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K3LR:

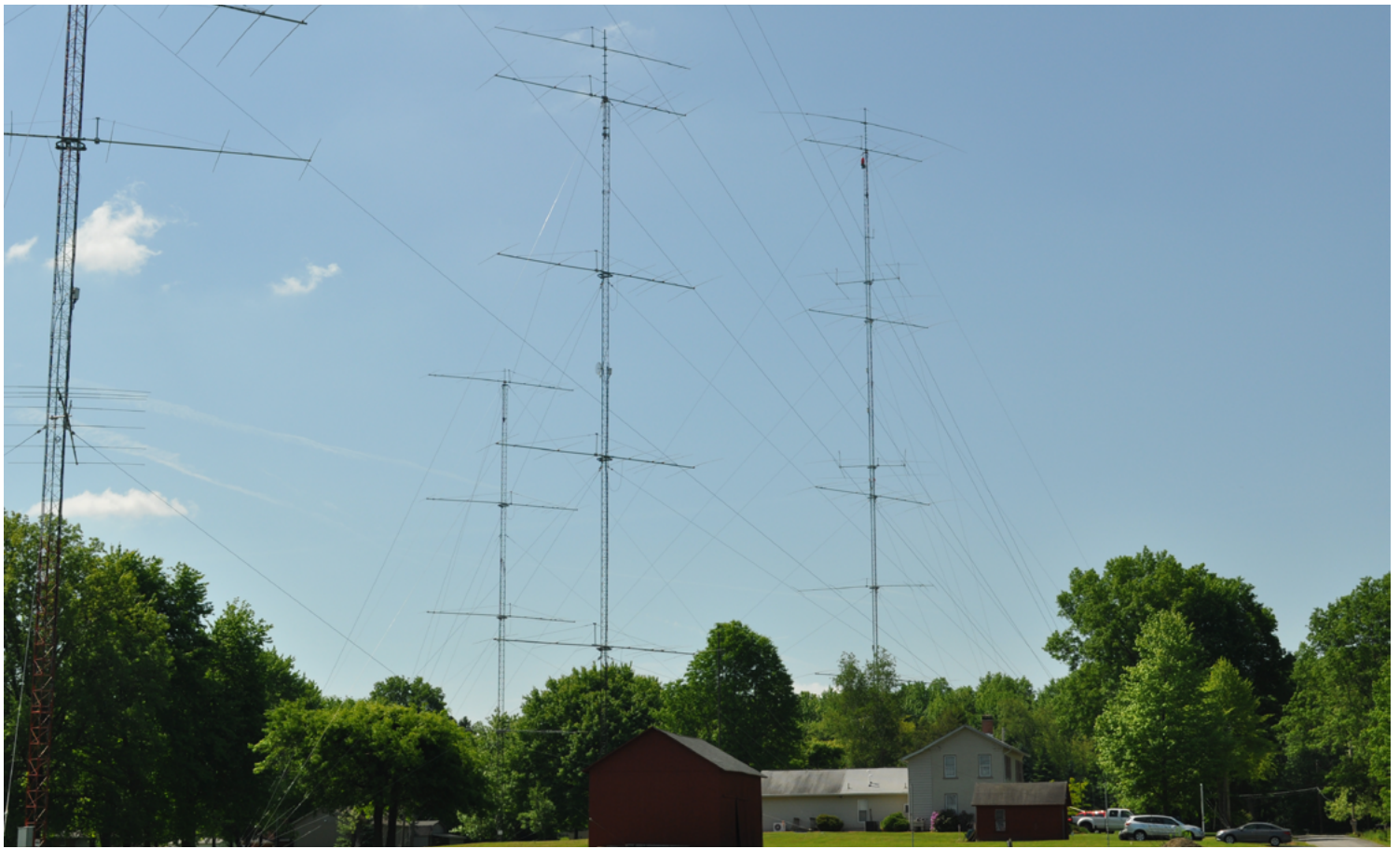
Contesting with the Big Guns

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A partial picture of K3LR's antenna farm. (Photo by Mark Haverstock K8MSH)

K3LR: Contesting With the Big Guns

By Mark Haverstock K8MSH

Does this guy have enough antennas or what? That's a question that's been asked hundreds of times by drivers on I-80 who have passed Tim Duffy's station, K3LR, just east of the Ohio border. The answer is no. "You can never have too many antennas!" he says. Since 1987, Duffy has spent countless hours building his dream station, as well as collecting numerous contest awards along with the operators that make up the K3LR Contest Team.

Up Close

Our tour began at Tim's house/station in West Middlesex, PA—just one mile from the Ohio border. The house, originally built in 1865, was originally part of the Elliot farm and sits on 11 acres of land.

