ARRL 10 Meter Contest 2016 Results

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It was the best of times, it was the worst of times

This line from Charles Dickens "Tale of Two Cities", and Gerry, W1VE's post-contest soapbox commentary, pretty well sums up the 44th edition of the ARRL 10 Meter Contest. While participants experienced the challenge of a low sunspot year version of this event, there were plenty of highlights. If you knew what to look for and were in the right place at the right time there was much fun to be had. Let us take a look at the sunny side of the street — pun intended.

While Dickens' story was about two cities, London and Paris, the 2016 ARRL 10 Meter Contest was about two days, Saturday and Sunday, the 10th and 11th of December. Saturday UTC time was exciting — full of wonderful and ever-changing band openings. Of all the QSOs reported during the contest 70% were from Saturday. As Bill, KO7SS summarized: "I hoped there would be a Saturday morning run just like the old days, and there was!!!" Multiple operators mentioned that when the band was open it was really open. Contesting "rate junkies" reported high QSO rates during these openings. Bob, K2DRH reported rates above 150 QSOs per hour from 20:00 to 22:00 UTC. Mike, N7MH operating at the W6YX station, found conditions even better. He reported a couple hours above 200 QSOs per hour on his way to a first-place U.S. and second-place worldwide finish in the Single Operator, Mixed Mode, High Power category. Justin, K9MU experienced a 182 hour from 21:30 to 22:30 with a peak 10-minute rate of 258 QSOs per hour! As he commented: "It was the most fun I had in a long time of radio contesting."

Other operators reported than even when the band sounded dead, it really wasn't. They just needed to call CQ as an advertisement that the band was open. Tom, N2CU's experience was typical. As he said: "On Saturday I was calling CQ to a mostly dead band when at around 14:00 TX, AR, LA, and OK suddenly began booming in. Worked 34 of them in short order. The same thing happened at 21:50 when IL stations became the go to state. 25 of them in the log quickly."

However, the 10 meter band also challenged operators with its fickle nature. That is just what it does in low sunspot years. You must work for and outthink the band to make QSOs. It is not as simple as turning on your radio and jumping in. Dave, WN4AFP described it well: "I cut my radio-teeth on 10 meters back in the 1970's and it's an amazing band! This is a contest that's not about QSO rate but about patience and endurance. There's no other band I've worked that offers the quick propagation twists and turns like this band. There were many 'burst' openings from a few minutes to a couple of hours." Or as long-time contester Bob, K3EST summarized: "The 10 meter contest teaches you a lot about propagation."

The impressive antenna arrays at CW5W. (Photo credit – Jorge, CX6VM)

One common aspect of band openings during years like this is that the opening from your QTH may be to a relatively small area on the other end. Perhaps, just a single state or country. These are called "spotlight" openings as spotlights illuminate just a small area at a time. While some operators may be disappointed by these, others take a glass is half-full perspective. Jim, KP2XX described one benefit: "this was the first year I had near zero splatter when operating in the middle of the band." When the band is not open for everyone to make QSOs to everywhere, QRM and other noise is drastically reduced. When you are search-and-pouncing (S&P) for stations calling CQ, this also means your competition is greatly reduced. You may be just one of a small handful of stations that are hearing the CQ-er, and they probably have low QRM levels on their end. So, when you call them, you work them. Paul, NG7Z had this comment on his experience: "It was almost magical to call a station just barely above the noise level and hear them come back with the exchange." Doug, N2BEG similarly said: "Very surprised to work anyone from the mobile running

100w into a MFJ Outbacker knockoff with conditions so marginal. Most came back on the first call."

When propagation has spotlight openings experienced operators also knew their operating strategies have to change. Often, station spotting methods such as skimmers and DX spotting networks cannot be relied on. Paul, KØPK said it bluntly: "Found most spots to be useless. Almost none were audible here." Longtime 10 Meter contest participant Barry, W2UP had similar comments: "Lots of rolling, spotlight Es openings. Interesting how focused they can be. Despite entering Unlimited, the cluster was fairly useless."

The question then becomes: What operating strategies do work? Generally, you have to actually sit in front of your radio, listen, and then even if you don't hear anything, call CQ in case the band it open to somewhere and everyone else is just listening. Looking at a PC screen interfaced with a spotting network may not do the job. Jim, K9YC summarized it well: "Ten meters is getting pretty close to what it was when I moved here 10 years ago -- it's possible to have some fun, but you've got to be there when it happens, and if you miss one of the few good openings, you might as well have not turned your radio on all weekend." Experienced contester Todd, WDØT created a very simple approach to the contest: "Listened a lot more than I operated, and ran in the shack when things sounded favorable, since I was in the basement doing work." It really comes down to what is happening right at your station, not what is happening elsewhere. If you want to apply technology to assist you the most useful hardware will be a panadapter or band scope tied into your own radio and antennas.

For those that accept the challenge of figuring out how to make QSOs, the results can be exciting. Calling CQ can often lead to be being called with a surprise QSO you didn't expect. Each year there are a handful of DX operators who spend most of their time S&P-ing. Then when that little spotlight of propagation from your QTH washes across them, they give you a call! During 2016 V51VJ, VP8NO, 9J2BO, TZ5XR, A31MM, and V55DX all received mentions of being logged by unsuspecting stations to their surprise and pleasure. One typical story is from Mike, VE9AA: "Fairly early Sunday morning, I was running 40 wpm meteor scatter into New England and out of the blue comes V51YJ and surprises the heck out of me. WOW! Where did you come from? " They say for golfers it just takes one good shot a round to keep you interested in the game and to go play another day. In radio contesting it may just take one of these fun QSOs to keep you interested and have you turn out for the next contest.

Top Ten – United States

Single Operator, Mixed Mode, High Power	
W6YX (N7MH, op)	532,416
N4OX	489,160
KØTT	299,676
W4TAA	202,476
W6UE (N6AN, op)	194,238
N4PN	191,136
K5YAA	182,952
K3TC	178,290
K4BAI	177,000
KØVXU	156,780
Single Operator, Mixed Mode, Low Power	
KI6RRN	299,040
KX4R	189,420
K2PS	133,284
WB8WKQ	124,432
KØOU	96,600
W2RM	92,880
WN6K	84,000
WC4H	81,624
WA8ZBT	81,176
W2TF	70,744
Single Operator, Mixed Mode, QRP	
WA6FGV	56,550
NDØC	15,048
N3UR	9,842
K2YGM	9,576
N8BB	7,946
WB2AMU	7,590
WB4GHZ	7,004
W7YAQ	6,076
AF9J	5,508
K1VUT	4,356
Single Operator, Phone Only, High Power	
W5PR	179,712
K5TR (WM5R, op)	122,808
NR5M	118,668
W4DD	100,584
AF1T	45,942
K4WDR	31,328
N8BI	28,512
KC8QDQ	21,836
W1LX	20,880
W6LP (K6SCA, op)	19,680
Single Operator, Phone Only, Low Power	
K4FCG (K1KNQ, op)	44,688
W4GKF	36,432
WD5DJW	26,240
K2SDS	22,050
WA9BZW	19,880
KB4OLM	19,178
K4PZC	17,802
WB5R	16,456
N2HMM	15,444
W3PAW	15,028
Single Operator, Phone Only, QRP	
W6QU (W8QZA, op)	5,984
KB5KYJ	2,814
NO4FX	2,016
KF4BY	1,862
NA4O	1,344
N2WN	1,216
WBØIWG	870
KC9AMM	506
KE4TZJ	340
WB6CZG	308

Single Operator, CW Only, High Power

K5NA	319,680
K1TO	289,772
KD4D	257,920
WD5K	201,620
N5FO	192,432
WJ9B	175,656
WØVTT	161,832
K5LG	156,928
K1KI	147,576
K1PT	142,140

Single Operator, CW Only, Low Power

N4WW (N4KM, op)	178,272
W3BGN	141,984
N7YK	127,120
AE5GT	124,432
K9WZB	93,940
N4IJ	79,800
W2TZ	78,864
W3SM	77,328
N4ZI	62,424
KM4D	61,128

Single Operator, CW Only, QRP

N5OE	48,564
K2YAZ	27,360
N8AP	13,728
W5GAI	13,320
W6JTI	10,540
N4AU	8,960
KS4YX	8,236
K2SM	8,008
KR2Q	7,384
WO9S	5,600

Single Operator Unlimited, Mixed Mode, High Power

N5XZ	451,510
W4ML (W4MYA, op)	386,208
WB9Z	338,040
N2PP	290,928
K5KG	276,060
W3EP	237,286
N4YDU	224,448
W1TJL	220,124
K6SRZ	215,992
KA4RRU	193,536

Single Operator Unlimited, Mixed Mode, Low Power

K5KJ	183,396
K9OM	143,364
NØAT	78,650
AAØAW	69,552
K7XC	60,720
KS1J	55,296
K7SS	52,394
KE2D	50,592
AB9YC	49,400
K1ZE	47,970

Single Operator Unlimited, Mixed Mode, QRP

N1CC	37,088
K2GMY	31,694
NK8Q	30,352
KA7T	4,150
AB8FJ	238
N3HCN	182
KB1KXL	170

Single Operator Unlimited, Phone Only, High Power

K3EST	119,100
W3LL	93,578
K9MU	70,224
W2RD	52,752
WW5TT	40,716
N1IXF	29,736
WB9JNZ	23,010
N4MM	22,064
KB1RI	20,650
WØLSD	20,090

Single Operator Unlimited, Phone Only, Low Power

K2DRH	71,736
W4ZAO	18,880
K3GWK	16,380
KB3KNX	10,032
KT4ZB	9,234
KG7GYI	8,448
N3TD	7,004
NA5NN (K2FF, op)	6,250
KW5RF	5,454
K4LDC	4,836

Single Operator Unlimited, Phone Only, QRP

N2GBR	1,880
N9NBC	272
KØTEA	224
K7ATN	16

Single Operator Unlimited, CW Only, High Power

K2SSS	250,432
N6SS	240,368
N4BP	227,840
AA3B	214,488
W7RN (K5RC, op)	208,936
NR4M	180,120
K9YC	163,096
N3RS	144,288
K6IJ	131,736
N1LN	127,872

Single Operator Unlimited, CW Only, Low Power

KH7M (KH6ZM, op)	192,600
W9XT	92,512
K6WSC	75,348
W2UP	70,144
K2DFC	63,168
KØVBU	41,968
K5WO	35,392
KØQC	32,508
W3KB	25,568
KA2D	20,000

Single Operator Unlimited, CW Only, QRP

N2KW	29,640
NØUR	17,756
K3TW	11,016
K4FT	7,344
K5NTT	2,508
W6XK	1,456
KU4A	720
K8ZT	540
WTØO	4

Multioperator, Single Transmitter, High Power

NX5M	544,258
AA1JD	378,312
NX6T	243,318
AA5B	169,608
N2BJ	154,530
KJ4IPF	137,804
W8PR	129,532
W7FSL	111,520
W4YCC	110,808
K3OQ	96,408

Multioperator, Single Transmitter, Low Power

N4SVC	129,168
W7TVC	101,520
WA1F	93,660
N4MUH	34,430
W7PU	11,580
W3KWH	11,322
WY3P	10,812
N1SOH	5,808
KB5ENP	5,520
K6EI	5,350

