the Keystone Division of the Multiple Sclerosis Society](#). This annual ride is a fund raising event that starts in Hollidaysburg, PA on Saturday morning, arrives in State College, PA on Saturday afternoon with a dinner at the [Penn Stater Hotel](#). After breakfast Sunday morning, the well over 600 riders leave for the return trip to Hollidaysburg Junior High School by a slightly different route, for a total of approximately 150 miles. Therefore, it is known as the MS-150.

As the full name implies, riding through the country means that cell phone coverage is lacking in some areas. However, two different club repeater systems (with others as back-ups) provide excellent radio coverage on 2 meters, with operators shadowing the race director, Quick Response Service (QRS) {a medical technician}, and riding in various Support And Gear (SAG) wagons.

This year, we expanded the information made available to the Net control stations and event coordinators through APRS. Coverage for this network is also fairly good with two permanent digipeaters, [W3YA-1](#) & [K3ARL-5](#), and a new station, [W3VO-1](#). We supplemented that coverage this year with a receive-only I-gate and object server, [KB3TBX-5](#).

This fixed APRS station consisted of Lynn Deffenbaugh's [APRSIS-32](#) with MS WinXP Pro SP3 on a compact Shuttle dual-core machine. The host facility, [Camp Kanasetake](#), provided wireless Internet access, AC power, and shelter. The interface to the computer used the recording line output of a scanning receiver. The computer sound card line input was connected through an audio isolation transformer. The audio was processed by the [AGW Packet Engine](#) for windows. The location of this station was at a lunch stop, where bicyclists and support people congregated; but in an area where APRS coverage suffered due to 'shadowing' from nearby surrounding hills (this can be seen if you use the terrain maps while viewing the links below). This allowed position reports from this area to be sent to the Internet System (IS). Also sent to the Internet by this system were the fixed objects (Items), as shown in the link below, which provided way-points as a reference for viewing by ride officials on Internet browsers. These objects include physical street address to aid navigation and phone numbers for the Hospitals in the beacon Status Text.

One of the most valuable sets of location information for MS officials is the location of the 'Tail' SAG wagon. This vehicle shadowed the last rider at all times, picked up riders who were unable to continue, and clearly indicated the progress through the course. Primarily, Kenwood D-710 radios with GPS units attached were employed, but

there was also a Yaesu VX-8R HT and a Byonics TinyTrak3 in use.

Overall, the APRS data provided increased situational awareness, including the exact location of several incidents such as bee stings and one case of road-rash. I also found the information on even the small HT display useful in determining the proximity to another SAG wagon while on the road.

Here are links to a database of saved position reports on a Google map at [APRS.FI](#); feel free to zoom in, pan around, change map types, or click on anything (there is nothing to break):

[Objects \(Items\)](#)

[Stations \(Saturday\) \(Sunday\)](#)

[Digipeaters & I-gates](#)

My thanks to everyone who contributed to this support effort, but especially [Carmine Presita](#), [K3CWP](#) for his newsletter articles and debriefing reports that saved a lot of research time on my part.

###

APRS is a registered trademark of Bob Bruninga, WB4APR
<http://www.aprs.org/>

APRS Tactical Call Signs

By Jim Alles, KB3TBX

You may want to program tactical call signs into your radios to provide clarity during a special / public service event. Here are some recommendations (for the United States):

PREPARE IN ADVANCE

Determine which stations and posts will participate.

Decide on a prefix to identify your event. I might use CC for Centre County. ZZ is used in the examples here.

Use the remaining 4 characters for the unit name. This could be SAG1, SAG2, SAG3, NETC, TAIL. The unique tactical call signs would then be ZZSAG1-6, ZZSAG2-6, ZZTAIL. Although you can use any SSID you like (or none), do not rely on them to make your tactical call signs unique.

If a message is sent to a call sign, all stations with the same call sign will receive the message, regardless of the SSID. You may not be using messaging, but you might still receive messages from anywhere, adding confusion.

Verify that your tactical calls are unique. Search for each of them in your favorite web site (aprs.fi, www.openaprs.net, www.findu.com, www.aprsworld.net, or others listed on info.aprs.net). If the site supports it, you will want to search with a wild card for the SSID, like ZZTAIL*, even if you aren't using one.