It borders a residential area, so there are neighbors nearby. Decades ago, the wireless communications from a station of this size could have been an issue—but not in today's world of high tech.

"Because most have satellite or cable, these are relatively closed systems and the satellite is on very high frequencies," he says. "I don't know of any neighbor that's having any RFI trouble from the station. Because cell phones are displacing the wired land-line system, all of the phone issues

are pretty much off the table too."

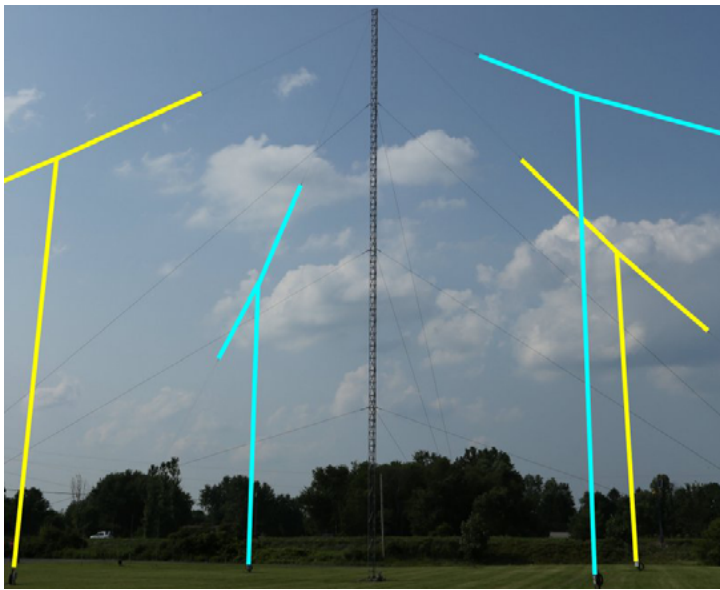
K3LR also practices good neighbor relations by setting aside some of the land as a common area. There's a neighbor burn pile, composting heap, and even a large dog walking area!

Multiple antennas dot the landscape, ranging from tower-mounted Yagis to vertical arrays and short verticals for receiving. We entered through a side entrance, near the back of the house. K3LR's contest station is primarily located in the basement, with some computer equipment and Perseus SDR CW skimmer receivers located on the first floor, adjacent to the stairwell. An extensive array (13) of eight-foot ground rods were placed in the shack floor before the concrete was poured. Talk about a good station ground, this guy planned for almost everything!

At the basement level are the operating positions for each band, including Icom transceivers, computers, single band amplifiers, and various accessories. Logging computers are networked for easy tracking of entries and to help keep operators informed of multipliers—more on that later.

Operating Conditions

Though some have suggested that K3LR is too far inland



This is a full-sized 160M vertical Yagi antenna. The center tower is the radiator (driven element) and it is surrounded by 4 vertical "T" wires that can be switched in and out to provide reflectors and directors in 4 directions—the wire locations are marked in color for easier visibility. (Photo courtesy Fred Lloyd AA7BQ, QRZ.COM)

(away from contact rich Europe) to be an effective force in DX contesting. The K3LR team has proved otherwise over the years. Thirteen towers, including Yagis, directional arrays, and switching systems as well as other antennas are designed to maximize contacts to desired DX locations. A 300-foot slope toward the northeast helps them better snag European contacts.

The complete listing of antennas is about four pages long—it can be found on the Web at <http://www.k3lr.com/Hardware> Here's an excerpt from the 80-meter antenna description:

The station #1 antenna is two full-size, self-supporting (23 meters tall x 8 towers), phased four squares that are spaced 5/8 wavelength apart (broadside to Europe). The squares can be fed broadside (45 and 255 degrees) or end fire (135 and 315 degrees). 95,000 feet of radials with two Comtek Systems Hybrids and a custom K3LR designed splitter switch. The operator can select one or two 4 squares in each direction.

80-meters Station #2 K3LR uses top-of-the-line Icom gear—all purchased by Duffy. "We endorse, like and support Icom, but I've always maintained an independent relationship," he says. "Thus, we have the option of moving to other brands if we find they have superior radios. So far Icom is our vendor of choice. It's about using the best we can find" Right now, the Icom 7700 and 7800 are their rigs of choice, paired with single 8877 tube - single band home brew amplifiers that run at the legal power limit.

K3LR Beginnings

What motivates an amateur radio operator to enter the major leagues of contesting and construct a station of this

Right: WA3SZX in 1973 (13 years old) at his bedroom station on Euclid Avenue, Sharon, PA. Station included a TA-33jr, DX60A, Drake 2C. (Photo courtesy of Tim Duffy K3LR)



magnitude and complexity? A lifelong intense love of amateur radio.