Top Ten - Canada

Single Operator, Mixed Mode, High Power

VE3KZ	196,420
VE9CB	17,836
VY2LI	12,876
VA3TIC	11,856
VE3TW	7,598

Single Operator, Mixed Mode, Low Power

VE1ZA	24,768
VE3WG	21,500
VE3IAE	18,522
VE3RCN	3,700
VE7BGP	2,376
VA5LF	156
VY2HF	72

Single Operator, Mixed Mode, QRP

VE6EX	1,430
VA3RKM	540

Single Operator, Phone Only, High Power

VA2KF	1,800
VA6CV	306
VE3AD	260
VE2HAY	150

Single Operator, Phone Only, Low Power

VE3RR	1,848
VE3KTB	504
VA2MO	480
VA3QWW	400
VA2QA	180
VA7AM	108
VA3GD	80
VE2HIT	50
VE6QO	18
VE3CNA	8

Single Operator, Phone Only, QRP

VE3BKM	1,656

Single Operator, CW Only, High Power

VE3PN	85,644
VE5UF	44,000
VE3FJ	28,224
VE7KW	4,288
VE3EJ	3,496
VE6BBP	3,008
VE1JS	660

Single Operator, CW Only, Low Power

VA3SY	21,140
VA7MM	16,256
VA3GUY	15,908
VA7EU	7,616
VE3ZY	7,440
VA3EC	4,752
VE7XT	4,284
VA7ST	3,904
VE3DZ	3,040
VE9HF	2,100

Single Operator, CW Only, QRP

VE3XT	2,220
VE3DQN	768
VA3PCJ	48
VE3CBK	4

Single Operator Unlimited, Mixed Mode, High Power

VE3CX	66,096
VE9AA	31,906
VE3RZ	30,800
VA7DX	28,454
VE4GV	15,738
VE1OP	10,780
VE2EBK	7,194
VE3MZD	560

Single Operator Unlimited, Mixed Mode, Low Power

VA3DF	72,652
VE3PJ	10,332
VA3KAI	9,240
VE7KCY	16

Single Operator Unlimited, Phone Only, High Power

VE3WPV	216
VE2GT	84
VE6KD	84

Single Operator Unlimited, Phone Only, Low Power

VA2BN	1,260
VA3IPG	480

Single Operator Unlimited, CW Only, High Power

VA3DX	88,976
VE7XF	23,828
VE3MA	21,488
VE2FK	4,640
VE1DT	112

Single Operator Unlimited, CW Only, Low Power

VE2FWW	30,576
VE2ZT	23,056
VE5MX	17,408
VA3MJR	6,700
VE3VSM	5,704
VE3XAT	1,800
VO2AC	64

Multioperator, Single Transmitter, High Power

VE6AO	2,060

Multioperator, Single Transmitter, Low Power

VA7DZ	42,840

Top Ten - Mexico

Single Operator, Mixed Mode, Low Power

XE3WMA	17,794
XE2AU	6,396
XE1H	2,728
XE2MWY	1,408
XE2NK	450

Single Operator, Phone Only, High Power

XE1B	56,544

Single Operator, Phone Only, Low Power

XE2O	6,396
XE2AA	3,596
XE2PEA	2,530
XE1AO	936
XE2PDZ	750
XE2OK	558
XE1DBE	280
XE2PXZ	80
XE2MZL	72
XE2MRV	28

Single Operator, Phone Only, QRP

XE2NRG	154

Single Operator, CW Only, Low Power	
XE1RZL	9,024
XE1AY	5,040
XE2MVY	4
Single Operator Unlimited, Mixed Mode, Low Power	
XE2B	63,216
XE2ST	1,210
Single Operator Unlimited, Phone Only, Low Power	
XE2JS	14,350
XE2JTS	1,548
Single Operator Unlimited, CW Only, High Power	
XE2CQ	74,100
Single Operator Unlimited, CW Only, Low Power	
XE2S	52,400
XE1EE	280
XE2FGC	48
Multioperator, Single Transmitter, Low Power	
XE3RCC	17,680
XE2VHF	930
XE2N	910

The View from a Contest Founder

The first ARRL 10 Meter Contest was held in 1973 with Larry, WØPAN and Bob, K8IA providing the energy and inspiration. A history of the contest can be found on page 21 of the Extended Version of the 2011 Contest Results at: www.arrl.org/contest-results-articles. Larry was on the air during 2016 and I asked him, as a participant in 44 consecutive contests, to tell us how things went from his perspective:

"Over the years, I have participated in all of the 10 meter contests and have seen good and bad conditions. Until I moved to Arizona, I usually had a good antenna system but am HOA-challenged and use my vertical sitting on the ground in an 8-tree orange grove. You would think that since I am the President of the 2,400 home HOA I would be able to do something better – not yet however. This year it was a particularly challenging contest as the only reliable and consistent openings were to South America. Only a few times, the central U.S. popped in for some Q's. Managed to snag a few East Coasters with very heavy QSB on them. Rough going with my 150 watts and search and pounce! At age 78 and continuously licensed since 1953, I thoroughly enjoy the 10 Meter contest and plan to participate in many more in the future. I hope to take advantage of better conditions as the sun spot cycle improves at least one more time. This year, with the rapid QSB when the band opened a little bit to Arizona, the challenge was to talk fast before the band conditions shut 10 meters down. Thanks to all those who got on CW making life a little easier with the QSB situation. It was great to work the regular contesters." We all look forward to working Larry in future contests as well! See you down the log.

Continental Winners	Call	Score
Africa		
Single Operator, Mixed Mode, Low Power	V55DX	44,298
Single Operator, Phone Only, High Power	ZS1CO	2
Single Operator, Phone Only, Low Power	EA8CZK	11,232
Single Operator, CW Only, High Power	3B9HA	24,000
Single Operator, CW Only, Low Power	V51YJ	95,732
Single Operator Unlimited, Phone Only, High Power	EA8DET	7,344
Single Operator Unlimited, Phone Only, Low Power	ED8B	21,824
Single Operator Unlimited, CW Only, High Power	ZS6WN	24,892
Single Operator Unlimited, CW Only, Low Power	CN8KD	4,284
Multioperator, Single Transmitter, Low Power	EA8AH	132,264
Asia		
Single Operator, Mixed Mode, High Power	A93JA	33,840
Single Operator, Mixed Mode, Low Power	JR1MEG	8,046
Single Operator, Mixed Mode, QRP	JR1UJX	1,890
Single Operator, Phone Only, High Power	JA7OWD	4,928
Single Operator, Phone Only, Low Power	JS6TQS	1,210
Single Operator, Phone Only, QRP	7N4WPY	336
Single Operator, CW Only, High Power	HSØZIA	35,256
Single Operator, CW Only, Low Power	4XØA	8,976
Single Operator, CW Only, QRP	JQ1NGT	6,984
Single Operator Unlimited, Mixed Mode, High Power	5B4AIF	12,880
Single Operator Unlimited, Mixed Mode, Low Power	JA1BPA	11,842
Single Operator Unlimited, Mixed Mode, QRP	JK1TCV	1,064
Single Operator Unlimited, Phone Only, High Power	JH1CML	4,650
Single Operator Unlimited, Phone Only, Low Power	BG8TFN	518
Single Operator Unlimited, CW Only, High Power	E2A	13,680
Single Operator Unlimited, CW Only, Low Power	JL3MCM	6,080
Single Operator Unlimited, CW Only, QRP	BA4DL	3,968
Multioperator, Single Transmitter, Low Power	TC4A	1,066
Europe		
Single Operator, Mixed Mode, High Power	LY9Y	12,320
Single Operator, Mixed Mode, Low Power	ZB2TT	11,026
Single Operator, Mixed Mode, QRP	EA6SX	2,440
Single Operator, Phone Only, High Power	CT1DVV	13,120
Single Operator, Phone Only, Low Power	EB1DJ	960
Single Operator, Phone Only, QRP	I5KAP	112
Single Operator, CW Only, High Power	RA7A	12,876
Single Operator, CW Only, Low Power	CS7AJL	5,704
Single Operator, CW Only, QRP	US5VX	1,012
Single Operator Unlimited, Mixed Mode, High Power	PI4DX	68,080
Single Operator Unlimited, Mixed Mode, Low Power	RU7A	16,640
Single Operator Unlimited, Mixed Mode, QRP	OT6M	414
Single Operator Unlimited, Phone Only, High Power	DL2ARD	24,288
Single Operator Unlimited, Phone Only, Low Power	CT1BXT	216
Single Operator Unlimited, Phone Only, QRP	G7KXZ	1,258
Single Operator Unlimited, CW Only, High Power	EF5Y	51,920
Single Operator Unlimited, CW Only, Low Power	EA7RM	7,592
Single Operator Unlimited, CW Only, QRP	UA6ARR	1,512
Multioperator, Single Transmitter, High Power	ED5T	15,048
Multioperator, Single Transmitter, Low Power	IT9YVO	2,556
North America		
Single Operator, Mixed Mode, High Power	HP3SS	170,724
Single Operator, Mixed Mode, QRP	HR2DMR	33,894
Single Operator, Phone Only, High Power	KP2XX	65,772
Single Operator, Phone Only, Low Power	TG9ADQ	13,020
Single Operator, Phone Only, QRP	TG9ANF	41,064
Single Operator, CW Only, High Power	KP2M	228,468
Single Operator, CW Only, Low Power	NP3A	136,640
Single Operator, CW Only, QRP	CO6RD	5,304
Single Operator Unlimited, Mixed Mode, High Power	NP2P	322,014
Single Operator Unlimited, Mixed Mode, Low Power	HI3CC	48,990
Single Operator Unlimited, Phone Only, Low Power	KP2DX	10,150
Single Operator Unlimited, CW Only, High Power	KP2Q	196,872
Single Operator Unlimited, CW Only, Low Power	VP5CW	65,280
Multioperator, Single Transmitter, High Power	WP3E	34,568
Multioperator, Single Transmitter, Low Power	VP2VGG	335,400

Oceania		
Single Operator, Mixed Mode, High Power	A31MM	106,398
Single Operator, Mixed Mode, Low Power	VK4LAT	3,250
Single Operator, Phone Only, High Power	VK2CZ	7,488
Single Operator, Phone Only, Low Power	VK2NSS	7,946
Single Operator, Phone Only, QRP	DU4DXT	492
Single Operator, CW Only, High Power	ZM2B	46,060
Single Operator, CW Only, Low Power	VK2IG	11,808
Single Operator Unlimited, Mixed Mode, High Power	9M6XRO	13,376
Single Operator Unlimited, Mixed Mode, Low Power	YC6MYO	2,964
Single Operator Unlimited, Phone Only, High Power	VK4QH	960
Single Operator Unlimited, Phone Only, Low Power	9W6MUL	164
Single Operator Unlimited, CW Only, High Power	VK4SN	33,480
Single Operator Unlimited, CW Only, Low Power	VK7CW	6,392
South America		
Single Operator, Mixed Mode, High Power	4M1K	556,624
Single Operator, Mixed Mode, Low Power	PR9M	191,694
Single Operator, Mixed Mode, QRP	PU2RTO	2,968
Single Operator, Phone Only, High Power	CX2DK	283,934
Single Operator, Phone Only, Low Power	LU8VR	85,008
Single Operator, Phone Only, QRP	PU2TRX	1,232
Single Operator, CW Only, High Power	LU6UO	14,896
Single Operator, CW Only, Low Power	XR2K	128,520
Single Operator, CW Only, QRP	LU6DO	168
Single Operator Unlimited, Mixed Mode, High Power	PX2V	195,778
Single Operator Unlimited, Mixed Mode, Low Power	PJ2T	353,078
Single Operator Unlimited, Phone Only, High Power	LU1FKR	166,716
Single Operator Unlimited, Phone Only, Low Power	3G1D	52,114
Single Operator Unlimited, Phone Only, QRP	CE3WYZ	720
Single Operator Unlimited, CW Only, High Power	PS2T	425,088
Single Operator Unlimited, CW Only, Low Power	CX4SS	240,384
Single Operator Unlimited, CW Only, QRP	LT7H	32,832
Multioperator, Single Transmitter, High Power	CW5W	1,064,850
Multioperator, Single Transmitter, Low Power	FY5KE	558,656

Perspective Of a South American Powerhouse

The CW5W call sign is familiar to many ARRL 10 Meter Contest participants. Their regular participation, strong competitive drive, and booming signal out of Uruguay makes them an entry in many logs. In 2016, their commitment once again powered them to first place worldwide in the Multioperator, High Power category.