Identify your stations - You will need to add the legal ID into the (beacon) Status Text, and separately, the text of each and every message you send. Also

consider other information to be included in the status text, and what should be prominent on a small display. Although "KB3TBX supports MS-150" is fine, I am now considering something more like "146.52 MHz on the MS-150 route, sagging riders 57 & 99 de KB3TBX" - and update it as circumstances change.

Pre-program your radios and test the operation. It would be helpful to have operators get familiar with the operation, especially if they are using loaner equipment.

Be prepared for the need to re-assign units and re-program radios and trackers. Have user's manuals, programming cables and a laptop with the appropriate software available at the staging area. Most voice transceivers can also be 'programmed' on the fly, if operators are familiar with the process (it is really similar to texting).

CONSIDER OBJECTS

Using the appropriate software, Objects/Items can be added to the maps to show static posts such as intersections and water stops. They can also be used to indicate moving targets, based on voice reports. Objects can be added to the maps for crashes or other incidents. You have more flexibility with the object name (up to nine characters) and the legal ID of the sending station is automatically transmitted (make sure this station has a real call sign). Use the same prefix (ZZ) in the object name for consistency and uniqueness.

ENJOY THE EXPANDED INFORMATION IN YOUR EVENT!

###

Write Here!

PSR is looking for a few good writers, particularly ham radio operators working on the digital side of our hobby, who would like to publicize their activities here.

You don't have to be Hiram Percy Maxim to contribute to *PSR* and you don't have to use Microsoft Word to compose your thoughts. The *PSR* editorial staff can handle just about any text and graphic format, so don't be afraid to submit whatever you have to w1lou@tapr.org.

The deadline for the next issue of *PSR* is October 15, so write early and write often.

###

Fixing A Little TAPR History

By Stan Horzempa, WA1LOU

In the previous issue of *PSR*, I presented the results of my researching the past officers, board of director members, *PSR* editors, and TAPR office managers.

After presenting the results, Bdale Garbee, KB0G (ex N3EUA), wrote, "The table of officers through history has at least one mistake. I wasn't treasurer, I was VP for a year. I suspect Pete [WB9FLW - ed.] was treasurer, though I don't recall for sure."

I thanked Bdale and revised the table accordingly. The following three pages represent the revised results of my research.

To reiterate, each column in the following table represents one elected office term. For example, the first column, "1982 07 to 1983 01," indicates that the officers in that column began serving in July 1982 and that their term of office ended in January 1983.

Board members serve three-year terms, which are represented by the three column color coding. By the way, early on, there were 15 board members, but in the early 1990s, there was a transition from 15 to the present 9 board members.

History is always a work-in-progress and this project is no different. If you discover any errors, omissions, etc., please let me know so I can make corrections and this project as accurate as possible.

