The Potpourri Edition!

- The Demographics of Contesting
- Carolina Contest Weekend — Two States, One Event
- Making It as a "Small-Signal" Station
- *NCJ* Profiles Ken Grimm, K4XL
- *Results:* North American RTTY Sprint — February 2020

Top Photo: Andy, KØSM, operates on 10 GHz from his driveway. Find out how to have fun on 10 GHz inside. [Andy Flowers, KØSM photo]

Bottom Photo: This fellow thinks contesting from TI7W is a real howl. [John Warburton, G4IRN, photo]

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Table of Contents

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From the Editor

My profound thanks to Ward Silver, NØAX, who stepped up to edit this issue of *NCJ* due to my work issues related to the COVID pandemic. Ward is a master writer and editor. You will enjoy this issue, as it brings a rich diversity of contesting articles and content. Ward continues to do so much for amateur radio and contesting. He is a true leader in our field.

In this issue, you'll find some contest reports, an article on the demographics of contesters and how aging may impact our vitality by Frank Howell, K4FMH, a sociologist and demographer, and an exciting contest report about operating from TI7W by Lee Finkel, KY7M.

Later this year, *NCJ* will be a sponsor of the Portable Ops Challenge (POC), **https://foxmikehotel.com/challenge/**, a contest-like event designed to encourage activity by operators who are real-estate limited (compared to a full-blown contest station). This also should provide an opportunity for all of us to dust off our portable HF gear and antennas and get them ready to go. The rules and promotional material are still under development, but Frank, K4FMH, and a group of active HF contesters on his advisory committee are planning for the big event later this year. Events like this stimulate more interest in contesting by those who may not be equipped to do a major 48-hour event. The POC will have an international component, so it could provide a chance to snare some new DXCC entities from a summit or hilltop near you.

COVID-19 has changed nearly everything with ham radio and our society, it seems. Long-promised new equipment, such as the K4d, has been further postponed due to COVID. Icom announced a delay in delivery of its IC-705, due to issues from COVID and has not updated us on the new PW-2 amplifier. DX Engineering also announced a delay in the new rotator for a few more months. The International DX Convention (Visalia), Dayton Hamvention,® and Ham Radio in Friedrichshafen, Germany, all were cancelled, along with a plethora of popular regional events. In addition, the 2020 IARU Region 2 YOTA event and the Team Exuberance youth events were postponed due to the COVID-19 pandemic.

Is there an end in sight? Yes of course the pandemic will end but I honestly don't know when it will be. It will not be as quickly as any of us would like. Likely, COVID-19 will forever impact how we organize meetings and travel. The pandemic has forced some innovation in our hobby, with more HF nets on the air and more HF activity in general as home-bound hams want to get on and operate. I have participated in some state-wide and district-wide club meetings via *Zoom*; they are efficient and personal, and remind me of the old days with 75 meter SSB state nets, except possibly better because of no QRN or QRM, and we can see one another and get FM-like sound quality. Last week, Contest University was live-streamed on *Zoom*. I enjoyed it more than I did the 2019 in-person event in Dayton. I had a more comfortable chair, I could get a snack or beverage anytime I wanted, and I could hear the speakers better and see the slides more clearly with my desk's 28-inch monitor. Tim Duffy, K3LR, reported more than 2,000 attendees via *Zoom* and the YouTube presentation. This represents at least a five-fold increase in attendance for the meeting. Imagine how much better CTU will be in the future, if it can be simulcast on *Zoom* as it occurs live in Dayton. I see a strong future for *Zoom*-type meetings to train and help new contesters learn more advanced skills and for ham organizations to stay better connected. I live in the Dakota region, and it is a several-hour commute to our monthly HF club meeting, the TCDXA. *Zoom* or similar would allow more members to join meetings without the long drive. Isn't it nice to see ham radio adapting 21st-century technologies to advance our learning and socialization?

I hope to see you in the IARU and NAQP events this summer. Remember to work on your station improvements and antenna arrays, as the fall contest season will be upon us sooner than we realize. I have my own plans as I'm sure you do as well. DX Engineering has announced some new products that you may want to check out, and hopefully Elecraft will be able to ship the K4d, which was displayed at Dayton 2019, in time for the fall contest season.

Continue to share your thoughts on contesting.

Frank M. Howell, PhD, K4FMH / k4fmh@arrl.net

Aging and Radiosport — Part 1

Modest Evidence from Survey Data

The Holy Grail of statistics when it comes to amateur radio is the age distribution of licensees. While very high-quality data from the US Bureau of the Census tells us the age distribution of the national population and how it is changing over time, we simply have no data of comparable quality on ham operators, nor do we have it for sub-groups, such as hams who participate in radiosport. Yet, we speak to one another based upon what we observe in the hobby, as if what we see each day out of our personal windshields represents all there is to see in the amateur radio world. If this is all we have, then this is what we will use in order to make sense of the hobby. We should not fool ourselves, though, by typifying all hams just on the basis of what we see as individuals.

The large cohort of those born after World War II — commonly called Baby Boomers — is approaching retirement or has already arrived. Such a large cohort, and the smaller "echo effect" of their own children, tends to shape our impressions of society due to the sheer size of the age group. We simply see more people from these age cohorts than we do from other age groups, all else considered. So, it appears that hams' collective impressions of the age demographic in the hobby are based upon both societal trends as well as what they experience, whether on the air, at hamfests, at club meetings, through hobby publications, or on websites.

But like the ship captain who sees only a small tip of the iceberg, we do not know the real answer until we reliably and accurately measure the entire iceberg. This is an example of "convenience sampling" (see Figure 1). If we talk to people at a hamfest or club meeting about a ham radio topic, we are using a "convenience sample," and, just like the survey in The Literary Digest that asked subscribers whom they favored for president in 1936, it was FDR, not Alf Landon, who was actually elected, despite the favorable opinion of Landon expressed by the (non-random) subscribers of the magazine.[1]

The Literary Digest had asked its readers to voluntarily return a survey form included in one issue of the magazine. If we put out a general notice that an online survey is open for responses, we have a "voluntary response sample." While each has the internal validity of actual observed responses (subject to measurement errors), neither has the external validity of generalizing to a larger population of ham operators.[2] There is an important lesson in these two examples for us in amateur radio. Until we have a large random sample of amateur radio licensees drawn from the FCC Universal Licensing System (ULS) database and measure these demographic and other characteristics, we will only be *guessing* at the answers we seek.

In Part 1 of this article, I present some systematic "guesses" about aging and contesting, using modest survey data with two exceptions. I've combined US Census data on age and Bureau of Labor Statistics (BLS) data on time use with the ARRL membership database in conjunction with an online survey conducted by ARRL on behalf of the NCJ editor.[3] I've added two regional surveys that I conducted with the ARRL staff for members in the Delta Division during 2011[4] and 2013.[5] All told, while the Census and BLS surveys are of the highest quality, the surveys of ham operators are "opt-in" or volunteer response samples where relevant amateur operators were contacted about participating and given a website link to take the survey. These volunteer response surveys possess credible internal validity but have undefined external validity. Thus, I call this "modest" survey evidence against the standard of high-quality random-sample designs and implementation of a fielded survey using best practices.[6]

While the results are not authoritative in their design regarding their ability to
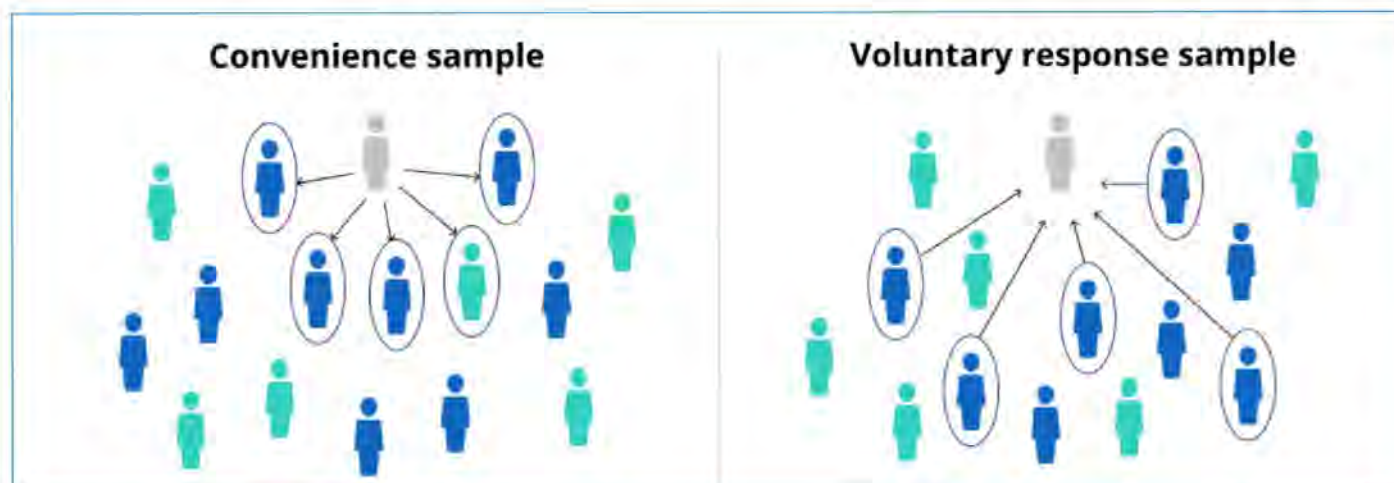
Figure 1 — Illustration of convenience and voluntary samples.

be applied generally to the US ham population, they do help us gain better insight than we would get by peering through our respective personal windshields into how aging is related to contesting in the US. I examine how the US population compares to our best available proxy for the age of the ham population: ARRL membership age data, and contesters through the *NCJ* survey. I add some detail into the age differences in the focus of hams on contesting per se, how much time is spent doing that using the two regional surveys, and, in Part 2, how they use various sources of information for contesting practice from the national *NCJ*

survey. All told, these results give us a modest picture of aging in the practice of US radiosport, one that we do not get from our daily operations or visits to our favorite hamfest or club meeting. Some results do, however, confirm the impressions that many hold regarding aging, amateur radio, and radiosport.

A Conceptual Perspective on Aging in Amateur Radio

Analyzing data without a set of theoretical expectations is akin to the new ham pushing buttons and turning knobs on a sweeping antenna analyzer without a sense of what to expect from those results. I'll briefly describe what social scientists call the *life course*,

a set of age-related transitions that occur at relatively narrow ranges of time (ages) for a population as a lens thorough which to interpret our results. Hutchinson describes it as:

"A life course perspective is stage-like because it proposes that each person experiences a number of transitions, or changes in roles and statuses that represent a distinct departure from prior roles and statuses... Life is full of such transitions: starting school, entering puberty, leaving school, getting a first job, leaving home, retiring, and so on."[7]

These transitions amount to multiple trajectories that most people experience, each shaping one another ac-
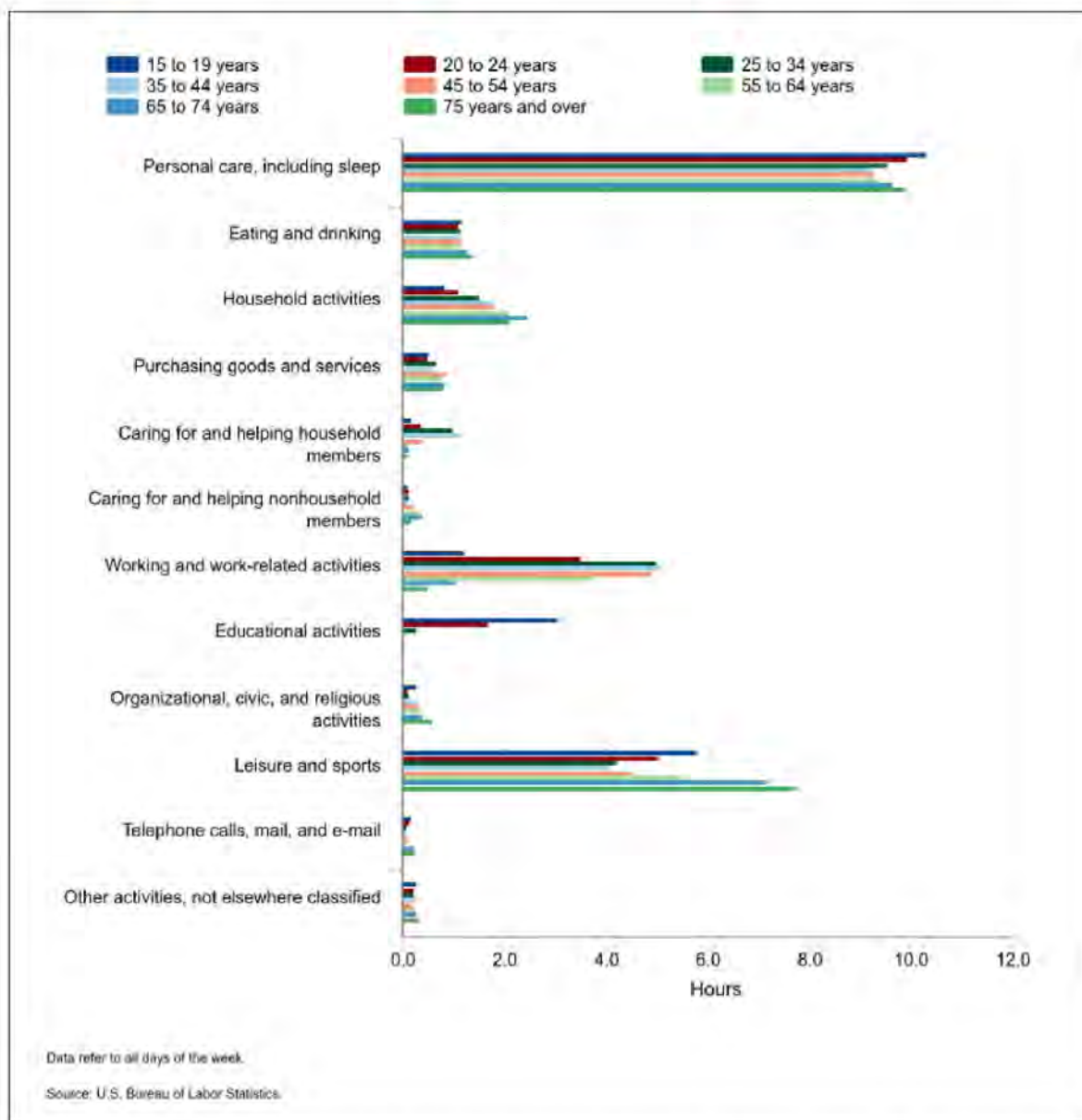
Figure 2 — Average hours per day spent in selected activities by age (2018 annual averages, BLS Time Use Survey).

cording to various other social forces. One might think of complex impedance visualized in a Smith chart as an example of multiple forces shaping one another. While it is not a directly parallel example, it does share a notion of mutually influencing complexity that typical ham operators may be more familiar with.

Time use, especially for a leisure-time activity such as amateur radio, is shaped by these age-related transitions and social trajectories.[8] For instance, many young people in the Baby Boom cohort were exposed to amateur radio but did not get licensed because of these transition-based trajectories. Some — what I call *late-in-life hams*[9] — return to the hobby and become licensed when forces embedded in these trajectories allow one to engage in a hobby: Available time and discretionary money.

National Data on Leisure Time and Aging

The BLS American Time Use Survey annually collects data on samples of adults regarding how they spend their time. To show how life-course trajectories affect leisure time,[10] I've created a graphic to illustrate age patterns in time use (see Figure 2). Several life-course trajectory effects are evident, which will be important for us to understand the survey results on contesting. Figure 2 shows that educational activities sharply taper off with age. Work-related activities ramp up and peak at the tail ends of the typical work career (55 – 64) in an inverted-U shape. Personal care has a U-shaped pattern, wherein middle age adults spend less time in those activities (including sleep). These are no doubt linked to education, work, and family trajectories. Household activities ramp up toward the end of work careers and the beginning of retirement phases. Note in particular the leisure and sports time use. It, too, has a clear U-shaped aging characteristic. This gives us an insight into how many middle-aged amateur radio operators may not spend as much time in the hobby through club membership and on-air operations, including radiosport. It has less to do with amateur radio as a hobby, but more to do with other more socially pressing trajectories in life, such as careers and child-rearing, versus the relative priority of leisure-time pursuits.

In data not presented here due to space limitations,[11] trends over time in the BLS Time Use Survey show that total leisure time has become dominated by watching television, which now comprises *one-half* of all leisure activities. Because of the differential life-course trajectories faced by women (commonly called the *second shift*[12]), leisure-time activities are systematically lower for women in favor of other household activities and employment. Current time use for children shows that they are perhaps "over-scheduled" in organized activities, leaving leisure time pursuits ("play") such as amateur radio are increasingly secondary in the trajectories in which they find themselves. If we had to point to a significant competing leisure-time activity to amateur radio, the data would show *increased television watching* as the dominant theme over the past decade or so in the total time adults devote to leisure pursuits!

Age Distribution of the US Population and Radio Amateurs

Since we have no direct measure of the age distribution of all amateur licensees, I am using as a proxy the 2019 ARRL membership data on age. For contesters, the 2019 *NCJ* Survey is the source for that age distribution. The US data are from the Census Bureau[13] (see Figure 3).

The US follows a clear age distribution of an even population spread, declining with the higher mortality in the most elderly years.[14] Using ARRL membership data,[15] the middle to later age dominance fits part of what we tend to see as we attend hamfests or club meetings. They are concentrated in the 50 to 79 age group.[16] For contesters, it does appear that they tend to be older than are amateur operators as a whole. The *NCJ* Survey respondents are predominately in the 60 – 79 age group, while the 80 and older contesters drop off considerably to levels lower than the 50 – 59 group. While younger participants are shown in this graph, evidence exists to suggest that contesting is less popular for hams in general for those 40 – 49, a dramatic gap as compared to the older group of hams in their 50s, 60s, or 70s. Rates of contest participation do increase with age among the youngest age groups in this survey.

Radiosport Participation by Age

The *NCJ* Survey asked about participation in contests, but to put that in
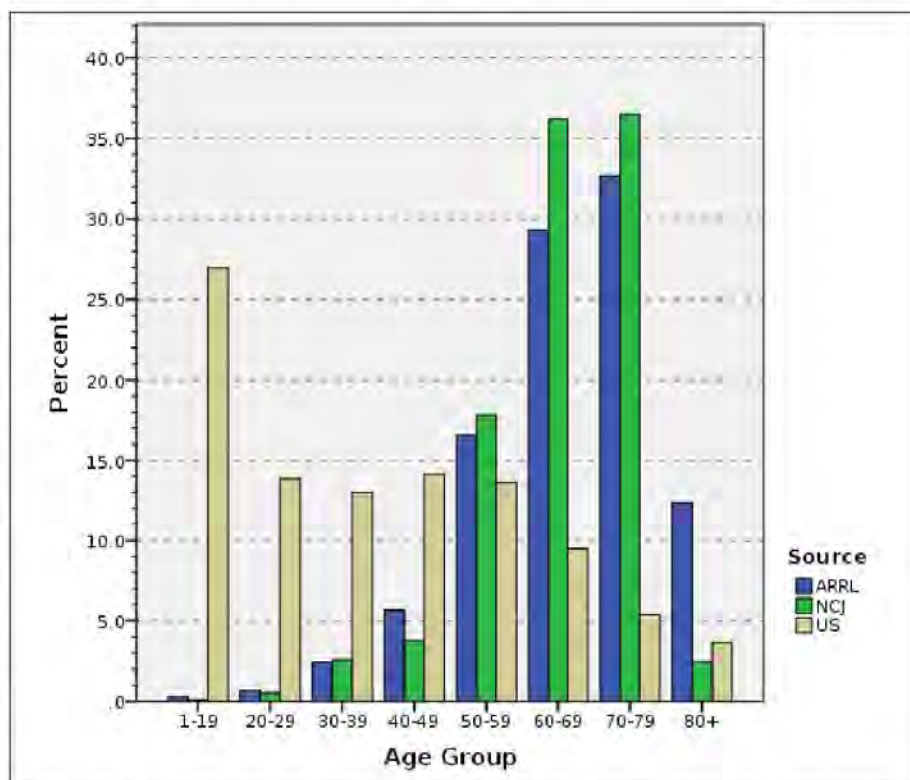
Figure 3 — Age distribution of US population, ARRL membership, and *NCJ* survey participants, 2019.

some context of operator preferences, I also report data from my Delta Division surveys in 2011 and 2013. Respondents were asked about favorite operating activities and the time spent in them from among those most popular among hams (see Figure 4). Radiosport in the form of DXing and contest participation ranks high in both years.[17] There is some age variation in 2011, but not as much in 2013. About 30% of those hams in the Delta Division said that radiosport was their favorite activity. So, contesting was one of the *most popular* activities in these two regional surveys of ARRL members.

While radiosport is one of the two most popular operating activities, how much time do radiosport participants actually say they spend in pursuit of contacts? In Figure 5, I've compared the amount of time reported on the air per week with favorite operating activity. For both years, contesters report high percentages in the 5 hours and above categories. By example, 10 hours and above reflect what a quarter-time paid employment position would require. Note that experimenters and builders report significant time "not on the air," or no more than 1 hour per week. So, contesters spend more time on the air each week than in any other popular activity.