The CW5W team is all smiles after another winning effort. Front to back are: Claudio, CX4DX; Wilder, CX6DRA; and Jorge, CX6VM. Missing is Alan, CX5UA. Notice all the plaques on the wall! (Photo credit – Jorge, CX6VM)

Jorge, CX6VM is the leader of this team and here is his story of the contest: “Winter weather had done a number on the 10 meter arrays, and the ARRL 10 Meter contest was fast approaching. Our long term goal of using two radios on the band — one on CW, one on SSB — would have to wait until next year. One by one, the 10 meter antennas were pulled off the towers, repaired, hauled back up the towers and correctly aimed. The stacks for U.S. East Coast/Europe and U.S. West Coast/Japan were up again, and working FB!

“The date was fast approaching, and few friends had committed to coming to CW5W to work the contest; a date too close to the holidays, too many activities related to work/family/children reduced the team even more. A week before the contest, only Wilder, CX6DRA and Claudio, CX4DX had confirmed their participation. The defense of our 2015 Multioperator, High Power category win was in doubt.

“Both Wilder and Claudio arrived the day before the contest, and we quickly set up the shack. One of the Stackmatch units didn’t work properly, but after a few hours work we were able to get it going. Our big decision: go for multi-single with only one CW operator, or stay SSB only with 3 operators! Alan, CX5UA finally made the decision clear for us, when he confirmed he would be over on Saturday to help with the CW operation. That gave us CX6DRA and CX4DX for SSB, with CX6VM and CX5UA for CW. We were finally ready to rock as CW5W Multioperator!

“The contest started with poor propagation; QSOs came slowly. Our strategy was to ask every QSO to work us on the other mode if they were a needed mult; we did not know if we would ever hear them again. We even asked a number of ‘easy’ multipliers, both states and countries, to QSY. We felt we would need every mult we could get. As the contest continued, we had a nice time chatting with friends, eating good asados, and monitoring our competition (ZW5B, CX4AT, and PX2B). Judging from the numbers that we were giving out, we knew we were competitive with everyone, but one never knows about the breakdown between SSB and CW, nor how many mults each team had worked.

“Although smaller than past years, we believed our QSY strategy was correct and had great faith in our multiplier total taking into account the poor propagation. Good friends, good food, good competition! After comparing notes with our competitors after the contest and reading the 3830 posts, it looks like our QSY strategy made the difference — we were 30 mults above our nearest competitor! I´d like to thank the ops that have come to El Mangrullo over the years, knowing how far the station is

from their homes, and to all that gave us a QSO (or two) during this contest. A big thanks to those that QSYed for us. You made the difference!"

Top Ten - DX

Single Operator, Mixed Mode, High Power

4M1K	556,624
OA4SS	267,168
P4/DL6RAI	175,056
HP3SS	170,724
A31MM (JA6WFM, op)	106,398
A93JA (KE5JA, op)	33,840
KP4JRS	23,310
LY9Y	12,320
G4FKA	10,112
UA9BA	9,842

Single Operator, Mixed Mode, Low Power

PR9M (PY9MM, op)	191,694
LW1EUD	106,106
V55DX	44,298
PY2XIZ	39,760
PY1AX	38,624
LU6FLZ	18,500
PY2EX	14,186
EA8AQV	12,600
ZB2TT	11,026
PV8DX	9,590

Single Operator, Mixed Mode, QRP

HR2DMR	33,894
PU2RTO	2,968
EA6SX	2,440
JR1UJX	1,890
JH7UJU	1,260
VU2UR	1,080
WP4WV	682
UT7MT	490
YO4AAC	160
JR2EKD	110

Single Operator, Phone Only, High Power

CX2DK	283,934
PY5ZD	182,810
KP2XX	65,772
J79WTA	57,908
YV6CR	39,744
LU9FHF	26,950
WP4YL	18,620
TG9IIN	18,400
CT1DVV	13,120
LU3DX	11,340

Single Operator, Phone Only, Low Power

LU8VR	85,008
ZV2C	84,304
LU7DH	56,392
LT7F (LU6FOV, op)	33,280
LU9DDJ	18,300
PU2XDX	17,388
LU1EY (LU6DPP, op)	16,732
LU6FHO	15,744
LU9VD (LU9VEA, op)	15,272
ZP6DYA	14,976

Single Operator, Phone Only, QRP

TG9ANF	41,064
PU2TRX	1,232
DU4DXT	492
7N4WPY	336
JA1NEZ	238
JH3DMQ	140
I5KAP	112
HK4KM	48
VK2FGLB	16
PI35ETL (@PDØPMS)	8

Single Operator, CW Only, High Power

KP2M (KT3Y, op)	228,468
ZM2B	46,060
HSØZIA	35,256
KP4/K7GM	31,680
VK2GR	24,864
3B9HA (GØCKV, op)	24,000
HSØZLM	15,480
LU6UO	14,896
JA6GCE	14,432
RA7A	12,876

Single Operator, CW Only, Low Power

NP3A	136,640
XR2K (CE2LML, op)	128,520
CB3R	120,080
PP1CZ	117,952
V51YJ	95,732
LU1ICX	49,500
LU3MAM	49,056
LU5FF	39,576
CO2RQ	27,416
EA8CN	27,416

Single Operator, CW Only, QRP

JQ1NGT	6,984
CO6RD	5,304
JA1YNE (JR1NKN, op)	4,488
4X1IF	3,724
US5VX	1,012
RT4W	720
UT9EZ	288
7K1CPT	280
RW3AI	240
LU6DO	168

Single Operator Unlimited, Mixed Mode, High Power

NP2P	322,014
PX2V (PY2KJ, op)	195,778
NP2X (K9VV, op)	188,496
CE2MVF	157,248
PI4DX (PD1DX, op)	68,080
EA6URA (EA3AIR, op)	23,392
RK4FL	18,920
PA3AAV	15,522
R7AB (R7DA, op)	15,232
DH8BQA	14,400

Single Operator Unlimited, Mixed Mode, Low Power

PJ2T (WØCG, op)	353,078
LU1FAM	145,782
ZW8T (PS8HF, op)	66,992
PP5BZ	58,824
HI3CC	48,990
TI8/AA8HH	45,140
LU2FE	30,866
RU7A	16,640
PP6ZZ	12,648
JA1BPA	11,842

Single Operator Unlimited, Mixed Mode, QRP

JK1TCV	1,064
OT6M	414
UT1DX	288
PE2K	168
YP8W	144

Single Operator Unlimited, Phone Only, High Power

LU1FKR	166,716
CE3WW	84,132
LO7H (LU7HW, op)	78,392
PY5AB	48,816
PY5IN	28,800
DL2ARD	24,288

PY2ZZ	22,366
PY1FI	16,074
PY3PA	14,310
ZP5BVK	14,112
Single Operator Unlimited, Phone Only, Low Power	
3G1D (XQ1FM, op)	52,114
PU2PSP	38,592
PP1WW	26,536
ED8B (EA8CZT, op)	21,824
PY5FO	17,888
YV6YV	13,542
PY2ZR	12,600
KP2DX (KP2BH, op)	10,150
PU5BOY	7,920
PP5DZ	7,380
Single Operator Unlimited, Phone Only, QRP	
G7KXZ	1,258
CE3WYZ	720
Single Operator Unlimited, CW Only, High Power	
PS2T (PY2ZEA, op)	425,088
KP2Q (K3TEJ, op)	196,872
KP3W	151,088
LU7YS	139,060
HK1MW	113,520
EF5Y (EA5FR, op)	51,920
VK4SN	33,480
PP5EJ	28,812
ZS6WN	24,892
S57Q	16,112
Single Operator Unlimited, CW Only, Low Power	
CX4SS	240,384
LU4EG	71,400
PY5AKW	67,600
VP5CW (W5CW, op)	65,280
3G3O (CE3OP, op)	56,196
PY4XX	43,616
PY4HO	35,200
LU4HK	26,040
PX1M (PY1MK, op)	11,748
EA7RM	7,592
Single Operator Unlimited, CW Only, QRP	
LT7H (LU7HZ, op)	32,832
BA4DL	3,968
UA6ARR	1,512
MWØBRO	252
JG1EIQ	72
HA3HX	60
Multioperator, Single Transmitter, High Power	
CW5W	1,064,850
ZW5B	850,108
PP5ME	736,062
CX4AT	723,100
PX2B	646,920
PY3UEB	566,398
LU1DK	145,848
L77D	101,184
PY6AA	59,840
WP3E	34,568
Multioperator, Single Transmitter, Low Power	
FY5KE	558,656
VP2VGG	335,400
J68HF	183,992
PW1A	143,524
EA8AH	132,264
PP5BLU	55,902
CW1DC	27,492
LQ7E	17,368
ZW5TR	11,266
PR1M	3,450

ARRL Affiliated Club Competition

Club competition continues to be a popular and fun aspect of this contest. Operators get a chance to be part of a team while still operating from their home QTH. For many of us it is motivating to get on the air to make some points for our club or to compete for honors against fellow club members. Many operators mention in their soapbox comments something similar to: "Wanted to get on the air to make some points for our club." Just another way to have some fun on a December weekend.

In 2016, a total of 815 operators submitted logs that were also credited towards ARRL Affiliated Club Competition. This means about 50% of the W/VE operators were part of one of the 64 different clubs that participated. Given the conditions this year club organizers were key in motivating folks to get on the air. Way to go club organizers!

Local Clubs

	Score	*Entries*
Central Virginia Contest Club	755,572	9
Kansas City Contest Club	424,414	8
New Mexico Big River Contesters	279,504	3
Niagara Frontier Radiosport	264,668	7
Redwood Empire DX Assn	253,456	4
Sussex County ARC	121,956	4
North Carolina DX and Contest Club	106,960	3
Maritime Contest Club	74,170	6
Delara Contest Team	62,754	4
Sunday Creek Amateur Radio Federation	57,844	5
Bristol (TN) ARC	50,484	4
Contoocook Valley Radio Club	49,414	3
Orange County ARC	37,460	4
Portage County Amateur Radio Service	34,716	3
599 DX Association	33,258	3
Spokane DX Association	27,348	4
West Park Radiops	24,030	3
Skyview Radio Society	14,598	6
Ventura County Amateur Radio Society	12,150	3
Oakland County Amateur Radio Society	10,888	3
Mt Vernon (OH) ARC Contesters	8,638	3
Stanwood Camano Amateur Radio Club	7,764	3
Hughes ARC	3,646	3
Clark County Amateur Radio Club	736	3

In the Local category, the Central Virginia Contest Club (CVCC) took top honors among the 24 clubs in this category. In doing so, they have now won this category the last 4 years running and 5 out of the last 6! Their 9 entrants combined for a bit more than 750,000 points.

