The GRONK RADIO NETWORK
WB6TZL / W6KGB
1201 Hibiscus Street
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December 2015

MERRY CHRISTMAS FROM ALL OF US AT GRONK RADIO TO ALL OF YOU!
AND MAY YOU HAVE A HAPPY NEW YEAR!!

2013-2015 in Review

Continuing our trend of ***Solid Success!*** 2013, 2014 and 2015 were very good years for GRONK. We made great strides with upgrades & repairs. We were also joined by new members! As you can see, even with this success come many trips ironing out the details. Overall we have great reliability. Nonetheless some of our equipment is over 30 years old, and gremlins can surface. Having a multi port radio system at a single site is an accomplishment. Having a multi-site multi-port radio network is a constant job. This year was a bit stalled due to significant health issues in my family requiring my attention, but we still managed gains like Saddle!

The average repeater is a much simpler beast than what we employ in our system. Much thought/planning, effort and expense goes into the "final product" with repeatability, reliability, serviceability, pride of craftsmanship & flexibility in mind. A professional approach is an apt description of this, toward what we enjoy as hobbyists. We can all be proud of having one of the better sounding radio networks in the nation. With its roots in the late 1960s, as the GRONK system, we carry on a legacy of being the first inter-mountain radio network! That's quite a heritage.

We also work cooperatively behind the scenes with other radio systems, groups and clubs. Keeping in the amateur radio spirit, we are stronger together than we are apart. Forging alliances is not only smart, but pays dividends for all participants. And the benefits sprinkle beyond those immediate ties throughout the community at large. A great example of this was our part in constructing the new Chatsworth Peak communications site in 2012 with the Rabbit Radio Network. We also lend our services to the Santa Barbara Amateur Radio Club (SBARC) among others. We have fun, new things happening in the digital world too – please be sure to read farther down the newsletter!

Blue Ridge 449.740 MHz 136.5 Hz

The FlagShip of our network is Blue Ridge, a great crossroads of our radio world. Unfortunately the radio experienced an outage recently & is completely disabled. Power supply related failure is suspected. We're hoping site access is still possible to affect repairs before Spring. Prior to this outage, a long-time intermittent problem of frequency drift on our Westbound link transmitter to Chatsworth Peak was identified and solved. A big victory!

Chatsworth Peak 446.660 MHz 136.5 Hz

Chatsworth was a big build & came together extraordinarily well. Among the hottest of receivers we have, we call it the "Nuclear Receive Level"! On the horizon, we plan on upgrading its 5 ports to the full 8 ports capable on a Sierra controller. Additional RF links and a VoIP link are anticipated. Most recently we added the Saddle Peak link & reshuffled some antennas. Having Saddle is exciting! Our Samlex 100Amp supply faithfully plods along, even after a recent cooling fan failure.

Loop Canyon 446.620 MHz 136.5 Hz

The Loop radio received its long-awaited revamping! Mike (K6MJU) and I met on March 20th 2014 at the site, where he'd arrived a couple hours prior, and commenced swapping old for new. Recycled were the RLC-4 controller, PD-526 440 duplexer, PD-633-6A link duplexer, cabinet and Astron RM-50M power supply. The new 440 package is a customized Motorola Mitrek, and a Motorola CDM-1250 / GM-300 duo for the new Link shelf. We have a functional 2-Meter Remote onsite again as well! It supports 15 selectable channels. A few details are yet to be ironed out, but it's a long-overdue upgrade now realized! Receive performance is much better thanks in part to an Angle Linear LNA. Our 2-Meter antenna has developed a problem and will need to be changed. Also under consideration is upgrade to the 440 Antenna. It's been in service since the early 1980s, quite remarkable!

Saddle Peak 447.78 MHz 136.5 Hz

Newly arrived to our system, a storied site of amateur radio – Saddle Peak. This radio was formerly part of the Crossbar Radio Network. As some groups do, Crossbar had unfortunately declined to zero activity over the last decade. Rather than have the radio disappear or lie dormant, I had reached out to its owner about absorbing it into the GRONK Network. He agreed with the current state of affairs & the proposed acquisition / future with our system, and the change was made. Another of the many

excellent sites we enjoy, this will serve us superbly. Currently operational, it's slated for total rebuild very soon. As good as it's working now, it'll be that much better afterward! We thank Jeff (WA6EQU) & the Crossbar group for their contributing this to our system!