While the *NCJ* Survey and the earlier regional surveys of the Delta Division are not directly comparable in terms of sample population (one is national; the other two are regional), Figure 6 contains the *NCJ* Survey question asking about the number of contests each respondent said they participated in per year, broken down by age category.[18]

Most engage in 6 – 10 contests per year, but there are age effects in participation. Note that marginal radiosport participants (1 – 5 events per year) tend to be less than 50 years old. In stark
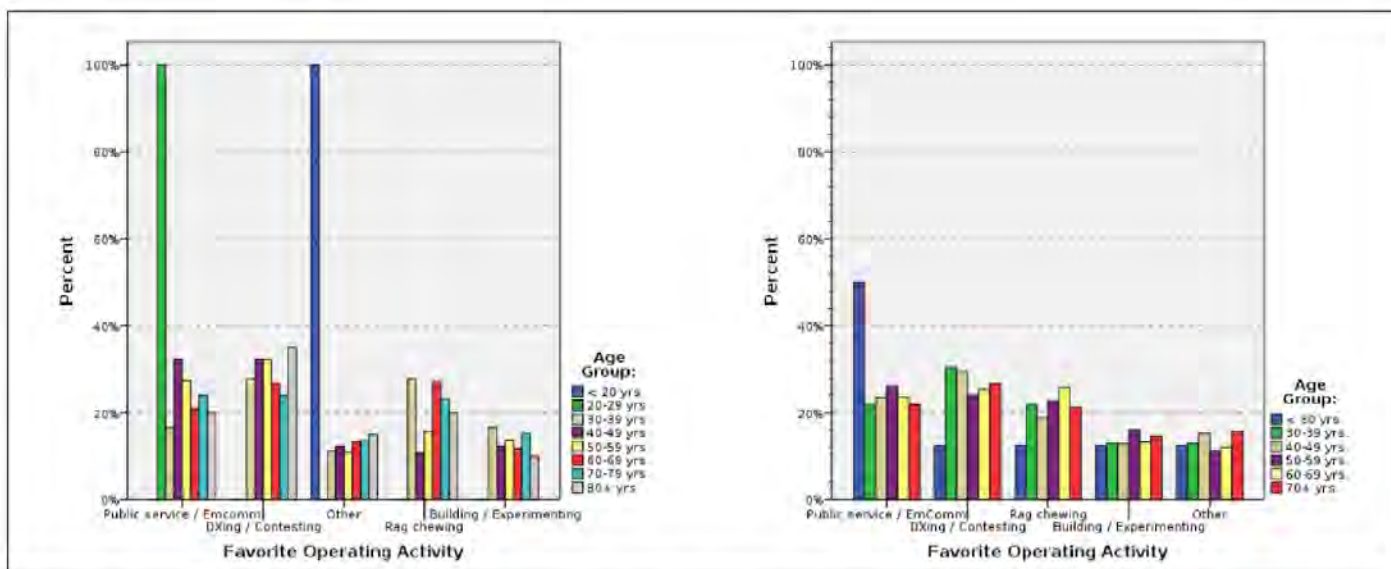
Figure 4 — Favorite operating activity by age group, 2011 and 2013, ARRL Delta Division.
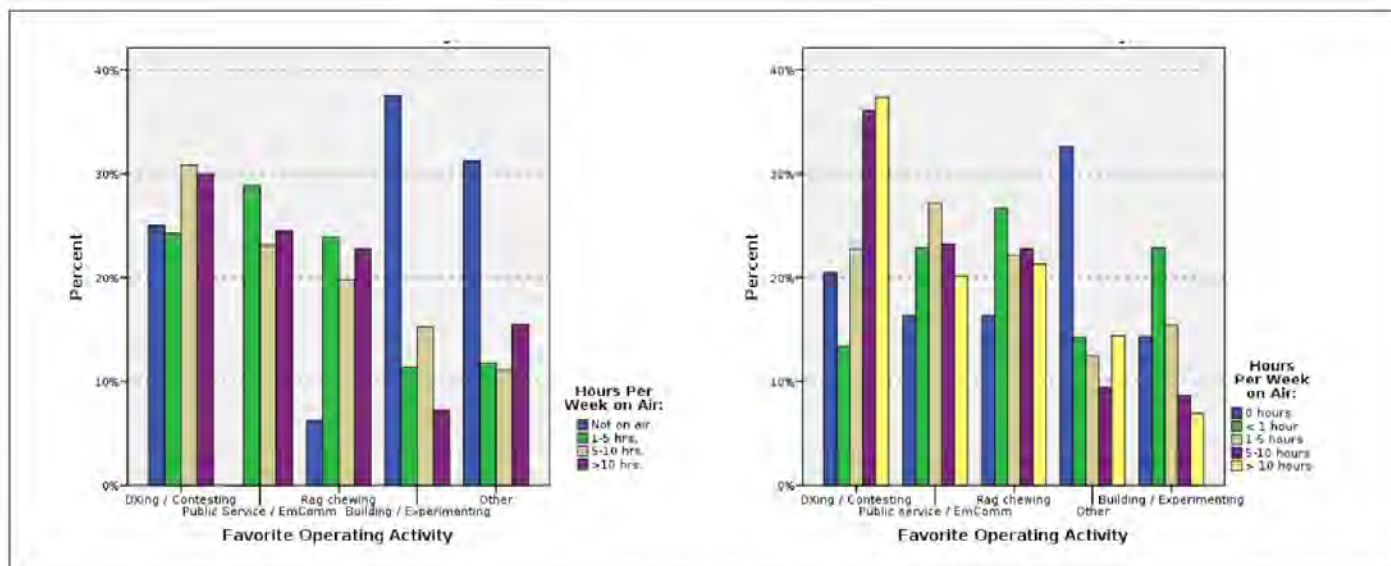
Figure 5 — Favorite operating activity by hours per week on air, 2011 and 2013, ARRL Delta Division.

contrast, those who participate in 16 or more events tend to be distinctly older. Survey respondents who are 80 years or older report the highest percentages in the 16 – 20 and 20 or more contests per year. To put this into perspective, 20 or more is about one contest every 2 weeks.

Age is linked to placing a priority on contesting, how much time is spent on that activity, and how many of those activities are pursued each year. This is to the extent such that the most committed and active radiosport enthusiasts are the oldest respondents in the *NCJ* Survey in 2019. For the most part, it is due to the portion of the life-course trajectory in which they reside, without the competing interests for their time, attention, and money.

Conclusions and Recommendations

I've presented modest survey data on aging and selected aspects of radiosport. They have internal validity in that the differences observed through comparing respondents by age are really observed (within measurement error). But they *lack* external validity of no firm basis to generalize to all amateur radio operators or contesters. Until we have random samples from the FCC ULS of licensees using best-practices survey methods, our ability to reliably generalize to the population(s) of choice will remain limited to guesses, such as I've reported here.

What I've found is that age indeed appears related in several ways to participation in radiosport. All leisure time by adults in the US is constrained by the life-course trajectories in which the individuals are situated. This includes amateur radio operators (and those who would like to become one). Hams engage in DXing and contesting at about the same levels as radio amateurs who concentrate on emergency communication activities. But contesters are slightly older than our proxy of all hams (ARRL members). Even so, contesters spend more time on the air than most any other popular category of operating, many devoting more than 10 hours per week and taking part in more than 20 contests per year. Age is related to *more participation*, except for those 80 years old and older. I interpret this as a function of the life-course trajectory that post-employment years
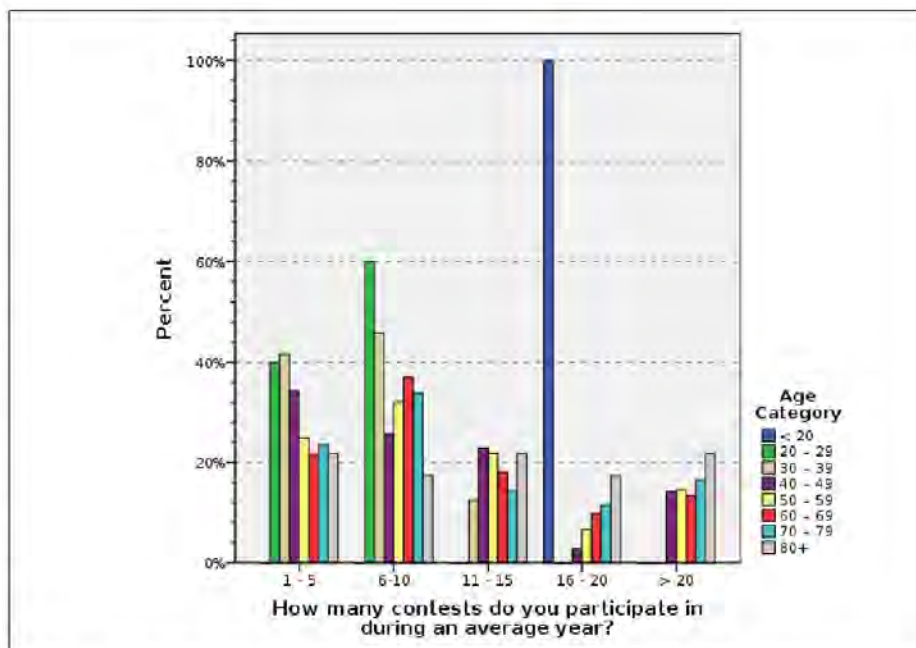
Figure 6 — Number of contests per year by age group, NCJ survey, 2019.

provide: Time based upon an "empty nest" and more discretionary income perhaps invested over a few years while employed (i.e., building a contest station). It is characteristic of the U-shaped age pattern in the BLS American Time Use Survey for the later years.

In conclusion, with the age-graded contest participation results that I've presented here, coupled with the age concentrations of both the ham population (proxied by ARRL membership) and contesters responding to the *NCJ* Survey, contesting is likely to change in the future. This does not mean that contesting will become extinct, only that it will change. There *may* be less competition in the coming years as hard-core, highly participating, heavily invested hams age out of the picture. This could bring on more younger hams who, at present, do not feel they can compete against the current contest leaders.

More likely, it will be the change in life course trajectories for leisure time in general that "frees" younger contesting operators to devote more time to these pursuits than they say they do at this point in their life-course trajectories. This could be characterized as a *vacancy-chain model*[19], whereby the aging-out of ardent contesters ("Big Guns") leaves perceived "openings" for their replacement in the competi-

tive world of radiosport. Or, focusing on more egalitarian scoring methods that facilitate the stations, modes, and power accessible by a larger audience of hams might attract extant amateurs who currently focus on other operating activities. For instance, those who identify emergency communication as their favorite operating activity and have HF access might be attracted to contest participation if they were collectively made aware how valuable contesting skills are during traffic handling in times of emergency. These are just some ideas toward change rather than demographic extinction that is frequently feared regarding the graying of radiosport.

Part 2 of this article will focus on aging and the sources of information participants use to compete in contests. The use of newer online resources, as opposed to other more-institutionalized sources, including *NCJ*, is a leading indicator of potential change in radiosport.

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serves as an Assistant Director of the *ARRL Delta Division and is a presenter on the ICQ Podcast. Howell holds a General class license and blogs about amateur radio at k4fmh.com.*

Notes

[1] For an overview, see **en.wikipedia.org/wiki/The_Literary_Digest**.

[2] See, for example, Earl S. Babbie. 2010. *The Practice of Social Research*, 12th Ed. Belmont, California: Wadsworth Publishing.

[3] *Per* Steve Ford, *WB8IMY,* at ARRL (personal communication, October 30, 2019): "According to the person who managed the survey, it was sent to all *NCJ* subscribers for whom we had email addresses. That would have been about 1,500 individuals." A total of 937 valid survey responses were received. As noted in the actual survey results, many of these previous *NCJ* subscribers say they do not currently subscribe to *NCJ, so* I interpret it as a convenience sample using a voluntary response modality.

[4] Frank M. Howell. 2011. "Results of ARRL Delta Division Survey of Members, July." Available at **k4fmh.com/wp-content/uploads/2014/10/2011final.pdf**. There were 641 respondents.

[5] Frank M. Howell, Survey of Members 2013, ARRL Delta Division, Available at **k4fmh.com/wp-content/uploads/2014/10/dd-final13.pdf**. There were 1,234 respondents.

[6] James D. Wright and Peter V. Marsden. 2010. "Survey Research and Social Science: History, Current Practice, and Future Prospects," pp 3 – 25 in Peter V. Marsden and James D. Wright, *Handbook of Survey Research* 2nd Ed. New York: Emerald Publishing.

[7] Elizabeth D. Hutchinson. 2011. *Dimensions of Human Behavior; Changing Life Course*, 4th Ed. Thousand Oaks, California: Sage Publications, p 22.

[8] The podcast *QSO Today*, hosted by Eric Guth, 4Z1UG, contains a "convenience sample" of amateur operators who often give rich biographical details on how these forces have shaped their exposure to and participation in the hobby. See **www.qsotoday.com**.

[9] See my 2013 Delta Division Survey report, Frank M. Howell, "Survey of Members 2013, ARRL Delta Division."

[10] The BLS *American Time Use Survey*, **www.bls.gov/tus/**.

[11] Available on the BLS ATU website.

[12] See Arlie Hochschild and Anne Machung. 2012. *The Second Shift: Working Families and the Revolution at Home*, Revised Ed. New York: Penguin Books.

[13] US Census Bureau, "Population Division, Annual Estimates of the Resident Population by Single Year of Age and Sex for the United States: April 1, 2010, to July 1, 2018." Release Date: June 2019.

[14] The category of 1 – 19 is twice the age period as the successive decade categories.

[15] Provided by then-ARRL CEO Howard Michel. WB2ITX.

[16] ARRL's 150,000 or so reported membership does not include approximately 600,000 licensees out of a total 750,000 or so current licenses. The statistical issue here is that we have no empirical idea about how the age distribution of non-members compares to League members. The membership data themselves are incomplete as they are not universally volunteered by members.

[17] The 100% columns in Panel A reflect single survey respondents and may be ignored.

[18] The single 100% column represents a single survey respondent and should be ignored.

[19] See, for example, Ivan D. Chase "Vacancy Chains." *Annual Review of Sociology.* Vol. 17:133-154, 1991.

Tom Williams, N2CU / n2cu@roadrunner.com

Taking QSO Party Contesting to the Next Level

State QSO parties have been in the contesting arena for decades. Pennsylvania has had a QSO party since 1957, Washington and California since 1966; Georgia also has had one for more than 50 years.

I recall operating my state's New York QSO parties in the mid-1970s, before it went away for decades. A new sponsor revived it. Some states with little or no state QSO party activity have joined forces with neighboring states to create regional QSO parties. The New England QSO Party (NEQP) and the 7th Call Area QSO Party (7QP) are two examples. State QSO party participants may include non-contesters just stopping by to let you know you're being heard, the casual contester doing only search and pounce, or the serious contester operating full-time SO2R. Mobiles and rovers activating multiple — and often rare — counties are the lifeblood of these events. County hunters also can benefit from QSO parties by working stations in rare counties that might not have resident hams or are infrequently activated.

On any given weekend, you're likely to find a QSO party on the schedule, and they're a great way to keep your contesting skills sharp. Some states take a friendly approach, with participants taking time on the air to explain the contest or tell you about the weather. Camaraderie among operators often stems from making repeated contacts with the same stations on other bands and/or modes.

Interest in state QSO parties has surged over the past few years, and states that had been dormant in this regard have again joined in the fun. Doing well in a contest can earn you a plaque or certificate, and some even offer modest prizes as an added incentive.

Some smaller QSO parties don't have enough on-the-air presence to attract out-of-state participants. Those of us who love to operate these events felt that something needed to be done to increase interest and activity.

As avid QPers, Dave Edmonds, WN4AFP, and Stan Zawrotny, K4SBZ, brainstormed how they could establish a national program/points system in which competitive QPers could battle it out one contest at a time throughout the year. Another objective was to tie all QSO parties together to create something bigger than just individual contests.

Dave and Stan wanted to create two programs — one for participation and one for performance. The goal would be an increase in contacts for in-state participants and more logs submitted to the QP organizers, as well as building relationships between contesters. A prime example is what Paul Newberry, N4PN (SK), brought to the contesting community. Not only could he win just about any contest but would always take time to greet his radio friends and have a short chat in the midst of the battle.

The State QSO Party Challenge

The first step was to establish the State QSO Party Challenge (SQP). This year-long competition would award points for cumulative number of contacts made and the number of state QSO parties participated in. The goal would be to encourage operators to participate in as many QSO parties as possible and become hooked on them. The more QSO parties you work, the better your own state's party will be, because you learn how they work and how to play in them. The only requirements would be to participate in at least two QSO parties, make at least two contacts in each, and submit your scores to **3830scores.com**. The results would be tabulated and results published.

The second step would be to create a recognition program for the operators who put in the effort to win the QPs they enter. This would encourage competitive QPers to participate in more events and to challenge each other weekend

VE7KPZ finds a site as a rover for the British Columbia QSO Party near the Kelowna-Mission district.

The Yaesu FT-891 up and running in contest mode.

after weekend. The QSO Party Cup leaderboard will be updated as results of each QSO party are published. The expectation is that we will see a much higher level of interest in the QPs and the QPs will gain prestige within the contesting world.

As 2020 approached, Dave and Stan decided to focus their energy on building the State QSO Party Challenge. Stan provided Dave with 3830 data in an *Excel* spreadsheet that included 1,296 operators who had participated in QSO parties during 2019. The next task was to find an internet home for the leaderboard and post statistics. Dave contacted Bruce Horn, WA7BNM, and he offered to help.

Dave hoped that they could roll out the 2020 State QSO Party Challenge before the initial QSO parties of the year took place — Minnesota, British Columbia, and Vermont all happen during the first weekend in February. That was only 7 weeks away. Just 29 days before the planned kick-off, Bruce said he would launch the State QSO Party Challenge page on 3830 once the State QSO Party website was up and running. Additional team members were recruited. Mark, WB9CIF, a very active QPer and manager for the Indiana QSO Party signed on. About 2 weeks later, Jeff, N8II, and I agreed to join the team.

Bruce launched the State QSO Party Challenge page on 3830scores.com 3 days ahead of our target date. To see current statistics, visit **3830scores. com** and click the SQP Challenge link under Special Summaries.

The team began sending out news releases, contacting managers of other QSO parties, ARRL, *CQ* Magazine, and anyone else that could help spread the word of this exciting new competition. ARRL included our news release in *The ARRL Contest Update* newsletter, and Valerie Hotzfeld, NV9L, delivered a presentation on the State QSO Party Challenge on the *Ham Nation* webcast.

The publicity seems to have stoked interest, resulting in greater participation in the early events. "I have a feeling that the Challenge provided an incentive to actively participate in all three QSO parties on the first weekend of February," British Columbia QSO Party Coordinator Rebecca Kimoto, VA7BEC, said. With many of the logs I received for BCQP, participants mentioned that it

An Overview of the State QSO Party Challenge

The annual State QSO Party Challenge recognizes all radio amateurs' participation in the US state and Canadian province QSO parties. It is open to any radio amateur who participates in any of the approved State QSO parties (SQPs). Participants simply submit their scores to **3830Scores.com** to be included in the Challenge.

Participants are recognized for reaching five levels of achievement: Bronze, Silver, Gold, Platinum, and Diamond. Using the submissions to 3830Scores.com, each call sign's cumulative score is calculated by totaling up number of reported contacts and multiplying by the number of SQPs entered year-to-date. The use of the number of SQPs entered as a multiplier is to encourage radio amateurs to enter more state/province QSO parties. The use of the number of contacts as a metric is to encourage participants to operate longer in each SQP, increase the effectiveness of their station and improve their contesting skills. — *Adapted from the State QSO Party website*
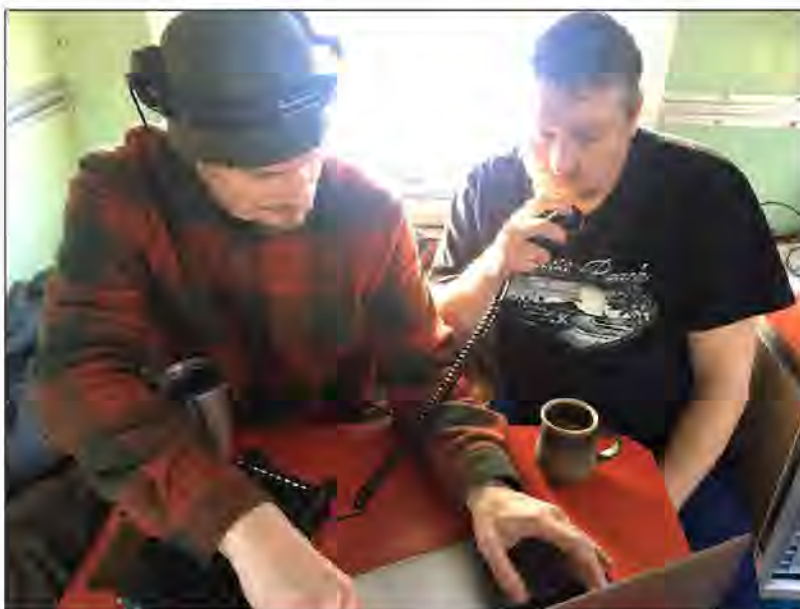
Mike, VE7KPZ, and Kevin, VE7XY, operate in the BC QSO Party.

was the Challenge that prompted them to get in the hunt for BC stations. The State QSO Party Challenge seems to be off to a great start."

Vermont QSO Party Manager Mitch Stern, W1SJ, judged the QSO Party Challenge a winner. "This year, folks were finding and working the Vermont stations on multiple bands and modes," he said. "This is despite the fact that conditions were quite poor with the sunspot number around 0." He said one in-state operator who logged 276 FT8 contacts last year was able to maintain runs on CW due to the additional participation. More CW meant less FT8.

The Minnesota QSO Party obliterated its old record for number of logs submitted. "It's pretty evident from the data that the idea of a year-long State QSO Party competition struck a chord

with a lot of participants, especially the non-Minnesota folks," said Mark Endorf, WAØMHJ, the MNQP director.

As of this writing, Vermont has received 259 logs (117% greater than 2019), and Minnesota, 419 logs (57% greater than 2019). Something magical is happening in QSO party contesting.

Discussion of awards for both the SQP Challenge and the SQP Cup are in the works, and we recently received notice that Icom America wants to be a sponsor. We are also planning "Worked All QSO Parties" awards, which will be offered in 2021 to operators who participate in all 47 approved QSO parties during the calendar year. So, why don't you join us in the fun?

For additional information, visit the State QSO Party website, **stateqso party.com/**.

Lee Finkel, KY7M / ars.ky7m@gmail.com

¡*Viva Bijagua!* Our Week at TI7W for the ARRL DX CW

TI7W, owned by Kam Sirageldin, TI5/N3KS, was operated as a Multi-Single entry in the 2020 ARRL International DX CW by John Warburton, G4IRN; Mike Chamberlain, G3WPH, and Lee Finkel, KY7M. This is their story.

The Kam Connection

In the usual discussions about where to go next, John, G4IRN, had been talking with his friend Mark, MØDXR, about Kam's station in Costa Rica. Mark had operated there several times and said it was an excellent station and Kam an excellent host. John followed up with an email to Kam in October 2018 about operating at the station in a future CQ WW CW, but at the time, Kam explained, his station was regularly occupied by Chris, KL9A, or Nate, N4YDU, for the major CW contests. Last fall, however, Kam notified John that his station would be available for the 2020 ARRL International DX CW, so John immediately placed his reservation.

Through our trips with the Voodoo Contest Group (**voodoocontestgroup. com**) over the years, John and I have become good friends. As "Voodudes," we have operated together in Mali (TZ5A), Liberia (EL2A), Cyprus (P3F), and Suriname (PZ5V). John has also been my house guest on the way to Visalia for the International DX Convention. He had let several of us know that he was in touch with Kam, so it came as no big surprise when he asked me if I wanted to join him for ARRL DX CW in 2020. Originally, the third member of the team was going to be Ned, AA7A, but he had to withdraw. John and I made several calls and were lucky enough to find Mike, G3WPH, available on short notice.

