

# Publication of the Northern California Contest Club



### Issue <u>502</u> March 2014

#### Inside this issue:

November Sweepstakes	4
NCCC News	13
February Meeting	13
Contest Calendar	14
HRO	17

Guests are always welcome at the NCCC!

Please join us.

Monday, March 10th, 2014

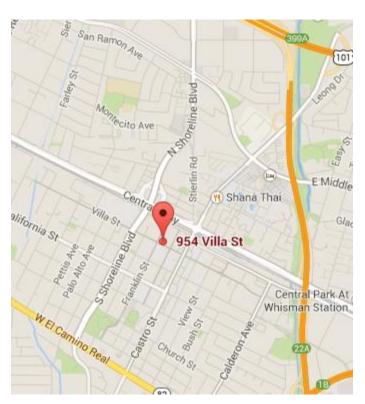
#### Time:

6:00pm Schmooz, 6:30pm Dinner, 7:00pm Program

### **NCCC - Annual Awards Meeting**

#### Location:

Tied House, 954 Villa Street, Mountain View, CA 94041 Directions: <a href="http://goo.gl/maps/laHri">http://goo.gl/maps/laHri</a>





## President's Report for March.

### **Not Quite A Rant**

I am uninspired today. Next Monday marks the culmination of the NCCC year—our annual awards night. Awards night has always been a happy time for me. Sometimes I've won wine, sometimes a plaque, and always I've enjoyed seeing what my fellow (boys and girls) in the club have accomplished. This year, not so much joy. At least not yet.

From behind the scenes, I have had the chance to see just how much work goes into the awards meeting. Lots of members are involved. Lots of tedious work goes into getting it right. We have to determine the awards for CQP, for the RTTY Roundup, for the KB Sweepstakes awards, and for operating achievement award.

Some folks have been doing this for years while others are just learning the ropes. There are ample possibilities for miscommunication and for stepping on each other's toes. We need to be cutting each other a lot more slack. There is no book of the rules to follow. At least not yet.



# **Officers:**

President Alan Eshleman K6SRZ Penngrove CA doctore@well.com Vice President / Contest Chair Alan Maenchen AD6E ad6e@arrl.net San Jose, CA Secretary/Treasurer Tom Epperly NS6T tepperly@gmail.com Livermore CA Past President Dean Wood N6DE cqden6de@gmail.com Sunnyvale CA Director Fred Jensen K6DGW k6dgw@foothill.net Auburn CA w1srd@arrl.net Director Steve Dyer W1SRD Redwood City CA Director Jim Brown к9үс k9yc@arrl.net Santa Cruz CA

K6MM

W6TCP

# Volunteers:

Webmaster

JUG Editor

**New Member Mentor** Al Rendon WT6K wt6k@arrl.net Charter Member **Rusty Epps** W60AT w6oat@sbcglobal.net **Awards Chairs** Joanna Dilley joanna.k6yl@gmail.com K6YL Rebar Rebarchik N6DB rebar@hamilton.com CQP Chair Chris Tate N6WM ctate@ewnetinc.com **CQP** Certificates Andy Faber AE6Y ae6y@arrl.net K6ZM QSL Manager **George Daughters** K6GT k6gt@arrl.net K6CQP,N6CQP,W6CQP QSL Mgr Ed Muns W0YK w0yk@arrl.net NCCC Email reflector Admin Phil Verinsky W6PK kb-w6tqg@verinsky.com

John Miller

Ian Parker

# Thursday Night Contesting:

NCCC—SprintKen KeelerN6ROkenkeeler@jazznut.comNS LadderBill HaddonN6ZFOhaddon.bill@gmail.comSlow NS (SNS)Chris TateN6WMctate@ewnetinc.com

#### **NCCC** Net

Thursday 8 PM Freq: 3.610 +/-

#### **NCCC**

Monthly meetings take place on the second Monday of each month!

## **NCCC Membership Information**

k6mm@arrl.net

w6tcpian@gmail.com

If you wish to join NCCC, you must fill out an <u>application for membership</u>, which will be read and voted upon at the next monthly meeting. (<u>PDF application form</u>)

To join, you must reside within <u>club territory</u> which is defined as the maximum of:

- Northern California, anything north of the Tehachapi's up to the Oregon border, and
- A part of north-western Nevada (anything within our ARRL 175-mile radius circle centered at 10 miles North of Auburn on Highway 49).



Proofreading awards takes time and we don't always get things right. Exhibit A, a couple of my awards from years past. Can you tell what's wrong with the picture?

The core group of the NCCC—folks who live in the South Bay and who have been members of the club for many years—have an advantage here. They've been officers and volunteers. They know who-has-done-what in the past and face-to-face cooperation doesn't require a 160 mile round-trip. Continuity is important and continuity has been lacking in the past few years. I need not elaborate here.