Entrants from the Central Virginia Contest Club

Station call sign and score in 1,000s of points

K4OSO (1)	KG4W (66)	KJ4IPF (138)	N3UA (109)
W4DR (1)	W4ML (386)	W4PM (19)	WB4GVZ (30)
WD4LBR (7)			

Though well down from their more than 1.8 million points in 2015 it was enough for a solid victory. Their success formula this year? Member turnout. They had more submitted scores than any other Local Category Club.

Medium Clubs

	Score	*Entries*
Florida Contest Group	2,210,726	47
Northern California Contest Club	1,685,598	34
Arizona Outlaws Contest Club	1,603,992	42
Yankee Clipper Contest Club	1,576,286	50
Frankford Radio Club	1,042,828	29
Southern California Contest Club	857,532	20
Texas DX Society	852,952	8
Contest Club Ontario	673,520	24
Alabama Contest Group	585,400	11
Central Texas DX and Contest Club	530,916	8
Grand Mesa Contesters of Colorado	501,384	15
Georgia Contest Group	494,150	9
South East Contest Club	459,112	12
Northeast Maryland Amateur Radio Contest Society	445,552	13
North Texas Contest Club	434,776	4
DFW Contest Group	432,546	15
Mother Lode DX/Contest Club	336,402	11
Willamette Valley DX Club	254,382	9
Kentucky Contest Group	253,466	12
Hampden County Radio Association	233,406	12
Rochester (NY) DX Assn	228,562	7
Western Washington DX Club	221,470	9
Mad River Radio Club	177,286	14
Hudson Valley Contesters and DXers	169,394	9
North Coast Contesters	157,188	5
Utah DX Association	148,944	6
CTRI Contest Group	144,792	4
Tennessee Contest Group	111,068	7
Carolina DX Association	100,598	5
Big Sky Contesters	78,548	6
Order of Boiled Owls of New York	77,966	6
Orca DX and Contest Club	64,866	6
Saskatchewan Contest Club	61,564	3
Swamp Fox Contest Group	46,620	9
Pacific Northwest VHF Society	21,076	3
Contest Group du Quebec	12,214	5
Six Meter Club of Chicago	9,984	6

In the popular and always competitive Medium category, 37 clubs fought it out. In the end, the 47 members of the Florida Contest Group (FCG) came out on top by a wide margin over the Northern California Contest Club.

Entrants from the Florida Contest Group

Station call sign and score in 1,000s of points

AD4ES (45)	AD4Z (15)	AF4RK (3)	K1PT (142)
K1TO (290)	K2PS (133)	K3SEN (22)	K3SV (12)
K3TW (11)	K4ADR (1)	K4EJ (3)	K4FCG (45)
K4LM (3)	K4LQ (138)	K4MF (21)	K4SXT (13)
K5KG (276)	K8MR (56)	K9HXO (1)	K9OM (143)
KK4AND (3)	KK4LGC (2)	KM4HI (50)	KS3K (1)
KT4Q (100)	KT8TD (2)	NØSMX (3)	N2ESP (1)
N3GD (6)	N4BP (228)	N4EK (30)	N4KS (41)
N4LF (5)	N4LZ (2)	N4MUH (34)	N4TB (1)
N4WW (178)	N6AR (43)	NJ2F (12)	NN4X (9)
NX4N (4)	W4CU (65)	W4LT (1)	W4MRJ (2)
W4ZGR (2)	WA8QYJ (10)	WB4OMM (4)	

FCG's success formula? Participation. They had the second-most entrants of any Medium club. This allowed them to finish ahead of other clubs with much higher average scores per member. In fact, their average score per member was only 7th among all Medium clubs. Two Texas clubs more than doubled FCG's scores per member.

In the Unlimited category, only three clubs fought it out in 2016, all with similar numbers of entrants. Congratulations to the 72 members of the Potomac Valley Radio Club (PVRC) who came out on top by a comfortable margin. They once again found themselves at their usual first-place position after being dethroned in 2015 by the Yankee Clipper Contest Club. This means the PVRC has now won the Unlimited category 4 of the last 5 years. PVRC's success formula was having high-scoring members —More than 50% higher than second-place Minnesota Wireless Association.

Unlimited CLubs

	Score	*Entries*
Potomac Valley Radio Club	2,380,662	72
Minnesota Wireless Assn	1,636,258	77
Society of Midwest Contesters	1,634,730	71

Entrants from the Potomac Valley Radio Club

Station call sign and score in 1,000s of points

4U1WB (20)	AB1AX (1)	AB3CV (12)	AI1W (5)
AK4D (2)	K3AJ (41)	K3AU (14)	K3CCR (79)
K3KU (1)	K3MAW (1)	K3MM (6)	K3OQ (96)
K3ORC (4)	K3TC (178)	K3TD (2)	K3YDX (19)
K3ZU (104)	K4FTO (12)	K4GM (1)	K4GMH (5)
K4HQK (4)	K4MIL (6)	K4ORD (30)	K4SO (98)
K4XL (13)	K5VIP (20)	K7SV (50)	K8GU (1)
KA4RRU (194)	KD4D (258)	KE4S (4)	KH6/AB3WS (1)
KK4VA (12)	KQ4LA (11)	N1LN (128)	N1SZ (2)
N2YO (3)	N3ALN (15)	N3HEE (1)	N3JT (1)
N3KN (3)	N3QE (18)	N3TD (7)	N3VOP (7)
N3ZV (34)	N4CF (23)	N4CW (58)	N4DJ (14)
N4MM (22)	N4PD (59)	N4QWF (3)	N4UEZ (1)
N4VA (13)	N4XYZ (6)	N4YDU (224)	N8HM (3)
N8II (63)	ND3D (7)	W2CDO (10)	W2YE (18)
W3CB (51)	W3DQ (55)	W3GVX (7)	W3IUU (23)
W3LL (94)	W3MBC (4)	W4PK (4)	W4YE (17)
WA3AER (14)	WA3EKL (32)	WB2ZAB (26)	WY3P (11)

Additional Analysis and Insights

In the five prior years I have written about the ARRL 10 Meter Contest, I have provided each additional in-depth analysis beyond the results and people. My intent was to provide insight into contest strategy and planning, how the 10-meter band behaves, or just something to satisfy my, and hopefully your, curiosity. In past years I examined the following topics. These articles can be found on the ARRL web site in the 10 Meter Contest Expanded Results articles (**www.arrl.org/contest-results-articles**).

2011

- A Skimmer View of the Contest -- looking at Europe, Asia, and South America openings
- Skimmer Spots Counts as a way to Predict Scores?
- Phone versus CW Mix -- A magic formula?
- A Bit of Contest History

2012

- A Skimmer View of the Contest -- looking at the North America to Europe Opening as well as some perspectives on skimmer spot quality and usage.
- Contest Planning Insights -- characterizing the locations and activity levels in the U.S. by state.

2013

- A look into the North America to Europe opening
- Contest logging program usage

2014

- Breakthrough animated movies of propagation from the U.S. to major contest areas.
- A look at late evening activity in the U.S. and its impact on three close races
- A updated look at contest logging program usage
- New world records established in 2014
- So how many stations really were on the air and how many QSOs were made?

2015

- A updated look at contest logging program usage
- New world records established in 2015
- Total contest activity – how many stations were on the air and how many QSOs did they make?
- Investigating propagation differences in the U.S. between 2014 and 2015

This year I am going to take a deeper look into typical 10-meter propagation in a two-step process. The first is to construct time lapse movies of every QSO reported in the lower 48 U.S. states. Then using these maps, you will be able to see, in action, three typical propagation methods that occur during the 10 Meter Contest. After the propagation investigation, you will find an updated view of entry category usage now that we are three years into the Unlimited category era. You will then find an update on new World, W/VE/XE, and DX records. After that will be my annual update on contesting logging program usage and then I will close with some predictions for 2017.

Another View of 10-meter Propagation

In every article I have written about the ARRL 10 Meter Contest I have presented some sort of analysis on propagation during the weekend. With the contest moving into it "low sunspot years" mode I thought it would be interesting to come up with a way to demonstrate visually where, when, and how QSOs were made during the 2016 edition. This should help you understand how 10-meters is going to work for the next few years and help you develop operating strategies to maximize your fun and score.

To accomplish this investigation, I did two things. First, I updated and improved on some of the software tools I used in past years. Specifically, I developed a way to create maps of the lower-48 U.S. states that plot every single QSO reported during the contest. By generating maps in small incremental time slices and stitching them together into a time lapse movie format you can actually see QSOs being made over time. This achieves the "where and when QSOs were made" insight.

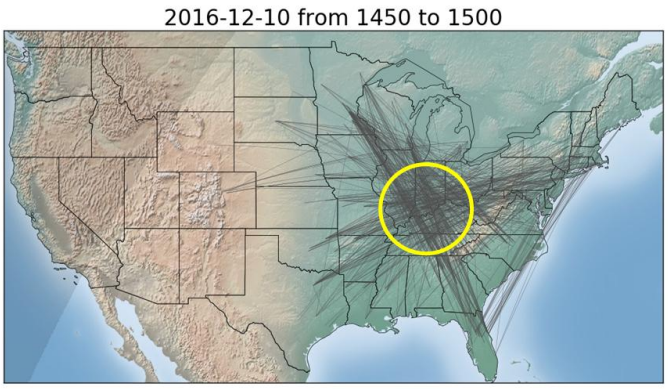
Achieving the second part, "how QSOs were being made," requires a bit of investigatory wizardry and knowing what to look for. Based on my past studies and readings on the topic, I have a basic technical knowledge of propagation. I also asked well known author of propagation articles and the National Contest Journal "Propagation" column, Carl Luetzelschwab, K9LA to review this work. He graciously accepted and offered valuable insight, suggestions, and additional forms of analysis.

What were the findings? First, it is fun to watch the movies to see the where and when QSOs were made. They can be found on the following links:

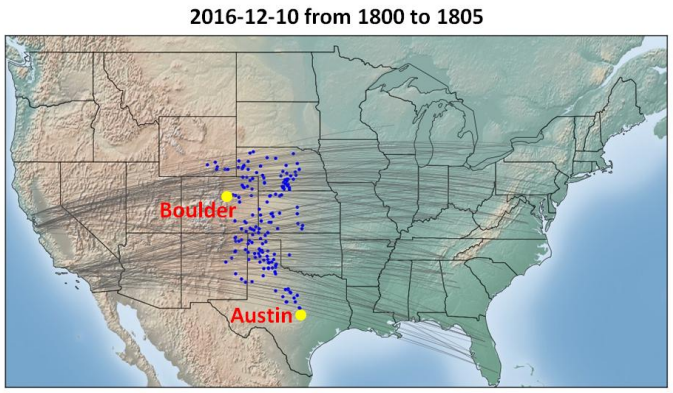
Day 1 - **vimeo.com/213927084**
Day 2 - **vimeo.com/213927356**

If you want to think of it this way, the advantages of 2016's propagation and QSO totals being reduced from past years, is that these movies are readable. If three or even five times as many QSOs had occurred, these maps would be impossible to read as one big blob of lines. Likely, I would have had to do some sort of sampling to reduce the number of lines being drawn.

