

Thoughts after WRTC 2014

Tõnno Vähk

ES5TV

OHDXF/CCF Meeting 2015

Good

- Very well organized, smooth as silk
- Budgeting achieved
- Good marketing and promotion done
- Sites prepared flawlessly and amazing volunteer work
- Wonderful premises, meals, travel arrangements and beautiful weather
- Well handled qualifying program and clear contest rules
- Smooth log checking and judging
- Organizers gave their best and more
- The best guys won. Nobody deserved to win more looking at the stability Dan and Chris have shown

What went wrong?

- Selecting hilly area (W1 coast) with no chance for equal locations
- Elimination of TX Blocking
 - amplified even the very small differences in locations and conditions
 - left the skills and teamwork out of the formula making 2xRUN the dominant strategy (winners made 600 S&P Qs – 13% while it was ca 30% in Moscow)
 - simple amount of EU callers on 20 and 15 meters became the crucial element
 - QSYs did not matter
 - K1A made 21 QSYs
- Score submission failed
 - And no scoreboard info provided for participants

CALL	QSYs	OP1	OP2
N1F	119	RW1A	RA1A
N1T	96	ES5TV	ES2RR
N1L	79	KU1CW	EA5GTQ
W1W	57	OH2UA	OH6KZP
K1N	55	OE3DIA	E77DX

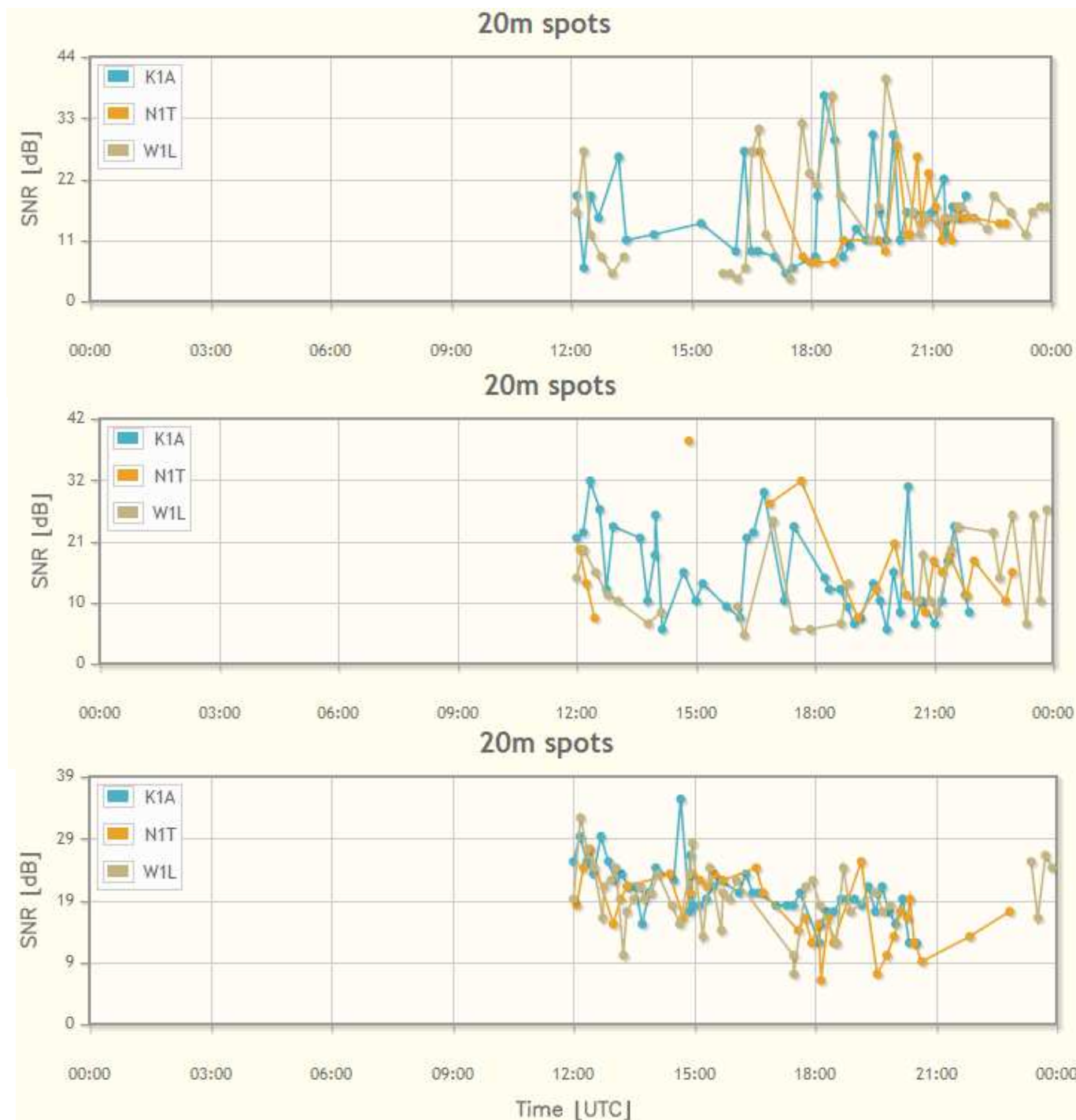
N1T

- A=B tests before the contest showed 1S unit clear advantage to EU in the evening on 15 and 20 meters for the K9VV/VE3EJ team close to our QTH on a small hilltop
 - ES5RY who was the referee there could still talk to guys back in ES (several stations) on 15 meters who did not any more hear us at all anymore.
- In the contest the bands clearly opened and closed for stations to EU at different times
 - K1A is spotted by EU skimmers right from the start while several of them start spotting us only 4-5-6 hours into the contest although we did the same thing as K1A (confirmed by RA3AUU) - turned the beam to EU and fired away.
- Take a look for example on those 20M skimmer spots for K1A (gold), W1L (silver) and us - N1T. Here is SE0X from EU:

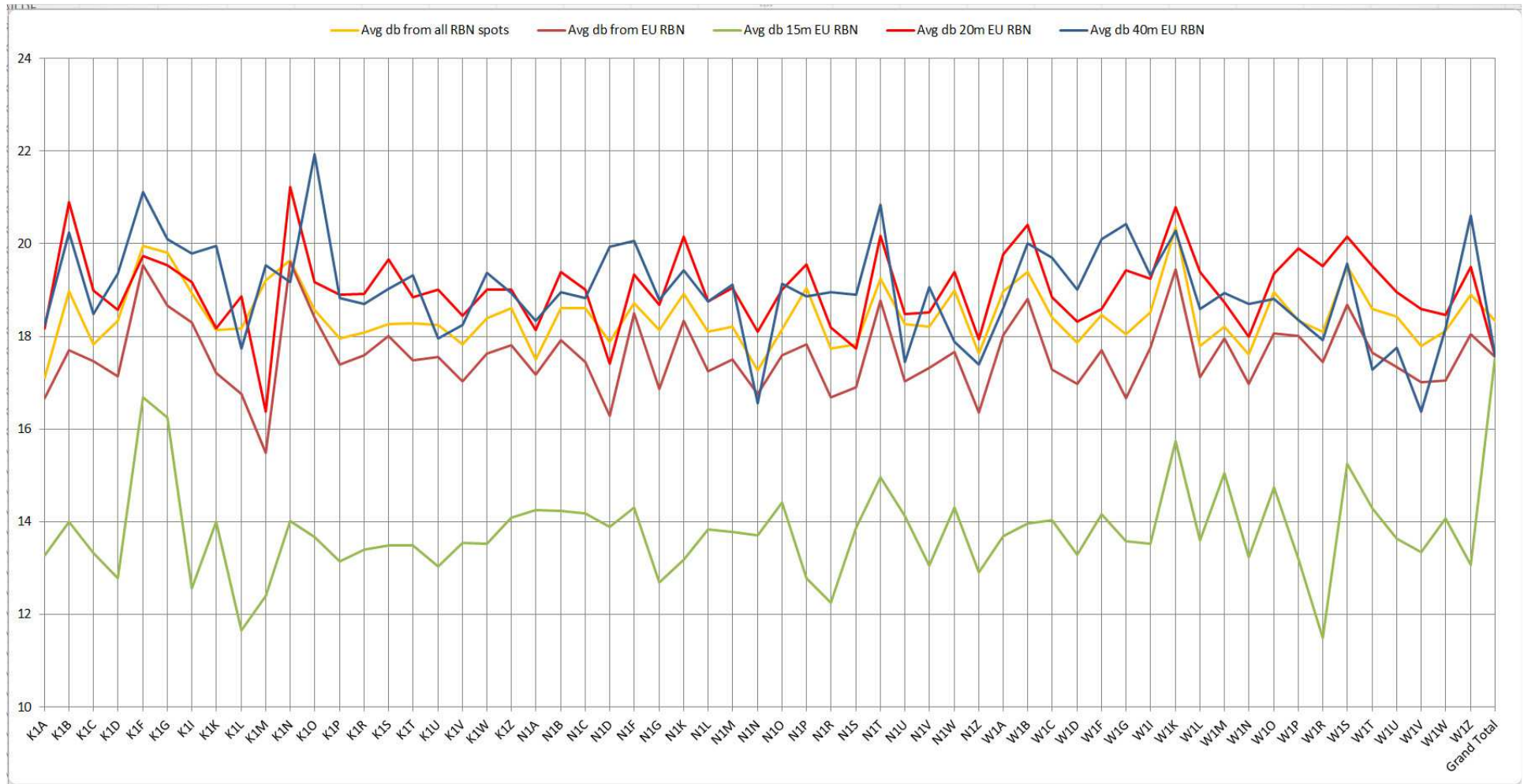
SE0X
Our spots start from
ca 17z

WA7LNW
Almost no spots for
us from 12:30 to 17z

AA4VV (local)
We are there all the
time!

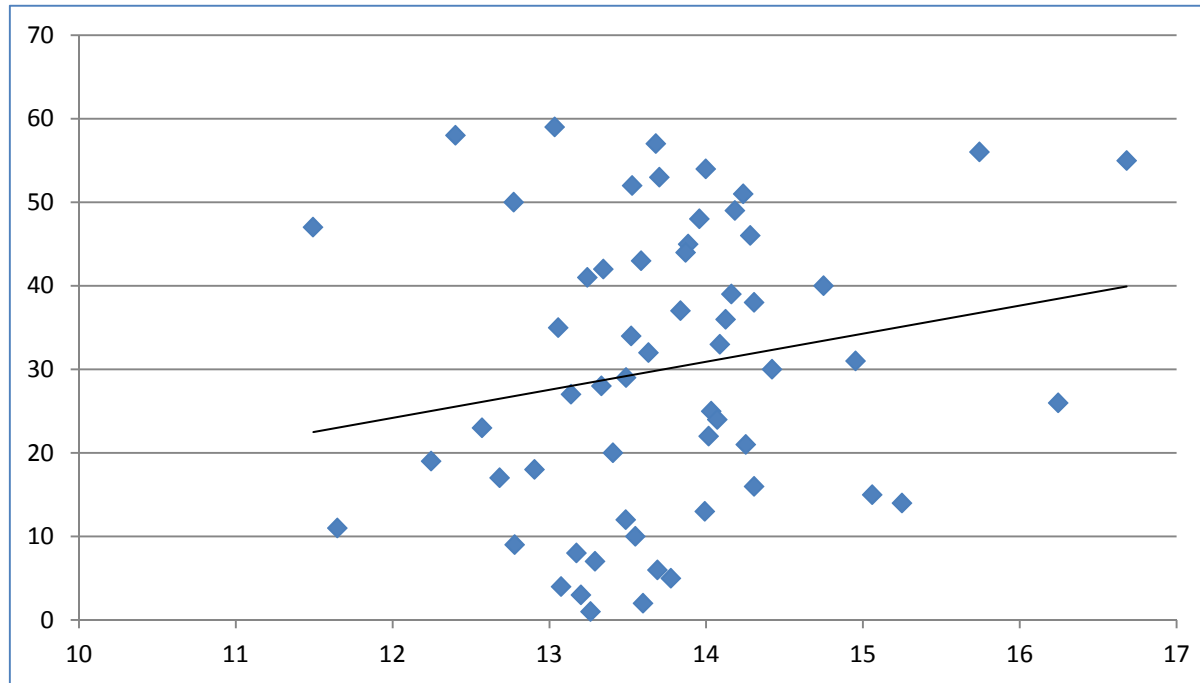


Everyone equal by RBN reports?