Storm Winds Close London Airports

Dallas was the planned jumping-off point for Costa Rica. Due to high winds in London, John and Mike's separate flights on Sunday morning to Dallas were both cancelled, but they rebooked together on another flight that would get them to Dallas on time. That flight

A sloth enjoys a leisurely lunch. [John Warburton, G4IRN, photo]
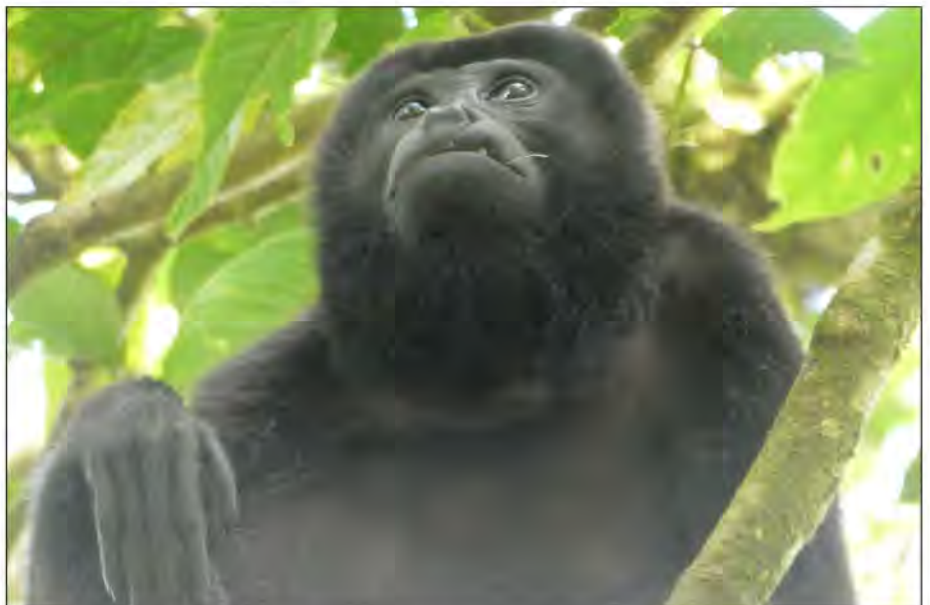
A howler monkey [John Warburton, G4IRN, photo]

The colorful toucan. [John Warburton, G4IRN, photo]

also fell victim to the high winds, but they finally got a Virgin Atlantic flight that arrived in Boston after midnight on Sunday to connect with an early-morning flight to Dallas.

I had my own challenges at Phoenix Sky Harbor Airport on Sunday night, after a first officer/co-pilot on my evening flight to Dallas called in sick and finding a replacement was delaying the flight. At one point, it looked as if I would miss my flight to Costa Rica, but a substitute first officer was secured, and my flight to Dallas took off 2 hours late. I was very relieved to finally see John and Mike walking toward the airport gate in Dallas for our flight to Costa Rica.

Extra Luggage

Kam's station utilizes FLEX-6600M SDR radios. One had suffered lightning damage last year and had been repaired by FlexRadio. Kam asked if one of us could return it to Costa Rica, and I agreed to have it shipped to my house. I was hoping to avoid paying to check a bag. Fortunately, the radio fit perfectly in my wife's oversized computer case. All incoming luggage is X-rayed upon arrival in Costa Rica, and electronics often attract attention, but I breezed through the line without getting stopped. Since the station is effectively a turnkey operation, my only other luggage was headphones and personal effects.

Weather and Wildlife

Although Costa Rica is not an island, the climate is very much like many islands with a wet side and a dry side. Bijagua, where TI7W is located, is in a wet part of the country near the rain forest. Downpours occur repeatedly, almost every day and night, blowing through for 10 or 15 minutes, always accompanied by strong winds. The area we were in lies between two dormant volcanoes — Volcán Miravalles and Volcán Tenorio — and it seemed to have its own climate. We made plans to visit nearby waterfalls and parks, but contest preparation or bad weather always got in the way.

Because Kam's property is literally in the middle of a forest, there was wildlife in the area. Our first contact was with a sloth hanging out high in a tree next to the path we took from our cottage to the main house and the station. The large, furry sloth was in that tree for several days eating the leaves before moving on to a neighbor's tree.

We very much wanted to see some monkeys, and Kam's wife, Bertha, told us one afternoon that some howler monkeys were in the trees near our cottage. We ran out to see them and then kept watch for them. Several mornings they were howling before dawn, and we recorded their dog-like howls. These monkeys are native to South and

Central American forests and travel in families, eating the leaves and fruit from trees in the area.

Some colorful birds also made their habitat in the area but rarely stayed still long enough for a photo. John did manage to take a wonderful photo of a toucan perched outside the shack window one afternoon. Native to the rain forests in Central and South America, they are members of the woodpecker family and named for the sound they make.

Kam warned us to watch out for spiders and snakes on our hikes in the neighboring forest. Some of the spiders can give toxic bites. We did see a few spiders, but thankfully only for photos. We did not run into any snakes. Kam also warned us about local ticks (*coloradillas*) that ravage ankles and legs by digging into the skin and causing intense itching. We only had one close encounter with the *coloradillas* and escaped without bringing back any unwanted souvenirs.

Kam's Station

Kam has been a serious contester for many years and is a CW aficionado (FOC #1928 and CWops #146). He has carefully planned and built an award-winning station in Bijagua. After retiring at a relatively young age, he transitioned to living full-time in Costa Rica and has hosted many contesters in recent years. A station like his is daunting to master in the time that most visiting contest operators have between arrival and the start of a contest. Our first morning there was dedicated to learning the station basics.

Kam was very patient in answering all of our questions and concerns. None of us had prior experience operating a Flex radio, so getting comfortable with a FLEX-6600M was our biggest challenge — for instance, how to turn on the RIT without creating a new "slice" of the band. We took turns operating the station before the contest trying to get comfortable with the radio.

Kam's station is set up for SO2R operation, so everything has a twin — radios, amplifiers, computers, antennas, etc. A unique feature is a 40-inch multi-input/split-screen monitor that displays both computers; a mouse program allows the operator to access both sides of the screen. Our plan was to operate multi-single with a second operator on the second radio as needed for chas-

ing multipliers or monitoring 10 meters. We also wanted to try "partner mode," where a second operator would listen to the same pile-up and, hopefully accelerate the run rate. The logging program we were asked to use for the contest was *DXLog*. John and Mike had used it as single ops in a few contests, but not for a multi-op. I had not used it before. It is another *CT/Win-Test* lookalike with its own shortcuts and other nuances.

Contest Planning and Preparation

We decided to operate in 3-hour shifts. That would give us each a 6-hour stretch of sleep each night. Whoever was off could staff the second station as needed to hunt for mults or band openings. Kam provided us with an SDR to monitor 10 meters. We knew that the only way we might beat our Caribbean competition would be to catch a 10-meter opening that was not available to them. We were also not sure how productive 15 meters would be at this point in the sunspot cycle.

The ARRL International DX Contest is unique, because the multipliers are limited to the Canadian provinces and the US states plus Washington DC, but excluding KH6 and KL7. This contest also has a unique band-change rule for multi-single entries — only six band changes are allowed per clock hour. Some argue that this rule is antiquated and needs to be retired in this age of SO2R operating, since it can be a major impediment to freely chasing mults as they become available.

Given the geographic location of TI7W vis-à-vis the US and Canada, antenna rotation is a non-issue. Because Kam has twin antennas for 10 – 80 meters, one set is aimed at the East Coast and one at the West Coast with the option to use both at the same time. There are similar choices for Beverage receive antennas on the low bands, but listening in both directions at the same time is also possible.

Gaining familiarity with the station control and monitoring software and configuration of the logging software took lots of the pre-contest preparation time. *DXLog* is very configurable, but setting it up for networked operation in the multi-single environment and making sure we were all comfortable with the user interface, functionality, and controls took some time.

Operating the Contest

The contest started at 1800 local time. We decided to try "partner mode" for the first shift with G4IRN running, and KY7M partnering. The partner listens to the pileup on a second pair of headphones and can list call signs on a "call-stack" that appears on the run operator's screen. The theory here is

G4IRN operating. [Lee Finkel, KY7M, photo]

that the partner will hear call signs in the pile that the run operator may miss. The run operator uses keystrokes to pull down a call sign from the list at any time. We quickly discovered that we were almost always hearing the same call signs, and the partner was not adding to the rate, so I was excused before the first hour ended. We are curious about how this technique works so effectively for the highest-rate stations; while we had no opportunity to practice ahead of time, we came away unconvinced that it would have made a difference, and we concluded that partnering is probably more worthwhile where the partner is listening on a different antenna or located at a remote site and can hear a different perspective on the pile-up (some European HQ stations use this latter technique in the annual IARU contest).

Kam advised us to start on 20 meters and milk it for as long as it was productive before moving to 40 meters, where we would spend a good part of the night with occasional moves to 80 and 160. He also advised us to pay close attention to 160, where we might gain a multiplier advantage over our competition. The first hour yielded 114 Qs on 20 in the first 40 minutes before moving to 40 where 63 Qs gave us a first hour of 177, followed by a solid hour of 199

KY7M (right) operating and G3WPH (left) hunting mults. [John Warburton, G4IRN, photo]

The team (L – R): G4IRN, G3WPH, KY7M, and N3KS.

on 40 meters. In his third hour, G4IRN moved to 160 for 64 Qs and then to 80 where 47 Qs gave him a 3-hour total of 542 when he handed off to me. I had a wonderful first hour on 80, with 177 Qs plus 12 on 160, and then I split my second hour between 160 and 80, then back to 40 to finish off my third hour. After 6 hours, we had 1,039 contacts in the log when G3WPH took over for the midnight shift and an anticipated slower pace, as many casual US/VE operators were asleep by then.

Conditions in general were not good, and we were concerned about whether 15 meters would be available in the morning or if we would be stuck on 20. Kam told us to keep an ear on 15 and to pounce on it if and when it opened for us. We made the move from 40 to 20 meters shortly after sunrise and had the challenge of attracting attention from the east coasters who had their beams pointing at Europe. The first hours on 20 were productive, but not great — 144 and 124/hour — when we saw 15 come alive and made 84 Qs there along with

55 on 20 in that next hour.

It seemed as if we worked everyone we could on 15 — many US/VE stations obviously did not make the move to 15, even though it was open. Back on 20, we had hours of 151 and 152 with a couple of quick trips to 15 for mults. At noon local time, 15 came to life again, and we added 111 Qs there along with 82 on 20 for a 193-contact hour. That was followed by one of those magical hours on 15 meters when the calls come one after the other, steadily with clarity, and G4IRN had the best clock-hour of the contest with 233, which included two 20-meter mults on the second radio (also the best elapsed-hour rate of 244 Qs). We stayed on 15 for the next 2 hours before moving back to 20 and, again, stayed with 20 as long as it remained open as sunset approached and logged 182 and 135 Qs/hour on 20 meters before moving to 40 around sunset.

At the end of Day 1, we had 3,438 contacts in the log and 284 multipliers — a very good start we thought — es-

pecially with the mults we had accumulated on 160 and 15. Unfortunately, we heard not a whisper of a signal on 10 meters all day. "Maybe tomorrow will be better," we hoped.

The first few hours of the second night were decent but quickly slowed, as is typical when new stations get increasingly difficult to find. The rate decelerated from 144 to 128 to 111 to 84, *down, down, down* until morning. We paid close attention to the mults we needed on 80 and 160 and moved a number of stations between the low bands to fill out needed mults without breaking the band-change rule.

We had a wonderful surprise on Sunday morning: Signals on 10 meters. After some dismal hours on 20 meters, 15 came back to life, and 10 followed shortly thereafter. We made 163 Qs on 10 meters over the next 4 hours — 116 contacts in just one of those hours. Those 10-meter Qs yielded a critical 31 multipliers that would make a huge difference in our score. The big question was whether our Caribbean competi-

tion hit the same 10-meter opening, or if we had an unmatched advantage (we found out post-contest that not only did they have the 10 meter opening, theirs was better, plus they had an opening on Day 1 that we never got).

When the dust settled at the end of Day 2, we had 5,365 Qs in the log and 329 multipliers for a claimed score of 5,292,294. The station performed extremely well for us. The 80-meter wire Yagis and 160-meter horizontal loop were impressive performers, as were the Beverages for the low bands. We had one or two minor emergencies requiring Kam's assistance but kept things going with almost no down time. On Day 2, we had someone on the second station watching for mults and picking them off easily in most instances while carefully adhering to the band-change rule.

Post-Contest Reflections

But for the stress of getting to Costa Rica, this was a wonderful experience for the three of us. We thoroughly enjoyed our time there and cannot thank Kam and Bertha enough for their hospitality. Our lodging was comfortable, and we had plenty to eat and drink during our stay. We had some memorable dinners in town on several nights and got to taste some of the local specialties. We had a visitor the second afternoon of the contest who joined us for our post-contest dinner — Freddy, a young man employed by the local power company who is fascinated by ham radio. He has helped Kam locate and repair noise sources on power lines in the area and, in the process, got hooked on our hobby. We shared favorite stories with him over dinner while encouraging him to get his license.

Given that we were operating in a new location, learning to use an unfamiliar station and radios, overcoming software challenges, and competing at the bottom of the sunspot cycle, we were incredibly pleased with our score.

I must say that after years of operating the ARRL DX CW from home in Arizona, it was much more fun *being* the DX, something I hope to do again soon.

John W. Thompson, MD, K3MD

Ode to the Superhet

Once upon a contest dreary
With the SFI at 60 and sunspots nary
As the rate reached nearly 0
Did I ponder:
How strong was the arm of Armstrong
To invent the superhet?
Gone were the days of the TRF and regenerative receiver,
'tho some lazy designers did put regens in their IFs.
Yes, the 6K8 and 12BE6 perfected the pentagrid,
Which enabled many a ham to work a new grid.
The overload point continually increased,
Especially with the invention of the product detector.
Few were the years that SSB
Needed to supplant AM.
Now a DDC receiver
Thinks it is superior,
When it converteth only to baseband.
How base!
Yes, the R-390A
Did achieve the near-superiority of the era
Only to be outdone by the 2B and R4
Not to mention the 75S3B.
The balanced-ring mixer did
Increase the IP point.
Now we again find
That preselection may be necessary even with a DDC!
The circle closes.
And yet one finds
A new perfected design of my beloved superhet in the newest super transceiver!
The many years of perfecting
Image-free designs are now defecting.
Continental CW is sadly dead.
In fact,

CW, SSB, and RTTY may go
The way of the superhet,
Now we have the new digital modes.
However good the DDC (some improperly chant SDR) is
I will always be close to my superhet-design rigs.
My great depression at the DDC invention
Will fade as I tune my 2B, KWM-2A and NC-300.
The general-coverage receiver
Was followed by the ham band only
Only to be replaced by a new general-coverage design.
Many years of fun
Of overloading some of the low IP
Superhet designs
Are now gone as routine entry level rigs
Have better overload
Protection than an IC-701! (at the time the best on the market by 20 dB)
The down conversion was replaced
By up conversion
To be replaced by down conversion.
And yet I hope that
By using my superhet
The Maunder Minimum will be reset
By the superhet's mystical power,
Avoiding a mini Ice Age
To combat carbon dioxide damage.
We find that Heathkit's old design
Of the bandscope is now
As routine a design criterion
As streamlining on a Cadillac headlight.
The common IF design of the transceiver
Which revolutionized design
Is a thing of the past, as there is no IF.
Once upon a contest dreary....

The Carolina Weekend Story

In early November 2015, I was just finishing up the scoring of the rebuilt South Carolina QSO Party (SCQP) earlier that year. With a successful contest behind us, it was good time to take a short break and then regroup in March to make plans for the 2016 SCQP. But near the end of November, I awoke with a radical idea: Move the date of the South Carolina QSO Party from warm September, where it has lived for many years, to chilly February on the Saturday of the North Carolina QSO Party (NCQP) weekend. Holding both Carolina QSO parties back to back on the same weekend would provide for one amazing QSO party experience. I shared these points in my proposal to the SCQP team:

♦ Both QSO parties would share in the promotion and benefits of the contest weekend.

♦ Each QSO party would operate independently, while offering several joint contest weekend awards, such as "Worked Most Carolina Counties."

♦ Mobile operators would have an opportunity to run counties in both states during one weekend, an amazing opportunity for experienced mobile contesters.

♦ During this weekend, the SCQP and the NCQP are the only ones on the air, to better focus the attention of QSO party enthusiasts.

The team shared my enthusiasm and was committed to the new adventure.

On December 3, 2015, I contacted North Carolina QSO Party Chair Marty Young, W4MY, to share my plan. Marty was excited about our date change and encouraged me to continue with the initiative. So, within several weeks, the SCQP team decided to change the event date to February 27, 2016, with the support of the Columbia Amateur Radio Club.

Marty and I decided we should call the event "The Carolina Weekend." Even though the SCQP and NCQP would remain independent contests, we offered several joint awards for those who participated in both contests. Prizes included gift certificates and
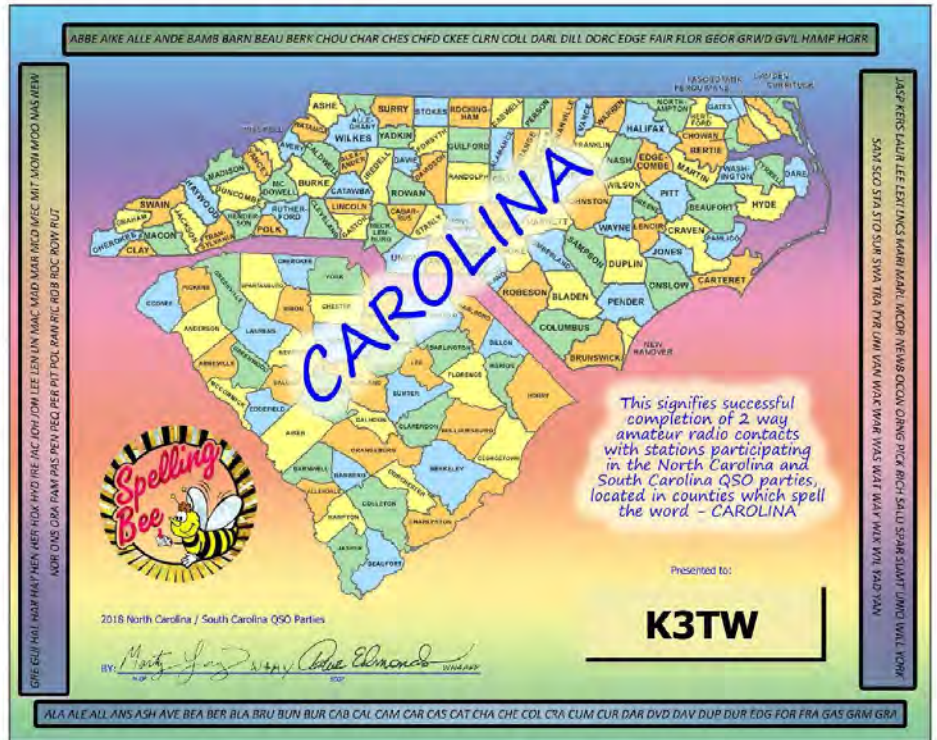
The Carolina Spelling Bee award certificate, designed by Marc Sullivan, W4MPS.
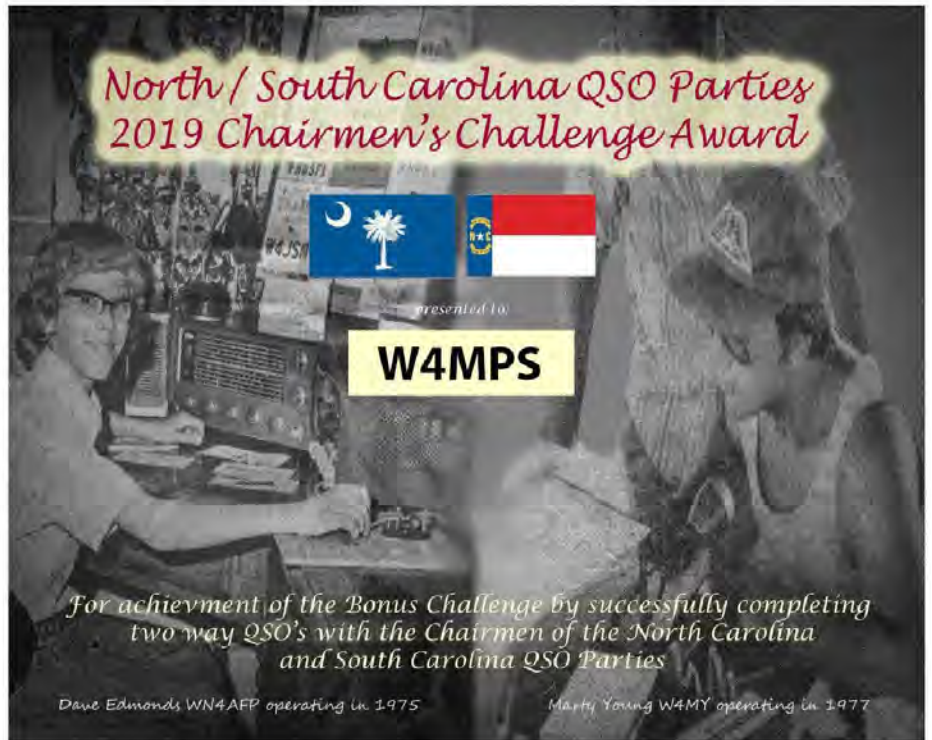
Marc Sullivan, W4MPS, designed our Chairman's Challenge award certificate, which features images of the two chairmen from many years ago.

even a Carolina Barbecue Feast.

The joint weekend offers a unique experience for all in-Carolina stations. On Saturday, South Carolina would be the hunted, and 12 hours later they would become the hunters, with the opposite occurring for North Carolina stations on Sunday.

Since the inaugural event in 2016, we have continued to offer an exciting contesting experience for hundreds of QSO party participants. Our two teams meet once a year to plan for the next contest weekend. As a result, synergy between the two groups began to grow. Both contests have experienced an increase in participation and log submissions as a result of the new schedule.

Each year we have added several special achievement awards for participants in both state contests. One year, we offered the Carolina Spelling Bee award, which could be earned by working stations located counties with names beginning with one of the letters in "Carolina."

One of the most memorable special achievement awards was in 2019 when Marty and I offered the Chairman's Challenge Award. The purpose of this award was to provide a special opportunity for Marty and me to thank all of the participants who have made The Carolina Weekend so successful. To obtain this award, participants had to work WN4AFP (SCQP Chairman) on Saturday and work W4MY (NCQP Chairman) on Sunday. To make this possible, Marty drove to South Carolina on Saturday morning, where he was part of the WN4AFP multiop station at N4IQ. Marty, Bill Chartier, N4IQ, and I ran for 11 hours in the SCQP. After the contest, Marty and I drove 250 miles to the W4MY multiop station in North Carolina at 3 AM on Sunday. Marty, Marc Sullivan, W4MPS, and I operated 10 more hours on Sunday. We made around 1,400 thank-you QSOs. It was a long weekend, but very rewarding for us.

The Carolina Weekend has had a great 5 years. We don't know if there will ever be a Carolina QSO Party down the log, but you can always count on The Carolina Weekend to serve-up a one-of-a-kind QSO party experience.

North Carolina QSO Party Chair Marty Young, W4MY (left), and South Carolina Party Chair Dave Edmonds, WN4AFP, at Marty's multiop station after operating the SCQP, driving 250 miles, and getting very little sleep. [Marc Sullivan, W4MPS, photo]

Stan Zawrotny, K4SBZ / k4sbz.stan@gmail.com

Developing a Contest Incentive Program from Scratch

What do you do when you notice that many members of your contesting club are not contesting? Apparently, the leadership of the Florida Contest Group (FCG) noticed and I must have wondered out loud because, before I knew it, I was chairing a newly formed FCG Contest Incentive Committee. We tapped several of our club's active contesters to evaluate ways of incentivizing FCG members to participate in contesting. The committee to discuss and evaluate various alternatives and make recommendations to the FCG Officers included WO4O, Ric; N9OU, John; KM4HI, Jim; NN4X, Steve; NN7CW, Wolf; K8MR, Jim, and me as chairman.