Tim was first licensed in 1972 at age 12 as WN3SZX. His first introduction to on the air events was at the 1972 ARRL Field Day. "I thought it was pretty cool," he says. Later that year, he operated in his first "real" contest, the 1972 ARRL November CW Sweepstakes, which began his contesting career. He operated in the novice category as a single operator, making 172 contacts. "Even though I didn't do well in the QSO department, I was hooked on contesting and found that I wanted to do more of it." And more of it he did—winning the challenging North American CW Sprint Contest in 1979, 1981, and 1984.

During this time, Duffy began to make his mark in the contesting world. He also won the ARRL 160-meter Contest in 1980 as a single operator and again in 1992 as part of a multi-operator team. In 1987 and 1988, he took top operator single operator USA honors in the ARRL International DX SSB Contest. During 1992, the K3LR multi-multi team was born. The first multi-multi contest for the team was the CQ World Wide phone contest and the team finished 4th in the USA.

The Thrill of Competition

Tim enjoys getting to know people on the air through casual contacts, but he's also got a intense competitive side. He's always looking to sharpen his operating skills, learn new things—or to tweak antennas or radios to stay up with the competition. The K3LR crew has some friendly competition with rival W3LPL in Maryland and other multi-multi stations in the USA.

There are different categories in major competitions, starting with just a single operator on a single rig. The K3LR team prefers the multi-operator, multi-radio approach—going toe-to-toe with the mega-stations across the globe. "This is well suited to how we like to operate, because we like to operate as a team with other people in the room," says Tim. "To me it's much more fun to assemble 12 to 15 guys, operate 48 hours together and have fun."

Every operator at K3LR is assigned to a specific band. For example, whoever is operating on 10 meters only worries about 10 meters—no other band. "They do have to work



Tim Duffy K3LR explains station operations to a group of visitors for Portage County Amateur Radio Service (PCARS) (Photo by Mark Haverstock K8MSH)

as a team to exchange multipliers,” says Tim. “If a guy calls in from Norfolk Island on 10 meters, and we haven’t worked him on 15 or 20, it’s the 10 meter operator’s responsibility to realize this and ask the caller for a future contact on other bands as well.” This kind of teamwork is critical to maximizing points during the contest.

No one ever needs to become sleep deprived in the heat of the contest. Due to the propagation and characteristics of each band, there are times that activity will be minimal or cease entirely for a while. There’s no worry about stressing out or having to stay up for the entire 48 hours with a few strategically planned naps. The exception is 20 meters. “20 is open around the clock, so we invite a third operator,” he says.

As with all ham radio contests, no cash or material awards involved, just bragging rights. “The K3LR team members are making sacrifices being away from their homes and jobs,” he explains. “We’re chasing something you can’t buy—a number one USA position in a hobby radio sport contest. And being part of this team, that’s some pretty cool stuff.”

“I am thrilled to be a part of more than 85 multi-multi team operations from the K3LR station in the last 22 years,” says Tim. “More than 125 different operators have participated in international contesting events from the K3LR station. These extensive competitions test the capabilities of the K3LR station and its operators to effectively communicate with other amateur radio stations around the world.”

Being Prepared

A lot of preparation goes into operating these contests each year. “We could be on the air in a contest every weekend, because the contest calendar is full of them—but we’ve traditionally concentrated on just the major DX contests: the CQ Worldwide CW and Phone, the ARRL International DX contest, which also includes CW and phone,” he says. “Those four weekends it’s guaranteed we’ll be on the air in a competitive role. We’re fully staffed with operators and we



One of the operating positions, featuring a pair of Icom transceivers. (Photo by Mark Haverstock K8MSH)

will do our best.”

As we all know, age and weather can be devastating to ham equipment and antennas. You can’t compete if your equipment isn’t working. K3LR gets a thorough shakedown before each contest. Amplifiers, rigs, antennas and all the peripherals are checked and double-checked. Problems found are repaired in advance before the operators appear for the weekend. Everything is there and ready to go—no one needs to tote equipment to the station.

If Murphy’s Law comes into play during a contest, they also have this covered. Should any equipment fail; there are backups for ready for plug-and-play replacement. Tim has standardized the operating positions with mostly the same types of equipment, which simplifies maintenance.

There is even a 50 kW generator at K3LR that comes up if the AC power fails. In only two minutes after power company failure, the entire operation is back in business on back up power.

Creature comforts are not ignored. Remember, operators need maintenance too. A fully stocked refrigerator and kitchen are available to everyone at all hours in case they get a case of the munchies. If they need a caffeine jolt, a high-tech coffee machine is available—one that would be the envy of just about any barista.