EU RBN spots on 15M

0,183 correlation between average db and place



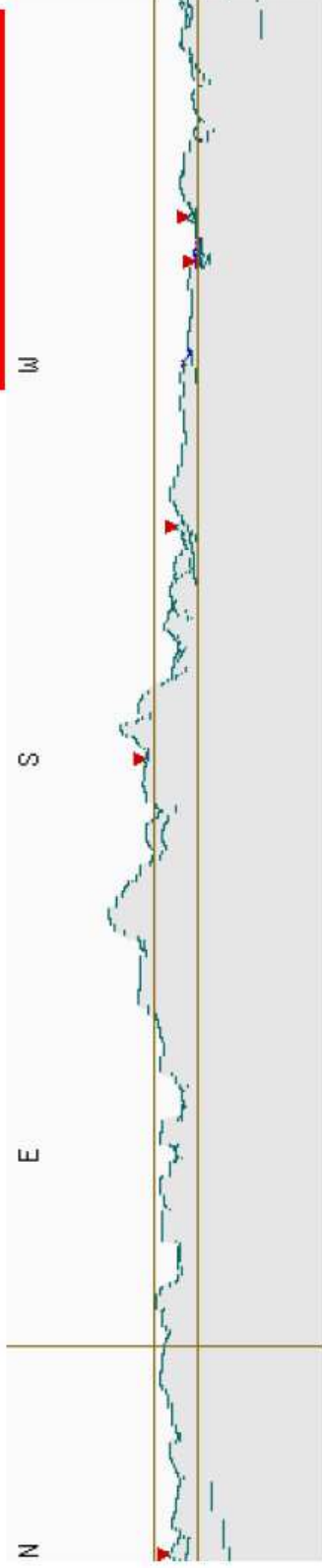
-0,53 correlation between number of spots and place