Structured Methodology

To facilitate sharing ideas, we created a group using Google's **groups.io**. This enabled us to exchange emails automatically shared by all committee members. We could also share data files and post drafts for committee review.

Right away, almost everyone was ready with suggestions for increasing participation. As a retired management consultant, I recommended a four-step structured approach.

1. Define the problem
2. Generate alternative solutions
3. Evaluate and select an alternative
4. Implement and follow up on the solution

Step one of problem-solving is always defining the problem, starting with the critical task of determining that a problem actually exists. Prior to forming our committee, several expressed the opinion that all is as it should be, and there is no problem. So, we drafted a working hypothesis that many of the club's members were not participating in contests.

Data Collection

In an effort to get information from the entire membership, we spent considerable time constructing a survey using Survey Monkey (**surveymonkey.com**). Although the committee was primarily interested in contesting activity, we were able to incorporate the questions into a 41-question general membership profile survey. This made the survey less intimidating than one that simply asked, "Why aren't you contesting more?" The club itself benefited from knowing the membership demographics and understanding where the membership was coming from.

The survey went out to 252 members with 48% responding (half of that would have been considered a good survey response). We gave the membership just 1 month to reply, as anything longer would only drag out the process. Most people answered within the first 2 weeks.

While waiting for the survey results, we worked on a second data source. We downloaded information from **3830scores.com** about the previous year's (2018) contests posted by club members. Using an *Excel* spreadsheet, we massaged that year's claimed activity. This data formed a comparison benchmark for our new program's results.

We chose to use reported activity from **3830scores** rather than use published scores, as it would have been a tremendous task to obtain final results from so many contest sponsors, and even if we could, the data would be in a variety of forms. Because contest sponsors sometimes take up to a year to publish their final results, the data would always be significantly out of date.

The **3830scores** results served to prove the accuracy of the responses from the survey. According to the survey, only 27% of the members claimed that they had contested in the past year. Amazingly, in 2018, only 27% of the members submitted reports to 3830scores. The survey results and 2018 data together validated the hypothesis that the club has a problem with low contest participation by its members.

Problem Statement

This led us to the creation of our problem statement: "FCG would like to explore ways to increase the level of participation over the previous years' levels." The problem statement and any action program based on it had to be consistent with our club's philosophy. We didn't set an amount of increase in
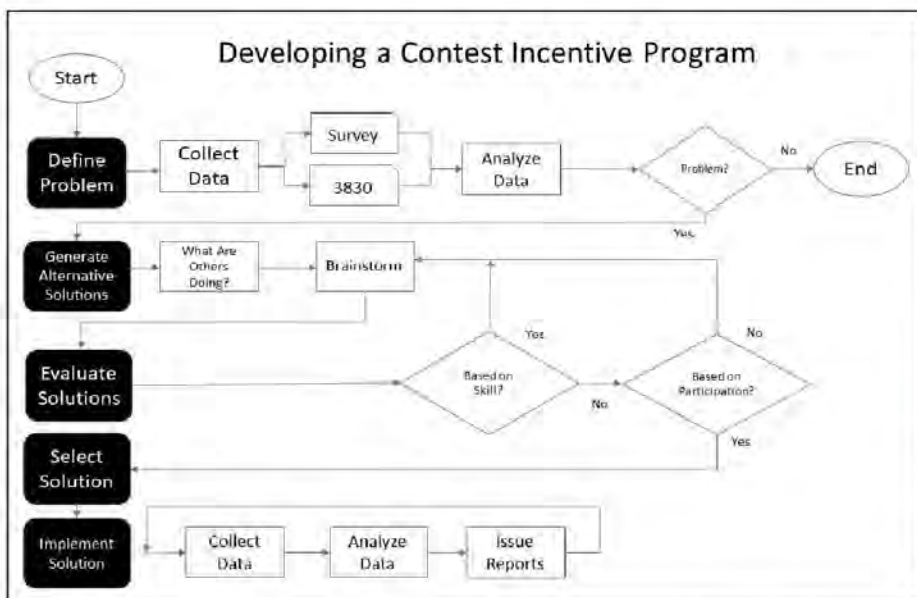

Figure 1 — The overall process used to develop the Frequent Contester Program.

participation because we didn't want to put pressure on members to reach some arbitrary goal. And we didn't want to tell members that they have to get out there and participate in some big contest coming up.

We also wanted to develop something that everyone could benefit from — essentially a non-competitive program. Our goal was to find a way to motivate members to contest more, not to create another contest.

What Are Others Doing?

Not wanting to reinvent the wheel, we looked at what others were doing. I posted a discussion topic on three Facebook groups asking what others were doing to incentivize their members. The most common response was, "Why are they members of a contest group if they don't contest?"

We also looked at what other contest clubs are doing. Although we didn't find a program that we could copy, we found many good ideas. We also identified several things that we did not want to do. From this, we started to build a program.

Program Development

Our first task in developing the motivational program was to determine its duration. Some clubs have a program that keeps cumulative scores year after year. It seemed to us that, because newcomers would always be behind those who had been a member longer, cumulative scores would not be as motivational for newcomers. It also would not be very motivational for anyone who had already obtained a higher ranking, because with very little effort they would always remain at or near the top.

We decided that an annual program with everyone starting the new year together would provide new incentives every year. It would also enable making annual awards.

Which Contests?

In looking at other clubs' programs, we saw a huge difference in which contests to include. Several clubs included only a few (4 – 5) major contests. Some have a select group of interest. We agreed that if the goal is to incentivize members to contest a lot, there should be many approved contests nearly every weekend, not just a few scattered through the year.

Turning to our survey, we saw that the contests favored by our members included the major contests sponsored by ARRL, *CQ*, and WWROF, the DX contests sponsored by foreign clubs, and the state QSO parties. Using WA7BNM's Contest Calendar (**www. contestcalendar.com**), we generated a list of around 150 contests. To the dismay of members who enjoy them, contests that did not make our list included short contests (4 hours or shorter), weekly contests, practice contests, club member contests, and non-worldwide contests. We also did not include ARRL Field Day, because most hams operate with their local clubs, and, technically, it's an exercise, not a contest.

We established contest weights to encourage more participation in certain contests while giving credit for all others. These weights are used as multipliers in the scoring. The major contests would all have a weight of 10, while the minor DX contests would have a weight of 5. To encourage participation, state QSO parties have a weight of 7, which is more than the DX contests, but less than the majors. As a bonus, operating in our own Florida QSO Party would receive a weight of 20.

Possible Metrics

One our most important decisions was the choice of metrics of achievement. How do you measure participation? Many of the contest programs by other clubs use contest scores as a metric. It seemed to us that people with high scores are already motivated and are already rewarded by the individual contest sponsors. Plus, contest scores are more of a measure of skill and quality of the station than of participation. Throughout this project we had to keep reminding ourselves that our intent was to reward participation, not operating skill.

We considered using the number of contests as a metric but discarded it. Someone could "game the system" by operating for a few minutes in each contest and getting credit for just showing up. And this wouldn't be fair to those participants who put in long hours.

One metric that doesn't favor the Big Guns over Little Pistols is operating time, which is the same for everyone regardless of station or skill. Increased operating hours are a direct measure of participation.

Using the 2018 data, we tried several scoring prototypes. We looked for metrics that accurately reflected participation and multipliers that provided a uniform spread of final results. After a few tries, we settled on using operating time and contest weights as metrics.

Scoring

With our metrics defined, we were able to develop a simple scoring algorithm. The score that an operator receives for participation in a contest is the number of hours operated multiplied by the weight of the contest. For example, operating 8 hours in a 10-point contest would result in 80 contest points. The sum of contest points for *all* contests provides the member's accumulated points.

Data Source

We chose to use 3830scores for input, rather than to develop our own data collection process. Most contesters already submit their results to 3830scores after they send their logs to contest sponsors. Having members input contest results to still another source would be counterproductive.

Collecting the data from 3830scores is quite simple via the 3830 has an Activity Tracker tab that lists all contest reports associated with a club or group. These lists can be copied and pasted into an *Excel* spreadsheet for manipulation. However, both the Op Time and the Club Name fields are optional in a basic 3830scores entry. We had to emphasize to our members that if they wanted to participate in our Frequent Contester Program, they had to include both the Op Time and the Club Name for every contest. Failure to enter Op Time defaults to 1 hour.

The requirement to name the club in order to be included in the program presents a couple of problems. One is when someone is participating in a multiop station with members of another club. Another is when a club member lives part time in two different areas with two different clubs, a common occurrence with our Florida "snow birds." Bruce, WA7BNM, owner of 3830scores, came to the rescue with a feature that enables clubs to upload a list of club members, so that contest activity is automatically associated with the club based on the call sign. The list must be updated regularly to allow for new members. To ensure all possible

credit is received, participants are still encouraged to enter their club name for each contest.

Some manual editing is needed to reconcile such activities as multioperator and use of special call signs, in order that hours are credited to the correct operator. Multiop hours are divided evenly among the number of operators. Operators using special call signs receive credit to their home call signs, if they list themselves as the operator.

We also need to delete records for non-approved contests. Contest weights were added for each contest. Columns were added that calculated scores by multiplying Op Hours by the contest weight.

Recognition

Using the history from 2018 activities as a prototype, we established plateaus of recognition resembling a frequent flyer program (see Table 1). The achievement levels provide targets that encourage members to attain the next level of recognition.

The first level, Bronze, requires 100 or more points and can be reached with minimal effort — just one or two contests. Silver, requiring more than 500 points, represents occasional contesting activity with a small amount time in the chair. A frequent contester will reach the Gold level of 1,000 points with a fair amount operating time in a number of contests. Some serious contesters may reach the Platinum level at 2,000 points. Only a few very active contesters will attain the highest plateau. The Diamond level requires more than 3,000 points.

Originally, members were not ranked — only awarded achievement levels. But contesters are competitive and have requested a listing by points in addition to the status report in call sign order.

More Motivation

We wanted to provide some kind of award for each level besides just bragging rights. Plaques immediately came

Table 1 – "Frequent Flyer" plateaus.

Level	Points Needed	Reward
Bronze	100 points	Certificate
Silver	500 points	1 ticket
Gold	1,000 points	2 tickets
Platinum	2,000 points	3 tickets
Diamond	3,000 points	4 tickets

to mind, but they are expensive. Our club leadership agreed that we could award extra door prize tickets at our annual banquet. The drawing is a popular activity at the annual event. There are usually over 50 prizes ranging in value from $50 to the grand prize of a new transceiver. Members at the Silver level receive one extra ticket for the drawing. Gold level receives two tickets, Platinum receives three tickets, and the few that reach the Diamond plateau receive four extra tickets for their accomplishment.

Reporting

Frequent reporting of status is essential. These reports serve not only to keep participants informed, but also serve as motivators and reminders of the program's existence.

The FCP produces a two-part monthly report. Part 1 provides a summary of the approved contests for the coming months with a brief discussion of each. A monthly schedule is included with dates, start times and modes. This report allows participants to plan their next month's activities.

Part 2 is a report of members' achievements in the past month and year-to-date. Status listings are published in call sign order and ranked by score. *Excel* pivot tables make it a snap to create numerous statistics about the group's achievements: sums of Op Hours, number of contests entered, contests with the most hours or entries. The reports that can be created are only limited by the knowledge of *Excel* and the developer's imagination. A complete listing of all participants' status is attached and put on the club's website at **floridacontestgroup.org**.

Frank, K4EJ, sends out a weekly email report of the contests coming up during the next week. Contests that are approved by the FCP are highlighted. This keeps the program on the minds of members and helps with their short-term planning.

Rules

All of the decisions made to this point were summarized and formalized by the rules. Included in the rules are the purpose of the program, eligible contests, scoring, exceptions, plateaus, and awards (**floridacontestgroup.org/frequent-contester-program**)

Does It Work?

As expected, the big question in ev-

Table 2 – Activity Increase from 2018 to 2019.

Members participating	293%
Contests with FCG participation	92%
Logs submitted	189%
Total operating hours	134%

eryone's mind after the introduction of the program was, "Does it work? Will it improve the amount of participation of our club members in contests?" Several months of 2019 had already passed when the development of the program was completed. However, we didn't want to wait until the following January to start. We wanted to make an impact as soon as possible. Despite a couple of vacations and other distractions, we announced the FCG Frequent Contester Program on May 22. Even though the program was being introduced midyear, awards for 2019 were based on the entire year.

FCG officers and the committee members eagerly awaited the first report to see if there was any increase in contesting activity in June. We all rejoiced when June 2019 activity greatly surpassed June of the previous year.

More important, we started to see new call signs appear. By July 1, after only 1 month, the percentage of members participating in contests rose to 33%, already exceeding the 27 % who participated in all 12 months of 2018. Every month the percent of participation climbed until it reached 79% for the year, almost three times the number of participating members in 2018 (see Table 2 for percentage changes in 2019 over the previous year).

The statistics are staggering and almost speak for themselves, but unsolicited comments from members tell the story best.

This program adds a new dimension and fun to contesting. — W3IK

I can say the program incentivized me to try some new contests I hadn't tried before. — KM4HI

Since this program had been implemented, I am participating in more contests and spending more time in the operating chair. — KE1F

I may be biased, but I would say that a program that almost triples the number of members participating, encourages existing contesters to try new contests, and is fun, is a success.

John Miller, K6MM / k6mm@arrl.net

NCJ Profiles: Ken Grimm, K4XL

In his youth, Ken Grimm loved to run track, especially the mile. He always thoroughly enjoyed the race, even though he rarely won. As in track, the fun in contesting for Ken has always been in the race itself, not necessarily how he places. Here's how Ken put the "excel" in K4XL.

I grew up on a ranch in central Texas, and as far as I can determine, I became the first amateur radio licensee in Bosque county. As an only child I had to amuse myself once chores were done. I first became interested in radio in about 1952, when my science teacher suggested that I build a crystal set. This was quickly followed by one- and two-tube radio kits.

My parents encouraged my interest in radio and bought me my first shortwave receiver, a Hallicrafters S-19R. I enjoyed listening to the big international broadcasters of the day — Radio Australia with its laughing kookaburra interval signal as well as the powerful Voice of the Andes, HCJB. I became an active member of the Newark News Radio Club. I also enjoyed listening to AM contacts on 20 meters between amateurs in other countries. Fascinated, I was determined to join them one day.

I became an associate member of ARRL in 1954. I also purchased a license manual and a code course on 78-RPM phonograph records. During those high school years, however, I had no Elmer, and the phonograph records were not all that helpful. Even the Hallicrafters SX-96 that I saved for and bought with my earnings as a grocery delivery boy didn't make CW any easier.

It wasn't until early 1957 and my freshman year at Baylor University that one of my college roommates, Guy Lewis, K5DCA (now N2GL), encouraged me to take the Novice exam. Guy helped me practice on a homebrew code practice oscillator until I was comfortable at a speed a little better than the required 5 WPM. After a few hours study with the ARRL license manual, I easily passed the Novice exam and became KN5KBH.

College Days

After I received my Novice, I joined the Baylor University Amateur Radio Club. Not long after, the Dallas area was hit by a tornado, and Guy suggested loading up some gear and heading there to see if we could help with communication. And off we went, with Guy's DX-100 transmitter and my SX-96 receiver plus mic, key, antenna wire, coax, and all the necessary tools, in the trunk of my elderly Chevy.

On the outskirts of Dallas, the state police escorted us to the Red Cross center, where we were gratefully received and quickly put to work. Guy and the others with General class tickets installed the equipment and began handling emergency traffic, leaving me, as the lone Novice, with nothing to do.

When we got reports of another tornado, I volunteered to go to the roof and watch for the twister, which was reportedly heading our way. I found myself in

Ken at the KWTX-TV audio board

Guy, K5CDA, and Ken with their gear at Baylor.

W5KLB on the right with one of the other engineers.

a driving rain, however, and could barely see my hand in front of my face, so I did spot a tornado, I'd never be able to get off the roof in time to warn anyone below. Fortunately, the twister picked up and disappeared into the clouds.

In a letter to Guy, the Dallas Red Cross thanked us for our help. I knew then that amateur radio was definitely going to be a part of my life and that I had to get busy and get my General.

Time to Upgrade

Back then, the Novice was only valid for a year, so I practiced every day to get my CW speed up to the 13 WPM required for the General. Seven months after I received my Novice, I headed to Dallas to take the General exam. While I can't remember much else, I do recall having to draw the schematic diagrams of a Colpitts oscillator and a Class C amplifier. The code test turned out not to be a problem. I left the building not knowing if I'd passed, but a few weeks later, my General arrived, and I was K5KBH. I immediately grabbed a microphone and had my first phone QSO on the Heathkit DX-100 I had just finished putting together.

My Elmers, My Heroes

While still at Baylor, I was able to leverage my experience running an audio board into a job as an audio engineer at KWTX-TV. The video engineer sitting next to me turned out to be W5KLB, Bob Tidwell. He'd been Liberty Ships radio operator during World War II and was an avid CW op. After patiently listening to my complaints about the difficulty of CW and my praise for AM as being much more fun, he invited me to see his shack, where he had a Hallicrafters SX-71 receiver and a WRL Globe Champion transmitter.

Bob tuned into the fast code practice run on W1AW, and when the 35 WPM run started, he began typing on his old Underwood while telling me about the R5er he'd rigged up from an old command set to make his SX-71 more selective. *Typing and talking! His* copy was perfect. Bob encouraged me to keep practicing my code and not spend too much time on phone — 5 minutes on CW for every 10 on phone. Soon the ratio was reversed.

When incentive licensing came along, I went for both Advanced and Amateur Extra, easily passing the 20 WPM code requirement. Today, my comfort zone is

K4XL operating 4U1ITU during 4UØITU event.

around 30 WPM, and I mostly operate CW.

All-Mode Fun

My earliest interest in radio wasn't contesting, but chasing DX. The early-to-mid 1960s were the era of sunspot Cycle 19, at that point, the best ever. I quickly made DXCC and developed some very good friendships with VK and ZL ops in the process, since the path between Texas and the South Pacific was exceptional.

ZL1AMO and I held weekly chats on 15 meters — occasionally on phone, but usually on CW. This was before Ron's DXpedition phase and his rise to DX celebrity. The other ZL that I talked with on a regular basis was Alex, ZL2AHZ. Ron and Alex both encouraged me to enter the VK/ZL Contest. Since I was on a first name basis with so many of the VKs and ZLs, it led to some good scores. That was my first foray into contesting and I won first place in W5 and second place in North America several times in the early 1960s.

I also entered the ARRL International DX Contest on phone and on CW but never came close to the Big Guns' scores. Still, I managed to earn some certificates documenting my accomplishments. My rig at this point was a Johnson Viking Ranger and the Hallicrafters SX-96. The antennas were three-element Hy-Gain monobanders for 10 and 15, a homebrew quad for 20, a pair of Bobtail curtains for 40, and a dipole for 80.

Contesting and DXing were not my only interests. I was fascinated with all

aspects of the hobby and did lengthy stints handling traffic and became proficient to the point where I ran the ARRL Regional Net 5 for a while. During my traffic-handling period, I qualified for the 35 WPM Code Proficiency Certificate. I had struggled to learn the code but came to love it more than any other mode. I've always wanted to try the "new thing," which meant satellites, 2-meter FM, RTTY, FAX, and, later, all the new digital modes that began to appear after PSK31. I even played a while with SSTV.

Code is King

After upgrading to a Hammarlund HQ-170, which was better for SSB, I built a Heathkit SB-10 SSB generator kit and modified the Ranger's 6146 to class AB1. With only a tiny bit too much drive it splattered dramatically! I quickly decided that CW was a better mode for me and went into an automatic keyer-building spree. I started with a home brew W9TO using 12AU7s and then when transistors came along I built a couple of keyers using them. Before long, automatic keying became a feature of rigs and keyers are now curiosities. A Bencher BY-1 gave way to a MagnaKeyer by AE8J — so far the best paddle I've ever used.

Career, Marriage, and Travel

In the mid- and late-1960s I worked in DC for a congressman for a couple of years with no time for ham radio. Then came grad school at the University of Tennessee for a PhD in political science. While living in Knoxville, I married a beautiful English lass, who was my helpmate for more than 50 years. While

Anne was never interested in radio, she tolerated my hobby.

Over the years, I accumulated some decent gear that included a Collins S-Line and a Viking Thunderbolt amp — a big step up from my 65 W Viking Ranger. Antenna wise, I had only a Hy-Gain 14AVQ trap vertical for 40 – 10 meters, and my studies severely limited my operating time.

After finishing my PhD, I became a professor in the Department of Government at Sweet Briar College in Virginia. Firmly settled in W4-Land, I gave up K5KBH in favor of K4JGI, which, under the vanity call sign program, gave way to K4XL.

My academic research frequently took me to Europe, and I always managed to have a week or so in Geneva where I was a regular at 4U1ITU. I was lucky enough to be there for various celebrations and to operate as 4U7ITU and 4UØITU. I enjoyed working the pileups and got a lot of good training for the future. This was when logging was still done by hand. I spent a sabbatical in England, where I was G5BKN and also operated as GB3NRC at the Northampton Club site. While I did only a little contesting during that time, I gained added perspective of what it is like on the other side of the pond.

Boat Anchor Passion

Back in the States, I had the use of a well-equipped shop at Sweet Briar where I could build amplifiers, and managed to put one together that could destroy four 811As in less than 30 seconds. From there, I progressed to 813s, which were much easier to tame, and finally to a 3-1000Z that served me well for several years.

I've still got my original S-19R and Viking Ranger. A fancier SX-100 replaced my SX-96. All are in good condition, and I occasionally put them on the air. I loved the old gear and collected a few pieces, but I found it wasn't all that easy to get documentation to help with restoration. As I found or bought manuals, I would scan them and put the files on my office computer. I happily shared the few manuals I had, and other folks repaid the favor by sending me copies of manuals they had available. This was the start of another aspect of the hobby for me that grew into a major project.

Soon, my office computer couldn't handle the FTP traffic of folks download-

Ken and his station.

ing manuals, and the collection was transferred to the college mainframe, where it became the Boat Anchor Manual Archive (BAMA). For several years, I devoted nearly all of my spare time to managing the website, but eventually realized that I wasn't having any "radio fun." I was fortunate to find a new home for the BAMA site, and the collection lives on at **bama.edebris.com**.

Club Connections

While all of this was going on, I became a member of the Lynchburg Amateur Radio Club where I met George Dubovsky, N4UA, an avid contester who has built a great contest station. He was one of the first to encourage me to get back into contesting. When he had to cancel a planned and prepaid trip to the 2014 Dayton Hamvention and Contest University, George generously offered the lot to me. I still sometimes think it was his way of sinking the hook and getting me really committed to contesting. Whether or not that was his plan, it worked. After listening to all the great presentations at Contest University, I couldn't wait to get home and try out the newly introduced *N1MM Logger+* in a contest. Once I started actively contesting, Mark Silanhik, N2QT, convinced me to join the Potomac Valley Radio Club.

