Tucson Amateur Packet Radio, Inc   4 December 2020
1 Glen Avenue
Wolcott, CT 06716 USA

Officer contact information:
President Steven Bible, N7HPR steven.bible@gmail.com
Vice President Scotty Cowling, WA2DFI scotty@tonks.com
Secretary Stana Horzepa, WA1LOU stanzepa@sbcglobal.net
Treasurer Tom Holmes, N8ZM tholmes@woh.rr.com

Web site: www.tapr.org

Mailing address and telephone:
Tucson Amateur Packet Radio, Inc
1 Glen Avenue
Wolcott, CT 06716 USA
972-413-8277

TangerineSDR Prototype Build ARDC Grant Status Dec 2020

As you know, the Tangerine SDR consists of a three-board set: the CKM (GPSDO Clock Module), the RFM (Direct sampling RF module) and the DE (FPGA-based Data engine). In addition, there is a magnetometer sensor module designed as a Raspberry Pi HAT. The MagnetoPiHat can be used with the TangerineSDR board set or independently as a RPi peripheral.

CKM Status
The CKM architecture has gone through several iterations since the beginning of the project. John Ackermann N8UR is the project lead. Through the iterations and with the assistance of the other team members (chiefly Tom McDermott N5EG and Scotty Cowling WA2DFI), John has come up with a novel approach that reduces both complexity and cost. The architecture has been finalized, all major components have been selected and the initial schematic is nearly complete.

RFM Status
The RF Module is the farthest along, and hence closest to prototype build. Tom McDermott N5EG is the project lead. The dual-channel 14-bit 122Msps architecture was established in the beginning phase of the project in order to meet not only the goals of the HamSCI PSWS (Personal Space Weather Station), but to target the needs of academic users as well as amateur radio experimenters. The architecture has been finalized, all major components have been selected, the schematic is complete and the PCB layout is complete. The RFM build is on hold awaiting the completion of the DE placement in order to ensure that the boards will mechanically fit together without issues.

DE Status
The DE module architecture has also gone through several iterations, mainly fine-tuning the peripherals that are included on the board. The project lead is Scotty Cowling WA2DFI. The final architecture has been agreed upon and the schematic is nearly complete. Many team members have contributed to the DE feature set. Since it is the heart of the TangerineSDR system, it is important to take the time to get it right.

MagnetoPiHat Status
The MagnetoPiHat prototype build is complete and was funded by TAPR and the NSF grant to the University of Scranton. Fifty prototypes have been built and are now in the hands of about a dozen or so testers. Dave Witten KD0EAG built the first few proof of concept boards, followed by the TAPR prototype version by Scotty Cowling WA2DFI.

Use of ARDC Funds
To date, no ARDC funds have been expended on the project. All of the ARDC grant monies are being held in TAPR's accounts pending their use for building CKM, RFM and DE prototypes. All of the work done so far has been either from volunteers or paid for by the University of Scranton NSF grant.

We expect that the bulk of the ARDC funds will be spent in the first quarter of 2021, when the prototype build is scheduled to occur.
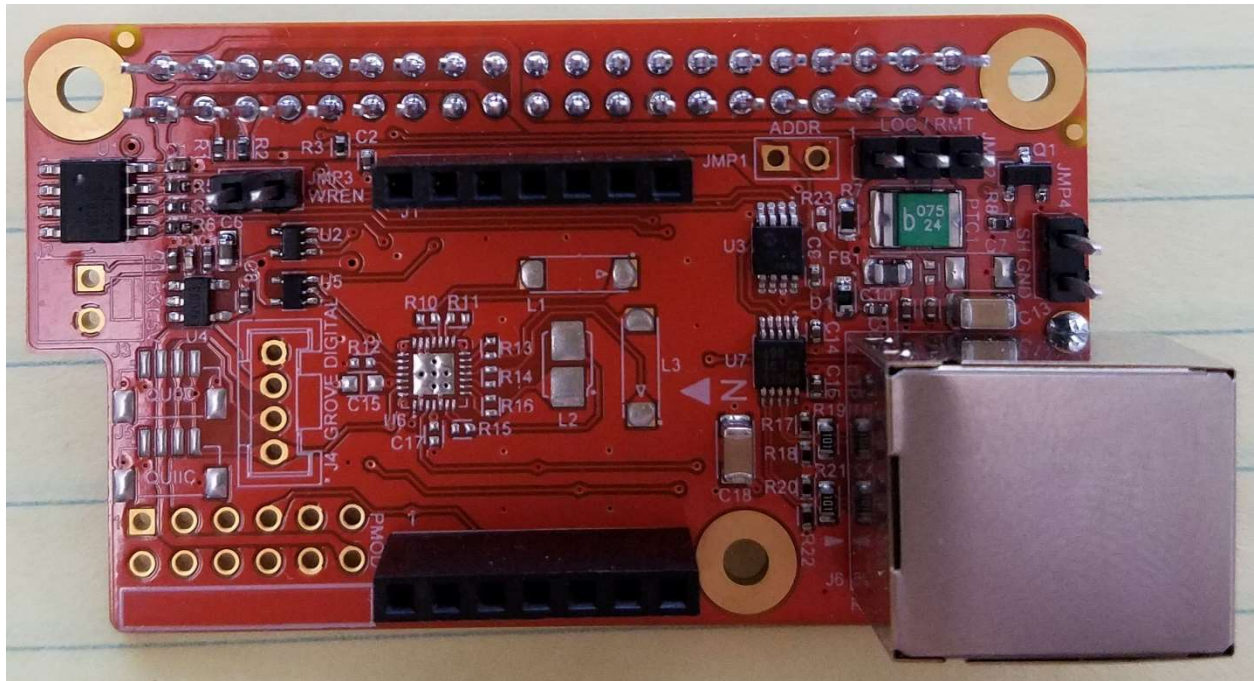

Challenges and Successes
One of the biggest challenges has been to manage the expectations and best utilize the skills of a large team. Filtering all of the ideas and contributions down to good ideas that we can use is difficult. Staying focused on the requirements is the key. One of our best accomplishments was writing down our requirements and specifications in advance. Most amateur radio projects progress in a very hap-hazard way. We have many documents (see http://tangerineSDR.com) written early-on that help us stay on track. Yes, we have more work to do in refreshing these documents; but we have them as a framework from which to work.

We also have weekly on-line meetings to discuss progress, solve problems, and generally make everyone aware of what everyone else is doing. These meetings started out as audio only Teamspeak meetings but have now evolved into Zoom meetings. While targeting one-hour duration, they frequently spill over into the next hour with most participants remaining. These weekly sessions are on Monday evening at 9:00PM EST and are open to everyone. Recordings of all meetings to date are available on the TangerineSDR web site (see link above). We also have an e-mail list for announcements and text discussion. Subscription instructions are on the website.

Respectfully submitted,

Scotty Cowling WA2DFI
TAPR Vice President
602-432-3409 cell
scotty@tonks.com

Prototype MagnetoPiHat for Raspberry Pi