

GeoFox Radiosport Rally

Boy Scouts foxhunt rallies youth, excitement and ham radio.

Stu Turner, WØSTU

Three red-shirted Boy Scouts surge out of the Pike National Forest's deep green pines and golden aspen, hooting and hollering and pumping their fists in the air, broad grins illuminating their faces. "We're done! Yeah! Did we win?" One celebrating Scout, slight of build, wields a 3 element Yagi with brilliant yellow tape measure segments flopping gently as he jogs toward the finish line. Another, older and presenting a glowing teenage shine from exertion, cradles a global positioning system (GPS) unit in his upturned palm and slows to a walk with his 11 year old teammate. These young Scouts of Monument, Colorado Troop 6, have just successfully completed the first-ever *Troop 6 GeoFox Radiosport Rally*.

A total of 31 Boy Scouts participated in this hybrid Radiosport event that combined the challenge of Amateur Radio foxhunting with GPS-guided geocaching along an aggressively rolling wooded course atop the front range of the Rocky Mountains. [Geocaching is an outdoor sporting activity in which the participants use a GPS receiver and other navigational techniques to hide and seek containers, called "geocaches" — *Ed.*]

I learned of GeoFoxing from the North Bay (California) Amateur Radio Association (www.nbara.org). Teams of three or four Scouts comprised of young Technicians, savvy GPS operators and additional supporting teammates, circumnavigated a 4 mile circuit of seven segments, alternating foxhunting and geocaching activity in a timed competition. Geocaches provided frequency information and hints for the next leg's foxhunt, while fox locations supplied new GPS coordinates to be found and sometimes required that latitude-longitude values be decoded from the beacon's CW signal. These young boys loved the action and the competition, but how can you go wrong combining boys with radios, cool home-made antennas, secret codes, GPS units and a beautiful forested landscape in which to run and explore?

"GeoFox is awesome! Let's do it again!" announced enthusiastic Scout Kent Griffith, KDØMFR, at the evening's campfire where every Scout had a spellbinding GeoFox

war story to tell, classically spiked with laughs, groans and grins. This young man's gusto was typical of the reaction of each of the Scouts completing this unique event. It not only developed Amateur Radio and land navigation skills, but provided a stunning example to dozens of Scouts and parents of the thrill and

enjoyment provided by Amateur Radio and Radiosport action.

Setting the Hook

"I think we have the seed for a really fun new Radiosport, and a terrific hook to get young people interested and actively involved in Amateur Radio," stated event co-coordinator Bob Witte, KØNR. Indeed, fully two-thirds of the Scout participants were not licensed amateurs, but each had the chance to personally engage in the foxhunting and radio reporting requirements of the GeoFox course under the supervision of a licensed peer. Peer interaction seems key to engaging young people in Amateur Radio and this event provided the licensed boys ample opportunity to show off their radio skills to friends. In complement, the unlicensed Scouts got hands-on ham radio experience during an enjoyable activity that encouraged them to become Amateur Radio operators and join in the fun.

Additional radio demonstrations were provided by the sponsoring Tri-Lakes Monument Fire Radio Association (WØTLM). This group of Amateur Radio operators includes Amateur Radio Emergency Service (ARES®) and Radio Amateur Civil Emergency Service (RACES) qualified hams, as well as local fire and rescue personnel, who work together to provide enhanced communications support for fire and emergency response. "This is an incredibly valuable event," noted El Paso County Sheriff fire and rescue responder and event volunteer Buzz Lovell, N8NMZ. "In just a few short years these boys will be our first responders. Instilling these kinds of communications skills and developing comfort with radio operations will pay huge dividends to us all in the future."

Many Boy Scouts made their first HF radio contacts thanks to EMT responder Elliot Linke, KBØRFC, who erected and operated a portable HF station. Steve, WØAT, provided demonstrations of low-power CW operating, complete with his two "pack goats," Rooster and Peanut, that pack radio gear to the tops of some of Colorado's highest peaks. All together, the GeoFox event and extra radio activities provided a striking showcase of



Scouts Quentin Marchetti, KDØKGJ (left) and Austin Armstrong, KDØKJP, prepare antenna segments for soldering during the tape-measure Yagi workshop.



Cole Turner, WØCOL (center) provides first-year Scout Reese Pepple (left) a practical lesson in foxhunting, while Ryan Daniel lines up a GPS vector in their team's winning GeoFox course run.



Here are (from left) Scouts Ethan Bucknall, KD0MFP; Kent Griffith, KD0MFR, and Matthew Lyons, KD0LLA, conducting foxhunting practice in the forest during a Scout backpacking excursion.

Amateur Radio capabilities wrapped in fun and excitement. Even the goats enjoyed the day, attending closely to the myriad red shirts who offered tasty treats.