So, what is the answer to "how the QSOs were made"? Let's look at some maps as examples. This first one is from 14:50 UTC on Saturday. Notice the high number of QSOs with the midpoint of the path being in the Midwest – centered over southern Illinois, Indiana, southwest Ohio, Kentucky, and northern Tennessee.



A sporadic-E cloud developed over the Midwest on Saturday.



Likely F2 layer propagation on Saturday supporting long distance QSOs. Just like the good old days!

The midpoint of these QSOs is where the reflection of the signal is occurring in the ionosphere. The signal travels up from the transmitting station, enters the area where the ionosphere supports reflection of 10-meter frequencies, and then travels back down again to the receiving station. Though it is not shown on this map, these QSOs were largely in the distance range of 500 to 1,200 miles. This is the typical distance range for classic E-skip propagation. There are other ways based on ionosondes to tell if this is E-skip, and we will see them later in another example. For now, just believe that it is highly likely that these QSOs were made possible by sporadic-E ionization. Another characteristic of sporadic-E is that the "cloud" of ionization drifts over time, just like the visible clouds we see in the sky. Often these sporadic-E clouds drift to the north or northeast. Here is an excerpt of the overall Saturday QSO movie from 20:00 UTC to 22:40 UTC. You can see how the center of QSOs does in fact drift to the northeast before eventually dissipating an hour or so later.

E-cloud drift - **vimeo.com/213927996**

How cool is that? In hindsight, this was a very strong and long-lived E-skip event lasting most of the day on Saturday. Often such E-skip propagation is much shorter in duration. This propagation was a pleasant surprise for operators during 2016.

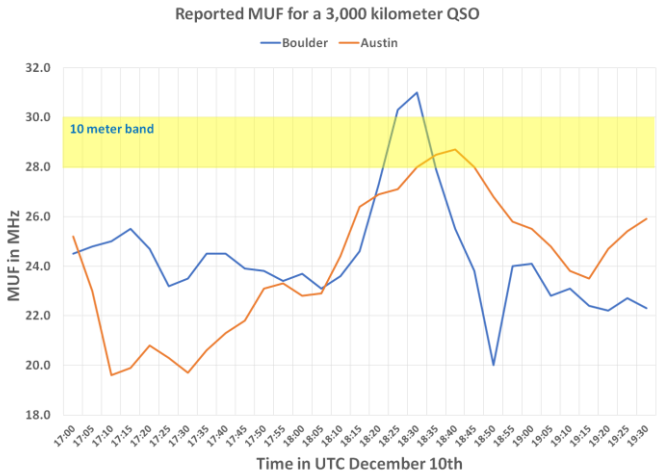
The second example is from 18:00 UTC on Saturday. In this case, this map only shows QSOs of greater than 1,500 miles with one of the stations being in California. The midpoint of each QSO is also indicated. Filtering down to this view makes it much easier to see what was going on.

The reason to look at just longer QSOs is that these QSOs can't be accomplished using one skip via the E layer. The E layer is just not high enough. For QSOs longer than 1,500 miles, something else has to come into play. Either F2 propagation or multi hop E-skip must be occurring. F2 layer propagation supports the long-distance QSOs that many of us enjoy in high sunspot years, such as from U.S. to Europe or Japan. The challenge is that F2 layer propagation needs high solar radio flux to energize the ionosphere sufficiently to refract 10-meter signals. With solar flux levels in late 2016 in the 70-75 range this is not something you would normally expect. But in this case, for short periods of time on both Saturday and Sunday, it likely happened. And for those who caught these openings they were rewarded with high QSO rates of nice strong signals – just like in the good old days.

Why do we think these QSO may be due to F2 propagation? We can look at ionosonde data. Per the HFUnderground Wiki: "An ionosonde or ionospheric sounder (colloq. chirpsounder), is a specialized radar system for the examination of the ionosphere. An ionosonde is used for finding the optimum operation frequencies for broadcasts or two-way communications in the high frequency range." (**www.hfunderground.com/wiki/Main_Page**) Luckily, there are two ionosonde reporting stations located reasonably near the midpoints of these QSOs: Boulder, Colorado and Austin, Texas.

One of the data items reported by an ionosonde is the F2 Maximum Usable Frequency (MUF) for a signal traveling 3,000 kilometer or 1,865 miles. The MUF is the highest frequency that can be refracted back to earth by the F2 layer at a designated distance from a fixed point. Any signals with higher frequencies will just travel into outer space. Here are plots of the MUF's being reported from the two ionosondes previously mentioned. You can

see that for a tantalizing few minutes the MUF's did rise above 28.0 MHz at both locations.

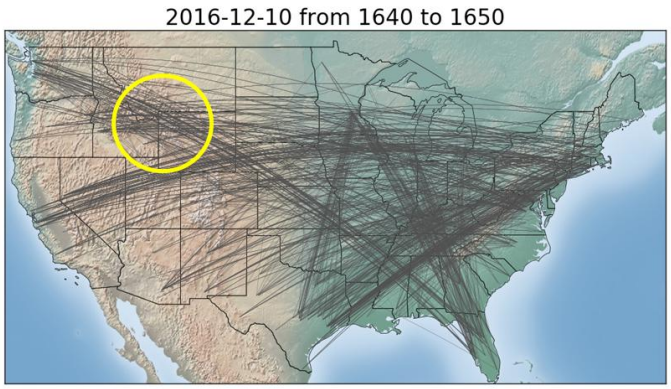


Ionosonde data showed sufficient ionization in the F2 layer to support propagation on 10 meters. (Data from Digital Ionogram Database and the Lowell GIRO Data Center)

This was enough for the band to open and during that period QSOs flew from coast to coast. However, you can see from the movies that QSOs based on this F2 layer were occurring from roughly 1645 to 1930 UTC. But, the reported MUF was only above 28.0 MHz for a short period between 18:00 and 18:45 UTC. How were all these QSOs possible? Another aspect of F2 propagation is that, for these same conditions, the MUF for a QSO longer than 3,000 kilometers is even higher – up to a point where nothing is going allow the QSO to occur. Looking at the data from this period of time there were QSOs up to and beyond 3,800 kilometers being made. So, QSOs were possible even when the 3,000-kilometer MUF was below 28 MHz. For those who were on the air Saturday morning and commented on amazing conditions, this is what was behind it. A similar opening occurred on Sunday, just not quite as strong and as long.

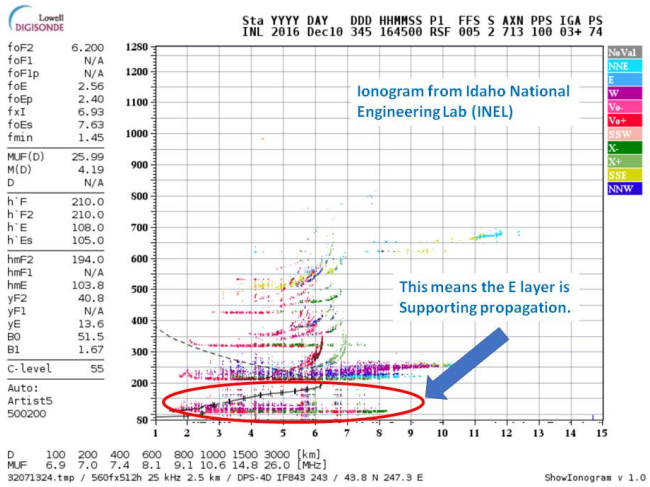
There is another way long-distance QSOs can occur during low sunspot year and this is by having two skips or hops via E-layer propagation. For this mode to work you need two different sporadic-E "clouds" to form. Then, they need to be located at just the right distance from each other so that a signal after being reflected down from the first cloud bounces back up off the ground into the second cloud. During 2016 just such a situation developed for a period on Saturday, supporting QSOs between the northwest and southeast portions of the country. Because of the "more moving parts" involved with these QSOs they are harder to see on the maps, but when you know where to look they pop right out.

First, here is the QSO map from 16:40 UTC on Saturday. You can see a sporadic-E "cloud" forming over the western Wyoming, eastern Idaho, southern Montana region.



Another sporadic-E cloud develops Saturday over the northern Rockies.

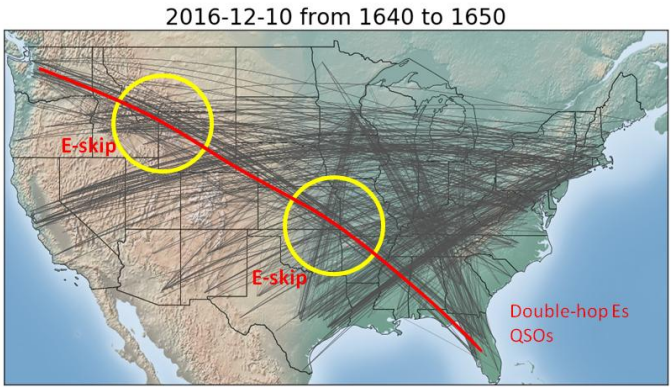
There is an ionosonde in the area at the Idaho National Engineering Lab whose data shows the E-layer is what was supporting 10-meter propagation. In fact this specific cloud was probably supporting propagation up to around 40 MHz – just under the 6-meter band. There is not enough space in this article to offer a full interpretation of the ionogram to explain how we know that. If you are interested there are plenty of references and articles to be found online, such as at www.ukssdc.ac.uk/ionosondes/ionogram_interpretation.html.



An ionogram showing an active E layer capable of supporting propagation on 10 meters. (Chart from Digital Ionogram Database and the Lowell GIRO Data Center)

When this cloud formed, signals reflecting through it were able to link up with the cloud over the Midwest already discussed. This allowed much longer QSOs to occur than when only a single sporadic-E cloud is in action. Such QSOs are known as double-hop Es. In this case they supported QSOs from the Pacific Northwest down into the Southeast. If you lived in the Northeast or

Southwest, this specific double-hop Es configuration did not help you.

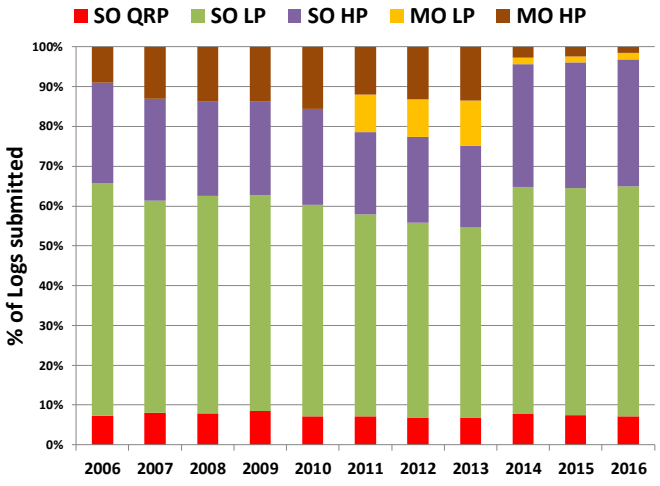


Long distance QSOs made possible by two sporadic-E clouds.

Looking back on the 2016 ARRL 10 Meter Contest there was quite a lot of exciting propagation going on. Even in low sunspot years these propagation events occur and will lead to high QSO rates and long distance QSOs. You do have to be on the lookout for them and be at your radio listening, and calling CQ in order to take advantage of them.