Joining the PVRC gave me the opportunity to associate with and learn from others who enjoy and have set records in contesting. I got to rub shoulders with Sam Leslie, W4PK, who is an RTTY contesting expert. Mark still holds the QRP world record in the CQ

World Wide CW. I also met Bill Perkins, KC4D, of CWops and its CW Academy, who is also building a great contesting station, and many others who enjoy contesting. This provided me with the opportunity to see just what I could do as I entered my 75th year. I discovered that my CW skills were still there, but that I also enjoyed phone contesting and even RTTY a bit.

I became very centered on the PVRC and its 5 Million award program. This program, based on points, rewarded

K4XL's single tower with wire antennas.

Digital Contesting

NCJ RTTY Sprint Participation

Analogous to the North American Sprint CW sponsored by *NCJ*, an RTTY Sprint is held twice a year for 4 hours on a Saturday evening, North American time. The accompanying graph depicts the history of RTTY Sprint activity since it began in March 2000.

During the peak participation years, 2009 – 2014, enough stations were active that contact totals were limited only by operator skill. Since 2014, lower activity has reduced contact totals, and this has become the primary complaint about the event. One reason behind reduced activity is that many RTTY operators dislike the Sprint format. (This is also the case for the CW Sprint.)

This review of Sprint basics and suggestions on how to operate may encourage bystanders to give it a try. The reward is not only a sense of accomplishment, but also improving operating skill while having a lot of fun. Also, the 4-hour time period doesn't take a huge chunk out of your weekend.

The NCCC (Northern California Contest Club) runs a 30-minute RTTY Sprint every Thursday evening in North America. This affords everyone the opportunity to practice this unique contest format and maintain their expertise between the semi-annual RTTY Sprints. For CW enthusiasts, the NCCC CW Sprint follows 15 minutes later each Thursday evening. (See **ncccsprint. com** for details on both.)

The ABCs of (RTTY) Sprinting

Objectively, sprints embody many key elements of skillful radio communication. The fact that sprints can be intimidating is due to the number of skills needed to be successful, or at least to enjoy the activity.

The primary format detail of the sprint that confounds operators is the rule of only one contact solicited by the CQ-ing or running station being allowed on a frequency. After that contact, the running station is required to move to another frequency. So, a responding station can answer a CQ then stay on that same frequency for one more contact, while the initial running station

moves to another frequency. After that second contact, the station that inherited the frequency also must move, after having become the new running station on that frequency. Some call this "working a couplet," because two contacts can be logged on that one frequency before moving to another frequency either to call another running station or to call CQ.

On one hand, this format forces stations to be skillful at constantly and quickly tuning to another frequency and determining the state of the contact there. On the other hand, this can be very frustrating for some operators, especially those inexperienced at sprinting.

A secondary detail that trips up people is the unofficial protocol of the exchange elements being sent in a different order for a running station as opposed to an answering station:

♦ Run: WØYK N5KO 23 TREY CA
♦ Answer: N5KO 19 ED CA WØYK

This protocol is *not* a rule, but rather a long-standing practice to help other

stations just tuning onto a frequency to immediately determine which station will be remaining on the frequency for one more contact (WØYK), and which station will be moving to another frequency (N5KO). If the station remaining on frequency is a dupe, you can immediately look for another station without waiting for the contact to end.

Another aspect of the sprint format is that when several stations answer a CQ, the running station only works one of them. Unlike other contests, stations not breaking the pile-up can't wait around, because the running station will be moving to another frequency. If the running station's QSO partner is also a non-dupe station, then an unworked station may choose to wait and call that station instead. Little Pistols can quickly become disenchanted with constantly being the unworked station, however. In sprint jargon, the worked station "wins the jump ball."

Ideally, one would always work couplets and always win the jump ball when tuning onto a new frequency and
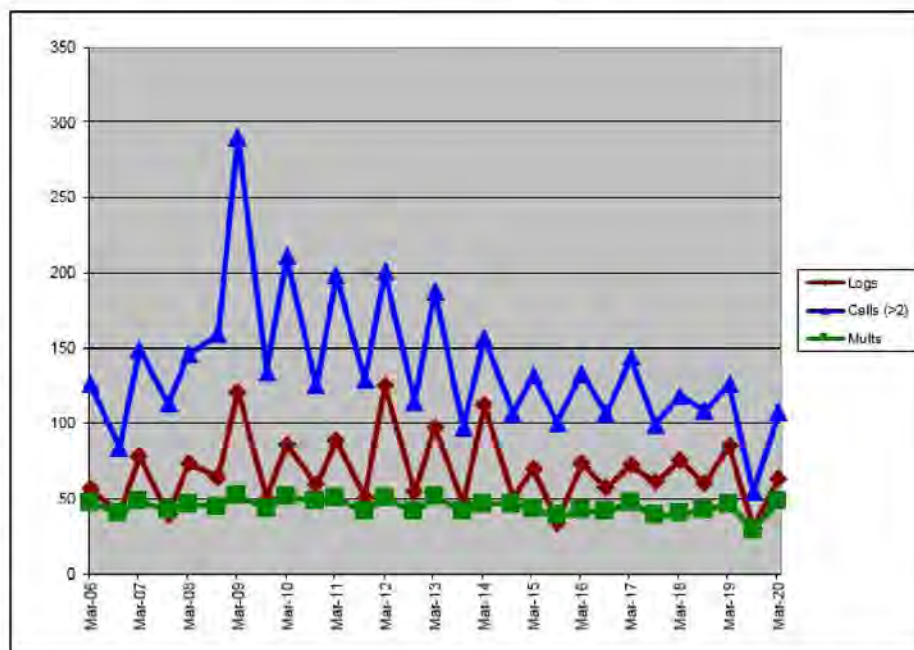
RTTY Sprint History. Shown are data for submitted logs, unique call signs involved in at least three contacts, and available multipliers. The RTTY Sprint scored duplicate contacts (with at least three intervening QSOs) through the March 2008 event, shown by dotted lines. Not all data is available prior to March 2006.

calling a new station. Of course, this doesn't always happen, even for the top sprint competitors. The reality is that one must employ another operating skill of sensing how long to seek a workable couplet as opposed to just finding a clear frequency and CQing for a single contact before having to move to another frequency.

Finally, there is the decision of whether to call in the midst of the highest activity or to move away a bit to avoid QRM. All of these decisions must be made dynamically depending on the situation at each moment. This is very different than simply staying on one frequency and CQing, or tuning methodically through the band and calling new stations who are CQing (i.e., search and pounce).

Alternative (RTTY) Sprinting Techniques

Thinking outside the sprint "box" can greatly relieve anxiety from failing to smoothly work couplets. The first thing to recognize is that couplets are not required. Although they may be a fast and efficient means to log lots of contacts, they are often not achievable, leading to slow and inefficient operating when they don't work out.

One alternative is to forgo couplets and only CQ, moving to a new frequency after each contact. This not only eliminates the anxiety and frustration of losing jump balls, but allows the operator to concentrate on mastering the art of tuning to a clear frequency before the next contact. NA Sprint rules require moving at least 5 kHz before soliciting a new contact by calling CQ. To facilitate this, some operators set their two VFOs about 10 kHz apart so they can satisfy the QSY rule with a simple button press. From there, they can adjust the VFO to a clear frequency.

Another hint is to operate on the fringes of the main activity. That is, find clear frequencies above and below the fray. A spectrum display can be invaluable in this regard.

A good way to practice jump ball skill is to wait until a band is worked out, so that there's less competition in answering a CQ. In fact, serious sprinters are begging for contacts on a worked-out band and readily welcome any call, especially from a newcomer. After completing a jump ball contact, another station may call you for your "CQ QSO" before you have to move again. If not, then just call CQ until someone answers.

When any of these techniques fails to produce a contact in a short while, try a different tactic. If no one is answering your CQ, try a jump ball. Again, the spectrum display is very helpful, and you will soon be able to quickly zero-beat a running station. If you are too late (i.e., someone is already calling or the contact is in mid-stream), just wait until the contact finishes and call the station that is remaining on frequency.

If activity is too overwhelming, move to a less-active band, where operating will seem saner. Typically, Sprint operation begins on 20 meters, moves to 40, and then to 80, as activity wanes on a given band. SO2R stations will be on 20/40, moving to 40/80 in the latter part of the 4-hour event. Operators wanting to avoid high activity while building their skills may chose the opposite pattern by starting on 40 or 80 before going to 20 after the initial jump ball pileups die down.

If the pace is overwhelming, just copy a few contact cycles on a frequency before calling the remaining station. Use your logging software to click on the name and location from the prior contact, so that all you need to do is click on the number for your contact. Better yet, type in the prior-number-plus-one to minimize the actions needed during your contact. Make sure, however, that the number and exchange you receive actually match what you have entered into your logger window. Serial numbers from an SO2R station may increment by more than one, because they made an interleaved contact on another band.

Summary

The NA Sprint offers skill development and fun for any level and interest of operating. Winning jump balls and working couplets are not required. Take these at your own pace. Deploy counterintuitive techniques such as tuning to the outside edges of activity and use the less-active bands during the sprint period.

Join the weekly NS (NCCC Sprint) sessions to build and maintain operating expertise. This will benefit all contest operating, not just sprints, as well as DXing and operating in general.

Try to fit the two semi-annual *NCJ* RTTY Sprints into your calendar. They will be rewarding and fun for you, and your participation will make it more rewarding and fun for all other participants as well.

Don Daso, K4ZA / k4za@juno.com

Workshop Chronicles

Hams don't use lubricants often, so questions often arise when they do:

"Should I grease this bearing, oil it, or not at all?"

"What's the difference between greasing and oiling?"

"Can't I use one lubricant for everything?"

When folks ask about one lubricant for everything, I always indicate that it's possible, but only for a finite amount of time, and with varying results. Selecting lubricants means you must understand something about the properties of bearings, or bearing surfaces, so let's begin there.

Lubricants are designed to:

♦ Minimize friction at the points of contact in bearings.

♦ Protect the polished bearing surfaces from becoming corroded.

♦ Dissipate heat.

♦ Remove or prevent foreign particles from getting into a bearing.

Oils and Greases

There are two basic types of lubricants — oil and grease. Each has advantages and limitations. Being liquid, oil can lubricate all surfaces and dissipate heat more readily. It retains its characteristics over a broad range of temperatures, making it ideal for high-speed and high-temperature jobs. Oil levels can usually be carefully controlled and monitored.

Being thicker, grease can seal a bearing better than oil, simplifying seal design. It can easily be confined inside a bearing, allowing you to "pre-lube" fittings, for instance, as it clings to surfaces better than oil. As such, it lasts longer than oil.

Since hams are more likely to use grease, let's look at that lubricant more closely. Grease consists of three elements — a base oil, thickeners, and additives. About 95% of grease is either mineral, synthetic, or bio-degradable oil. Thickeners are what give grease its density—its ability to stay in place—and also play a role in lubrication. The thickener allows the oil to "come to the surface" as needed.

Lithium is the most common thickener. It's popular because it's very water resistant and holds up well over a broad temperature range. Aluminum-complex greases are also common because of their thixotropic properties, meaning they thin out under load then thicken or harden again when not being worked. They also pump readily, making them popular for hand use. (*Lubriplate* is a typical commercial example.)

Additives help address specific problems in lubrication. Molybdenum disulfide (referred to as "moly") is the most common. Graphite and zinc are also commonly used. Tackifiers make grease sticky, meaning the grease will stay in place. Rust-inhibitors do exactly that.

Compatibility can be an issue in using lubricants, as not all of them are compatible with one another. Polyurea-thickened greases are incompatible with lithium or aluminum-thickened greases, for example. Some synthetic oils do not mix well with mineral oils. These are usually not critical issues, but something you should be aware of. For example, if you notice your grease getting harder or softer than you expect it to be, you may have a compatibility issue. Simply putting enough of the new, different grease into the bearing, effectively flushing out the old, is usually the solution.

Even the best grease or lubricant won't do you any good if it's incorrectly applied. Some applications require more grease than others. You can over-grease anti-friction bearings, causing them to run hot. Extreme environments also require your attention. Any water or dirt in or on bearing surfaces can destroy the effectiveness of all your lubricating efforts.

Tower Thrust Bearings

Tower bearings are always a hot topic: Should I grease my thrust bearing or not? The typical Rohn bearing is designed to run dry. The speed is so slow that little heat will be generated. However, let's consider some basic physics. When a ball in such a bearing is motionless, the load is distributed symmetrically on the ball and the race. When a tangential load is applied, causing the ball to roll, the material in the race will "bulge" in front of the ball, while "flattening out" behind it. Since not enough heat is generated from sliding friction in a typical thrust bearing, metal pickup or welding does not occur. But the aluminum race can show evidence of wear. Since it's a softer metal than the ball bearings, it will deform first, often to the point of seizure. Lubrication will not solve that problem.

Recommended Lubricants

What lubricants or chemicals are in *my* toolbox? NoAlOx/Penetrox or Jet-Lube SS-30l are for use with dissimilar metals. Lubriplate is for tool use. White lithium grease is for tower assembly and stainless connectors. WD-40 is for water displacement, which is exactly what the name means. The old household standby is formula #40 from an extensive series of tests. PB Blaster works for loosening rusted or frozen parts. STUF is for sealing coax connectors.

Typical lubricants used for amateur radio applications.

The Little Pistol Pages

*Guest columnist for this issue is Ken Lehman, AB1J (**ktfrog007@aol.com**).*

Niche Contesting for Small-Signal Stations

Many small-signal stations contest along with the bigger stations for fun or award chasing. They are often low power, antenna poor, and limited by available space or antenna restrictions. I fall into this category myself, but wanted to become more competitive, so I delved into contest rules, especially those for the CQ World Wide and CQ WPX events, and came up with the concept of "niche contesting." This is the opposite of big gun, all-band, high-power, SO2R, or multioperator contesting. Instead, it emphasizes small-scale operation: 100 W or less, single-band operation, simple antennas, and limited operating hours.

The CQ contests, in particular, offer a wealth of niche opportunities. I tried some and was surprised to find I could be competitive, even setting regional records and occasionally placing at or near the top nationally. I'd like to encourage others to try niche contesting.

Do Your Research

Settling on a niche is the top priority. The idea is to find a small pond where you can be a bigger fish, and match your station to the contest's goals. For any contest of interest, look at past records and recent yearly results to find underutilized niches. You may even find categories no one has ever entered.

Match niches with your station and personal capabilities. Generally, everyone-works-everyone contests are better. In the CQ WW, you can't work your own country for points, but in the CQ WPX you can work anyone. Do the latter, if DX is a challenge for your antennas. Few small-signal stations would tackle 40M in the CQWW-SSB, but it's a reasonable, if challenging choice in the CQWPX-SSB.

Station considerations

Antennas matter the most, so improve them if possible. Which bands are your best? If you can get away with putting up a better antenna for the duration of the contest, do it. I've used temporary antennas that I put up only after dark.

Get the best equipment you can, but even simple gear can be effective. Acquaint yourself with all the features of your transceiver so you can operate it under demanding conditions.

A simple station doesn't mean inferior contest and logging software. Use a contest logger like the N1MM Logger+ (complicated) or the N3FJP suite (simpler). Practice before the contest and learn all their features. Use rig control if you can. If the contest has practice sessions, do them.

Bands

Pick bands based on the sunspot cycle, with the propagation that suits you. Are you willing to stay up all night on 40 or 80? Do you want to fight the powerhouse stations on 20? Ten isn't very productive at this time. Maybe 15?

Single band with your best antenna is usually the way to go. It's difficult for a small station to be competitive on one band, let alone multiple ones. Some complain that a single band can get slow and boring. True, but the single band goal is to dig in deeply and pretty much clean it out. That's a good score in the making. If things get too slow, it's time to eat, nap, or sleep. If you can, when things get slow, try SO2V, where you can do S&P and run at the same time. It just needs a transceiver with a sub-receiver, and some practice.

If you want to operate all bands, do your homework. Examine old logs. Multi-band introduces a lot more complexity. As the contest wears on, change bands more frequently. Definitely consider an overlay, like Classic in the CQ WW and CQ WPX or TB-WIRES in CQ WPX.

Some contests, such as the BARTG-HF, offer 6-hour categories, which make sense as all-band operations. Time limits and bands both need to be taken into account, a tricky combination.

A day before the contest, I cycle the *HamCAP* propagation prediction utility through 24 hours, to see what I'm likely to encounter on my bands of interest.

Mode

For the most part, I've stuck to the more efficient modes: CW, RTTY and FTx. It's often difficult to compete on SSB. It helps to be able to copy contest CW in the 30 – 40 WPM range. The CWops Wednesday contests are a good way to get live practice. Some contests allow code readers, some don't. Check the rules. RTTY is a lot

Ken, AB1J, at his station. [Courtesy of Ken Lehman, AB1J]

Neil Rapp, WB9VPG / neil@neilrapp.com

Next-Gen Contesters

Bradley University's participation in the North American Collegiate Championship

The North American Collegiate Championship (NACC), **www.w9smc.com/nacc**, is now in its third year, based on the North American QSO Party January SSB and February RTTY contests (RTTY was included this year for the second time). These events should pique greater interest as youth participation in amateur radio continues to grow. The NACC includes live, online scoring to create a more competitive atmosphere among participating schools. One of these is Bradley University Amateur Radio Club (BUARC) in Peoria, Illinois. I had a chance to speak with W9JWC president Connor Dickey, KD9LSV, about the club's participation in the RTTY round of the NACC.

Seventy-two hours before the event, the club received a new rack to house most of its equipment at the HF desk. Reorganizing the gear was key to having a less-cluttered and more-efficient operating position. Preparation for the competition at hand was well underway.

The club kicked things off at the very beginning of the contest period, Saturday at 1800 UTC. Several visitors stopped by the club room to see what was going on during the radio event. In the middle of the NACC, however, the Bradley men's basketball team (one of my former students is an assistant coach) was playing Loyola on Senior Night. Keeping an eye on both the game and the RTTY contest proved to keep up the level of enthusiasm, although Bradley lost the basketball game by a single point!

As the contest clock reached 0300 UTC on Sunday, Connor was getting tired and needed a spark of energy. He brought a reserve player in off the bench for the final hours of the contest — Peter Handler, KD9LPV. With that additional boost and a solid run on 80 meters toward the end of the contest, W9JWC ended up claiming a new record score of more than 50,000 points. Unfortunately, the log initially was submitted in the single-operator category, resulting in a 30% score reduction due to the 10-hour operating time limit for more than one op. Still, it was a great effort.

Throughout the event, the competitors were constantly watching the online scoreboard for other schools. They also communicated with Bruce Yang, KN8U, at the Georgia Tech Amateur Radio Club (W4AQL), to drum up some more competition. Georgia Tech won the inaugural SSB edition of the NACC. One challenge has been to find more colleges and universities on the air for the contest. While many colleges operate the School Club Roundup and a few operate ARRL November Sweepstakes, the NACC is still lacking in the number of participating schools. Connor feels that contesting as a college club allows for exposure of the college's name in the amateur radio community. He would like to see greater participation going forward, and so would I.

The addition of an equipment rack frees up much-needed space in the W9JWC shack. [Connor Dickey, KD9LSV, photo]

Bradley University electrical engineering major and amateur radio club president Connor Dickey, KD9LSV, during the North American Collegiate Championship RTTY 2020. Connor is a member of the class of '22. [Peter Handler, KD9LPV, photo]

Ned Stearns, AA7A / aa7a@cox.net

Technical Topics

Increasing Competitiveness through New Technology

We all participate in contests for different reasons. Personally, I find the contesting experience to be a unique mental exercise with hundreds of fascinating tactical engagements managed by a framework of critical, strategic operational decisions. Winning a contest is apparently not required for my continued interest in the activity, since I have lost every single contest in which I have ever engaged, except for two. But, what really keeps me going is the interest in improving my performance year after year in my favorite events. My principle satisfaction in operating in a contest does not only come from the final score, since that can be heavily influenced by propagation factors or my available time to participate in a contest.

Typically there's a feeling after a contest that warms your heart when you did the best you could or that you did better than last year or that you smoked your long-standing friendly competitor with your latest spirited effort. In the quest to compete or remain competitive, though, it may be necessary to consider change.

The contesting experience is constantly evolving. New and evolving logging software removes much of the drudgery of manual activity in contests and enables the use of multiple stations in order to compress more activity into the same amount of time. Skimmers and spotting networks have greatly increased the chance that someone will respond to your CQ or announce some rare multiplier, no matter where it is in the band. Part of any strategy to improve results or increase satisfaction in any contest may come from the introduction of new station capabilities that exploit changes in the competitive environment. The challenge for today's radiosport enthusiast is figuring out what new things to do and — likely more difficult — figuring out how to integrate these successfully.

In order to make this discussion more tangible, let me use an example. Say that you operate in contests in the single-operator, low-power class but wish to improve your score for the benefit of your local contest club and would like to try single-operator, two-radio (SO2R) mode to make this improvement. Your station has separate wire antennas for the low bands (160, 80, and 40 meters) and a modest tri-bander for the higher bands (20, 15, and 10 meters). So, what to do?

Make a Mission Statement

An important first step in any undertaking to introduce a change to an existing system is to clearly define what you are trying to achieve as a result of that change. Without doing this, you may not recognize that you've achieved your goal(s). For my example, let us say that the objective is to improve rate on 40, 20, and 15 in prime time periods using SO2R. This might be a clear strategy, given that these are bands that are important to your station's best capabilities at this time in the solar cycle. It is important to bracket expectations, though, since otherwise you might expend energy and resources in areas with little to no reward or, if unbounded, the project may never come to any useful conclusion in a reasonable amount of time.

The Robust Exploration of Alternatives

I am not talking about the search for robust solutions; this is important to recognize. Solutions are different than alternatives (or options). Initiating a search for a solution starting with a given approach might not result in what you want or need. How do you prevent such off-ramp thinking? I recommend that you identify two or more ways to address an added capability. For one, it gives you the satisfaction that you can justify your approach as best meeting your needs. And, as a second value, you might now have an alternative, if your primary approach fails to work for some unforeseen reason.

Back to our example. Let me identify two very simple approaches that would potentially address the stated need for the change to improve rates on 40, 20, and 15 during low sunspot activity.

Both solutions would permit the operator to have a station that could operate on any two important bands at the same time. Notice, however, that technical characteristics in some of the components must be known in order to make a meaningful decision. It

Table 1

	Option 1	Option 2
Component 1	Add second radio with preselect capability "A" (i.e., DR3* < 90)	Add second radio with preselect capability "B" (DR-3 > 95)
Component 2	Add antenna switch matrix	Add antenna switch matrix
Component 3	Add RX band-pass filters with skirt selectivity "X"	Add RX band-pass filters with skirt selectivity "Y"
Component 4	Add a new 20-meter antenna with comparable performance to tri-bander	Add diplexer to separate 20 meters from the existing tri-bander

*Third-order dynamic range at 2 kHz

is important to make a decision among an array of optional approaches only if all potential solution options meet the stated needs. So, it might important first to evaluate the technical capabilities of components of a solution before settling on a preferred option. For example, test the isolation of the existing antennas and the front-end capabilities of a potential second radio by using low-level transmitters (e.g., signal generator test equipment) into other antennas or diplexer ports to determine whether a low-end radio might fit the requirements of a second receiver or whether you might need a higher-end radio with superior front-end characteristics. Different levels of isolation in front-end preselects or receive band-pass filters may be needed with alternate options. To be successful, it is important to know these critical requirements are met for all components in a solution option before declaring any option as a viable — and certainly before spending significant sums of money to implement the option.