Jordan Peak 440.825 MHz 136.5 Hz

A special site, and one of our tallest, it towers high above the San Joaquin Valley at 9,115ft AMSL. Coverage of the SJV isn't complete, but very close! Literally coverage for hours of driving. Jordan is an adventure with every trip, considering it's a 6Hr drive from my doorstep to the summit. The site is entirely off-grid, relying on its aged solar panels & battery bank. 2013 & 2014 saw significant upgrades. There's a lot left ahead, and I'm excited for the site's future. A complete changeout of radio equipment, installation of proper 19" rack, addition of structural bracing, some concrete work to a damaged support pylon, and total rewiring of the site were completed. A very HUGE thanks to Jay (WB6YQN) for his dedication on the long weekend up there! This site has newly built µMASTRs with a special Auto High/Low power on the local 440. Normally resting at 15 watts, between 8AM to 4:30PM, a local user can trigger 55W transmitter power automatically. This can be invoked manually as well & lasts 30 minutes after last local activity. Special thanks to a donation by Max (KJ6HN) toward the Power Amplifier upgrade! Less enthusiastically I report, we've experienced interference in our northern coverage from a newly added repeater in Stockton. Our inquires have gone unanswered, hence a new frequency is being sought. An announcement of the change will be sent once its new home is known. Jordan keeps on working so far this winter! US Forestry hosts webcams viewable by the public, and our main 440 antenna is visible in them, as is the very top of our solar rack. View the webcams here: http://www.sierracamnetwork.com/viewcams/jordan-peak/

Oxnard Switch 449.140 MHz 136.5 Hz

This radio has served a few roles in its life. One of my earliest builds, it's continued as a work-in-progress. The local 440 is normally off, with the links operating as a pass-through site. This is currently our conduit between Chatsworth Peak & La Cumbre Peak. The future holds some sort of reconfiguration, but as yet unknown. For now, the site rent is cheap & service trips very short – just a short walk down the hall! Earlier in the year, most equipment was removed from the rack & the whole rack re-wired. Serviceability improved, and the overall performance better.

Cheatwood (Verdugo Peak) 447.840 MHz 136.5 Hz

Providing fill-in of the Downtown LA, West LA, South Bay & Eastern San Fernando Valley with extended Orange County & LA basin coverage. Also upcoming, this site will link us to Mt. Otay for San Diego coverage! This radio is in need of attention. Some problems were corrected in the last year with failed coax jumpers & an audio intermittent. Nonetheless, work remains to rebuild the entire radio, and rework our antennas.

Rasnow Peak TBA MHz 136.5 Hz

Still on the futurecast, Rasnow Peak will add fill in the Thousand Oaks & surrounding Conejo Valley area. We're waiting for the right pieces to fall into place. Some administrative matters with our landlord are pending before we can construct. But when we do, we'll have a prime spot!

La Cumbre Peak 446.200 MHz 136.5 Hz

La Cumbre was installed in 2009 & has worked mostly without issue since then. Some audio and sensitivity problems in 2014 prompted an upgrade cycle. The 440 radio became a µMASTR along with other tweaks. Its former MASTR II chassis came back to be downsized & renovated into a µMASTR, now awaiting assignment elsewhere in the system. We're investigating further upgrades including a 2-Meter remote & second link. All in all, a very good site that's given us excellent coverage of the Santa Barbara city & surrounding areas, even down into Thousand Oaks along US101! I've accessed it in places as far out as Bell in the LA Basin and Carlsbad Field in San Diego!

Diablo Peak (Santa Cruz Island) 446.600 MHz 136.5 Hz

Another unique site, presenting logistical & engineering challenges similar to Jordan Peak. Access is by helicopter only! We ride-share with other activities where possible since helo rides are >$900/hr. Nevertheless, we were able to secure an agreement. So far a temporary stand-alone radio is installed allowing us to test. Initial results were mixed, as the antenna was suspected to be sub-par. Short notice meant we had to go with what we had. The opportunity to swap antennas came & a more substantial 4-bay antenna was installed. Performance improved. A more permanent package is in the works to integrate it with the network. Offering unique coastal coverage from San Diego to Point Conception, it'll be exciting to see this mature.