-0,2 correlation between number of spots and average db

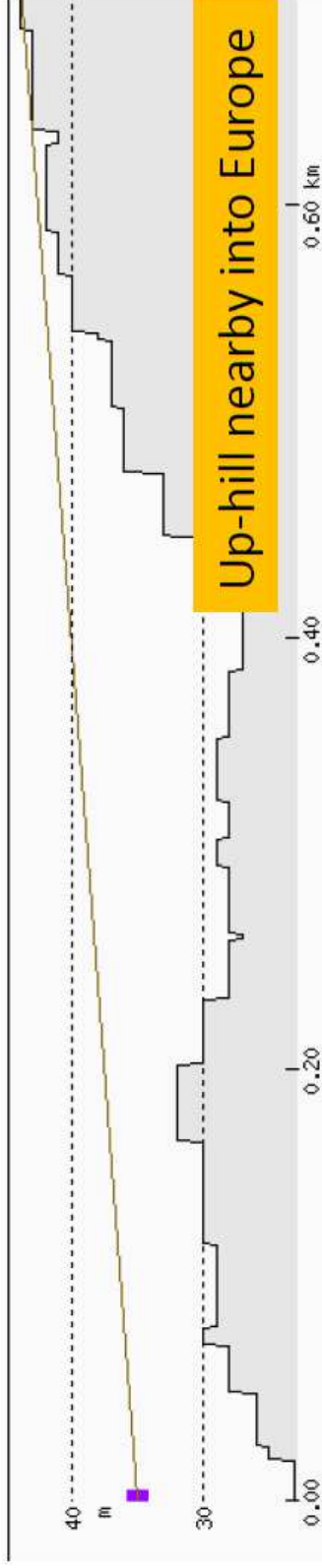
Lower WRTC Rank stations topography

K10 JH5GHM JA10JE

Rank # 57



(vertical scale exaggerated 10x) az 144° alt -3.16° show 0° and 1° alt

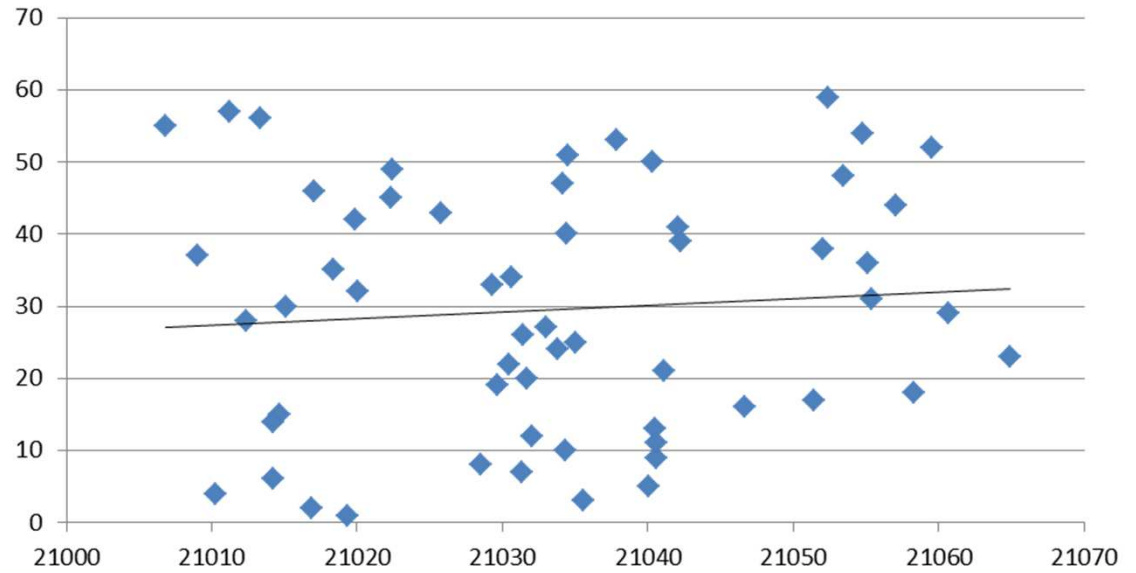


<http://www.heywhatsthat.com/?view=JIEJRBJK>

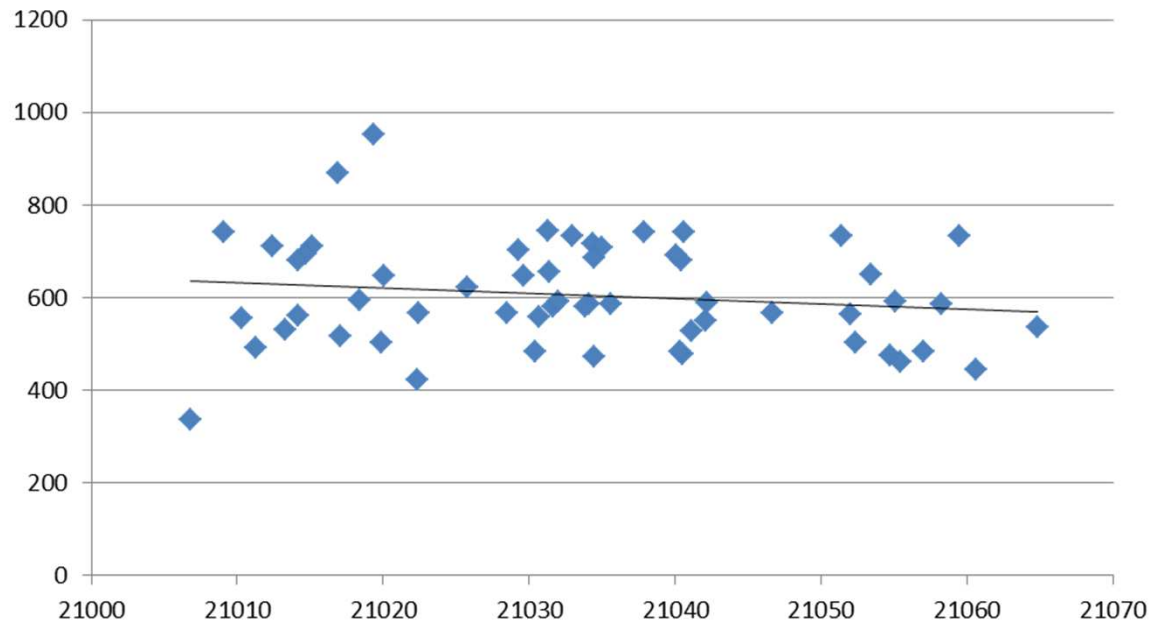
N1T

- ca half of the EU skimmers (more sensitive) were still coping us in the first 4 hours on 20M. In that period we have less than 50% of the EU spots (130) of the ones with top spot count (over 300).