More than 125 hams have competed here in various contests over the years, but it’s typically the same thirty or so that have done so lately. “The guys that operate here are ones that I know, have operated with us for years, are great operators and we get along well together,” says Duffy. “We take over the house, so it’s very comfortable. In our situation, one secret of survival is not having rules that are restrictive.”

Want to be a Contester?

The best advice K3LR gives prospective testers is to find a contest Elmer (mentor). “My first contesting Elmers were Drew, W8GFG (SK) and Jim, K8MR. Thanks to DX multi-multi station hosts Ed - W3AU (SK), Jim - W2PV (SK) and Buz - K2GL (SK) all who invited me to operate



K3LR 2013 operating team. (Photo courtesy of Tim Duffy K3LR)

with their teams and were great contesting mentors to me,” he says.

You’ll also find some very good sources on the Internet, such as <http://www.contesting.com/>

There are great Internet reflectors, including archives on contesting—a great place to find people who can mentor or you can partner with. One list such is located at <http://www.ac6v.com/mail.htm>. Read as many articles and contest write-ups as possible in QST, CQ, and National Contest Journal. Get schooled. “In the USA, UK, Germany and Italy, there is Contest University, which is aimed at beginning or intermediate contesters,” he says. “You can come up to speed quickly by attending one of these.” The USA course is held in Dayton prior to the Dayton Hamfest—and Tim is the founder and Chairman of Contest University. This is one of many ways he gives back to the hobby he dearly loves.

Contesters don’t necessarily need a lot of fancy equipment, nor a yard full of antennas. Many have started with modest equipment and added to their stations over the years. Work by yourself, or with a few friends if you choose. You don’t have an entire weekend to devote to a contest? Participate as little or as much as you want to. “I’m personally active in lots of other contests where we’re not seriously competitive, putting in a few calls here and there to test antennas or have some fun,” says Duffy.

Future of Contesting

Contesting is one of a few segments of the ham radio hobby that’s experiencing good growth. “I think that contesting is continuing to become more popular, as evidenced by the increasing number of logs entered in contests,” says Tim. “It’s easy for people to get excited about contesting and anyone can participate. Barriers to entry just aren’t there.” Being a competent contest operator can also have some real world benefits. “Last week, I was at the Pennsylvania Emergency Management Agency meeting and gave a talk on contesting and how it relates to emergency communications,” says K3LR. “There’s a lot of push with FEMA and

Homeland Security to have very good amateur radio communications—when all else fails we’ll be there. Contesters are self-trained to be very efficient, accurate, and to dig signals out of the static. What better guy to have to take care of your emergency communications than somebody who can get it right, get it fast, and get it done?”

Going for the Gold

So how successful is the K3LR team? Tim gives a quick rundown of their accomplishments.

“In the last 22 years of operating multi-multi (multiple operators, multiple radios) contests, we’ve won 30 times operating in those four contests—out of 88 possible. We didn’t operate in all of them, especially when I was living in Oklahoma—we’ve been on for 81 or 82. As far as the United States is concerned, 30 is pretty good! In 2008 during CQ Worldwide Phone, which is the largest contest of the four in which we operate, has the most activity, gets the most logs. Not only were we first in the USA, but we were also first in the world. That was an accomplishment for us, being the top multi-multi in the world.

K3LR is quick to credit longtime friends who have helped him build this dream station. Dave Zeph, W9PA has spent thousands of hours working on the elaborate computer network at K3LR. Greg Ord, W8WWV has been Tim’s RF system technical go-to guy. W3JTV, W3LPL, W3YQ and many others continue to inspire and help keep the station moving forward.

K3LR holds the USA record score in three out of four of the major DX contests. K3LR is the second winningest multi-multi in the USA having won 30 times. Sounds like the K3LR team might be shooting to get to the top of that record book too!

Resources:

Contest University-Dayton. <http://www.contestuniversity.com>
 K3LR Website: www.K3LR.com
 K3LR Web Cluster: <http://dx.k3lr.com/WebCluster>
 Contesting.com <http://www.contesting.com>

Video: Drone Fly-Bys. Overhead view of K3LR antenna farm.

<https://www.youtube.com/watch?v=OMzdTQzJjSc>
<https://www.youtube.com/watch?v=kimSQsEKqGE>
https://www.youtube.com/watch?v=XjgK_cAF1Y
https://www.youtube.com/watch?v=SA_NG-bVQuC

Video: K3LR During contest

<https://www.youtube.com/watch?v=wIXu7Q3h8RI>
<https://www.youtube.com/watch?v=jo2mCNJdvdK>

TSM