Santa Ynez Peak 447.160 MHz 131.8 Hz

Our newest hilltop, another long sought spot! Santa Ynez Peak looms above Goleta and Santa Barbara at over 4,000ft elevation. Sprawling with many towers, it's the site of choice for many. Our interest is mostly coverage northward up PCH & 101, as well as linking paths in the same direction. La Cumbre Peak covers the Santa Barbara City side much better than Santa Ynez, and Santa Ynez favors the north toward San Luis Obispo. Our landlord was very gracious to donate this space to us! John (K6LUA) has long been a friend to amateur radio & understands the struggles often encountered securing sites. We thank him deeply!

Running Springs 446.600 MHz 131.8 Hz

A few difficulties at the old site resulted in our radio being operational a short time. Nevertheless, it is destined to return. Where we're lacking is coverage in the east, and this site fills in a lot of the missing ground. I-15S & the Inland Empire are seen by this site.

Cummings Mountain 446.600 MHz 110.9 Hz

We're still planning to add a radio at Cummings Mountain, but other priorities have kept us from this goal so far. It's still on the drawing board, and the invite from our landlord remains open.

Mt. Otay 449.740 MHz 141.3 Hz

A site we've sought to develop for years, it became reality as 2013 came to a close. Mt. Otay is a prime San Diego area location, and we're excited to have it! Linkage to Verdugo Peak is coming when we have a chance to visit both sites to complete installation of link hardware.

Mt. Palomar 449.720 MHz 141.3 Hz

Like Mt. Otay, Mt. Palomar has been desirable for many years. Another prime San Diego location, this one favors more of the north county than the south where Otay is king. Those unfamiliar with San Diego may wonder why it takes multiple sites for coverage. Like other areas, but more pronounced, San Diego's broader landscape is of many ridges and canyons. True blanket coverage takes a lot of hardware. Our goal is reliable mobile & some handheld coverage of the major arteries, with any bonus coverage we can. Our landlord has generously offered space, so as resources allow, this will be among our new builds.

Mt. Potosi 449.225 MHz 136.5 Hz

This is a planned addition when a site arrangement can be made. Years ago, we linked with another group in Las Vegas on this mountain. The first iteration goes as far back as 1969! The path to Blue Ridge is solid. There's been interest expressed by folks living or traveling through here in having a radio, so our search is on for an affordable site. It would also allow future linkage into the Kingman area, where some folks are interested in joining us too. Among them, our old friend Bob (KE7RC) ex-WA6KCV!

Mt. Wilson 449.720 MHz 131.8 Hz

Mt. Wilson is a non-linked site. It serves as a general wide-area talkaround radio. In years past this was known as the "phone radio" since its main claim to fame was a well-used autopatch. Still plugging away it works well over a wide area. Last year, the Power Amplifier finally gave up after 30 years in service! The 40W stage was found desoldered & intermittent. A replacement amplifier had been prepped & was installed with minor finish work. The old amp was brought back & will be rebuilt for service elsewhere.

Mt. Lukens 447.140 MHz 131.8 Hz

Mt. Lukens is a too non-linked site. We're considering other possibilities for this frequency like a site in Orange County if one can be found. For now, it's another available greater LA & surrounding area talk around system.

Temp Radio (Frequency & Tone Agile)

The Temp Radio concept is a handy one, allowing proving a site before a final assembly. Or in the case of rebuilds/failures, a solid fixture for rapid deployment. It's served Emmett & I well with Rabbit projects, so our own Temp Radio is under construction. It contains a local 440 & up to 2 links & lives in a 42" height Motorola cabinet. The first iteration is currently in service at Santa Ynez Peak. This will be an excellent tool.

Other Activities

We continue to have great success with our miniaturization of the GE MASTR II Station. Dubbed the "µMASTR II" or "µMASTR" (micro master). This platform is a rock-solid, efficient, well seasoned base upon which we can enjoy many years of service into the future. Designed from the original GE MASTR II Station chassis, this trimmed-down incarnation retains the reliability, serviceability, modularity, and superb RF performance of its ancestor while being specially geared toward our needs. The true test is Jordan Peak. Now using two µMASTRs replacing its MVPs, so far so good! The auto high-power for local use is particularly helpful in fringe areas, and involves no mechanical switching to wear out.

New to our R&D department, beta testing of Synthesized Channel Elements! Designed by friend & member Matt Krick (K3MK) in Kingman, AZ these elements will allow us near freedom from crystals. An exciting prospect indeed! Some refinement and testing is needed before general deployment, but so far we're pleased.