- We sent TEST CALL CALL, no speed changes, local skimmers were coping fine
- We ran the same power and equipment was working 100%
- We were spotted as frequently as the leaders when the band was open
- Our antenna was correctly aligned
- It was pointed to EU most of the time as the winners had
 - „I heard 3rd hand (not directly from him) that your team accidentally left the beam pointed to South America for a considerable time period. Maybe you referee can confirm. It is only a rumor. „
 - W4PA: „You were testing the station on Friday for quite a while with the beam pointed at 240 degrees which was EU from Estonia, not W1. I don't remember if it was me or ES2RR who noticed this later and turned it around to 45. This was not during the contest. “
- Did we miss RBN spots because of running too high?
 - No, only ca 10% of skimmers have 14060 limit and we were very seldom higher
- Did we miss non-RBN callers because of running too high??
 - EJ&VV spent the first hour on 14053 making the same amount of QSOs as W1L – 127 (we 81)

Place vs average RUN frequency on 15M



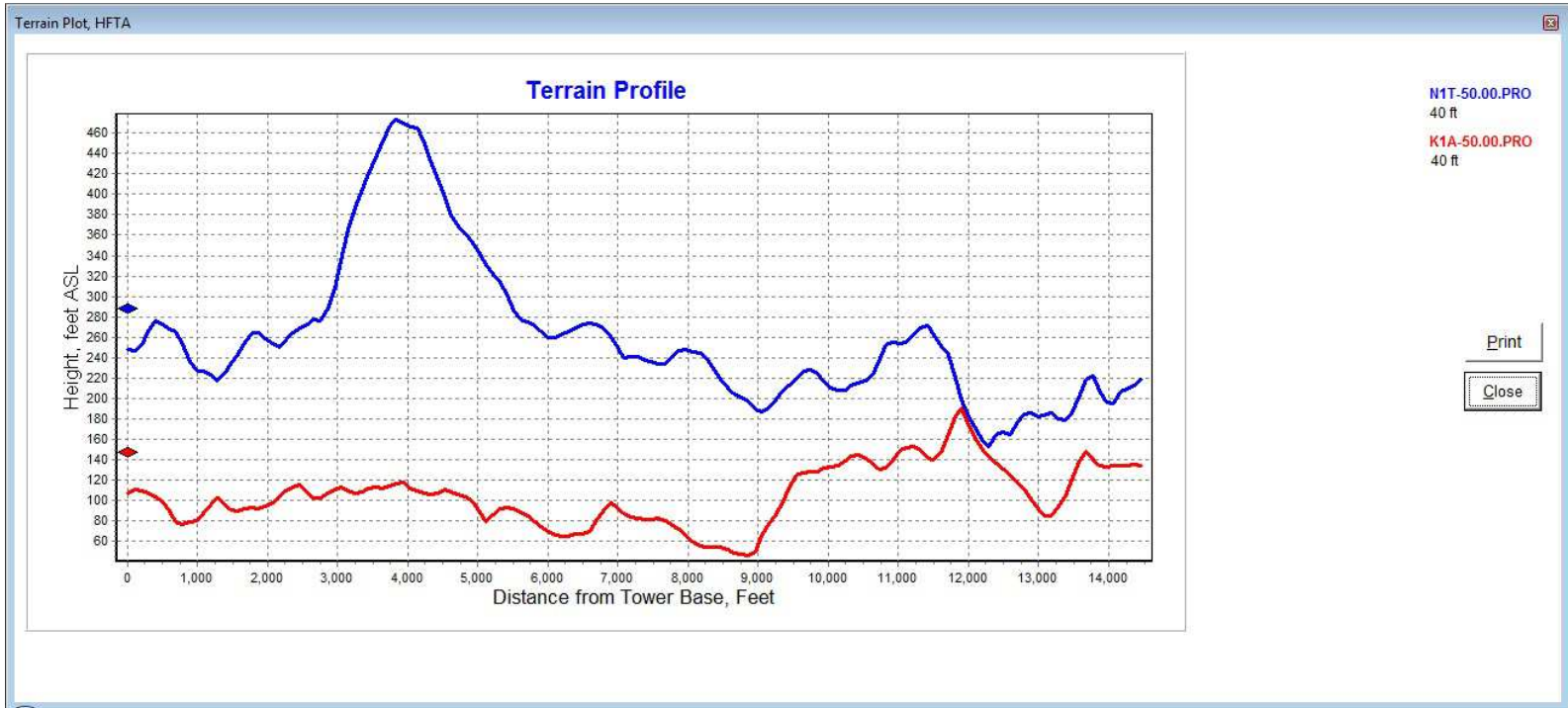
Amount of RUN QSOs vs average RUN frequency on 15M