The time is ripe for the NCCC to actually prepare a book of the rules. The officers need to know what is expected of them and to become familiar with the target dates (budgets, tax filings, and the like) in the by-laws. An easy-to-follow flow chart showing who does what would be a big help. And without opening a new hornet's nest, it may be time for a calm discussion of changing our one-year term limit for officers. Certainly as things are presently constituted, one-year is about right for mental health.

The fact remains that our core group is aging. Many of us are in the "been there done that" category. It is human nature—a good part of human nature—that grandchildren, old friends, and opportunities to see the world—are the most important part of our lives.

Let's do what we can to make stewardship of the NCCC a less onerous task for those that follow.

I'll see you at Awards Night and I'm truly looking forward to it.

73. Alan/K6SRZ

# Accuracy analysis of the 2013 November Sweepstakes (CW)

### Denis Pochuev – K7GK

#### **Overture**

I've been interested in accuracy of the top competitors in CW contests for a while, particularly in contests where accuracy really matters and may result in changes in the final standings, compared to the claimed ones. Sweepstakes is certainly one of such contests. I've been on both ends of this equation in the past. Last year I claimed 8<sup>th</sup> spot in SOLP category, only to be dropped to 9<sup>th</sup> by N9CK, who is consistently among the top operators in terms of accuracy in my observation. Ten years ago I managed to step up to spot #12 in the final standings in SOHP category after being 13<sup>th</sup> in the claimed scores. A small victory, but very satisfying nonetheless.

#### Data

What I've gathered here is not an absolute or the only measure of accuracy. Moreover, the data I gathered may well not show the most accurate operators in the contest, because I based my observations on the top 10 entrants in each category. These are the only data currently available on the ARRL web site. On the other hand, top competitors are likely to be there in part due to their accuracy, so I don't believe this to be a total misrepresentation of the reality.

My chosen measure of accuracy is the difference of the claimed number of contacts and the final number of contacts, divided by the former expressed as a percentage.

The values in the table are:

Nr	Place in the final standings	Clmd Ms	Claimed number of multipliers
Call	Callsign (Operator)	-Qs	QSO reduction
Final Sc	Final score	Accy %	Accuracy percentage
Final Qs	Final number of QSOs	Clmd #	Claimed standings
Final Ms	Final number of multipliers	Up/Dn	Lost or gained positions in standings
Clmd Sc	Claimed score	Accy#	Accuracy standings among top 10
Clmd Qs	Claimed number of QSOs		

Nr	Call	Final Pts	Final Qs	Final Ms	Clmd Sc	Clmd Qs	Clmd Ms	"- Qs"	Ассу %	Clmd#	Up/Dn	Accy#
1	W7RN (N6TV)	242,360	1460	83	244684	1474	83	14	0.95	1	0	3
2	N9RV	235,720	1420	83	239206	1441	83	21	1.46	2	0	5
3	NØNI (AG9A)	235,388	1418	83	237380	1430	83	12	0.84	3	0	1
4	N5RZ	228,250	1375	83	231902	1397	83	22	1.57	4	0	6
5	WDØT	222,108	1338	83	226590	1365	83	27	1.98	5	0	7
6	NR5M (K5GA)	219,452	1322	83	224764	1354	83	32	2.36	6.5	0.5	8
7	K6LA	217,294	1309	83	224764	1354	83	45	3.32	6.5	<b>-</b> 0.5	9
8	WØUA	216,464	1304	83	224598	1353	83	49	3.62	8	0	10
9	W9RE	215,136	1296	83	217958	1313	83	17	1.29	10	1	4
10	N4OGW	215,136	1296	83	216962	1307	83	11	0.84	12	2	2
	average	224,731	1,354	83	228,881	1,379	83	25	1.82			

Figure 1 - Single operator high power

Nr	Call	Final Sc	Final Qs	Final Ms	Clmd Sc	Clmd Qs	Clmd Ms	"- Qs"	Ассу %	Clmd#	Up/Dn	Accy#
1	K7BG	200,196	1206	83	202022	1217	83	11	0.90	1	0	3
2	K7GK (@W6JZH)	189,904	1144	83	194054	1169	83	25	2.14	2	0	6
3	N9CK	187,580	1130	83	188078	1133	83	3	0.26	5	2	1
4	K4RO	187,414	1129	83	189572	1142	83	13	1.14	4	0	4
5	NØAT (NØKK, op)	186,916	1126	83	191398	1153	83	27	2.34	3	-2	7
6	NAØN	185,920	1120	83	186418	1123	83	3	0.27	7	1	2
7	KØAD	180,774	1089	83	186584	1124	83	35	3.11	6	-1	10
8	WA1Z	176,292	1062	83	178450	1075	83	13	1.21	9	1	5
9	WJ9B	175,794	1059	83	181438	1093	83	34	3.11	8	-1	9
10	N7XU (K4XU, op)	171,478	1033	83	175794	1059	83	26	2.46	11	1	8
		184226.8	1109.8	83	187380.8	1128.8	83	19	1.69			