Making a Value Judgement

The nearly universal metric in measuring the relative value of alternative solutions to a problem is cost. In some situations, however, time to deploy or enhanced technical capabilities may be the primary concerns. Using your scale of value, and compare the array of viable alternatives to settle on the most highly valued approach. In cases where there is risk, it might be fruitful to carry more than one approach for a while until risks are mitigated.

In our example, the added 20-meter antenna might require a new tower or an enhancement to an existing tower and all the added cost (or time) would need to be included into the value equation. This may tip the balance to a multiplexer approach which is a capability that is well proven and available from several sources.

Making an Integration and Test Plan

One of the most common approaches to integration is what is referred to affectionately as the "Big Bang" approach. In this common approach, a new system is built from end-to-end and then turned on for testing. In our hobby, we are all familiar with some of the big bangs that can occur when high levels of RF take unanticipated paths. It is critical to identify all risks associated with a change to an existing system and to systematically retire each risk with testing. So, make an integration and test plan and follow the plan.

Summary

Technology rollouts are affecting ham radio and contesting at an ever-increasing rate. Contest station owners or operators will need to be ready to react to changes in the technology landscape to avoid obsolescence. It may be important to almost continuously evaluate your contest station design to keep it up to date with current logging software or emerging digital contest modes. This approach to a methodical strategy of identifying changes and implementing them is offered as a means to embrace change in a wise, strategic, and cost-effective manner.

The Little Pistol Pages

of fun, and I enjoy setting up all the software and hardware. FT4 and FT8 are the latest challenge. Contrary to you might hear, they have their own skill set and require a lot of operator input. They also have teething problems.

Assisted or Not?

I do both Assisted (Unlimited in ARRL contests) and Unassisted, depending on my mood. Assisted is getting more popular, especially for smaller stations, so it may pay to go without assistance if you are good at unassisted operating. You'll have less competition.

Spectrum scopes are useful in either case, and using one can greatly increase your rate when you're doing S&P in contests. For years I hung an SDR off the IF output of an older transceiver. It was clunky but worked well.

Overlays

Overlays are separate contests within a main contest. The CQ WW contest has Rookie and Classic overlays.

The CQ WPX includes them, plus a Tribander/Single Element (TB-WIRES) overlay. You can enter only one overlay at a time. Check the rules carefully.

For niche contesting I've found the WPX TB-WIRES overlay to be the most useful. The rules are tricky. Your antenna(s) for 20, 15, and 10 be on a single feed line. Lower-band single element antennas may be fed individually. No separate receive-only antennas are allowed.

Operating

The smaller your station, the more S&P you'll have to do. It can be Assisted or Unassisted. Logger band maps are your friends in either case. I don't spend too much time calling a given station before moving on, while making sure to double back before long to try again, as contest pileups can dissipate surprisingly quickly.

S&P can be very productive. Don't spend too much time in any single pileup. Remember, you'll probably have another chance, sooner or later.

Try running, especially as the contest wears on and the initial feeding frenzy has died down. Running contributes greatly to a good score, but can be challenging for small stations. Usually it's best to move up the band where things are less intense.

The better your antennas, the higher your running percentage will be. My results have been mixed. Under the best circumstances my running maxes out at about 25%. Sometimes it's zero.

The amount of time you spend in the chair is obviously important. Sometimes, that is my major consideration when selecting a niche. I like it when there are lots of sunspots, so I can do a high-band contest during the day, and sleep at night.

Aftermath

When submitting your log, don't forget to indicate an overlay if you qualified for one. Analyze your performance, and make notes for next time.

If you have a small-signal station, give niche contesting a try. Good luck.

Robert Ramirez, CE3CT / ce3ct.roberto@gmail.com

DX Contesting

Two Years Until WRTC 2022

Preparations have been under way for World Radiosport Team Championship 2022 (WRTC 2022), which will take place near Bologna, Italy, from July 6 until July 11 of that year. The event location is where wireless pioneer Guglielmo Marconi was born and conducted many of his early experiments. With just 2 years remaining until WRTC 2022, the event is gaining in prominence for contesters. WRTC 2018 in Germany — a marvel of professionalism and organization — will be a hard act to follow for our friends in Italy.

For WRTC competitors, it is becoming more difficult to qualify with each passing contest. For this WRTC, 50 teams will be made up of qualifiers plus the defending WRTC 2018 champions, six youth teams, five sponsored teams, and some additional wild-card teams.

Qualifying for one of the 50 teams is already at the half-way point. As of summer 2020, 16 qualifying contests

Figure 1 — Wireless pioneer Guglielmo Marconi was born in Bologna, Italy, on April 25, 1874.

out of the possible 24 (see Table 1) have already taken place. Each event has a different maximum qualifying point value.

Prospective WRTC 2022 competitors may submit scores from up to 12 events toward their qualifying scores. Obtaining the maximum possible point total of 11,900 points would require:

• Winning all 10 contests in the operator's Selection Area that have a value of 1,000 points.

• Winning two more contests with a value of 950 points apiece in the top-weighted single operator, high power (SOHP) category.

For WRTC 2022, there will be some important changes in the geographical distribution of the 50 teams, compared to WRTC 2018:

• Europe will have six fewer teams.

30 Years Ago — the First WRTC

The first WRTC took place in 1990. Rich Assarabowski, K1CC, was there, and his never-before-published post-event remembrance is available as a special feature article on the *NCJ* website, **ncjweb.com**. For more World Radiosport Team Championship history, visit the Official Web Site of WRTC History, **wrtc.info**.

• South America and Asia will have two more teams each.

• Africa and Oceania will have one more team each.

With the goal of promoting youth activity, WRTC 2022 will field three additional teams made up of contestants aged 25 or younger.

Another important modification: A Team Leader (TL) must have finished in the Top 20 in the last three WRTCs (2010, 2014, and 2018). This applies to Sponsored Teams and Wild Card Teams. Team Mates in WRTC 2022 must be among the top 20 qualifiers in the selection area and have earned at least 4,000 qualifying points.

Qualification standings are available on the WRTC 2022 website, **www.WRTC2022.it**.

To learn more about how preparations are going, we contacted Fabio Schettino, I4UFH, one of the organizing committee members for WRTC 2022.

"WRTC 2022 has gained a lot of support for the early days of wireless from the Foundation Guglielmo Marconi, a

Table 1 — Qualifying WRTC contests and their point values. Scores in all of these events in 2019 count toward qualification. Only scores for the CQ WW WPX SSB, IARU HF, Russian DX, and both ARRL International DX events in 2020 count toward qualification.

Contest	Value
CQ WW DX CW	1,000
CQ WW DX SSB	1,000
CQ WW WPX CW	950
CQ WW WPX SSB	950
IARU HF	950
Russian DX	1,000
ARRL Int'l DX CW	800
ARRL Int'l DX SSB	800
WAE DX CW	1,000
WAE DX SSB	1,000
All-Asian DX CW	800
All-Asian DX SSB	800

Table 2 — Category weighting factors. Single-operator categories include all-band, single-band, unassisted, and single- or mixed-mode.

Entry Category	Weight
SOHP (Single Operator, High Power)	1.0
SOA HP (Single Operator Assisted, High Power)	0.95
SOLP (Single Operator, Low Power)	0.9
SOA LP (Single Operator Assisted, Low Power)	0.85
MS (Multioperator, Single Transmitter)	0.9
M2 (Multioperator, Two Transmitter)	0.8
MM (Multioperator, Multi-Transmitter)	0.7

Table 3 — Top 10 qualifying competitors as of May 1, 2020.

Operator	Points
JH5GHM	9,674
RA9P	9,277
EA8RM	9,154
K7RL	9,096
RM9I	9,090
KI6RRN	8,849
4X6FR	8,710
JH1EAQ	8,698
IZ1LBG	8,653
CE2LR	8,339

Table 4 — Top 10 qualifying points by country.

Country	Total Points	Operators
US	1,681,336	5,243
UA	401,909	1,139
DL	342,885	1,480
I	270,566	939
UA9	247,032	518
BY	211,771	407
JA	199,814	1,279
PY	176,461	418
VE	175,660	485
LZ	150,999	189

Table 5 — Top 10 qualifying points by WRTC selection area.

Area	Total Points	Operators
EU8	547,297	1,775
EU3	507,847	2,385
EU7	431,202	1,276
NA3	345,868	971
EU4	319,334	878
NA1	295,261	837
EU2	283,702	1,310
EU9	260,126	436
EU1	258,501	840
AS7	233,053	1,388

part of the Ministry of Telecommunication," Schettino said. "This was a boost in interest even from outside the ham radio community. We will have our Headquarters in the house of Guillermo Marconi, the villa where he started his first wireless experiments." Schettino said several steps already have been made in moving event planning forward.

"I developed software to generate the score listings, Claudio, I4VEQ is managing the web scores, and Max, IW1FRU, is a professional webmaster involved in building the world image of the WRTC 2022 event," he explained.

"We have arranged with Gianluca, IK4LZH, to deal with local administrations and property owners to find the right ways for using 65 sites around the defined area. The region in which we expect to have the sites will be around 40 kilometers from the city of Bologna, in the middle of a flat area. Antonello, IT9EQO, is taking care of antenna support, antenna testing, and planning the site research. A group of local hams are involved in the first search of sites.

"We are still dealing with several sponsors, and have achieved several successes with major manufacturers to supply antennas, coaxial cable, and support rope.

"Unfortunately, COVID-19 has slowed down some planned field activity. However, we expect to have a WRTC field-style station ready for at least a few contests during the coming year. The worldwide community is strongly supporting the event, too. Several persons, groups, teams, and clubs are donating. Nevertheless, we really need each ham to make a simple donation to ensure that all the activity will be conducted as planned. Individual donations may be made via our website, **www.wrtc2022. it/en/donations-16.asp**."

Table 6 — A breakdown by continent of numbers of teams, selection areas, and countries.

Continent	Teams from Continent	Selection Area	Countries in Selection Area	Teams from Area
Europe	18	EU #1	SM, OH, LA, ES, JW, JX, OH0, OJ0, R1FJ, TF, OY, YL, LY	2
		EU #2	G, EI, ON, PA, GD, GI, GJ, GM, GU, GW	2
		EU #3	OZ, DL, SP, UA2F	3
		EU #4	UA1, UA3, UA4	2
		EU #5	CT, CU, EA, EA6, ZB	1
		EU #6	F, C3, LX, 3A	1
		EU #7	I (I1,I2,I3,I4,I5,I6), OE, S5, 9A, HB9, HB0, TK, T7, 4U1ITU	3
		EU #8	OK, OM, HA, YO, EU, UR, ER, UA6	2
		EU #9	4O, YU, LZ, E7, Z6	1
		EU #10	I (I0, I7, I8), IS0, IT9, SV, SV9, SV5, ZA, 9H, 1A, HV, SV/A, Z3, TA (European region)	1
North America	13	NA #1	W1, W2	2
		NA #2	VE1, VE9, VY2, VE2, VE3, VY0, VO1, VO2, FP, OX	1
		NA #3	W3, W4 north - VA, KY, TN, NC	2
		NA #4	W8, W9	2
		NA #5	W4 south - AL, GA, SC, FL	1
		NA #6	W5	1
		NA #7	W7 - WA, OR, ID, MT, WY	1
		NA #8	VE4, VE5, VE6, VE7, VE8, VY1, KL7	1
		NA #9	W6, W7 - UT, NV, AZ	1
		NA #10	W0	1
Caribbean	1	CA #1	CQ Zones 6,7,8, VP9	1
Asia	8	AS #1	CQ Zones 17, 21	1
		AS #2	CQ Zones 18, 23	1
		AS #3	CQ Zone 20 (Asian region)	1
		AS #4	CQ Zone 24 East (BY1, BY2, BY3, BY4, BY5, BY6, BV)	1
		AS #5	CQ Zones 24 West (BY7, BY8, BY9, BY0, XX9, VR)	1
		AS #6	CQ Zones 22, 26, 28 (Asian portion)	1
		AS #7	CQ Zones 19, 25	2
South America	4	SA #1	YV, HK, HC, OA, CP, P4, PJ, HK0/M, HC8	1
		SA #2	8 R, PZ, FY, 9Y, PY6, PY7, PY8, PY9, PY0F	1
		SA #3	ZP, CX, LU, CE, CE0, VP8	1
		SA #4	PY1, PY2, PY3, PY4, PY5	1
Africa	3	AF #1	CQ Zones 33, 34 (not including ST, Z8)	1
		AF #2	CQ Zone 35, 36, ST, Z8	1
		AF #3	CQ Zones 37, 38, 39	1
Oceania	3	OC #1	CQ Zones 27, 28 (Oceania region)	1
		OC #2	CQ Zone 31	1
		OC #3	CQ Zones 29, 30, 32	1

Contest Tips, Tricks & Techniques

Online Real-Time Scoring

This time, we look at real-time scoring. In the past, contesters would have a month to prepare their paper logs. Log checkers manually checked selected logs before compiling the results. Add the publication lead time, and it could be close to a year before you learned the results. You could get on 3830 kHz and report your score, but that was mostly for the big guns.

Now with computer logging, you have a week to submit your logs. Computers check all the logs and compile the results. With fewer pages allocated to contest results in print publications, results get posted online as soon as they are ready, often within a few months. Claimed scores posted to **3830scores. com** give you an even earlier approximation of placement.

Radio contesting is still very different from traditional sports, where competitors know where they stand at all times. Stadiums have scoreboards. Golf tournament leader boards show competitors how many strokes they are behind. This lets competitors adjust their strategy as the event is in progress. Until now, radio contesters could not track the competition except, perhaps, if they happened to tune past them and making a judgment based on the serial number the op was handing out.

Now you can direct your logging program to send your score, contact, and multiplier totals periodically. The website shows current standings broken down by entry class. Some contesters love it, but others don't care for it at all.

The Positives

The most common reason users like real-time scoring online is that it keeps them focused and encourages more time in the chair. K9ZO likes keeping track of club members and feels the competition provides an incentive to make a few more contacts, and that helps club scores.

K5ZD was an early adopter of real-time score reporting, first with **www. cqcontest.net**, then on **contestonlinescore.com**. Randy finds it most useful in part-time efforts. He sees who is ahead of him and tries to catch up. Without the scoreboard, he thinks he could get bored and shut down.

Marty, N9SE, feels it's an advantage, because he becomes more aware of his rate and time management. He also lists more time in the chair as a plus.

Several readers, including K7JOE and W1DYJ, suggested that real-time score reporting can expand interest, especially among young people. N8YXR often operates family multiops. His wife Jennie is KC0RBV. They have a 7- and a 10-year-old who sometimes join them. Bob says the kids enjoy watching the scoreboard and it helps sustain their interest. The oldest is studying for her ticket.

Anthony, AB9YC, tracks those in his pack and has noticed how the pack changes each contest. It happens less in 48-hour contests.

K9ZO notes how simple it is to set up in *N1MM Logger+*. Ralph goes on to say that if you turn it on, it will be on future contests unless you turn it off.

Scoreboards also can be useful when things are not going well. W1JDY finds that real-time score reporting can help operators learn when they are not doing as well as expected (or as they'd like) because of lousy propagation, and everyone else is affected too. Larry uses *N3FJP* and picks a YCCC friend to use as a baseline and motivator. He also grabs the graphs for historical data in future planning.

A posting a while back by someone running a real-time scoring site indicated that about three times more ops were watching than submitting scores. If it is an advantage, this strikes me as only a notch below using spotting assistance while claiming unassisted.

The Negatives

Some readers have not experienced real-time scoring, and some simply have not been interested. WB9RFB and others enjoy casual contesting and don't see any particular value in real-time score reporting. John does not have a problem with others using it but will reconsider operating contests if it becomes mandatory.

Others like more traditional contesting — the "boy and his radio" model. K6XT is one example. Art just prefers single op, non-assisted. He just wants to concentrate on making contacts. Mike, W9RE, tried it once and found it frustrating.

W0GXA has it set up in *N1MM*, and is sending in scores but has only watched the scores a couple of times. Bob found it interesting at first but considers it a novelty now. He feels if he is far behind, there's probably not much that he can change.

AA4NU and AB9YC pointed out that on-line scoreboards can be a distraction from actual operating. W2GD checks the scores about four times per hour to see what is going on. K9ZO does not use them in the CWT sessions, since there's just no time for distractions. N0AX notes that if he is watching the scoreboard too closely, he is losing. Sometimes Ward forgets he even has it running.

TMI?

Are you giving away tactical information if you submit your score for real-time reporting? K1VR is not too worried about it. W2GD says it was a concern at first but now thinks it does not have a meaningful impact.

WT9U uses the scoreboard. Jim's configuration sends only QSO and multiplier totals every 2 minutes. Band breakdowns could give away too much, he feels.

That's not a concern of K9ZO. Ralph has an endless list of projects and station improvements. Chances are changes will have been put in place since the last contest.

One concern I have is that it will discourage contesters, especially new contesters, and cause them to give up early if they are getting blown out. Real-time score reporting presents an opportunity for gaming the system to lead competitors into complacency or to discourage them. AA4NU and others have not noticed it. K5ZD has not

seen it, either, and does not see much purpose in gaming the system. Randy likens it to posting a fake score after the contest.

Anthony, AB9YC, reported seeing a few cases that appeared to be game playing. Typically it would be very infrequent score reporting, often hours apart. It appears the station has not been operating, but then the score suddenly jumps out ahead. Anthony doubted it was internet problems. I experienced a similar situation. I don't know if the intent was to discourage others, but it actually kept me operating longer than planned, and I finished ahead of the real-time score poster. If it was an attempt to gain an advantage, it backfired.

K5ZD and AB9YC are surprised that on-line scoreboards are being adopted so slowly. N9SE wishes more contesters would use them but is not in favor of requiring them.

K1VR and others are against mandatory real-time scoring, mostly because of connection issues. K9ZO likes living in an RF-quiet rural location, but internet connections are not reliable. Ralph thinks requiring real-time on-line scoring would cause him to contest less.

KC7QY has not used real-time score reporting and says it would be a real turn off if it were required. He is also concerned about how it might affect contest DXpeditions or stations in less-developed countries with no or poor internet connections. Despite this, Jim feels it is a good development as an option, especially in attracting youngsters.

N0AX has been a big proponent of more connectivity in contesting as a way to interest younger people. Ward feels they will demand real-time interaction. He hopes we have real-time contact validation soon but says there will always be a place for traditional contesting. Ward remembers when using keyers was considered "edgy."

K7JOE sees a future of required internet connections and real-time log checking. Joe notes that paper logs have almost disappeared. This could be the next step in the evolution of contesting.

Sometimes we embrace change, and sometimes we prefer traditional techniques.

Thanks to those who submitted their thoughts on real-time scoring. They were AA4NU, AB9YC, K1VR, K5ZD, K6XT, K7JOE, K9ZO, KC7QY, N0AX, N8YXR, N9SE, W0GXA, W0GD, W1DYJ, W9RE, WB9RFB, and WT9U.

Next Time

How did the COVID-19 shutdown affect your contesting activity? Did you operate more contests? What station or skill-building improvements did you make? How was Field Day different this year?

Send your comments and tips to **w9xt@unifiedmicro.com** by July 11. Include suggestions for future topics. Put "CTT&T" in the subject line, so your message doesn't get lost in the mass of emails.

VHF-UHF Contesting!

While our regular contributing editor Dr. Jon Jones, NØJK, has been kept busy as an ER doctor — thank you, sir — Rus Healy, K2UA, is filling in to promote the hidden gem that is 10 GHz.

Why 10 GHz?

The most compelling thing about 10 GHz is that it's truly a sweet spot when it comes to activity and propagation. The band provides new challenges but pays big rewards. A few important factors are at play here. There's considerable activity in the US and Canada on 10 GHz. Hundreds of operators are on the band — many from home, and even more with portable setups. The band produces surprisingly good DX with low power (a few watts) and a small antenna. The microwave community is enthusiastic, welcoming, and has a strong mentoring spirt. More than seven contests every year include 10 GHz.

Today's equipment options are better than ever and run the range from boards and kits to nearly turn-key options. Most people run modest setups, with an average of 3 W of transmitter power and a receiver noise figure below 2 dB.

A modest dish antenna has a ton of gain at 10 GHz. A surplus satellite TV dish can produce more than 32 dBi gain. Dishes are available commercially, but surplus channels such as eBay and discarded DSS dishes are common sources. Paul Wade, W1GHZ, has a lot of antenna-related resources on his website, **w1ghz.org**.

The atmosphere is quite friendly to 10 GHz signals. Not only is water vapor attenuation low in this frequency range, but rain and snow are tremendously helpful at extending 10-GHz paths well beyond the normal tropo-scatter range. To help operators make use of rain- and snow-scatter enhancement, Andy Flowers, KØSM, has migrated his excellent *Rain Scatter* program to the web, **rainscatter.com**. It's a great planning tool and visual aid that is already populated with dozens of home stations and portable locations. You can add your own locations to it as well. When rain or snow is in the region, small black circles appear at the densest parts of the storms. That's where you can point your antenna to scatter off the cells. Frequently these storms can produce contacts out to 700 kilometers (435 miles) or more for a 3-W station. Contacts of well over 500 kilometers are routine and easy to make with 3 W. For example, VA3ELE has worked 28 grid squares on 10 GHz from his home station in suburban Toronto with just a 2-foot dish on a short tower. His best DX is 599 kilometers (371 miles). K1TEO, who also operates from home, has logged 27 grids plus a best DX of 918 kilometers (569 miles).

Activity

Lots of people are already on the band. A look at the ARRL 10 GHz and Up Contest results for the past 3 years shows a strong growth trend. Other operating events that include 10 GHz also show increasing participation. Although activity is busiest during contests, many 10 GHz operators are active between contests as well. Many ops take their 10 GHz gear to hilltop or shoreline locations, either exclusively or as a complement to their home stations.

Group Building

Radio clubs around the US and Canada have done group builds of 10-GHz equipment to help those who lack test equipment or building experience. Elmering is alive and well on the microwave bands. It's just plain big fun to get on a new band and experience many things you thought were impossible, with a great community of operators.