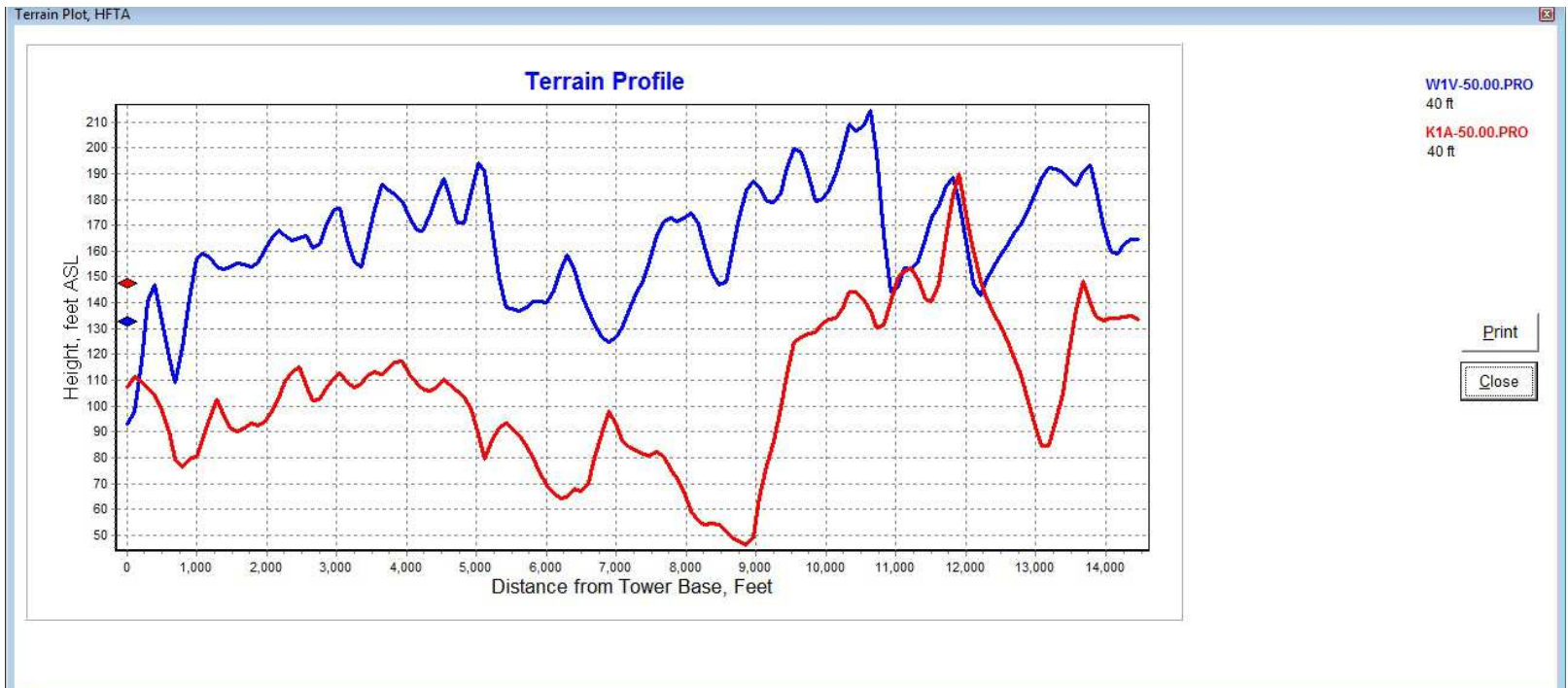
Very low correlation

10m hill in front causing 5-10db disadvantage on lower angles

High mountain 1km away



W1V
 R9DX/
 UA9CDV
 42nd place
 No
 comments!