###

	1982 07	1983 02	1984 02	1985 02	1986 02	1987 02	1988 02	1989 02	1990 02	1991 02	1992 03
	to	to	to	to	to	to	to	to	to	to	to
	1983 01	1984 01	1985 01	1986 01	1987 01	1988 01	1989 01	1990 01	1991 01	1992 02	1993 02
President	KD2S	WA7GXD	WA7GXD	WA7GXD	WA7GXD	WA7GXD	N0CCZ	N0CCZ	WA7GXD	W6SWE	W6SWE
Vice President	KV7D										VE3GYQ
Exec Vice President	WA7GXD	KD2S	WB9FLW*	WB9FLW	WB9FLW	W3IWI	W3IWI	N3EUA	NK6K	NK6K	
Secretary	Mbaker	N7DZU	N7DZU	WA0TTW	N7DZU	AL7FG	W3VS	VE3GYQ	WD5IVD	WD5IVD	WB6RTH
Treasurer		N0ADI	N0ADI	KV7B	N6HBB	N6HBB	W3VS	WB9FLW	WD5IVD	WD5IVD	WB6RTH
President Emeritus											
BOD		W1HDX	WA0TTW	WA0TTW	WA0TTW	VE3GYQ	VE3GYQ	VE3GYQ	VE3GYQ	VE3GYQ	VE3GYQ
BOD		W3IWI	W3IWI	W3IWI	W3IWI	W3IWI	W3IWI	W3IWI	W3IWI	W3IWI	W3IWI
BOD		WB9FLW	WB9FLW	WB9FLW	WB9FLW	AL7FG	WB9FLW	WB9FLW	WB9FLW	WB9FLW	WB9FLW
BOD		NK6K	NK6K	NK6K	NK6K	NK6K	NK6K	NK6K	NK6K	NK6K	NK6K
BOD		KV7D	KV7D	KV7D	KV7D	KB6QH	KB6QH	KB6QH	N4PCR	N4PCR	
BOD		WB6HHV	WB6HHV	WB6HHV	WB6HHV	WB6HHV	WB6HHV	WB6HHV	WB6HHV		
BOD		KD4NL	KD4NL	WB6YMH	WB6YMH	WB6YMH	WB6YMH	WB6YMH	WB6YMH	WD5IVD	WD5IVD
BOD		WD0ETZ	WD0ETZ	WD0ETZ	WD0ETZ	WD0ETZ	KA9Q	KA9Q	KA9Q	K7UPJ	K7UPJ
BOD		KV7B	KV7B	KV7B	KV7B	KV7B	KV7B	KV7B	KV7B	KV7B	KV7B
BOD		KT7D	KT7D	N0CCZ	N0CCZ	N0CCZ	N0CCZ	N0CCZ	N0CCZ	N0CCZ	WA4EJR
BOD	MarkBaker	MarkBaker	MarkBaker	MarkBaker	W1BEL	N4HY	N4HY	N3EUA	N3EUA	N3EUA	W6SWE
BOD	WA7PXW	WA7PXW	WA7PXW	WA7PXW	K9NG	K9NG	K9NG	K9NG	K9NG	K9NG	
BOD	KD2S	KD2S	KD2S	KD2S	W3VS	W3VS	W3VS	N6NKF	N6NKF	N6NKF	
BOD	N0ADI	N0ADI	N0ADI	N0ADI	N7CL	N7CL	N7CL	N7CL	N7CL	N7CL	
BOD	WA7GXD	WA7GXD	WA7GXD	WA7GXD	WA7GXD	WA7GXD	WA7GXD	WA7GXD	WA7GXD	WA7GXD	
PSR Editor	group	KV7D	KV7D	WA0TTW	W1BEL	W3VS	W3VS	WD5IVD	W6SWE	N2GDE	N2GDE
PSR Co_Editor		KD2S		N0CRN					N2GDE		
PSR Issues		2	3 to 5	6 to 15	16 to 27	28 to 35		36	37 to 41	42 to 80	
Office Mgr		N7DZU	N7DZU	N7DZU	N7DZU	AL7FG	N7DZU	N7DZU	N7DZU	N7DZU	N7DZU
Co-Office Mgr											
			* resigned May 1984								

	1993 03	1994 03	1995 03	1996 03	1997 03	1998 03	1999 03	2000 02	2001 09	2002 09
	to	to	to	to	to	to	to	to	to	to
	1994 02	1995 02	1996 02	1997 02	1998 02	1999 02	2000 02	2001 08	2002 08	2003 08
President	WD5IVD	WD5IVD	WD5IVD	WD5IVD	WD5IVD	WD5IVD	WD5IVD	N8UR	N8UR	N8UR
Vice President	W6SWE	KF7TP	AG9V	AG9V	N8UR	N8UR	N8UR	N7HPR	N7HPR	N7HPR
Exec Vice President										
Secretary	N4CHV	N4CHV	N4CHV	N8GNJ	N8GNJ	N8GNJ	N2GDE	KC5GOI	KC5GOI	KC5GOI
Treasurer	WA5LHS	WA5LHS	WA5LHS	WA5LHS	WA5LHS	WA5LHS	WA5LHS	WA5LHS	WA5LHS	WA5LHS
President Emeritus										
BOD	AG7H	AG7H	AG9V	AG9V	N8UR	N8UR	N8UR	N8UR	N8UR	N8UR
BOD	WA4EJR	WA4EJR	VE3JF	VE3JF	VE3JF	VE3JF	VE3JF	N6BG	N6BG	N6BG
BOD	WA5LHS	WA5LHS	KC3RL	KC3RL	KC3RL	KC3RL	KC3RL	KC3RL	KC3RL	KC3RL
BOD	KF7TP	KF7TP	KF7TP	N7HPR	N7HPR	N7HPR	N7HPR	N7HPR	N7HPR	N7HPR
BOD	N2GDE	N2GDE	N2GDE	N2GDE	N2GDE	N2GDE	N2GDE	N2GDE	N2GDE	WA1LOU
BOD	N4CHV	N4CHV	N4CHV	N4CHV	N4CHV	N4CHV	K4HG	K4HG	K4HG	VK2TDS
BOD	WD5IVD	WD5IVD	WD5IVD	WD5IVD	WD5IVD	WD5IVD	WD5IVD	N8GNJ	N8GNJ	N8GNJ
BOD	K7UPJ	W9DDD	W9DDD	W9DDD	W9DDD	W9DDD	W9DDD	W9DDD	W9DDD	W9DDD
BOD	KV7B	K0PFX	K0PFX	K0PFX	K0PFX	K0PFX	K0PFX	K0PFX	K0PFX	K0PFX
BOD	WA4EJR									
BOD	W6SWE									
BOD										
BOD										
BOD										
BOD										
PSR Editor	N2GDE	N2GDE	N2GDE	N2GDE	N2GDE	N2GDE	N2GDE	N8GNJ	WA1LOU	WA1LOU
PSR Co_Editor										
PSR Issues								81 & 82	83 to present	
Office Mgr	KA5DWR	KA5DWR	KA5DWR	KA5DWR	KA5DWR	KA5DWR	KA5DWR	L Koster	L Koster	L Koster