Peter, VA3ELE, has worked many of his 10-GHz grids from his home station, thanks to portable operations. [VA3ELE photo]
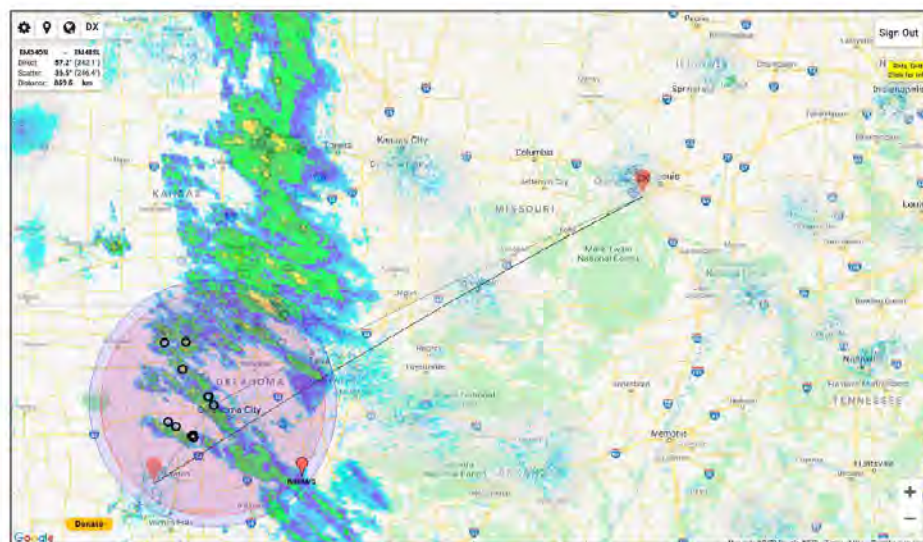
The rainscatter.com website lets 10-GHz operators take advantage of rain and snow events to extend tropo paths.

K2DH's portable setup along the shore of Lake Erie. [K2DH photo]

Frequently Asked Questions

Q: Where can I go to see how 10-GHz CW and SSB contacts sound?
A: Many ops post videos to the Amateur Radio Microwave Community Facebook group. Peter, VA3ELE; Hugh, VA3TO, and others post YouTube videos as well.

Q: What are the main operating events?
A: The big one is the ARRL 10 GHz and Up Contest. It runs for 2 weekends — one in August and one in September. These weekends often provide enhanced tropospheric conditions that offer opportunities for long-distance contacts, and in the Central and Eastern US and Canada, rain scatter is a frequent enhancing medium. In the 2019 running, rain scatter was a major factor on at least half of the contest days. All Top 10 stations' best distances exceeded 600 kilometers (372 miles). Other events worth mentioning are the spring and fall Microwave Sprints, and, of course, the ARRL VHF contests in January, June, and September.

Q: What makes a good location?
A: You need a place with a clear horizon in the direction you want to work. It doesn't have to be high or even flat, but it's good to avoid trees and shrubs for the first few hundred feet. Blocked paths work much better than you would expect as well, though, especially when there's a rain shower between the two stations. Many 10 GHz operators stop along the side of the road (safely out of the way of traffic, of course). Farm fields, wind farms, scenic overlooks, water towers, and even interstate highway rest stops can offer good horizons in many directions.

Q: What should I use for an IF radio?
A: The most common IF for 10 GHz is 2 meters, so you'll need a radio that can produce a few hundred milliwatts to a couple of watts at 144 MHz. The Yaesu FT-817/818 and Elecraft KX3 are two popular IF radios. Size and power consumption matter. Think small, but make sure it's usable in the field. Some small radios have terrible ergonomics.

*An expanded version of this article appears on the NCJ website, **ncjweb.com**.*

NCJ Profiles: Ken Grimm, K4XL

my performance in certain contests, whether I won or placed last. The competitive urge grew after each contest, and the 5 Million program reinforced my competitive urge. Age is unforgiving, though, and while I simply can't manage to stay in the chair as long as I once could, I enjoy seeing how well I can do. For me, the ultimate goal of contesting is to have fun, and I can truthfully say that contesting has given me more fun than any other aspect of the hobby. At the moment, I'm just a few points shy of reaching 20 million points, and after that there is always the next level to shoot for.

Current Status

My current station consists of an Icom IC-7800 and an Alpha 78 converted to a pair of 3CX800s, I have a single-tower antenna system that holds a SteppIR DB-18E, a dipole for 80, and a folded unipole for 160. The dipole is based on the DX-Special version of AI1H's broadband design, and the folded unipole was inspired by the late John Haerle, WB5IIR, and his "folded umbrella." My version is remotely tunable to provide coverage over the entire 160-meter band. For receiving I have used loops, pennants, flags and most recently, Beverages. I now have three reversible Beverages, giving me coverage in the most important directions. I'm in the process of installing a YCCC 9-circle to enhance my low-band receiving capabilities and plan to add 80-meter capability to the folded unipole.

My favorite contests are the 160-meter events and the NAQPs. I enjoy 160 because of the particular challenges it presents and also because I can take a nap during the daylight hours and not miss much. I particularly enjoy the NAQPs because they use names as a part of the exchange, and you get to associate names and call signs. When I work VE3MGY, for example, I recognize him as Brian and I enjoy that added personal element.

As it was in my high-school track days, my satisfaction as a contester comes from knowing that I have gone as long and as hard as I could. I've learned from others that "if you're not running, you're losing." Except for those rare occasions when conditions simply require "search and pounce," I heed the wisdom of the great contester Bob Morris, W4MYA (SK): "Run 'em Dude."

Thanks, Ken, for sharing your personal story with us. It's always fascinating to learn how successful operators get their start in contesting. As a key competitor, you have accomplished much for yourself personally and professionally. We wish you continued radiosport success in the years ahead.

Results: North American QSO Party RTTY — February 2020

*Magazine results may be reduced to fit the available space. Full results are available online at **ncjweb.com**.*

The February 2020 running of the North American QSO Party (NAQP) RTTY came during a carefree time. We had not yet been ordered to stay at home, and we could still go to hamfests, socialize, or get together with other hams at a multiop. Experts said sunspots for the next cycle had started showing up. All the FT8 excitement had brought some new operators to try RTTY, and it was a good time to contest.

Why were so many stations on from Minnesota? Al, KØAD, reports that the Minnesota Wireless Association (**www.w0aa.org**) offers an award for operating all 11 contests on their target list, which includes the NAQPs. The award is called "Get a Life!"

RTTY operators noted the passing of Ron Stailey, K5DJ (ex-AB5KD), of Farmington, New Mexico. Ron was a major player in the amateur radio RTTY scene and is credited with creating (with WS7I) the CQ World Wide RTTY WPX Contest and the North American QSO Party RTTY. He served as the *RTTY Journal's* contest columnist and hosted the RTTY Contesters Banquet in Dayton for many years.

Quite a few operators mentioned following the Contest Online Score Board at **contestonlinescore.com** to keep up their motivation. This is allowed in all categories and does not count as "assistance."

Single Operator

In the Single Operator category, well-known RTTY operator Ken, WØLSD celebrated his 75th birthday by logging nearly 1,000 contacts with good totals of contacts and multipliers from 20 to 80 meters. (Let's not talk about the absent 10-meter band or the occasional 15-meter band.)

In the Collegiate Championship, W9JWC at Bradley University put in a good showing, and we hope more schools will join in the fun.

Single Op Top 10 Breakdowns

Call Sign	Score	QSOs	Mults	80	40	20	15	10
WØLSD	153,252	946	162	157/44	365/49	369/44	47/21	8/4
K6LL	131,505	797	165	126/37	252/49	305/51	113/27	1/1
WD6T(@W6YX)	129,396	789	164	113/35	307/52	305/51	63/25	1/1
N6WM	129,244	818	158	80/26	294/53	317/47	125/31	2/1
KK6P	108,724	706	154	98/35	239/45	250/45	119/29	0/0
N6IE	106,335	695	153	81/32	226/48	309/45	79/28	0/0
W6RW	105,616	656	161	144/38	199/47	189/43	123/32	1/1
AA3B	104,130	801	130	251/41	352/45	171/33	27/11	0/0
K9OM	103,929	707	147	130/37	267/46	265/48	45/16	0/0
N5HC	94,248	693	136	116/35	290/48	279/45	8/8	0/0

Single Op QRP Top Five Breakdowns

Call Sign	Score	QSOs	Mults	80	40	20	15	10
N2WK	22,968	261	88	120/33	91/35	43/17	7/3	0/0
K2YG	12,525	167	75	71/26	38/27	56/20	2/2	0/0
NØUR	4,992	104	48	15/11	32/16	57/21	0/0	0/0
VE6EX	3,300	100	33	6/5	16/7	78/21	0/0	0/0
KI9S/8	3,080	77	40	4/3	61/27	12/10	0/0	0/0

Top Five Team Scores

Team	Operators	Score
SWACC #1	K6LL, AA3B, K9OM, N4ZZ, W4GKM	502,053
NCCC Team #1	WD6T, N6WM, N6IE, K6GHA, K6LRN	456,186
AOCC MUSTANGS	W6RW, N7GP, W7CT, K7JQ, KJ5T	272,251
SMC Team 6F	AI9T, WT9U, N7US, ND9G	253,233
Deep Dixie CC Team Elvis	ABØS, KØWA, WV4P, K4AFE	246,407

Multi-Two Breakdowns

Call Sign	Score	QSOs	Mults	80	40	20	15	10
NØNI	175,644	1071	164	334/51	416/54	302/45	18/13	1/1
W9KKN (@NW6P)	141,810	815	174	96/41	271/51	335/55	113/27	0/0
NV9L	136,800	855	160	295/44	319/54	197/38	38/20	6/4

QRP

Our QRP leader Wayne, N2WK, in New York made more contacts on 80 meters than on the other bands. *Wow!* 80-meter QRP! John, N6HI, was in the QRP mix again with a half-watt to a 20-foot wire out the window.

Team Competition

SWACC recruited a group of skilled operators for its winning team. The regional and local clubs were out in force. Thanks to the Society of Midwest Contesters (SMC) for fielding nine teams.

Multi-Two

The ever-reliable team members at NØNI put more than 1,000 contacts in the log and earned the top spot in the M2 category. Tom, NW6P, often opens his station to other operators, this time to Bill, W9KKN, who operated SO2R

with spots for the full 12 hours and a big total. Bill also provided data showing the most popular names in the fray were DAVE, BOB, and JIM.

The KI6DY M2 operation was interesting. Bob, KI6DY, was at the station in Kansas, the second op Raj, VE6RAJ, was in Yucatan, Mexico and logged in remotely. Another interesting remote operator was Dan, WA6URY, who operated his California station from Tokyo, Japan.

The M2 gang at K3CCR, the Collington Continuing-Care Retirement Community in Maryland, more than doubled their February 2019 score.

Notable DX stations were XE2AU, C6AAN, EA8DED, and OT6M!

Several logs submitted after the 5-day deadline were moved to the Check Log category. Our 5-day deadline is the same as the CQ WW contests

and has been in place for several years now. If you need more time, contact the contest manager for an exception.

Thanks to N6TR and WA7BNM for preparing the scores, and to Icom America for sponsoring our awards. The next NAQP RTTY will be on July 18, 2020.

Soapbox

This RTTY stuff is FUN! — *WD0T*
A shout out to my wonderful mother-in-law for allowing me to take over a corner of her backyard for the antenna. — *KJ5T*
When 80 got hot, it was too much fun to stop. — *KG9X*
Beverages were used on 80, which meant that I could decode people who couldn't hear me. — *WD6T*
I worked several YLs. That doesn't happen very often! — *KC9YL*

Al, KØAD, shows off his latest setup — with no wires on the table top. [KØAD photo]

Team Scores

1. SWACC #1
K6LL	131,505
AA3B	104,130
K9OM	103,929
N4ZZ	85,485
W4GKM	77,004
Total	**502,053**

2. NCCC Team #1
WD6T	129,396
N6WM	129,244
N6IE	106,335
K6GHA	59,796
K6LRN	31,415
Total	**456,186**

3. AOCC MUSTANGS
W6RW	105,616
N7GP	83,080
W7CT	49,595
K7JQ	19,440
KJ5T	14,520
Total	**272,251**

Team	Operators	Total
4. SMC Team 6F	AI9T, WT9U, N7US, ND9G	253,233
5. Deep Dixie CC Team Elvis	ABØS, KØWA, WV4P, K4AFE	246,407
6. SMC Team 63	N9LQ, K9CT, WB8BZK, N9SE, WT2P	188,846
7. NCCC Team #2	K7XC, KA6BIM, WU6W, NA6O, KE6QR	178,798
8. Aardvark	AA2MF, W4CU, WA4EEZ, AAØO, W4TA	176,649
9. SCCC #1	WN6K, W6ZL, WQ6X, KI6VC, N6GP	162,838
10. The Borg	NØIRM, W7RY, KIØI, KSØAA	162,650
11. MWA Icicles	NØAT, KØAD, KIØF, KØTI, KØMKL	155,244
12. FRC - Team Alpha	W3FIZ, K2TW, K3MD, K3PP	131,635
13. KCG	ND4Y, K4WW, W4LC, AJ4A, KE4KY	131,274
14. PVRC Rappahannock Team 2	K7SV, K4GMH	123,866
15. SMC Team 52	WD9CIR, WRØH, WB9HFK, WI9WI, W9XT	118,858
16. SMC Team 6B	KG9X, KT9L, AB9YC, N5RP	104,664
17. FRC - Team Zulu	W3RGA, K2RET, KD3TB, WA3AAN, WO2X	101,430
18. YCCC Baudot Believers	N1IXF, W1DYJ, W1TO	88,730
19. PVRC Rappahannock Team 1	N4CF, KS4Q, WS6X, KG3V, KA4RRU	86,547
20. Deep Dixie CC Team Magnolia	NN5O	78,840
21. NPARC RTTY Snitchers	K2AL, KC2WUF, K2YG, K2GLS, N2TO	68,029
22. PVRC Colonial Capital	K4MI, W3TB, KK4R	64,831
23. TCG Marks	AC6ZM, WK9M, AB4GG, K4DXV, K1GU	62,795
24. MWA Snow	WBØN, KØJJR, KØJP, NUØW	59,630
25. KCG-PT	KM4FO, AB4IQ, K4FN, KU4A	59,121
26. CanAm 2020	VE3MGY, W1CTN	50,730
27. SMC Team 53	K9CW, K9DUR, K9IR, K9LC, K9GY	47,717
28. YCCC Paper Perforators	K5ZD, W1TJL, W1UJ	46,871
29. Metro Runners	W9ILY, K9PY, N9TK, N9LAH	45,431
30. Shenandoah Valley Wireless	W4PJW, AD4TJ, N5SMQ, K4PZC	43,868
31. NCCC Team #5	N6ZFO, K9YC, K9JM, NF6A	36,522
32. Bristol ARC	AA4DD, K4FJW, NE2P	35,916
33. SMC Team 73	N9DR, KC9EOQ, W9RE, KC9YL, WB8RFB	34,291
34. NCCC Team #3	K6KM, K6NV, WK6I, WU6X, NN7SS	33,713
35. Milford OH ARC Sparks	K8DV, WS6K, AE8S	31,805
36. MWA Storm	KØTLG, NØBUI, KCØNFB, KØDSL	31,214
37. Team Sparky	N8TCP, NI8Z	30,773
38. I-guana go to the TTY Bar	AJ9C, K9NW, W9IZ, K9PG	27,040
39. TCG Spaces	KS4X, K3FH, W4BCG, KA4OTB	26,387
40. NCCC Team #4	W6FB, K6EU, K6ELE, K6ST, W6RKC	26,372
41. SMC Team 4D	KC9K, K9QQ, KW9U	24,921
42. Digi Owls	KS2G	22,720
43. SM Rockets	AA9L, KG7VIZ	22,484
44. SMC Team 43	N9WG, NT9E, N9VPV	21,555
45. AOCC Gamblers	KE6K, N9NA	16,454
46. Contest Group du Quebec #1	VE2EBK	14,475
47. Digi Owls 2	KA2D, W2YK, K2RB	13,494
48. Cornwall	N3RM, KI9S/8, KA3D	10,866
49. Milford OH ARC Suns	K8PK, WB8RNV, AD8DM	7,895
50. MWA Ice	ACØW, W6GMT	6,861
51. SMC Team 21	AC8ZU	2,343
52. Whackers	ACØE	1,008

Single Operator Scores

Call Sign	Score	QSOs	Mults	QTH
N1IXF	58,734	502	117	CT
KB1W	30,555	315	97	MA
K5ZD	20,979	259	81	MA
W1DYJ	15,800	200	79	MA
W1TJL	15,662	191	82	CT
W1TO	14,196	182	78	MA
N1MD	13,940	205	68	CT
W1CTN	13,386	194	69	CT
W1UJ	10,230	155	66	MA
KA1C	9,300	150	62	ME
KE1NZY	9,078	178	51	NH
KB1GKN	5,300	100	53	NH
AC1EN	3,161	109	29	NH
K1VW	3,116	82	38	ME
KB1VUN	2,070	69	30	NH
W1FSH	1,364	62	22	MA
W1ARY	1,026	54	19	CT
W1ZFG	920	40	23	CT
N1TYH	494	26	19	MA
*W1IG	385	35	11	CT
N1AM	117	13	9	MA
W1MJ	108	12	9	MA
W2JV	42,432	416	102	NY
K2TW	36,975	435	85	NJ
K2RET	30,849	339	91	NJ
N2HMM	26,230	305	86	NJ
K2AL	24,816	282	88	NJ
KB2CKN	24,475	275	89	NY
*N2WK	22,968	261	88	NY
KS2G	22,720	284	80	NY
KC2WUF	19,920	249	80	NJ
WA2QAU	19,592	248	79	NY
WB2NFL	18,343	221	83	NY
K2NV	13,662	198	69	NY
*K2YG	12,525	167	75	NJ
KA2D	11,800	200	59	NY
WB2PJH	11,529	183	63	NJ
AK2S	10,988	164	67	NJ
WB2COY	10,679	181	59	NY
K2GLS	10,608	156	68	NJ
NA2NY	10,530	162	65	NY
WO2X	8,784	144	61	NJ
N1IBM	7,874	127	62	NJ
W2DXE	5,250	105	50	NY
KD2DXJ	5,047	103	49	NY
NS2N	4,900	98	50	NY
WB2NVR	2,701	73	37	NY
AC2IK	1,416	59	24	NY
KD2DVW	1,395	45	31	NJ
W2YK	1,364	44	31	NY
K2RB	330	30	11	NY
*N2TO	160	16	10	NJ
K2MFW	112	16	7	NJ
KC2TVJ	8	4	2	NY
AA3B	104,130	801	130	PA
K3AJ	55,860	490	114	MD
W3FIZ	55,000	500	110	PA
W3RGA	37,350	415	90	PA
4U1WB (AJ3M)	30,336	316	96	DC
W3KB	29,892	318	94	PA
AG3I	29,744	338	88	PA
K3MD	29,484	351	84	PA
KB3AAY	21,248	256	83	MD
AA3S	20,748	247	84	MD
KD3TB	15,123	213	71	PA
N8NA	14,973	217	69	DE
N3DUE	14,245	185	77	MD
K3AU (K2YWE)	13,870	190	73	MD
N3XL	12,864	201	64	MD
KE3ZT	10,746	199	54	PA
K3PP	10,176	159	64	PA
WA3AAN	9,324	148	63	PA
KB3LIX	8,883	141	63	PA
N3RM	7,434	126	59	PA
K3FH	6,612	116	57	PA
NI3Q (W3FA)	5,950	119	50	MD
K3NDM	4,365	97	45	MD
KC3JNW	4,074	97	42	PA
WA1HEW	4,074	97	42	PA
KG4USN	2,541	77	33	MD
N3WMC	2,380	70	34	PA
K3BLN	2,144	67	32	PA
AB3SX	2,016	56	36	MD
WA3MD	1,860	62	30	MD
NO3J	1,363	47	29	PA
K3TN	910	35	26	MD
N3ATE	902	41	22	PA
WA3ZSC	630	35	18	PA
KA3D	352	22	16	PA
ND3R	330	22	15	PA
K3CWF	200	20	10	DE
K3LT	156	13	12	DE
W3MR	36	6	6	MD
K9OM	103,929	707	147	FL
AA2MF	93,654	726	129	FL
K7SV	85,626	639	134	VA
N4ZZ	85,485	695	123	TN
W4GKM	77,004	621	124	TN
WV4P	57,125	457	125	TN
ND4Y	55,833	503	111	KY
W4CU	48,615	463	105	FL
NR4O	45,864	441	104	NC
K4AFE	39,216	344	114	TN
WA5POK	39,208	377	104	TN
K4GMH	38,240	478	80	VA
AC6ZM	36,472	388	94	TN
AA8R	32,736	341	96	FL
K4MI	31,772	338	94	VA
N4CF	31,008	304	102	VA
W4PK	30,784	296	104	VA
K4WW	29,795	295	101	KY
AA4DD	29,088	303	96	TN
KS4Q	26,315	277	95	VA
WA4EEZ	25,680	321	80	FL
W4VIC	25,440	265	96	VA
N4UA	24,892	254	98	VA
W4UK	24,190	295	82	SC
K4QD	22,848	272	84	FL
KE0L	21,450	286	75	TN
W3TB	20,315	239	85	TN
NS4X	20,202	259	78	TN
NN4RB	19,936	224	89	VA
WA3LXD	19,712	224	88	FL
W4LC	18,286	223	82	KY
W4PJW	18,190	214	85	VA
AJ4A	17,220	205	84	KY
KM4FO	17,171	223	77	KY
WS6X	16,564	202	82	VA
AB4IQ	16,380	195	84	KY
W4TM	15,330	219	70	GA
AD4TJ	15,190	217	70	VA
K4FN	14,839	209	71	KY
KM4F	14,560	182	80	GA
WK9M	13,454	217	62	TN
W4WWQ	13,140	180	73	VA
KK4R	12,744	177	72	VA
N4CW	11,524	172	67	NC
W4GHV	11,088	144	77	NC
W4UT	11,076	156	71	TN
K4FTO	11,076	156	71	VA
KU4A	10,731	147	73	KY
KS4X	10,586	158	67	TN
W1AJT	10,148	172	59	NC
KE4KY	10,140	156	65	KY
KW1K	9,280	160	58	FL
KG3V	9,180	153	60	VA
KS4YX	8,960	140	64	SC
K4GM	7,980	133	60	VA
KW4J	7,965	177	45	AL
AA0O	7,965	135	59	FL
AB4GG	7,644	147	52	TN
W4OX	7,316	124	59	FL
K2PS	7,261	137	53	FL
K4EES	6,783	119	57	AL
NC4MI	6,588	122	54	NC
N5SMQ	6,348	138	46	VA
K4FJW	5,724	106	54	VA
K4HMB	5,304	104	51	NC
W4BCG	5,049	99	51	TN
KE4S	5,014	109	46	VA
K3SV	4,935	105	47	FL
K4DXV	4,850	97	50	TN
N4GU	4,536	108	42	NC
AI4WW	4,350	87	50	FL
K3WA	4,182	102	41	NC
K4PZC	4,140	90	46	VA
W7HJ	4,140	92	45	VA
KA4OTB	4,140	92	45	TN
N8AID	3,726	81	46	VA
AJ4AY	3,619	77	47	AL
KA4RRU	3,480	116	30	VA
K8RGI/4	2,535	65	39	FL
KS0CW	2,508	76	33	VA
N4BCD	2,331	63	37	TN
KM4MK	2,088	58	36	GA
WJ4HCP	1,944	54	36	TN
N4JRG	1,740	60	29	KY
KC4HW	1,711	59	29	AL
K3YDX	1,700	50	34	NC
N4AU	1,666	49	34	AL
K4MGE	1,416	59	24	TN
K4YDE	1,296	48	27	FL
AK4HB	1,204	43	28	FL
N4KXO	1,170	45	26	FL
NE2P	1,104	48	23	TN
W4TA (KP2N)	735	35	21	FL
*KI4MZC	696	29	24	GA
KQ3S	651	31	21	FL
W2GFV	561	33	17	SC
K2AV	550	25	22	NC
WA2PCN	455	35	13	SC
K1GU	375	25	15	TN
N4APR	240	20	12	NC
N4NQY	40	8	5	VA
K4LPQ	9	3	3	TN
N5HC	94,248	693	136	NM
NN5O	78,840	584	135	MS
WM5H	77,165	671	115	LA
AD5XD	73,848	543	136	TX
W5PR	55,545	483	115	TX
WQ5L	50,553	411	123	MS
WB5BHS	41,638	382	109	AR
KG5LRP	25,384	334	76	TX
KG5U	23,520	294	80	TX
NK5P	22,881	263	87	TX
WA5LFD	20,739	223	93	TX
WA8ZBT	20,303	257	79	TX
AA5AU	19,040	238	80	LA
K5XH	18,785	221	85	AR
KD5ILA	18,592	224	83	AR
KJ5T	14,520	220	66	TX
K0GEO	12,236	161	76	TX
NA5J	10,140	156	65	TX
N5KWN	9,752	184	53	TX
WB5K	7,192	116	62	TX
WB5AAA	6,771	111	61	LA
AD5LU	6,027	123	49	TX
N5XE	5,208	93	56	OK
WB5JJJ	5,100	100	51	AR
WA9AFM/5	4,550	91	50	OK
KM5JV	4,524	87	52	TX
AE5P	3,150	75	42	TX
WA5LXS	1,908	53	36	TX
W5KQJ	1,624	56	29	TX
K5CRJ	525	25	21	MS
K5RM	368	23	16	AR
N5PV	315	21	15	TX
WW5XX	150	15	10	TX
KN5S (K5WW)	40	8	5	TX
KF5TWJ	4	2	2	AR
WD6T (@W6YX)	129,396	789	164	CA
N6WM	129,244	818	158	CA
KK6P	108,724	706	154	CA
N6IE	106,335	695	153	CA
K6GHA	59,796	453	132	CA
WN6K	56,826	462	123	CA
W6ZL	47,112	453	104	CA
WQ6X	45,630	390	117	CA
KH6ZM	42,720	356	120	KH6
KH6CJJ	34,112	328	104	KH6
N6HE	32,966	311	106	CA
K6LRN	31,415	305	103	CA
N6ZFO	28,737	279	103	CA
WA6I	27,606	258	107	CA
NA6O (@W6SRR)	23,920	260	92	CA

