

Radio Direction Finder

Saturday 2/13/2021 Meeting Summary

1. Purpose of RDF Project
 - a. Learn – create a modular architecture that allows any/all participants to design, build & test hardware, firmware & software while still interoperating.
 - b. Fun – using the RDF capability to play with direction finding/fox hunts that provide an outdoor competitive challenge while honing groups skill RDF
 - c. Service – if called upon use the RDF capability to locate interfering signal sources, locate/track mobile teams (used in Almaden CERT to track SAR teams using GMRS), assist in public service incidents (e.g. public service frequency jammers)
2. SFARC role
 - a. No official role
 - b. Group would like to use the club Zoom for RDF meetings given it is easy for casual drop in visitors to find the “coordinates” → if there is conflict RDF meetings will KI6RT’s Zoom meeting posted to Groups.IO.
3. Survey of available RDF products
 - a. Group decided to investigate the KerberosSDR 4-Channel Coherent RTL-SDR adapted for passive radar and RDF applications. Question is what will it take to integrate the product with the common backplane “architecture”.
 - b. Group agreed to support a DIY design that will enable experimentation of:
 - i. Antennas
 - ii. Antenna drivers (square waves, shaped pulses, conventional vs PIN diodes)
 - iii. GPS integration (UART, SPI/I2C, parallel, etc)
 - iv. HT audio processing (analog filters, direct sampling)
 - v. DSP firmware (BP filter, doppler shift computation, output averaging)
 - vi. Backplane driver (would be nice to have a reference design for others to leverage or port to other designs)
4. Backplane
 - a. Group agreed to use a derivative of NMEA sentences for the data “payload”. Rationale:
 - i. Is a well known & time-tested standard (marine electronics, GPS, other?)
 - ii. Standard NMEA sentences should be directly usable (i.e. no need to invent)
 - iii. NMEA standard has provision for NMEA sentence extensions if necessary
 - b. Group agreed to use ASCII over serial. Rationale:
 - i. Cheap & easy to implement on the most basic hardware
 - ii. Scales reasonably well (i.e. ubiquitous in the computer & embedded industry)
 - iii. Extensive library of parsers (strtok is even implemented on Arduino!), Raspberry-pi running a flavor of linux has mountains to choose from as does WINTEL languages du jour)
5. Meetings
 - a. Group agreed to meet ever Second & Fourth Wednesday at 7:30 PM (opposite the Elmer Net) and will nominally plan to use the SFARC Zoom