	2003 09	2004 09	2005 09	2006 09	2007 09	2008 09	2009 09	2010 09	2011 09	2012 09
	to	to	to	to	to	to	to	to	to	to
	2004 08	2005 08	2006 08	2007 08	2008 08	2008 08	2010 08	2011 08	2012 08	2013 08
President	N8UR	N8UR	VE3GYQ	VE3GYQ	VE3GYQ	VE3GYQ	N7HPR	N7HPR		
Vice President	N7HPR	N7HPR	N7HPR	N7HPR	N7HPR	N7HPR	WA2DFI	WA2DFI		
Exec Vice President										
Secretary	WA1LOU	WA1LOU	WA1LOU	WA1LOU	WA1LOU	WA1LOU	WA1LOU	WA1LOU		
Treasurer	N8ZM	N8ZM	N8ZM	N8ZM	N8ZM	N8ZM	N8ZM	N8ZM		
President Emeritus							VE3GYQ	VE3GYQ		
BOD	N8UR	N8UR	N8UR	N8UR	N8UR	N8UR	N8UR	N8UR	N8UR	N8UR
BOD	N6BG	VE3GYQ	VE3GYQ	VE3GYQ	VE3GYQ	VE3GYQ	VE3GYQ	N4XWE	N4XWE	N4XWE
BOD	KC3RL	WA7NWP	WA7NWP	WA7NWP	WA7NWP	WA7NWP	WA7NWP	NH6Z	NH6Z	NH6Z
BOD	N7HPR	N7HPR	N7HPR	N7HPR	N7HPR	N7HPR	N7HPR	N7HPR		
BOD	WA1LOU	WA1LOU	WA1LOU	WA1LOU	WA1LOU	WA1LOU	WA1LOU	WA1LOU		
BOD	VK2TDS	VK2TDS	VK2TDS	VK2TDS	VK2TDS	VK2TDS	VK2TDS	VK2TDS		
BOD	N8GNJ	N8GNJ	N8GNJ	WA2DFI	WA2DFI	WA2DFI	WA2DFI	WA2DFI	WA2DFI	WA2DFI
BOD	W9DDD	W9DDD	W9DDD	W9DDD	W9DDD	W9DDD	W9DDD	W9DDD	W9DDD	W9DDD
BOD	WA8WDQ	WA8WDQ	WA8WDQ	AA4SW	AA4SW	AA4SW	WB9QZB	WB9QZB	WB9QZB	
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PSR Editor	WA1LOU	WA1LOU	WA1LOU	WA1LOU	WA1LOU	WA1LOU	WA1LOU	WA1LOU		
PSR Co_Editor										
PSR Issues										
Office Mgr	L Koster	W9DDD	W9DDD	W9DDD	W9DDD	W9DDD	W9DDD	W9DDD		

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