The recent acquisition of a ROTEX Turret Punch Press adds to our manufacturing capabilities. A deal too good to pass up landed me a fully-tooled Rotex with sizing from 1/8" to 2" in rounds. Various sizing and shape combinations are available for this platform, but rounds are often the most useful. Panel fabrication is a cinch & allows 20 or more µMASTR panels to be cleanly punched in short order. Several projects lately have been expedited or more professionally finished with the Rotex. Items including Type-N & BNC connector anchoring brackets, D-Sub connector interface panels, rack mounting brackets, µMASTR front panels & more. With a Sheetmetal Shear, Brake and now the Rotex, production is reality! The ability to fabricate most parts ourselves results in significantly reduced cost & application-specific fitment. I normally develop templates to aid in quick and consistent repeatability. If any of you have projects where such tooling would help, let me know! We can arrange to assist.

Discussing Digital Radio

Continued on the technology front, there's a great buzz about digital radio in recent years. Not to be left behind, we're experimenting with digital radio too. Some of our members have or are procuring P25 gear. P25 is a very robust digital standard developed originally for Government and Public Safety use. Fully known as APCO Project 25, its genesis goes back over 20 years. More recent years have seen many high quality 1st Generation and 2nd Generation P25 radios, Motorola offerings being the most popular, hit the surplus market. These radios offer a quality experience whether in analog or P25 digital use. Overall, many formats are available such as Digital Mobile Radio (DMR), D-STAR, Fusion C4FM, NexEdge and IDAS to name major players. DMR is like a light version of P25. Like P25, it is a multi-manufacturer internationally accepted standard with its genesis in the development of P25, but is not compatible with P25. NexEdge is a similar system specific to Kenwood, IDAS is the Icom implementation. Kenwood & Icom cooperated to allow their conventional (non-trunking) digital formats to be compatible.

Digital's claim to fame is usually twofold: narrower occupied bandwidth and noise-free operation. Narrower bandwidth than reliably attainable in analog operation means more potential channels available. Noise-free operation means the absence of static/propagation or other noise with the desired signal, down to the point of its inability to decode. The noise factors are still there, you simply don't hear them. The convenience of not hearing them however, can blind you to awareness of or researching interference mechanisms.

Digital is fun to experiment with and even use regularly. It's like Pepsi, Coca-Cola or Dr. Pepper – a different flavor on the menu. Analog is certainly here to stay, and is the best "interoperable" mode across all manufacturers. But digital isn't going away; it too is rooted and evolving. Rather than "better" or "worse", I like to think of it as 'different'. If you're interested in digital, inquire within for details! We have an experimental P25 repeater up and running. We've also been working with both the Rabbit system and SBARC on P25 projects as well.

The key factor with digital flavors, is the platform upon which they're implemented. Where some folks get into trouble is not with the mode itself, but the equipment's underlying RF characteristics being substandard. P25 is a public safety / government rooted standard, thus radios implementing it so far adhere to all the typical commercial RF standards in performance and reliability. DMR in large part tracks this, as do NexEdge & IDAS. Unfortunately, the D-STAR & Fusion amateur-market repeaters are merely the same mobile radio you'd buy as an end user, with the control head removed & paired with a second radio likewise packaged as a "repeater." These radios aren't well suited for high RF environments or high duty cycle applications as found with repeaters. When Yaesu first released their Fusion DR-1X repeaters, they quickly learned this lesson. Advertised as a 50W repeater, soon many units came back for repair with blown amplifiers. Later they de-rated them to 25W for repeater service. Still, the problem of receiver interference susceptibility remains. Selectivity and IMD rejection is historically poor with amateur-grade radios. The receivers are quite susceptible to intermodulation or RF overload, and usable sensitivity suffers greatly. Extra external filtering is required for equivalency of a commercial-grade receiver. Transmitted spectral purity too, can be substandard to that of many commercial radios.