And They're Off

Although, getting an event like the GeoFox Radiosport Rally organized and running was not a trivial undertaking, it is quite feasible for a small radio club and youth organization to accomplish. A crucial factor was having a group of licensed young peer ham operators to distribute across the competing teams. Each young Technician was tasked to supervise a team's foxhunting activity and to be the radio control operator for the team's position and progress reports, as well as other ancillary communications as needed during the event. Bringing up a crew of young hams to form the core of the teams is perhaps the biggest challenge in the creation of this type of activity.

With the Troop 6 Scouts, educating 10 young Technician hams began 1 year prior to the GeoFox rally. The W0TLM organization conducted a Technician course that Bob Witte, K0NR, and I taught along with two other experienced hams. As a radio merit badge counselor for the troop, I encouraged a handful of Scouts to enroll in the 2 day class and I provided extra tutoring for them. They were incredibly successful and Troop 6 instantly had five 11 year old Technicians. Once these boys began to show off their "ham bling" accoutrements at troop meetings and conducting basic radio operations at camp outs, others quickly decided to join the next Technician class. Within 8 months of the initial Scout licensing, the troop hams had doubled to 10 and the parent licensees had grown to nine.

With this core group, we established a weekly Troop 6 radio net to hone basic skills and we obtained tactical net experience by volunteering the Scouts to assist in the operations of a local Independence Day parade and

a nonprofit music festival. Both public service activities were successful and the Scouts have been invited back to help again.

A few weeks before the planned GeoFox rally, I held an antenna workshop in which semiprepared materials were provided for the construction of tape measure Yagi antennas to be used for foxhunting. Following a design published online by Joseph Leggio, WB2HOL, PVC pipe segments and hairpin match wires were precut to length. The Scouts measured and cut all tape measure elements, prepped all components, tinned and soldered the driven element connections and pieced together the antenna for 2 meter band operation. The boys got practice foxhunting on two different campouts prior to the GeoFox rally, receiving training on close-in techniques such as third harmonic tuning. With this rather brief preparation we launched into the Troop 6 GeoFox Radiosport Rally plan.

The Course, of Course

The GeoFox course was designed to be challenging, but not overwhelming, for the group of 11-14 year old Scouts. The goal was to keep teams moving through the prescribed route and minimize overruns or bunching. Teams were started at 20 minute intervals to allow ample distance between them and total time to completion was the competitive measure of success.

All GeoFox team reports, communication with event headquarters and foxhunts were conducted on assigned 2 meter frequencies. The licensed Scouts typically used a 5 W dual-band handheld transceiver that also provided 70 cm capability. This allowed the use of third harmonic spurs of the 2 meter beacon transmissions with substantially reduced signal strengths for close-in foxhunting. The home built 2 meter tape-measure Yagi antennas performed admirably for direction finding even in the higher band.

We couldn't provide each team with fox-hunt "sniffers" for close-in hunting and since extended hunts in a small area would likely cause the sequenced teams to bunch up, we made each find-point (either fox or geocache) highly visible. This is a change from the typically well hidden foxhunt and geocache challenge, but it was a prudent modification for this event given the age and experience of the youngsters. Even with several blaze orange survey flags marking each location, the boys found the course quite challenging.

We constructed three fox beacons for the course with output power in the range of 50-100 mW. The foxhunt legs of the course were less than 1 mile long, so low power beacons were necessary to avoid too quickly maxing out the handheld transceiver's S meters that were the only source of signal strength information available to the foxhunters.

Commercial electronic packages and feed-line-attenuated handheld transceivers were used for the beacons. Each worked well and included one of the following: Byonics PicCon microcontroller, Doppler DF Instruments SquawkBox T-hunt transmitter or Argent Data Systems ADS-SR1 controller. The transmit duty cycle was approximately 33% or about 20 seconds on and 40 seconds off. The fox messages were largely CW numerals and station identification, but one beacon allowed random transmission of voice messages. Encouraging and mildly taunting tidbits were included in the voice transmissions, adding a little spice to the hunt.

The GeoFox course location and terrain was carefully selected for safety, access to find-point locations and variety. Thorough study of terrain and topographic maps, as well as online aerial and satellite imagery was undertaken to map out prospective circuits in the forest that were nestled within a surrounding set of national forest roads and trails. The roads and trails promoted easy placement of foxes and caches by automobile and bicycle.

For More Information

- Byonics PicCon microcontroller (www.byonics.com/piccon)
- Doppler DF Instruments SquawkBox T-hunt transmitter (www.silcom.com/~pelican2/PicoDopp/MICROHUNT.htm#SQBX)
- Argent Data Systems ADS-SR1 controller (www.argentdata.com)
- WB2HOL Tape Measure Yagi (theleggios.net/wb2hol/projects/rdf/tape_bm.htm)
- North Bay Amateur Radio Club (www.nobarc.com)

An on-site survey of prospective routes followed and resulted in the final selected course layout.