Trends in Entry Category

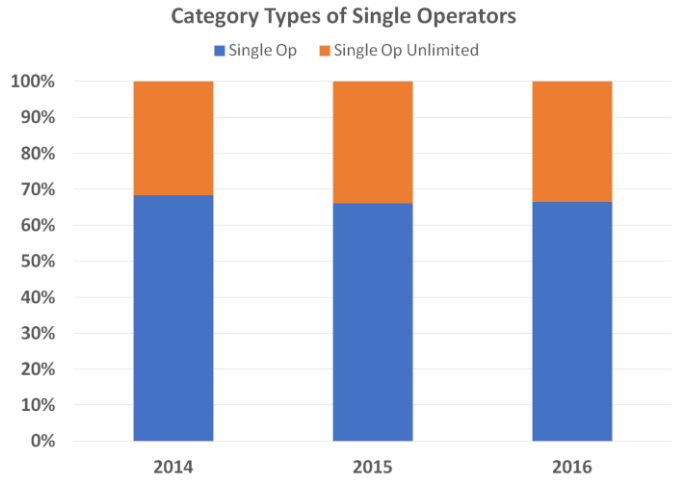
Over the past several years the ARRL has made a couple important changes to the operator categories for the 10 Meter Contest. In 2011, the Multioperator, Low Power (MSLP) category was created and then in 2014, the Single-Operator Unlimited (SOU) categories were created. Let's take a quick look at the trends in how participants have chosen a category.



After the creation of the Multioperator Low Power category in 2011 overall multioperator entries increased. When the Unlimited categories were created in 2014 multioperator entries dropped dramatically.

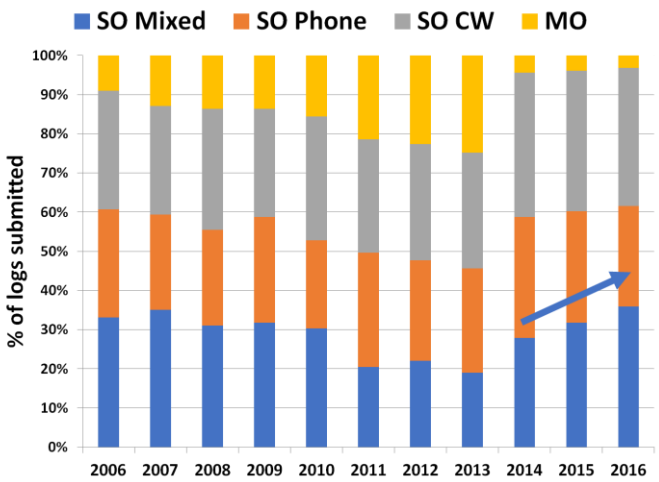
First, after the creation of MSLP, there was growth in the overall percentage of entrants entering in multioperator categories. It looks like folks who had been entering as Single-Operator, Low Power were moving to MSLP. Remember, at that time multioperator was used both for true multioperator stations as well as single operators who were using any kind of spotting assistance – *PacketCluster*, *CW Skimmer*, etc. My hunch is that it really was the operators who wanted to operate with spotting assistance driving this trend. However, the MSLP category was still not ideal for them. They had to compete with true multioperator stations and they had to enter as a Mixed Mode even if they wanted to operate just in one mode. Thus, the creation of the SOU categories in 2014 was perfect to give everyone a chance to operate as they wanted and to compete against stations just like themselves.

Second, since the creation on the SOU categories in 2014 overall year-to-year category mixes have been remarkably similar. Multioperator entries, who are now true multioperator stations, have held steady a 3-4% of total. This is down from 20-25% before the Unlimited categories were created. This indicates most of the multioperator entrants in previous years were really single operators using spotting assistance. Also holding steady has been the mix of single operators across the standard categories and new Unlimited categories – with 1/3 of stations utilizing the Unlimited categories.



Unlimited entries make up 33% of all Single Operator entries.

Finally, one trend over the last couple years is growth in Single-Operator, Mixed Mode categories. This has happened before in the downward part of previous solar cycles. Presumably it is driven by operators who just want to make more QSOs. Since propagation is not good enough to fill up their time and logs with a single mode they decide to operate in Mixed Mode to stay active.



Over the last few years Mixed Mode entries have been increasing.

Any New Records?

The short answer is: There were no new records set at a World, W/VE/XE, or DX entity level during 2016. However, there were multiple records set for individual Entities, W/VE Divisions, and Sections, and XE states. You can check out all records, including the new ones, at: www.arrl.org/contest-records. The following tables present the current records at the World, W/VE/XE, and DX level.

How many more years will these lists go unchanged? The upcoming solar cycle minimum is projected to be in 2019-2020. It likely will be three years after that until solar conditions will be good enough to allow category records to be set — likely the 2022 contest. That is just five years from now!

ARRL 10 Meter Contest World Records

Single-Operator Categories

	Station	Score	QSOs	Mults	Year
High Power, Mixed Mode	ZD8Z (N6TJ, op.)	4,733,880	5,063	309	2002
Low Power, Mixed Mode	ZF2DX	2,957,580	3,543	270	2014
QRP, Mixed Mode	KG9X	886,650	1,064	257	2001
High Power, Phone Only	D4C (IZ4DPV, op)	1,885,290	4,810	197	2013
Low Power, Phone Only	VP2EXX	1,291,800	4,306	150	1990
QRP, Phone Only	V31MA	388,750	1,565	125	2014
High Power, CW Only	PZ5JR (OHØXX, op)	2,100,744	3,211	163	1999
Low Power, CW Only	CE2/VE7SV (VE7SV, op)	1,328,000	2,105	160	2011
QRP, CW Only	KP2/N3IQ (ND3F, op)	791,120	1,593	124	2000

Single-Operator, Unlimited Categories

	Station	Score	QSOs	Mults	Year
High Power, Mixed Mode	NP2X (K9VV, op)	3,690,296	3,985	284	2014
Low Power, Mixed Mode	PY3OZ	1,816,580	1,855	305	2014
QRP, Mixed Mode	RT4W	311,538	668	137	2014
High Power, Phone Only	K4XS	1,062,360	2,959	180	2014
Low Power, Phone Only	YN5Z (K7ZO, op)	701,964	2,304	153	2014
QRP, Phone Only	IZ8GNR	101,640	390	132	2014
High Power, CW Only	KP2Q (K3TEJ, op)	1,601,312	2,467	163	2014
Low Power, CW Only	KP4EJ	919,080	1,750	135	2014
QRP, CW Only	VE3KI	299,592	660	114	2014

Multioperator Categories

	Station	Score	QSOs	Mults	Year
High Power	FY5KE (F1HAR, F5HRY, F6FVY, ops)	4,457,120	3,797	356	2014
Low Power	TI5N (N2BA, TI5KD, ops)	2,565,348	2,709	313	2011

ARRL 10 Meter Contest W/VE/XE Records

Single-Operator Categories

	Station	Score	QSOs	Mults	Year
High Power, Mixed Mode	KM3T (@ KC1XX)	3,018,720	3,647	285	2011
Low Power, Mixed Mode	VY2TT (K6LA, op)	1,884,420	2,336	261	2002
QRP, Mixed Mode	KG9X	886,650	1,064	257	2001
High Power, Phone Only	K4XS	1,151,580	3,387	170	1991
Low Power, Phone Only	K4XS	815,300	2,630	155	1999
QRP, Phone Only	K5RX	301,630	1,090	139	2001
High Power, CW Only	VY2ZM	1,638,972	2,587	159	2011
Low Power, CW Only	K1TO	1,218,000	2,040	150	2002
QRP, CW Only	VE5UF	527,076	1,102	121	2002

Single-Operator, Unlimited Categories

	Station	Score	QSOs	Mults	Year
High Power, Mixed Mode	N8OO	2,577,568	3,179	259	2014
Low Power, Mixed Mode	K9OM	1,427,090	1,575	259	2014
QRP, Mixed Mode	N5DO	187,620	504	118	2015
High Power, Phone Only	K4XS	1,062,360	2,959	180	2014
Low Power, Phone Only	W9XG (K2DRH, op @ K2DRH)	333,760	1,132	149	2014
QRP, Phone Only	W9RPM	41,064	239	87	2014
High Power, CW Only	N9NC	1,495,988	2,228	169	2014
Low Power, CW Only	VE6WQ	621,760	1,348	116	2014
QRP, CW Only	VE3KI	299,592	660	114	2014

Multioperator Categories

	Station	Score	QSOs	Mults	Year
High Power	K1LZ (K1LZ, KB1WKF, W2GB, K3JO, N8BO, ops)	3,635,992	3,037	361	2011
Low Power	KH6LC (KH6LC, AH6RE, NH6V, ops)	1,780,660	2,442	230	2013

ARRL 10 Meter Contest DX Records

Single-Operator Categories

	Station	Score	QSOs	Mults	Year
High Power, Mixed Mode	ZD8Z (N6TJ, op)	3,018,720	5,063	309	2002
Low Power, Mixed Mode	ZF2DX	1,884,420	3,543	270	2014
QRP, Mixed Mode	KP4KE	886,650	1,397	187	2004
High Power, Phone Only	D4C (IZ4DPV, op)	1,151,580	4,810	197	2013
Low Power, Phone Only	VP2EXX	815,300	4,306	150	1990
QRP, Phone Only	V31MA	301,630	1,565	125	2014
High Power, CW Only	PZ5JR (OHØXX, op)	1,638,972	3,211	163	1999
Low Power, CW Only	CE2/VE7SV	1,218,000	2,105	160	2011
QRP, CW Only	KP2/N3IQ (ND3F, op)	527,076	1,593	124	2000

Single-Operator, Unlimited Categories

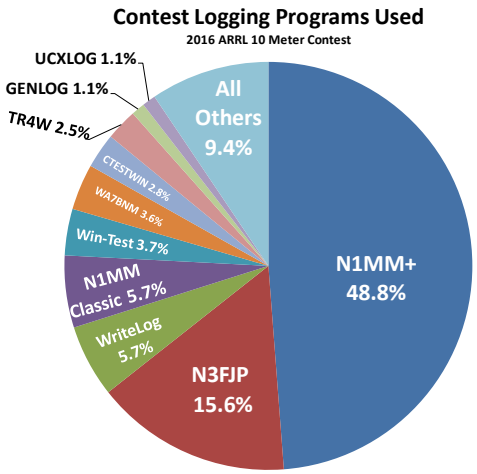
	Station	Score	QSOs	Mults	Year
High Power, Mixed Mode	NP2X	3,690,296	3,985	284	2014
Low Power, Mixed Mode	PY3OZ	1,816,580	1,855	305	2014
QRP, Mixed Mode	RT4W	311,538	668	137	2015
High Power, Phone Only	9A1UN	790,500	2,162	186	2014
Low Power, Phone Only	YN5Z (K7ZO, op)	701,964	2,304	153	2014
QRP, Phone Only	IZ8GNR	101,640	390	132	2014
High Power, CW Only	KP2Q (K3TEJ, op)	1,601,312	2,467	163	2014
Low Power, CW Only	KP4EJ	919,080	1,750	135	2014
QRP, CW Only	UA4Z	283,752	565	126	2014

Multioperator Categories

	Station	Score	QSOs	Mults	Year
High Power	FY5KE (F1HAR, F5HRY, F6FVY, ops)	4,457,120	3,797	356	2014
Low Power	TI5N (N2BA, TI5KD, ops)	2,565,348	2,709	313	2011

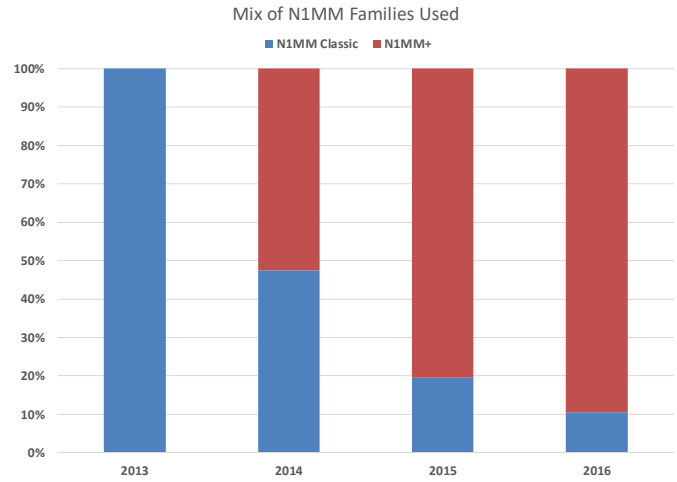
Updated View of Contest Logging Program Use

As I have done in past years, I looked at what logging programs people were using for the ARRL 10 Meter Contest. With access to Cabrillo log files it is easy to investigate. One of the standard Cabrillo tags is "CREATED-BY:" which is followed by the name of the logging program. A simple Python program looks through all the logs tallying the programs everyone used. For the 2016 ARRL 10 Meter Contest, logging program usage looked like this:



Logging programs used during the 2016 ARRL 10 Meter Contest.