Figure 2 - Single operator low power

Nr	Call	Final Sc	Final Qs	Final Ms	Clmd Sc	Clmd Qs	Clmd Ms	"- Qs"	Ассу %	Clmd#	Up/Dn	Accy#
1	NN7SS	125,624	766	82	130642	787	83	21	3.84	1	0	7
2	WØEEE (NØAX, op)	124,666	751	83	125662	757	83	6	0.79	2	0	2
3	NØUR	120,682	727	83	122176	736	83	9	1.22	3	0	3
4	WI9WI	117,916	719	82	119392	728	82	9	1.24	6	2	4
5	K9TM	117,588	717	82	123006	741	83	24	4.40	4	-1	8
6	N1RR	115,038	693	83	120682	727	83	34	4.68	5	-1	9
7	N7IR	113,212	682	83	113710	685	83	3	0.44	7	0	1
8	WF7T	105,742	637	83	109228	658	83	21	3.19	10	2	6
9	KØOU	105,410	635	83	112382	677	83	42	6.20	8	-1	10
10	N400	102,754	619	83	104082	627	83	8	1.28	12	2	5
	average	114,863	695	83	118,096	712	83	18	2.73			

Figure 3 - Single operator QRP

Nr	Call	Final Pts	Final Qs	Final Ms	Clmd Sc	Clmd Qs	Clmd Ms	"- Qs"	Accy %	Clmd#	Up/Dn	Accy #
1	KØEU	234,890	1415	83	241032	1452	83	37	2.55	1	0	7
2	KH7XX	218,788	1318	83	223104	1344	83	26	1.93	2	0	5
3	K7RL	212,978	1283	83	219618	1323	83	40	3.02	3	0	9
4	K6LL	206,670	1245	83	211484	1274	83	29	2.28	5	1	6
5	KO7AA	206,006	1241	83	211982	1277	83	36	2.82	4	-1	8
6	N4BP	202,520	1220	83	204180	1230	83	10	0.81	6	0	2
7	NY3A	201,192	1212	83	203848	1228	83	16	1.30	7	0	3
8	N4ZZ	198,868	1198	83	202188	1218	83	20	1.64	8	0	4
9	N6XI	195,548	1178	83	196710	1185	83	7	0.59	10	1	1
10	KTØA	192,726	1161	83	202022	1217	83	56	4.60	9	-1	10
	average	207,019	1,247	83	211,617	1,275	83	28	2.16			

Figure 4 - Single operator high power unlimited

Nr	Call	Final Sc	Final Qs	Final Ms	Clmd Sc	Clmd Qs	Clmd Ms	"- Qs"	Ассу %	Clmd#	Up/Dn	Accy#
1	WE9V	197,872	1192	83	201026	1211	83	19	1.57	1	0	2
2	VE6EX	188,078	1133	83	193224	1164	83	31	2.66	2	0	5
3	KK7S	185,754	1119	83	190236	1146	83	27	2.36	3	0	4
4	W4MR (AA4NC, op)	185,422	1117	83	188410	1135	83	18	1.59	4	0	3
5	KTØR (KØOB, op)	184,758	1113	83	193888	1168	83	55	4.71	5	0	10
6	KE7X	183,430	1105	83	188576	1136	83	31	2.73	6	0	6
7	KB7Q	175,296	1056	83	181936	1096	83	40	3.65	7	0	8
8	K2NNY (K2DB, op)	161,684	974	83	163510	985	83	11	1.12	8	0	1
9	N4PN	160,854	969	83	166332	1002	83	33	3.29	9	0	7
10	N2MM	160,356	966	83	168840	1005	84	39	3.88	10	0	9
	average	178,350	1,074	83	183,598	1,105	83	30	2.76			

Figure 5 - Single operator low power unlimited

Nr	Call	Final Sc	Final Qs	Final Ms	Clmd Sc	Clmd Qs	Clmd Ms	"- Qs"	Accy %	Clmd#	Up/Dn	Accy#
1	W2FU	230,076	1386	83	237214	1429	83	43	3.01	1	0	3
2	NX6T	227,254	1369	83	235720	1420	83	51	3.59	2	0	5
3	AA5B	225,096	1356	83	227088	1368	83	12	0.88	3	0	1
4	VY1EI	210,986	1271	83	213144	1284	83	13	1.01	5	1	2
5	W4RM	207,002	1247	83	215468	1298	83	51	3.93	4	-1	7
6	KP2M	202,354	1219	83	210322	1267	83	48	3.79	6	0	6
7	KØWA	195,880	1180	83	208496	1256	83	76	6.05	7	0	9
8	NY6C	162,348	978	83	175296	1056	83	78	7.39	8	0	10
9	K6SU	157,534	949	83	167162	1007	83	58	5.76	9	0	8
10	KT4RR	156,704	944	83	161850	975	83	31	3.18	10	0	4
	average	197,523	1,190	83	205,176	1,236	83	46	3.86			