For our rally, the course consisted of seven legs and one optional “out-and-back” bonus leg. Completion of the out-and-back segment earned the team a time reduction, but it required quick estimation of the time necessary to go “out and back” in order to ensure a net advantage would result. The total length of the course was approximately 4 miles and completion times ranged from 3½-5½ hours.

Each find point was well marked and provided a card of information and instructions necessary to continue on the next leg. A signature card was affixed to the reverse of the instruction card left at the site and each team member signed to prove his visitation to the point. Additionally, each find-point provided a secret word, the series of which fit together to form a Scouting motivational statement that was to be provided to headquarters upon route completion.

The challenge of course creation includes the testing of beacons with the intended direction finding equipment in the course terrain. In our case, the terrain was mild mountainous territory and signal strength dropped markedly in low spots. Additional attenuation and reflection by numerous large boulders was also a factor. Some tweaking of transmitter power and location was necessary to ensure proper levels of performance for the synergistic effects of equipment and terrain.

Lessons Learned

Our GeoFox rally ran well but this first-ever effort was far from perfect. We took home a number of lessons to improve our next rally. A few of the most significant include:

- Particularly with very young and inexperienced participants and numerous teams, post marshals on the course and at the find-points to provide personal aid and assistance when needed and to distribute responsibility for tracking team positions and progress confirmation.

- Organize the headquarters operation well, to include a single, large, mark-up map for tracking teams of youngsters, multiple coordinated radio operators and good procedural coordination with both course marshals and team radio operators — keep it simple!

- Minimize the number of different frequencies required for coordination; a single headquarters and marshal frequency and one unique reporting frequency per team should suffice for tracking and coordination, as well as reduction of improper team-to-team “espionage.”

- Do your best to train young foxhunters on the tricks and pitfalls of direction finding and give them ample practice in advance of the event. Similarly, ensure that GPS operators are familiar with the GPS unit to be used and are skilled at direction finding with it.



DARRYL LINGLE

Ham Scouts survey the forest they're about to venture into on the GeoFox course. From the left are David Benda, W0DTB; Michael Merola, KD0LLC; Austin Armstrong, KD0KJP, and Matthew Lyons, KD0LLA.



KIRK HILL

Demonstrating the radio hobby to the Scouts, Rooster shows off his radio gear packing capacity and shuns owner Steve Galchutt, WG0AT, who refuses to share his hotdog.

Remember, with young participants the primary goals are having fun and gaining experience with GeoFoxing and ham radio, not overly strict adherence to competition rules. Youngsters will make errors and they learn best with immediate mentoring corrections. Make good mentoring and proper coaching and correction integral parts of your event. The kids will appreciate your guidance, be safer and have a more enjoyable experience overall.

Exciting Interest in Ham Radio

“Was it hard?” I asked the Scouts at our weekly troop meeting a few days after the rally.

“Yes!” they chorused, nodding vigorously with wide eyes and emphatically injecting brief elaborations.

“Was it fun?” I immediately inquired.

“Yes!” they boomed in unison, louder and with even more zest, and all enthusiastically endorsed that the troop have another GeoFox Radiosport Rally soon.

Even more telling of the enjoyment and

excitement about ham radio fostered by this youth-centered activity is the response of action by the Scouts and adults involved to become licensed ham operators. Within a week following the rally one of our adult scoutmasters quickly studied and tested, earning his Technician license. Five Scouts and three parents signed up for the W0TLM Technician class, filling up the available spots. At least a dozen additional Scouts and many of their parents have either placed their names on our course waiting list or personally expressed interest in earning an Amateur Radio license.

Getting more young people involved in Amateur Radio is a responsibility we all share. Generating fun and excitement with GeoFox events like the Troop 6 GeoFox Radiosport Rally is a terrific way to take advantage of peer influences and operator experience across all age groups to help raise the next generation of hams. I hope you will get your radio club involved with a youth organization, whether Boy Scouts, 4H Club, school or church organizations, and share your love of ham radio with some terrific kids. 73 and good luck.

ARRL member Stu Turner, W0STU, is a space systems engineer and retired military officer who was first licensed in 2009. He is an assistant scoutmaster and radio merit badge counselor for BSA Colorado Troop 6 and a ham radio course instructor for W0TLM radio club where he helped more than 80 new hams become licensed in 2009-2010. His Amateur Radio interests are broad, as he is “still exploring all the possibilities,” but he enjoys HF operations, satellite and ARISS contacts and finding novel new ways for him and his scouts to apply their Amateur Radio skills in public service and for fun. Stu is currently working with James, KD0MFO, to develop a web-based Technician training course. He may be contacted at stu.turner@comcast.net.