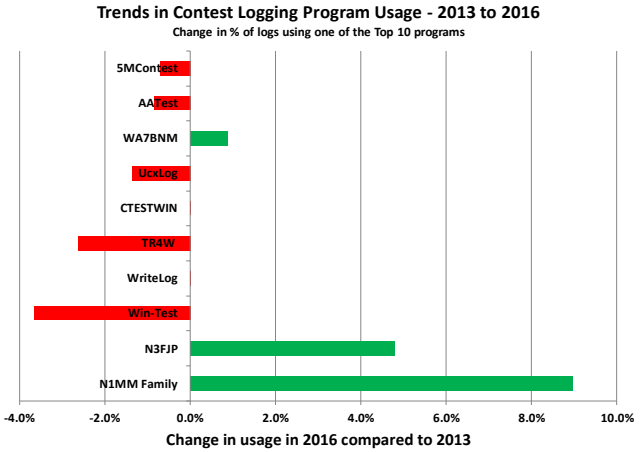
There are a few programs on this list I am not familiar with. The ARRL 10 Meter Contest is a worldwide event and there are several countries that have a logging program that is popular just in their country or region. For example, *CTESTWIN* is popular in Japan and *UcxLog* is popular in Central and Eastern Europe. There are also a noticeable number of operators who still log by hand and then use the WA7BNM Cabrillo Web Form to create their log file. In 2016 there were more than 50 different logging programs used by someone. Overall though, the *N1MM* family is used by far more contesters than any other logging program. It is used by more than three times as many contesters as the second most popular logging program, *N3FJP*. Looking into the *N1MM* family itself you can see the migration to *N1MM+* marching along. 2016 represented the third running of the ARRL 10 Meter Contest since *N1MM+* was launched in August 2014. In 2016 90% of *N1MM* users were using *N1MM+* versus 53% in 2014.



Mix of N1MM types in use during the ARRL 10 Meter Contest.

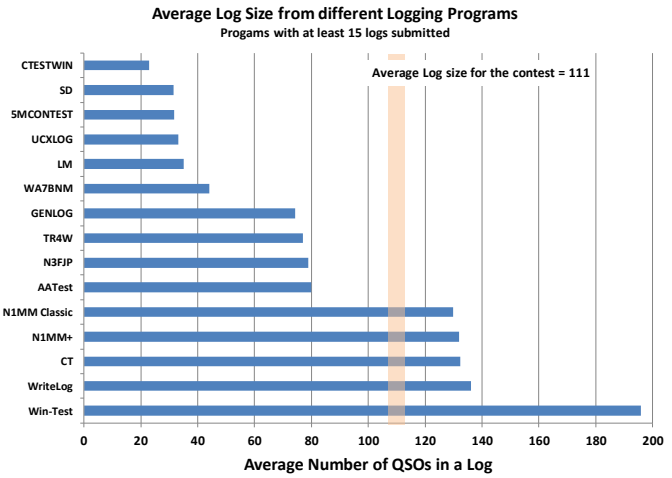
The *N1MM+* functionality that encourages/forces you to use the latest version seems to be effective, as almost 80% of N1MM+ logs were created by the latest version at the time of the contest. Whereas among the *N1MM Classic* users there were more than 60 different versions in use stretching across 3 different major releases.

To observe longer term trends in program usage I compared the logging programs used in 2016 to those used in 2013. Among the top 10 programs, the *N1MM* family and *N3FJP* are the only ones growing substantially in usage. *N1MM* family usage has increased from 45.4% of logs in 2013 to 54.4% of logs in 2016. Both *Win-Test* and *TR4W* usage have declined over the same period by 3.7% and 2.6% respectively. However, 2016 usage statistics were impacted by a major reduction in DX logs compared to past years. I did not investigate the impact, but programs more commonly used by DX stations would show decreased usage because there were just less of them submitted. Among the rest of the top 10 the change is less than 0.5%.



Change in usage among popular logging programs – 2013 to 2016.

Another question about contest logging program I have heard is "What do serious contesters use?" Using a metric of "Average size of log submitted" seems at least plausible to provide this insight. Serious contesters usually make more QSOs than the casual ones. Using this metric the view looks as follows:

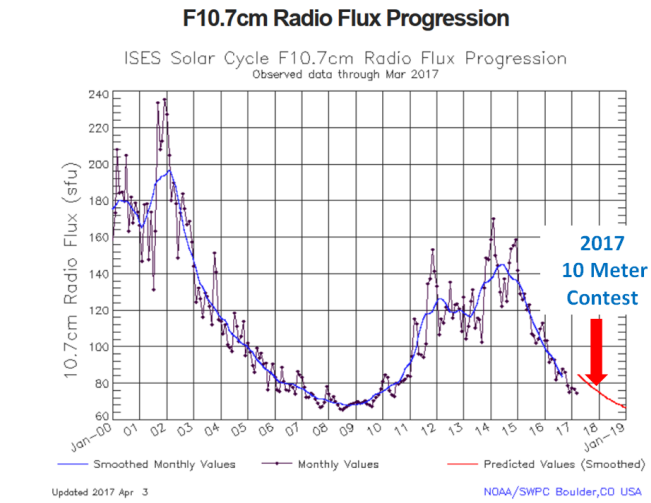


Average log sizes by popular logging programs during the 2016 ARRL 10 Meter Contest.

Win-Test users have the largest average log size at almost twice the average log. *CT*, *WriteLog*, and *N1MM* all have pretty much the same log size — just a little above average. It is interesting that *CT* does not have many users but those that do continue to use it are pretty serious. Also interesting is that *N3FJP*, the second most popular program, has relatively small logs at around 70% the average log. It would thus seem to appeal to more casual contesters.

Predictions for 2017

The 45th annual ARRL 10 Meter Contest will be held on December 9th and 10th, 2017. What might we expect? At this point last year, the NOAA's Space Weather Prediction Center's forecast for 10.7 cm Solar Radio Flux during the 2016 contest was 90. For the 10 Meter Contest, flux is everything. A lot of it generates good propagation. Not enough of it deprives us of propagation. Unfortunately, this solar cycle decayed faster than forecasted and actual flux during December 2016 was closer to 70, which is really low — almost as low as it can get. Depending on the source, minimum radio flux is stated as being in the 64 to 67 range. So, in 2016 we just about hit bottom. Unfortunately, the forecast for the 2017 contest is pretty much the same.



Solar Radio Flux forecast (Chart courtesy of NOAA/SWPC)

Remember, even in 2016 there was fun to be had by being in the right place at the right time and using your creativity and knowledge of propagation and operating modes. There were a few periods of traditional F2-layer ionosphere refraction that some operators enjoyed with very high QSO rates. There were long periods of sporadic-E ionization encountered by even more operators. An enterprising group made contacts via meteor scatter. My prediction is that these same opportunities will exist during 2017. You will have to work for your QSOs though just as in 2016. Let me repeat my advice from last year's article about successful operating strategies for the ARRL 10 Meter contest. The strategies are:

• An ability to operate CW will become more important for Mixed Mode entries or those Single-Ops interested in maximum QSO totals. CW is a much more effective emission mode in times of marginal propagation.

• Searching out other propagation modes than traditional F2-layer ionosphere refraction are going to be key for those seeking top scores, meeting your personal goals, or just having fun. For instance: backscatter, meteor scatter, trans-equatorial and sporadic-E ionization will become more important. If you are not familiar with these the ARRL Bookstore has several titles which can help you out.

• Having the patience and conviction to find path openings that may exist for only minutes over the whole weekend rather than hours on end. Meteor scatter is ethereal in nature with the path open for just a few seconds. It is best around your local dawn although it can happen any time in the day. Sporadic-E often occurs in the early evening hours – just when you think you might as well walk away from the radio. "It's shut down for

good!" may be your thinking. Well — not always. Regular F2 openings will be short, sometimes really short. As Jim, AD1C mentioned in 2015: "I heard JM7OLW for about 30 seconds on Sunday." That was the extent of his opening from Colorado to Japan. Or as Steve, K6SCA put it: "Many times the band would open for minute or so, then just totally fade away. You never knew where your next contact would come from."

It may also be tempting in these years to just say "I will just watch the spotting networks and let others tell me when the band is open." This might work if you are a CW op and you live near, or have your own, skimmer. Remember 10-meter openings can be very localized and the band might be open for you but not a distant skimmer. Also, my past studies have shown that skimmers often will not start producing spots until well after the band is actually open. See for example the "Expanded Results" article for the 2013 ARRL 10 Meter Contest that can be found at **www.arrl.org/contest-results-articles**.

The reason is skimmers typically have lower gain antennas than many contest stations, especially on 10-meters where beams of all size are more common. My recommendation is commit yourself to actual seat time using that big knob on the front of the radio to tune the band yourself to see what you can hear. If you don't hear anything. Fine, get up and walk away, but not for too long. Come back in 15 minutes, or 30 minutes, and check again. Robin, K1RCT applied this strategy well. As he described his operating strategy being made of: "2 hours of 'Oh, I have ten minutes, ok sit down and operate...' time." Your best technology assist might come from a band scope or panadapter in your station that gives you a visual indication of your band activity. By doing it this way at some point you will catch a band opening and have some fun. Remember — if everyone just listened all the time, no one would know if the band is open! So, even if you encounter a seemingly dead band, try calling CQ for a while. The key to a successful operating strategy in 2017 will be as much to catch the band openings as it will be to work them.