Figure 6 - Multi-operator high power

Nr	Call	Final Sc	Final Qs	Final Ms	Clmd Sc	Clmd Qs	Clmd Ms	"- Qs"	Accy %	Clmd#	Up/Dn	Accy#
1	WØDLE	182,600	1100	83	189572	1142	83	42	3.68	2	1	5
2	K5CM	181,604	1094	83	194386	1171	83	77	6.58	1	-1	7
3	KH6LC	181,106	1091	83	186252	1122	83	31	2.76	3	0	3
4	VE4EA	137,924	841	82	151392	912	83	71	7.79	4	0	9
5	N4UW	135,456	816	83	139772	842	83	26	3.09	6.5	1.5	4
6	W8EDU	129,646	781	83	139772	842	83	61	7.24	6.5	0.5	8
7	W5RU	126,492	762	83	143424	864	83	102	11.81	5	-2	10
8	K5KC	122,176	736	83	124832	752	83	16	2.13	8	0	2
9	AC5K	115,702	697	83	117528	708	83	11	1.55	9	0	1
10	KU7Y	88,614	547	81	95450	575	83	28	4.87	10	0	6
	average	140,132	847	83	148,238	893	83	47	5.15			

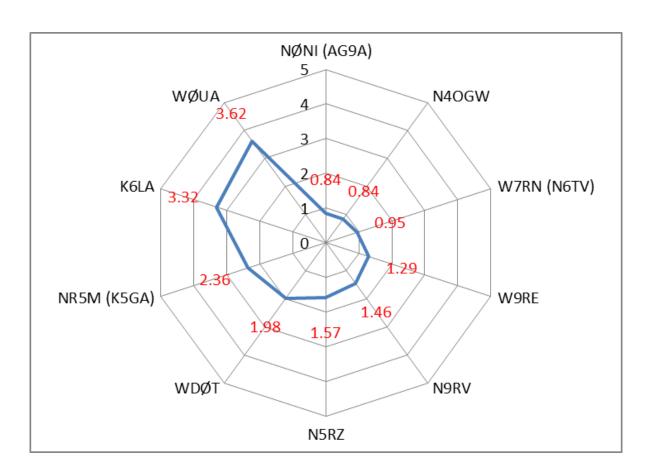
Figure 7 - Multi-operator low power

Nr	Call	Final Sc	Final Qs	Final Ms	Clmd Sc	Clmd Qs	Clmd Ms	"- Qs"	Accy %	Clmd#	Up/Dn	Accy#
1	W6YX	206,172	1242	83	210156	1266	83	24	1.90	1	0	4
2	KØHC (WØBH, op)	183,098	1103	83	184924	1114	83	11	0.99	2	0	2
3	W6RFU	121,512	732	83	123006	741	83	9	1.21	3	0	3
4	W6BB (K6JEB, op)	113,324	691	82	117030	705	83	14	1.99	4	0	5
5	W3YI (AB3LS, op)	73,538	443	83	76194	459	83	16	3.49	5	0	6
6	W2DSC (WB2NVR, op)	37,228	227	82	43160	260	83	33	12.69	6	0	8
7	N5XU	28,552	172	83	28552	172	83	0	0.00	7	0	1
8	K5LSU	15,494	127	61	20800	160	65	33	20.63	8	0	9
9	W1AF (W1PL, op)	9,800	100	49	10584	108	49	8	7.41	9	0	7
	average	87,635	537	77	90,490	554	77	16	5.59			