Worst of all however, takes us back to the bandwidth argument. Most digital formats allow a reduction by 50% or more in one's occupied bandwidth – in THEORY. Contrastingly in practice, the emission mask of a transmitted signal may be greater than theory suggests. Many amateur grade radios over the last 15 years have implemented a "Narrow" function, well before considering digital. This "Narrow" function merely decreases the radio's deviation, but does NOT reduce its upper audio frequency bandwidth. Equally as important, this function does NOT alter the receiver's IF bandwidth – a key feature to making the receiver reject undesired signals on adjacent frequencies. The receiver remains open to signals twice as wide, thus when the channel spacing is cut in half (25KHz to 12.5KHz), half the receiver's window is on the next channel! This is a huge problem oft overlooked! The Commercial & Government sectors have mandated Narrowband (12.5KHz spacing) operation. Manufacturers were obligated to offer capabilities of switchable bandwidth as early as the mid 1990s. As of 2013, the large majority of non-Amateur 2-way communications became narrowband exclusive. The equipment for these users DOES shape its transmitted mask, and DOES switch its receiver IF bandwidth. Now you would think, with the amateur grade systems touting narrowband digital capabilities now, they'd get with the program on receiver bandwidth? Even as one erroneously claimed the ability of 10KHz channel spacing? Sorry, not so! Whether by cost concern or oversight, even the current amateur grade digital systems have fixed IF bandwidth matching legacy wideband FM. As expensive as the amateur grade digital equipment is in amateur budget terms, it'd be much

higher with equivalent specs to the commercial/government sector.

Amateur Radio is all about experimentation. We should not shy away from it, but embrace it as the reality of who we are in this hobby. But we must recognize along the way, beyond the politics or brand loyalties, our roots in this experimentation: the engineering & deriving the best rewards there from. The features and pitfalls alike of the available formats themselves, as seen by the user are their own matter. Some of these formats have very useful features, especially for the amateur radio community. The fundamentals however are in the supporting engineering & specifications, which is a significant consideration in building a system survivable & acceptable at most communications sites. The considerations of error recovery/correction, bitrate and voice clarity, etc. bare weighing since not all are created equal. Nevertheless, be enthusiastic and curious. Just be wise also when making a big investment. Our study and experience landed us with P25 as more reliable, not necessarily the most "feature rich." The availability of high quality surplus infrastructure (repeater) and end-user (mobile, HT) equipment alike, often at prices matching or below amateur-grade new offerings, was a large influence. Could we explore other technologies? Of course, but lest we spread ourselves too thin, we take it a step at a time.

Kudos

Also, I'd like to thank Mike (K6MJU) for several site trips this year & last. He's been a big help making some of our recent changes happen more quickly. A repeated thanks to Jay (WB6YQN), Allen (KA6WGO) and David (K6KCK) for their various support missions with me to Jordan Peak. Their 4WD vehicles have been critical for our access to the site. One day I need to buy one & get with the program! Thanks to some of our regular contributors like Bill (W1UUQ) for leads on equipment, Emmett (WA6COT) for various equipments and general moral support, Paul (WD6EBY) for several equipment donations, and John (WB6NXP) for recent assistance on site trips. Also many thanks to Richard Arnold (K6SNO) and Mel Swanberg (WA6JBD) of Cactus for their donation of GE equipment in 2013. Thanks to my late friend Loren Marks (WB6BWU) who also donated GE MASTR II and EF Johnson equipment to us.Thanks finally to the rest of the group, for making it a great group and great radio system! We look forward to many more years.

Meeting

We really need to have a get-together! There will be an announcement in the coming year regarding a meeting. Locations are being researched, with preference for the San Fernando Valley area as being reasonably central to most members. If anyone has suggestions, please contact me! It will be a great opportunity to meet those you haven't yet, enjoy visiting old friends, and learn more about our capabilities as a radio system. We have much to offer that is often underutilized.

REMINDER!

Keeping the lights on…

Everyone's dues are from January thru December. That being said, all dues are now due. Please make your checks payable to myself (Matt Lechliter). We are interested in adding members to help sustain the radio system & allow sensible growth. There are many costs associated with an operation like this. Most significant are our site rental fees that are recurring. Site rental is over $2,300 annually! We're very fortunate with many site arrangements, but these expenses are unavoidable. In order to survive, support is therefore vital. Without adequate support, we will face some tough decisions such as relocation of Blue Ridge. As you talk with your friends, see if they would be interested in joining GRONK. It's a somewhat quiet system as many are, but we afford coverage opportunities other systems don't. We could use more spirited conversations! There's a great bunch of you out there, and we hope to add more to the ranks.

Standard Membership	$125 per year
Full Time Student	$50 per year

Merry Christmas and a Happy New Year!
73 de Matt W6KGB