(Note – the term "skimmer" refers to an automated receiver running *CW Skimmer* software written by Alex Shovkoplyas, VE3NEA – **www.dxatlas.com**)

Division Winners

Single Operator, Mixed Mode, High Power		
Atlantic	K3TC	178,290
Central	K9BGL	84,096
Dakota	KØTT	299,676
Delta	KØEJ	17,794
Great Lakes	W8KTQ	24,682
Hudson	NA2M	20,304
Midwest	KØVXU	156,780
New England	K1VMT	118,854
Northwestern	K7RL	144,800
Pacific	W6YX (N7MH, op)	532,416
Roanoke	K4CGY	39,308
Rocky Mountain	WØETT	100,464
Southeastern	N4OX	489,160
Southwestern	W6UE (N6AN, op)	194,238
West Gulf	K5YAA	182,952
Canada	VE3KZ	196,420
Single Operator, Mixed Mode, Low Power		
Atlantic	W2RM	92,880
Central	N9SD	21,360
Dakota	NØHJZ	28,952
Delta	KS4X	41,550
Great Lakes	WB8WKQ	124,432
Hudson	WA2JQK	44,116
Midwest	KØOU	96,600
New England	N1DID	34,680
Northwestern	N7LOX	51,840
Pacific	K6GHA	28,890
Roanoke	N8II	63,066
Rocky Mountain	KFØUR	13,832
Southeastern	KX4R	189,420
Southwestern	KI6RRN	299,040
West Gulf	WA8ZBT	81,176
Canada	VE1ZA	24,768
Mexico	XE3WMA	17,794
Single Operator, Mixed Mode, QRP		
Atlantic	N3UR	9,842
Central	AF9J	5,508
Dakota	NDØC	15,048
Delta	WB4GHZ	7,004
Great Lakes	N8BB	7,946
Hudson	K2YGM	9,576
Midwest	ADØBI	840
New England	K1VUT	4,356
Northwestern	W7YAQ	6,076
Roanoke	KG4IGC	1,862
Rocky Mountain	NS7K	1,900
Southwestern	WA6FGV	56,550
West Gulf	W5/MMØLID	3,608
Canada	VE6EX	1,430
Single Operator, Phone Only, High Power		
Atlantic	4U1WB (AJ3M, op)	19,610
Central	KF9US	18,772
Dakota	KØSIX	3,388
Delta	KD5UVV	18,392
Great Lakes	N8BI	28,512
Hudson	W2JTM	10,640
Midwest	KØARY	2,916
New England	AF1T	45,942
Northwestern	W7BJN	11,088
Pacific	W6LP (K6SCA, op)	19,680
Roanoke	W4SLT	16,632
Rocky Mountain	K9MWM	1,312
Southeastern	W4DD	100,584
Southwestern	WZ7ZR (W7ZR, op)	5,456
West Gulf	W5PR	179,712
Canada	VA2KF	1,800
Mexico	XE1B	56,544

Single Operator, Phone Only, Low Power

Atlantic	K2SDS	22,050
Central	WA9BZW	19,880
Dakota	NØVRM	6,144
Delta	WD5DJW	26,240
Great Lakes	N8MWK	6,464
Hudson	N2HMM	15,444
Midwest	KAØFSP	8,520
New England	KA1VMG	7,776
Northwestern	N7QOZ	1,748
Pacific	K7XE	5,214
Roanoke	KB4OLM	19,178
Rocky Mountain	N7MZW	7,436
Southeastern	K4FCG (K1KNQ, op)	44,688
Southwestern	KC1BB	6,208
West Gulf	WB5R	16,456
Canada	VE3RR	1,848
Mexico	XE2O	6,396

Single Operator, Phone Only, QRP

Central	KC9AMM	506
Dakota	WBØIWG	870
Delta	N2WN	1,216
Great Lakes	KE4TZJ	340
Hudson	W7BAK	70
New England	AB1HD	2
Pacific	WB6CZG	308
Roanoke	NO4FX	2,016
Rocky Mountain	KIØII	196
Southeastern	NA4O	1,344
Southwestern	W6QU (W8QZA, op)	5,984
West Gulf	KB5KYJ	2,814
Canada	VE3BKM	1,656
Mexico	XE2NRG	154

Single Operator, CW Only, High Power

Atlantic	KD4D	257,920
Central	W9RE	28,080
Dakota	WØVTT	161,832
Delta	K5LG	156,928
Great Lakes	W5MX	109,296
Hudson	N2ED	10,440
Midwest	KTØK	137,760
New England	K1KI	147,576
Northwestern	WJ9B	175,656
Pacific	KM6JD	113,520
Roanoke	K4SO	98,332
Rocky Mountain	N5FO	192,432
Southeastern	K1TO	289,772
Southwestern	W7ZR	113,920
West Gulf	K5NA	319,680
Canada	VE3PN	85,644

Single Operator, CW Only, Low Power

Atlantic	W3BGN	141,984
Central	K9QVB	52,920
Dakota	KNØV	24,320
Delta	N4ZI	62,424
Great Lakes	WD8S	24,640
Hudson	W2CVW	15,288
Midwest	W9MAF	30,448
New England	W3SM	77,328
Northwestern	KD7H	16,240
Pacific	N7YK	127,120
Roanoke	KM4D	61,128
Rocky Mountain	KCØV	12,384
Southeastern	N4WW (N4KM, op)	178,272
Southwestern	K9WZB	93,940
West Gulf	AE5GT	124,432
Canada	VA3SY	21,140
Mexico	XE1RZL	9,024

Single Operator, CW Only, QRP

Atlantic	K2SM	8,008
Central	WO9S	5,600
Dakota	KEØTT	4,048
Delta	W5GAI	13,320
Great Lakes	K2YAZ	27,360
Hudson	KR2Q	7,384
Midwest	KA4RUR	1,152
New England	KN1H	1,152
New England	KU1N	1,152
Northwestern	N7RCS	756
Pacific	W6JTI	10,540
Roanoke	KS4YX	8,236
Southeastern	N4AU	8,960
Southwestern	NU7Y	3,540
West Gulf	N5OE	48,564
Canada	VE3XT	2,220

Single Operator Unlimited, Mixed Mode, High Power

Atlantic	N2PP	290,928
Central	WB9Z	338,040
Dakota	KØKX	154,160
Delta	K5VR	14,952
Great Lakes	N4QS	17,538
Hudson	AB2DE	34,020
Midwest	K3PA	35,216
New England	W3EP	237,286
Northwestern	N7NM	147,246
Pacific	K6SRZ	215,992
Roanoke	W4ML (W4MYA, op)	386,208
Rocky Mountain	K7SCX	36,580
Southeastern	K5KG	276,060
Southwestern	KY7M	179,118
West Gulf	N5XZ	451,510
Canada	VE3CX	66,096

Single Operator Unlimited, Mixed Mode, Low Power

Atlantic	KE2D	50,592
Central	AB9YC	49,400
Dakota	NØAT	78,650
Delta	W5UE	13,688
Great Lakes	N8VV	29,618
Hudson	KA2FIR	27,404
Midwest	KCØDEB	26,460
New England	KS1J	55,296
Northwestern	K7SS	52,394
Pacific	K7XC	60,720
Roanoke	W2YE	18,300
Rocky Mountain	WA7LNW	44,486
Southeastern	K9OM	143,364
Southwestern	K3WYC	10,584
West Gulf	K5KJ	183,396
Canada	VA3DF	72,652
Mexico	XE2B	63,216

Single Operator Unlimited, Mixed Mode, QRP

Atlantic	NK8Q	30,352
Great Lakes	AB8FJ	238
Northwestern	KA7T	4,150
Pacific	K2GMY	31,694
West Gulf	N1CC	37,088

Single Operator Unlimited, Phone Only, High Power

Atlantic	W3LL	93,578
Central	K9MU	70,224
Dakota	NGØZ	14,016
Delta	W4KW	3,640
Great Lakes	N8PCN	18,308
Midwest	WBØYYE	13,104
New England	N1IXF	29,736
Pacific	K3EST	119,100
Roanoke	N4MM	22,064
Rocky Mountain	WØLSD	20,090
Southeastern	AJ4VE	5,600
Southwestern	W2RD	52,752
West Gulf	WW5TT	40,716
Canada	VE3WPV	216

Single Operator Unlimited, Phone Only, Low Power

Atlantic	KB3KNX	10,032
Central	K2DRH	71,736
Dakota	KDØUXO	56
Delta	NA5NN (K2FF, op)	6,250
Great Lakes	KCØRBV	650
Hudson	W2DLT	1,380
New England	KC1CRS	112
Northwestern	W7NN	4,266
Pacific	K6CTA	420
Roanoke	W4ZAO	18,880
Rocky Mountain	NØAJN	1,530
Southeastern	K3GWK	16,380
Southwestern	KG7GYI	8,448
West Gulf	N5GI	1,998
Canada	VA2BN	1,260
Mexico	XE2JS	14,350

Single Operator Unlimited, Phone Only, QRP

Atlantic	N2GBR	1,880
Central	N9NBC	272
Great Lakes	KØTEA	224
Northwestern	K7ATN	16

Single Operator Unlimited, CW Only, High Power

Atlantic	K2SSS	250,432
Central	K9CT	45,696
Dakota	KØPK	52,608
Delta	KM5PS	100,320
Great Lakes	KE4KY	34,672
Hudson	W2GDJ	98,784
Midwest	KØJPL	98,280
New England	KM1X	38,160
Northwestern	WC7Q	48,208
Pacific	W7RN (K5RC, op)	208,936
Roanoke	NR4M	180,120
Rocky Mountain	K5TA	74,504
Southeastern	N4BP	227,840
Southwestern	N6SS	240,368
West Gulf	N5ZK (W5ASP, op)	42,200
Canada	VA3DX	88,976
Mexico	XE2CQ	74,100

Single Operator Unlimited, CW Only, Low Power

Atlantic	W3KB	25,568
Central	W9XT	92,512
Dakota	KØQC	32,508
Delta	K3IE	17,080
Great Lakes	K8GT	2,340
Hudson	K2DFC	63,168
Midwest	KØVBU	41,968
New England	W1UK	6,600
Northwestern	K7BX	7,668
Pacific	KH7M (KH6ZM, op)	192,600
Roanoke	WN4AFP	11,532
Rocky Mountain	W2UP	70,144
Southeastern	N4LF	4,968
Southwestern	K6WSC	75,348
West Gulf	WA5LFD	18,408
Canada	VE2FWW	30,576
Mexico	XE2S	52,400

Single Operator Unlimited, CW Only, QRP

Dakota	NØUR	17,756
Delta	K5NTT	2,508
Great Lakes	K4FT	7,344
New England	N2KW	29,640
Pacific	W6XK	1,456
Southeastern	K3TW	11,016

Multioperator, Single Transmitter, High Power

Atlantic	K3OQ	96,408
Central	N2BJ	154,530
Great Lakes	W8PR	129,532
Hudson	WA2CP	84,980
New England	AA1JD	378,312
Northwestern	K7JR	65,664
Roanoke	KJ4IPF	137,804
Rocky Mountain	AA5B	169,608
Southwestern	NX6T	243,318
West Gulf	NX5M	544,258
Canada	VE6AO	2,060

Multioperator, Single Transmitter, Low Power

Atlantic	W3KWH	11,322
Dakota	KEØOR	846
Delta	W4BSF	1,950
Midwest	KB5ENP	5,520
New England	N1SOH	5,808
Northwestern	W7TVC	101,520
Pacific	K6EI	5,350
Roanoke	K4OTH	5,220
Rocky Mountain	K5LRW	660
Southeastern	N4SVC	129,168
Southwestern	KG6YFT	56
Canada	VA7DZ	42,840
Mexico	XE3RCC	17,680