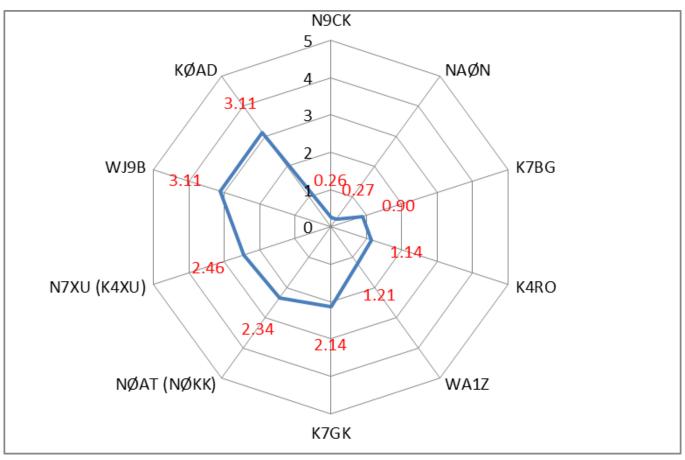
Figure 8 - School club

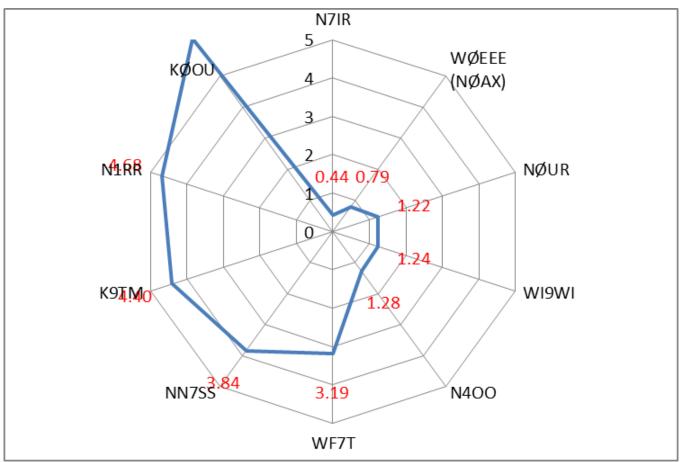
# **Charts**

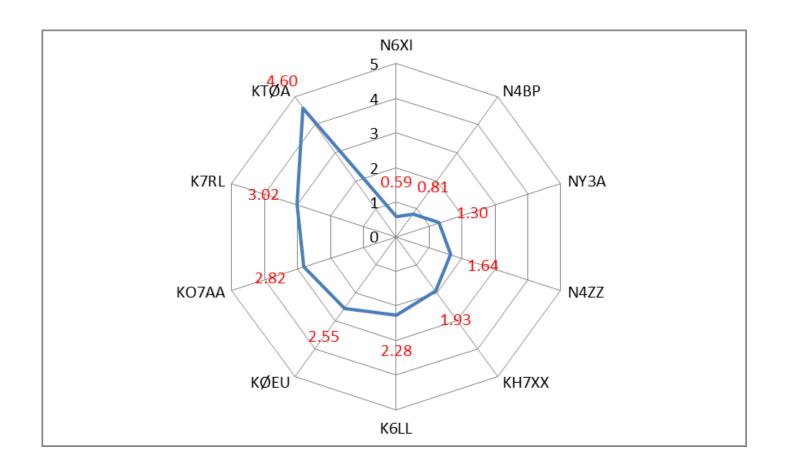
Next is a graphical representation of the accuracy, first by category and at the end as an aggregate.