Call Sign	Score	QSOs	Mults	QTH	Call Sign	Score	QSOs	Mults	QTH	Call Sign	Score	QSOs	Mults	QTH
KW6S	23,296	256	91	CA	W7JHR	1,222	47	26	OR	NT9E	7,056	126	56	IL
K6TQ	22,000	250	88	CA	WB7CYO	1,176	49	24	ID	KB9DVC	6,720	112	60	IL
W6IA	20,826	267	78	CA	K7STO	1,050	42	25	WA	N9UDO	6,413	121	53	WI
W6RC	20,230	238	85	CA	KL1SF/K7	800	32	25	AZ	K9NW	6,327	111	57	IN
K6KM	15,498	189	82	CA	KK7A	592	37	16	ID	N9LJX	6,201	117	53	IN
KE6GLA	15,111	207	73	CA	KE7GKI	476	28	17	AZ	W9IZ	5,130	114	45	IN
WØYK	14,000	200	70	CA	N7JI	63	9	7	OR	W9RE	5,044	97	52	IN
KE6SHL	12,384	172	72	CA						KW9U	4,608	96	48	IL
KE6QR	12,024	167	72	CA	KE3K	35,720	380	94	MI	N9TO	4,300	86	50	IL
W6FB	10,950	146	75	CA	ND8L	20,111	221	91	OH	KD9NHZ	4,134	106	39	IL
KI6VC	10,902	158	69	CA	WB8JUI	18,848	248	76	OH	KC9YL	3,984	83	48	WI
K6NV	10,792	152	71	CA	N8TCP	16,786	218	77	OH	N9TK	3,471	89	39	IL
N6GEO	7,788	132	59	CA	K2CUB	16,425	225	73	MI	N9SJ	3,168	72	44	IL
K9YC	7,740	129	60	CA	K8DV	15,768	216	73	OH	N9VPV	2,975	85	35	IL
K6EU	7,488	117	64	CA	WS6K	15,048	198	76	OH	N5RP	2,844	79	36	IL
NN6NN (W6XK)	5,555	101	55	CA	NI8Z	13,987	197	71	OH	AA5UK	1,643	53	31	IL
K6ELE	5,488	98	56	CA	AB8OU	10,890	165	66	OH	KG9N	1,612	52	31	IL
KH6AQ	5,304	104	51	KH6	W8TB	9,211	151	61	OH	K9LC	1,584	48	33	IL
KK6L	5,088	106	48	CA	N8FYL	8,640	135	64	MI	W9BGX (WA9LKZ)	1,360	80	17	IL
N6YEU	3,600	75	48	CA	W8RTJ	7,680	120	64	OH	K9GY	1,125	45	25	IL
WK6I	3,149	67	47	CA	NX8G	7,208	136	53	OH	WR9Y	884	34	26	WI
K6BIR	2,849	77	37	CA	N8WCP	6,962	118	59	OH	N9LAH	663	39	17	IL
N6GP	2,368	64	37	CA	WA8KAN	5,500	110	50	WV	NN1N	486	27	18	IL
WU6X	2,139	69	31	CA	K8PK	4,953	127	39	OH	K9PG	460	23	20	IL
NX6T (WQ6X)	2,088	58	36	CA	K8SIA	4,841	103	47	MI	N9DT	408	24	17	IL
KH6GMP	1,225	49	25	KH6	W8TWA	4,715	115	41	MI	K9BIZ	325	25	13	WI
W6RKC	1,102	38	29	CA	W8WTS	3,948	94	42	OH	N9BT	273	21	13	IL
W6JBR	972	36	27	CA	N8JLM	3,780	84	45	OH	N4TZ	224	16	14	IN
KM6I	874	38	23	CA	*KI9S/8	3,080	77	40	OH	WB8RFB	209	19	11	IL
KK6TV	609	29	21	CA	N8AA	2,652	78	34	OH	N9HSJ	108	12	9	IL
KA6W	255	17	15	CA	AC8ZU	2,343	71	33	OH	WAØJTL	81	9	9	IN
N6EE	247	19	13	CA	WB8RNV	2,142	63	34	OH	KK9N	48	8	6	IL
K6TET	168	14	12	CA	AA8SW	1,107	41	27	OH	N9LF	35	7	5	IN
WH7W	144	12	12	KH6	AE8S	989	43	23	OH	K7JOE	30	6	5	IN
KD6GWH	130	13	10	CA	AD8DM	800	40	20	OH					
K9JM	25	5	5	CA	*K8ZT	792	36	22	OH	WØLSD	153,252	946	162	CO
NF6A (K6XX)	20	5	4	CA	KG9Z	195	15	13	OH	ABØS	82,026	651	126	KS
W1RH	20	5	4	CA	W8AKS	56	8	7	WV	KØWA	68,040	540	126	KS
					KF8MZ	4	2	2	OH	NØTA	62,330	542	115	CO
K6LL	131,505	797	165	AZ						NØIRM	56,580	492	115	MO
W6RW	105,616	656	161	AZ	AI9T	71,463	581	123	IL	WØMB	50,172	444	113	MO
N7GP	83,080	620	134	AZ	WT9U	70,902	606	117	IN	W7RY	49,720	440	113	MO
K7XC	59,340	430	138	NV	K9WX	69,938	578	121	IN	NØAT	48,396	444	109	MN
KA6BIM	55,986	434	129	OR	N7US	57,188	493	116	IL	NØGZ	44,912	401	112	IA
W7CT	49,595	455	109	UT	KG9X	55,709	493	113	IL	KØAD	40,788	412	99	MN
K6VHF	37,520	335	112	AZ	ND9G	53,680	488	110	IL	N7WY	39,895	395	101	MO
W7VXS	36,135	365	99	WA	N9LQ	52,865	485	109	IL	KFOUR	31,929	367	87	CO
KJ9C	29,260	308	95	MT	K9CT	49,686	507	98	IL	KIØI	28,400	284	100	MO
K2RD	27,686	254	109	NV	WB8BZK	47,952	432	111	IL	KSØAA	27,950	325	86	KS
WU6W	27,528	296	93	NV	N4BAA	46,550	475	98	IN	NØKQ	27,645	291	95	CO
K7VIT	22,596	269	84	OR	WD9CIR	43,758	442	99	IL	KIØF	26,829	271	99	MN
W7GES	19,788	291	68	AZ	AC9S	42,479	397	107	IL	WRØH	23,310	259	90	MO
K7JQ	19,440	243	80	AZ	K9SE	39,678	389	102	IN	WBØN	23,275	245	95	MN
K7QA	14,070	210	67	MT	KT9L	39,055	365	107	IN	KØTI	22,515	285	79	MN
NG7M	13,275	177	75	UT	N9CK	35,910	342	105	WI	NØLLH	21,648	246	88	KS
W7CXX	11,766	159	74	UT	W9ILY	32,635	305	107	IL	KØJJR	20,792	226	92	MN
KE6K	11,304	157	72	AZ	N9SE	28,704	312	92	IN	KØMPH	18,020	212	85	MN
KA7PNH	10,024	179	56	WY	K9DJT	27,984	318	88	WI	KØMKL	16,716	199	84	MN
N7ESU	7,350	175	42	ID	N9TF	24,402	294	83	IL	KØYB	16,119	199	81	MO
K7VAP	6,045	155	39	WA	WB9HFK	22,264	242	92	IL	KØTLG	15,552	216	72	MN
WG7X	5,883	111	53	WA	AA9L	20,999	253	83	WI	WØDC	14,800	200	74	MN
N9NA	5,150	103	50	AZ	KR9U	19,401	223	87	IN	W8LYJ	14,308	196	73	CO
KB7N	4,048	92	44	WA	WI9WI	18,450	246	75	WI	NØBUI	12,738	193	66	MN
W7PU	3,600	100	36	WA	K9UC	18,095	235	77	WI	KØTC	11,960	184	65	MN
KB7AZ	3,542	77	46	AZ	K9CW	17,253	213	81	IL	KIØJ	11,160	155	72	CO
KU7Y	3,402	81	42	ID	W9LU	17,222	218	79	IN	NNØG	10,800	180	60	CO
KG7QXE	3,266	71	46	NV	N9DR	15,484	196	79	IN	WØPI	10,440	174	60	MN
WA7BRL	3,157	77	41	WA	AJ9C	15,123	213	71	IN	WØSD (KTØW)	9,900	198	50	SD
WA7YAZ	2,844	79	36	UT	K9DUR	14,896	196	76	IN	KØJP	9,179	137	67	MN
KC7V	2,627	71	37	AZ	KT9AC	14,874	201	74	WI	WDØBGZ	6,450	150	43	NE
KI6QDH	2,520	105	24	WY	K9IR	12,859	167	77	IL	NUØW	6,384	114	56	MN
WD7E	2,520	60	42	ID	KYØQ	12,709	179	71	IL	ACØW	6,148	106	58	MN
WB6JJJ	2,183	59	37	OR	N9LD	12,586	203	62	IN	WØUY	6,105	111	55	KS
KB7AK	2,170	62	35	WA	N9WG	11,524	172	67	IN	WO7U	5,292	98	54	MO
W8FDV	2,160	60	36	AZ	W9XT	11,076	156	71	WI	*NØUR	4,992	104	48	MN
*NN7SS (K6UFO)	2,135	61	35	WA	N9EP	11,025	147	75	IL	NWØM	4,700	100	47	MO
W7MTL	2,079	63	33	OR	KC9K	10,703	139	77	IL	K6XT	4,620	105	44	CO
K7MK	2,046	66	31	ID	KB9S	10,626	154	69	WI	KVØI	3,649	89	41	NE
WN7Y	1,925	55	35	MT	K9MMS	10,205	157	65	IL	WAØLIF	3,542	77	46	MN
NL7V	1,700	68	25	KL7	K9ZO	9,900	150	66	IL	NØGOS	3,520	110	32	CO
*N6HI	1,674	62	27	AZ	WT2P	9,639	153	63	IL	NØKIS	2,485	71	35	MO
KG7VIZ	1,485	55	27	WA	K9QQ	9,610	155	62	IL	KCØNFB	1,664	52	32	MN
K7RBT	1,350	45	30	OR	KC9EOQ	9,570	145	66	IL	NFØN	1,508	52	29	NE
K6ST	1,344	42	32	NV	K9PY	8,662	142	61	IL	KØDSL	1,260	45	28	MN
K7JSG	1,288	46	28	WA	AB9YC	7,056	144	49	IL	NYØJ	1,218	42	29	MO

Top Table

Call Sign	Score	QSOs	Mults	QTH
WØYJT	1,056	48	22	KS
ACØE	1,008	42	24	KS
*W6GMT	713	31	23	MN
WØBH	475	25	19	KS
*WB9QAF	408	24	17	MO
KAØKVW	390	26	15	CO
VE4VT	65,205	567	115	MB
VA3DF	56,500	500	113	ON
VE3TW	46,968	456	103	ON
VE3KI	43,930	382	115	ON
VE3MGY	37,344	389	96	ON
VE5KS	30,870	315	98	SK
VA7ST	22,673	287	79	BC
VE2EBK	14,475	193	75	QC
VA7KO	13,572	174	78	BC

Call Sign	Score	QSOs	Mults	QTH
VE3LVW	12,261	183	67	ON
VE3FH	8,008	143	56	ON
VE2BVV	6,900	138	50	QC
VA3PC	6,048	108	56	ON
VA3SB	5,668	109	52	ON
VE3TM	4,653	99	47	ON
VE7KAJ	4,578	109	42	BC
VE2NMB	3,810	127	30	QC
VA7MAY	3,784	88	43	BC
*VE6EX	3,300	100	33	AB
VE3SST	2,482	73	34	ON
VE3HG	2,240	64	35	ON
VA3IK	1,953	63	31	ON
VA3LR	1,450	50	29	ON
VE2NCG	1,248	48	26	QC
*VE3KJQ	1,204	43	28	ON

Call Sign	Score	QSOs	Mults	QTH
VE7BGP	570	30	19	BC
VA7ZM	532	28	19	BC
VE9AA	180	15	12	NB
VE2YUC	72	9	8	QC
XE2AU	3,360	84	40	XE
C6AAN (DF8AN)	3,008	94	32	C6
*CO6EC	56	8	7	CM
PY2NY	17,253	213	81	DX
EA8DED (OH2BP)	9,453	137	69	DX
OT6M (ON9CC)	2,484	69	36	DX
EB3A	740	37	20	DX
DLØGC (DF2SD)	40	8	5	DX

* = QRP

Scores

Call Sign	Score	QSOs	Mults	QTH	Operators
NØNI	175,644	1071	164	IA	KØGR, NØXR, WØFLS, NUØQ, NØAC, WØYR, WØBNW, NØNI
W9KKN	141,810	815	174	CA	W9KKN
NV9L	136,800	855	160	IL	NV9L, WB9Z
NE1C	128,557	899	143	MA	KX1X, K1NZ
KI6DY	119,138	839	142	KS	KI6DY, VE6RAJ
N3DPB	95,900	685	140	MD	AC3BU, WA3EKL, K3MTR, KB3VQC, AD5XI, N3DPB
N5YA	93,600	720	130	TX	N1XS, K7RSM, N5YA, N5NU, K5QE, K5KRK
K2ADA	89,750	718	125	FL	WA1PMA, K2ADA, KN4RIC
N3QE	86,112	624	138	MD	N3QE
NW8S	71,706	646	111	OH	KB8O, AB8M, NQ8O
K5RZA	68,123	563	121	TX	K5RZA, N5RZ
WTØDX	65,895	573	115	CO	WTØDX, NOØT
K3CCR	65,875	527	125	MD	N3UM, W3GB
N1MGO	63,840	570	112	MA	KB1LRL, N1MGO, WB8PKK
W4MLB	59,438	526	113	FL	K4ILG, KK4ZWC, AF4Z, WB5ZGA, N8KH, KEØNRY, N5GNA, W7TSO
KP4/K6DTT	53,603	443	121	KP4	K6DTT
W9AV	50,386	427	118	WI	W9AV
W3LL	49,476	399	124	MD	W3LL
K4XL	49,362	433	114	VA	K4XL
N7NM	48,678	399	122	WA	N7NM
K8BF	42,873	461	93	OH	K3GP, KE8JUZ, K8YLK, WA8US, AC8QG, KE8LWO, KB8TUY, K8IV, KB8AMZ, KE8LWP, N8QE, NX8G
W9JWC	36,624	336	109	IL	KD9LSV
VE2FK	36,359	353	103	QC	VE2FK
N2QT	34,771	319	109	VA	N2QT
N2BJ	33,532	332	101	IL	N2BJ
AE1EZ	29,704	316	94	NH	AE1EZ
KØYR	28,302	318	89	MN	KØYR
W2CDO	25,996	268	97	MD	W2CDO
W4JAM	25,575	275	93	VA	W4JAM
K4XY	24,338	283	86	VA	AK4AO, WBØPOH, W2WCM, KM4ADP, WA8AHZ, K3NHT, K3US, KA4CDN, WA1EM, N4ET, W4DDT
VE2CSM	22,792	296	77	QC	VE2CSM
NØAJN	21,800	218	100	CO	NØAJN
NOØL	20,080	251	80	MO	NOØL
W1IE	19,152	252	76	VA	W1IE
KD6TR	17,352	241	72	WA	KD6TR, KK6SUE
W4EE	16,490	194	85	FL	W4EE
WB4HRL	15,048	228	66	SC	WB4HRL
KA8G	14,976	192	78	OH	KA8G
K5ZG	14,773	187	79	CO	K5ZG
N9IO	14,129	199	71	IL	N9IO
NN3RP	13,987	197	71	DC	NN3RP
NR4M	13,640	155	88	VA	NR4M
N1UZ	12,545	193	65	MA	N1UZ
WØMI	11,570	178	65	KS	KDØEZS, ACØE
NJ1F	11,532	186	62	NY	NJ1F, K1RQ
W4AQL	10,320	172	60	GA	KN8U
AAØAW	10,269	163	63	MN	AAØAW
KC4D	10,065	165	61	VA	KC4D
K2MK	10,044	162	62	FL	K2MK
K7UAZ	9,792	153	64	AZ	KJ7LJX, KM6BKU, K7CHM
W4RN	9,699	159	61	VA	W4RN
WC7Q	9,570	174	55	WA	WC7Q
KEØYI	8,840	130	68	IL	KEØYI
W6SR	8,576	128	67	CA	W6SR
KD7PCE	8,174	134	61	AZ	KD7PCE
VE2PI	7,685	145	53	QC	VE2PI
N1JM	6,720	120	56	AZ	N1JM
N4ZR	6,480	108	60	MD	N4ZR
W9YK	6,480	120	54	IL	W9YK
NA5WH	6,300	105	60	FL	NA5WH
W3YY	6,213	109	57	VA	W3YY
AB3CV	6,039	99	61	MD	AB3CV
WB9TFF	6,032	116	52	WI	WB9TFF
N2YBB	5,940	110	54	NY	N2YBB
W3MAM	5,559	109	51	MD	W3MAM
KC3WX	5,292	98	54	PA	KC3WX
K3RA	5,049	99	51	MD	K3RA
KC9TZO	4,687	109	43	WI	KC9TZO
K2PAL	4,240	106	40	NY	K2PAL
N4UU	4,128	96	43	FL	N4UU
K8GT	3,850	77	50	MI	K8GT
WA9IVH	2,886	78	37	IL	WA9IVH
K4IU	2,340	60	39	MN	K4IU
AE7K	2,268	63	36	NV	AE7K, AC7Y, N7ONY
ND3D	2,263	73	31	MD	ND3D
N3MM	1,938	57	34	VA	N3MM
AB5XM	1,798	62	29	TX	AB5XM
N2MUN	1,595	55	29	NY	N2MUN
W4ER	1,566	54	29	AL	W4ER
KØTAL	1,551	47	33	CO	KØTAL
W3GVX	1,540	55	28	MD	W3GVX
KE2D	1,500	50	30	NJ	KE2D
KE5LQ	1,260	42	30	TX	KE5LQ
WDØGTY	1,178	38	31	OK	WDØGTY
K2YR	1,080	40	27	NY	K2YR
KB2URI	975	39	25	NY	KB2URI
WK1J	840	40	21	NH	WK1J
VE3JI	798	38	21	ON	VE3JI
WB4OMM	690	30	23	FL	WB4OMM
JG7PSJ	688	43	16	DX	JG7PSJ
VE3FZ	594	33	18	ON	VE3FZ
W7SLS	570	30	19	WA	W7SLS
N4LF	570	30	19	FL	N4LF
W3XOX	560	35	16	PA	W3XOX
AG6JA	285	19	15	CA	AG6JA
KA3EHL	240	20	12	FL	KA3EHL
KN3A	234	18	13	PA	KN3A
K7PAX	128	16	8	WA	K7PAX
KJ7JUD	36	6	6	WA	KJ7JUD, W7SLS
W3IDT	35	7	5	MD	W3IDT
JA7ZP	4	2	2	DX	JA7ZP

Check Logs: ACØC, AK7O, K4KZ, K8LF, K9NR, KF5BA, KM6Z, NØLEF, N8CWU, N8OO, VA3WW, VE3WRL, WØETT, W1BQ, W1N, W1NK, W1QK, W6SX, WA2MCR, WA6URY, WB1AEL

steppIR
COMMUNICATION SYSTEMS

DX
The SteppIR Advantage

DB36 40-6m 4 Element Yagi

DB42 40-6m 5 Element Yagi

The DB36 Yagi is unique among the Dream Beam series antennas in that it has a single feed line, and no relays inside the EHU's. The DB36 has a 49 ft looped driven element. This patented design allows us to make the end loop elements only 39 feet long, yet the performance is as if all 3 of the loop elements are 49 feet long. The folded dipole loop technology lets the footprint be 40% less than that of the a full sized Yagi. There are 3 active elements on 40/30m and 4 active elements on 20m-6m. The DB36 has a optional 80M dipole that allows for full coverage of the 80M band. The dipole runs parallel to the boom and uses the end elements as capacity hats, creating zero interaction with the rest of the antenna.

The DB42 MonstIR Pro is currently the largest of the DB series of Yagi antennas, with five active elements on 20m-6m and three active elements on 40/30. For those who aspire to the pinnacle of performance, the DB42 provides coverage from 80m through 6m (with optional 80m dipole kit). The dipole runs parallel to the boom and uses the end elements as capacity hats, creating zero interaction with the rest of the antenna. The DB42 has a 49 ft looped driven element. This patented design allows us to make the end loop elements only 39 feet long, yet the performance is as if all 3 of the loop elements are 49 feet long. The folded dipole loop technology lets the footprint be 40% less than that of a full size Yagi.