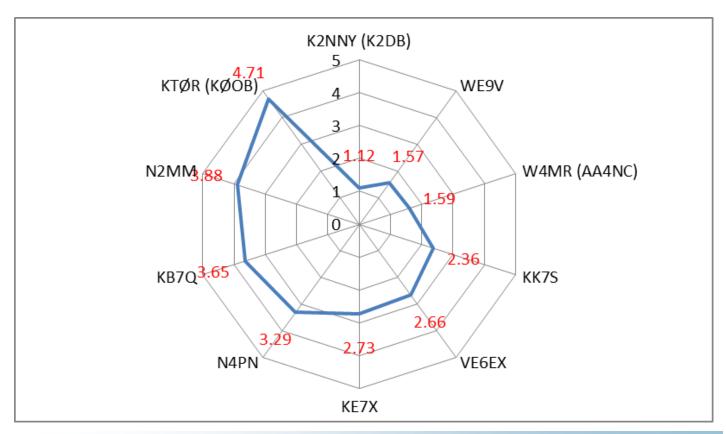


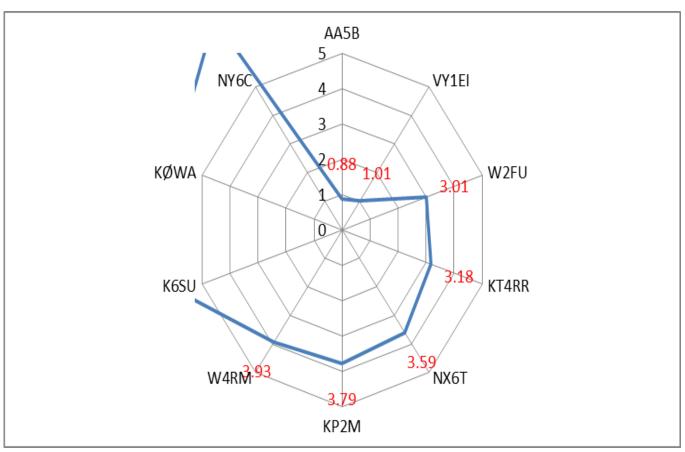
Page 7

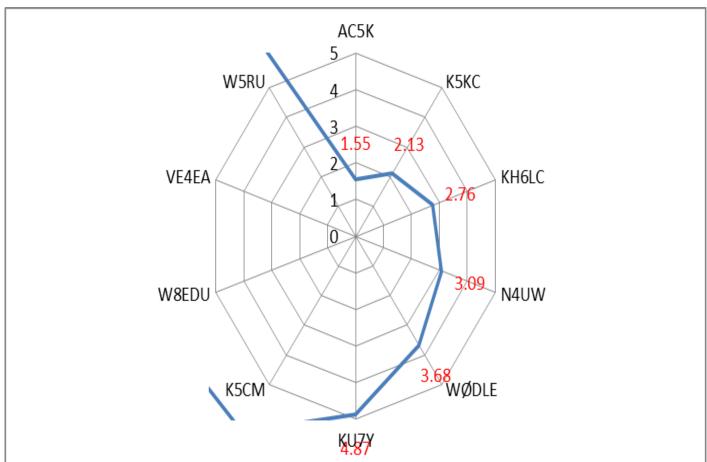


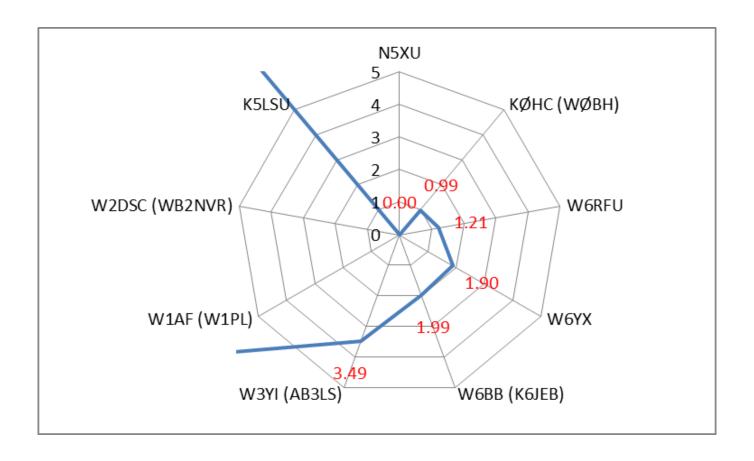


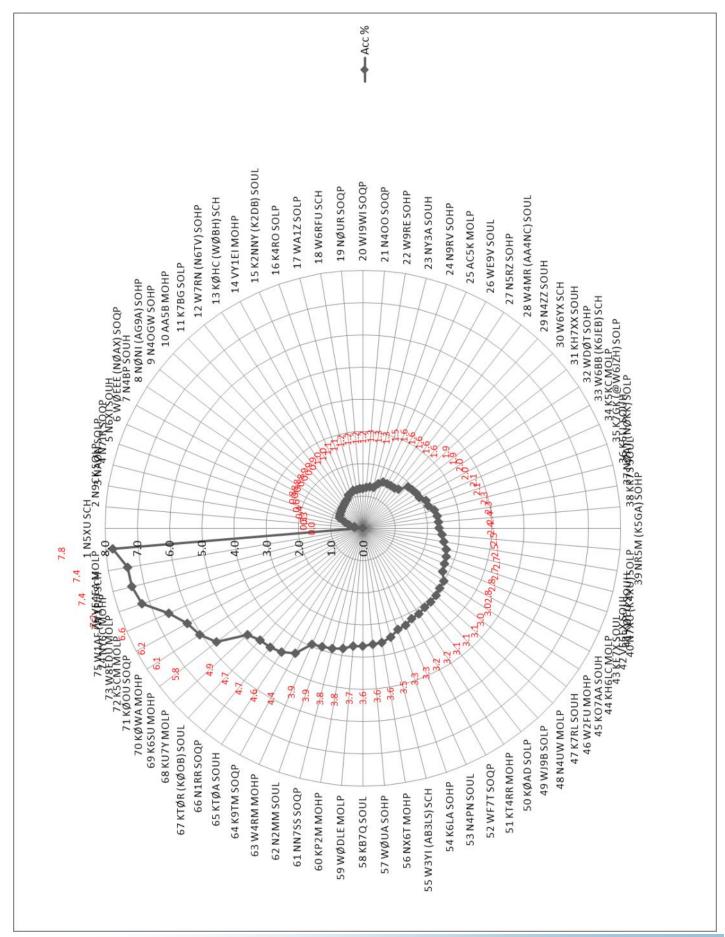












### In conclusion

Keeping one's accuracy under 1 percent is very impressive, given the long exchanges in Sweepstakes, but certainly achievable by top operators. This was the case with the following participants - N9CK, NAØN, N7IR, N6XI, WØEEE (NØAX), N4BP, NØNI (AG9A), N4OGW, AA5B, K7BG, W7RN (N6TV). VY1EI (N6TR) managed to achieve 1.01% accuracy using a remote operation. N5XU was the only station with a golden log among the top 10 entrants, but their log contained only 172 QSOs.

Keep your rates high and your accuracy low! KB



#### News

NCCC welcomes the following new members who joined on Monday February 10th

Paul Grigorieff N1HEL, Mike Ransom Al6II, Ed Essick K6ELE.



# **February Meeting**

The Northern California Contest Club (NCCC) held their February meeting at Cattlemen's restaurant in Livermore on Monday February 10th. LARK members that attended were Mikhail KK6BQX, Lee Kl6OY, Tom NS6T NCCC Treasurer and Secretary and Ian W6TCP, NCCC Newsletter editor.



Getting Stuck in-NCCC Dinner, Livermore



# Contest Calendar-March page 1

ARRL Inter. DX Contest, SSB 0000Z, Mar 1 to 2400Z, Mar 2

Wake-Up!QRP Sprint 0600Z-0629Z, Mar 1 and

0630Z-0659Z, Mar 1 and

0700Z-0729Z, Mar 1 and

0730Z-0800Z, Mar 1

Open Ukraine RTTY Championship 1800Z-2059Z, Mar 1 (Low Band) and

2100Z-2359Z, Mar 1 (Low Band) and

0800Z-1059Z, Mar 2 (High Band) and

1100Z-1359Z, Mar 2 (High Band)

PN Quick CW Contest 1900Z-2040Z, Mar 1

UBA Spring Contest, CW 0700Z-1100Z, Mar 2

DARC 10-Meter Digital Contest 1100Z-1700Z, Mar 2

SARL Hamnet 40m Simulated Emerg Contest 1200Z-1400Z, Mar 2

RSGB 80m Club Championship, Data 2000Z-2130Z, Mar 3

ARS Spartan Sprint 0200Z-0400Z, Mar 4

AGCW YL-CW Party 1900Z-2100Z, Mar 4

QRP Fox Hunt 0200Z-0330Z, Mar 5

AWA John Rollins Memorial DX Contest 2300Z, Mar 5 to 2300Z, Mar 6 and

2300Z, Mar 8 to 2300Z, Mar 9

NRAU 10m Activity Contest 1800Z-1900Z, Mar 6 (CW) and

1900Z-2000Z, Mar 6 (SSB) and

2000Z-2100Z, Mar 6 (FM) and

2100Z-2200Z, Mar 6 (Dig)

NCCC RTTY Sprint 0200Z-0220Z, Mar 7



# Contest Calendar-March page 2

QRP Fox Hunt 0200Z-0330Z, Mar 7

NCCC Sprint 0230Z-0300Z, Mar 7

RSGB Commonwealth Contest 1000Z, Mar 8 to 1000Z, Mar 9

SKCC Weekend Sprintathon 1200Z, Mar 8 to 2400Z, Mar 9

AGCW QRP Contest 1400Z-2000Z, Mar 8

QRP ARCI HF Grid Square Sprint 1500Z-1800Z, Mar 8

EA PSK63 Contest 1600Z, Mar 8 to 1600Z, Mar 9

Idaho QSO Party 1900Z, Mar 8 to 1900Z, Mar 9

North American Sprint, RTTY 0000Z-0400Z, Mar 9

UBA Spring Contest, 6m 0700Z-1100Z, Mar 9

NSARA Contest 1100Z-1500Z, Mar 9 and

1700Z-2100Z, Mar 9

Wisconsin QSO Party 1800Z, Mar 9 to 0100Z, Mar 10

QRP Fox Hunt 0100Z-0230Z, Mar 12

CWops Mini-CWT Test 1300Z-1400Z, Mar 12 and

1900Z-2000Z, Mar 12 and

0300Z-0400Z, Mar 13

RSGB 80m Club Championship, CW 2000Z-2130Z, Mar 12

QRP Fox Hunt 0100Z-0230Z, Mar 14

SARL VHF/UHF Analogue/Digital Contest 1600Z, Mar 14 to 1000Z, Mar 16

BARTG HF RTTY Contest 0200Z, Mar 15 to 0200Z, Mar 17

PN Quick CW Contest 0900Z-1040Z, Mar 15

F9AA Cup, SSB 1200Z, Mar 15 to 1200Z, Mar 16

Russian DX Contest 1200Z, Mar 15 to 1200Z, Mar 16

Virginia QSO Party 1400Z, Mar 15 to 0200Z, Mar 16 and

1200Z-2400Z, Mar 16



# Contest Calendar-March page 3

AGCW VHF/UHF Contest 1400Z-1700Z, Mar 15 (144) and

1700Z-1800Z, Mar 15 (432)

Feld Hell Sprint 1600Z-1800Z, Mar 15

North American Sprint, SSB 0000Z-0400Z, Mar 16

UBA Spring Contest, 2m 0700Z-1100Z, Mar 16

Run for the Bacon QRP Contest 0100Z-0300Z, Mar 17

QRP Fox Hunt 0100Z-0230Z, Mar 19

NAQCC Straight Key/Bug Sprint 0030Z-0230Z, Mar 20

RSGB 80m Club Championship, SSB 2000Z-2130Z, Mar 20

QRP Fox Hunt 0100Z-0230Z, Mar 21

FOC QSO Party 0000Z-2359Z, Mar 22

Oklahoma QSO Party 1300Z, Mar 22 to 0100Z, Mar 23 and

1300Z-1900Z, Mar 23

Louisiana QSO Party 1500Z, Mar 22 to 0300Z, Mar 23

QCWA Spring QSO Party 1800Z, Mar 22 to 1800Z, Mar 23

UBA Spring Contest, SSB 0700Z-1100Z, Mar 23

SKCC Sprint 0000Z-0200Z, Mar 26

QRP Fox Hunt 0100Z-0230Z, Mar 26

CWops Mini-CWT Test 1300Z-1400Z, Mar 26 and

1900Z-2000Z, Mar 26 and

0300Z-0400Z, Mar 27

QRP Fox Hunt 0100Z-0230Z, Mar 28

CQ WW WPX Contest, SSB 0000Z, Mar 29 to 2359Z, Mar 30

PN Quick CW Contest 1600Z-1740Z, Mar 29

ANAHEIM, CA

(Near Disneyland) 933 N. Euclid St., 92801 (714) 533-7373 (800) 854-buse Janet, KL7MF, Mgr. Shanrado.com

BURBANK, CA

1525 W. Magnolla BI., 91506 (818) 842-1796 Eric, K6EJC, Mgr. Magnolia between S. Victory & Buena Vista burbank@hanradio.com

OAKLAND, CA 2210 Livingsion St., 94606 (510) 534-5757

Mck, AKEDX, Mgr. I-880 at 23rd Ave. ramp oakland@hamradio.com

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#### 2 STORE BUYING POWE





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opt UT-20 module . Built-in TNC, DX packet duster

• 65 Watt • 200 Memories • CTCSS/DCS • MII-Std

\* 100W HF + 6M \* 500 Hz & 2.7 KHz roofing filter

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TS-2000 HF/VHF/UHF TCVR

. IF Stage DSP . Backlit front key panel

TM-281A 2 Mtr Mobile

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Dual channel receive • .1 - 1300 MHz

(cell blocked) RX • FM, AM, SSB • 5W

2M/220/440 TX, FM \* 435 Memorles

TM-V71A 2M/440 Dual Band

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specs • Hi-quality audio

32 bit DSP

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- 160-10M/6M/2M/70CM • 2x DSP • Digital IF filters
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- . 2.5" color TFT display



\* 5/2.5/1.0/0.5/0.1W Output \* RX: 0.52-1.71, 88-174, 380-479 MHz\*\* • AW FM/FM-N/WFM/DV • 1304 Alphanumeric Memory Chis • Integrated GPS • D-STAR Repeater Directory • IPX7 Submersible 1537/Taready



#### IC-7600 Al Mode Transceiver

• 100W HF/6m Transcelver, gen cov. receiver • Dual DSP 32 bit . Three rooting filters - 3, 6, 15khz . 5.8 in WQVGA TFT display . Hi-res real time spectrum scope



#### IC-V8000 2M Mobile Transceiver

• 75 watts • Dynamic Memory Scan (DMS) CTCSS/DCS encode/decode w/tone scan • Weather alert • Weather channel scan • 200 alphanumeric memories.



 D-STAR DV mode operation • DR (D-STAR repeator) mode • Free software download • GPS A mode for easy D-PRS operation • One touch reply button (DV mode) Wideband receiver D-STAR ready





#### FTDX-3000 100W HF + 6M Transceiver

 100 Watt HF/6 Meters • Large and wide color LCD display • High Speed Spectrum Scope built-in • 32 bit high speed DSP /Down Conversion 1st IF



#### FT-7900R 2W440 Mobile

 50W 2M, 45W on 440MHz \* Weather Alert \* 1000+ Memories • WIRES capability • Wideband receiver (cell blocked)

### FT-60R 2M/440 5W HT

· Wide receiver coverage · AM air band receive • 1000 memory channels w/aioha labels • Huge LCD display • Rugged die-cast, water resistant case . NOAA severe weather alert with alert scan



### FT-450D 100W HF + 6M Transceiver

 100W HF/6M • Auto tuner built-in • DSP built-in . 500 memories . DNR, IF Notch, IF Shift



#### FT-857D Ultra Compact HF/VHF/UHF

. 100w HF/6M, 50W 2M, 20W UHF . DSP Included 32 color display • 200 mems • Detachable front panel (YSX-857 require))

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