Where those
 plots not
 available for
 organizers??

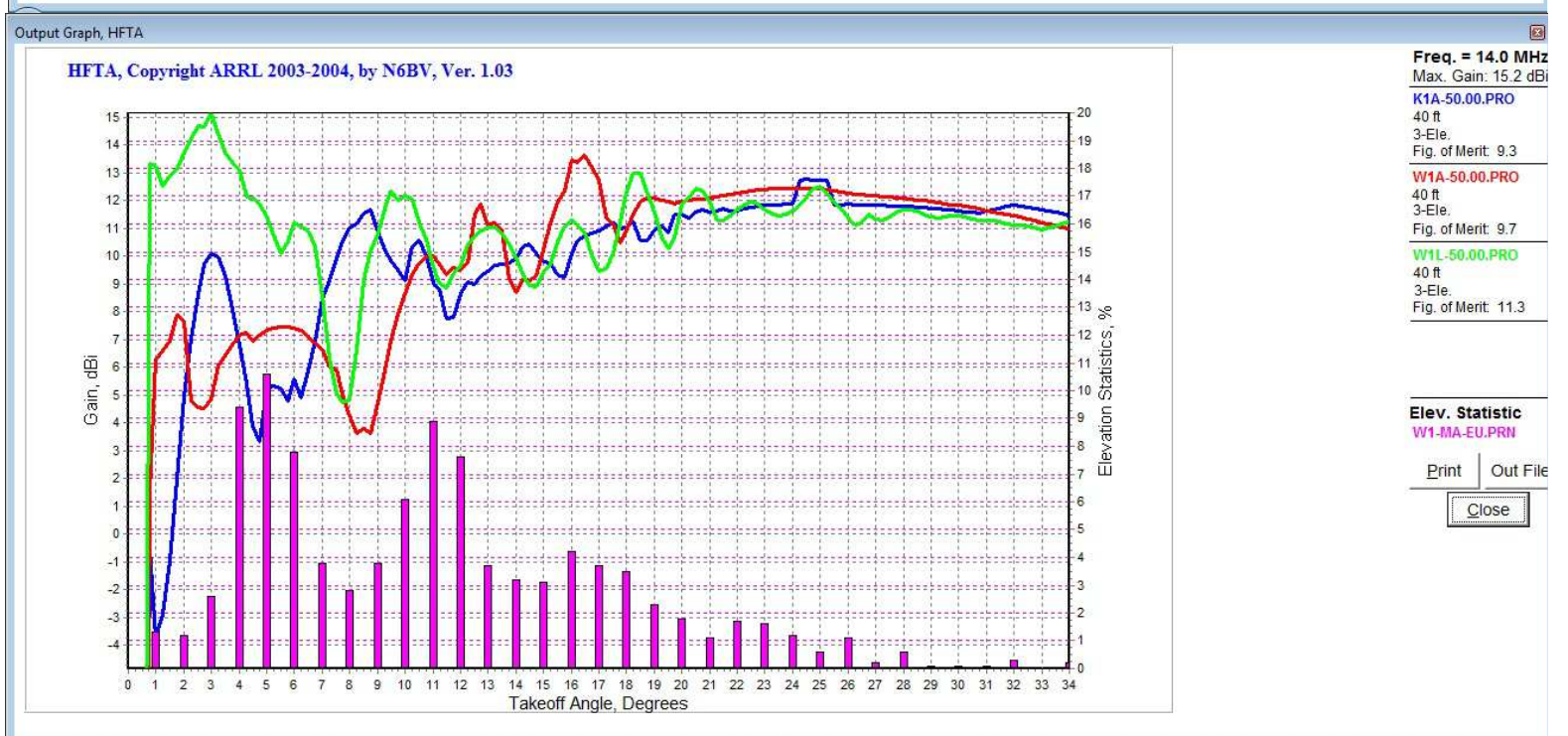
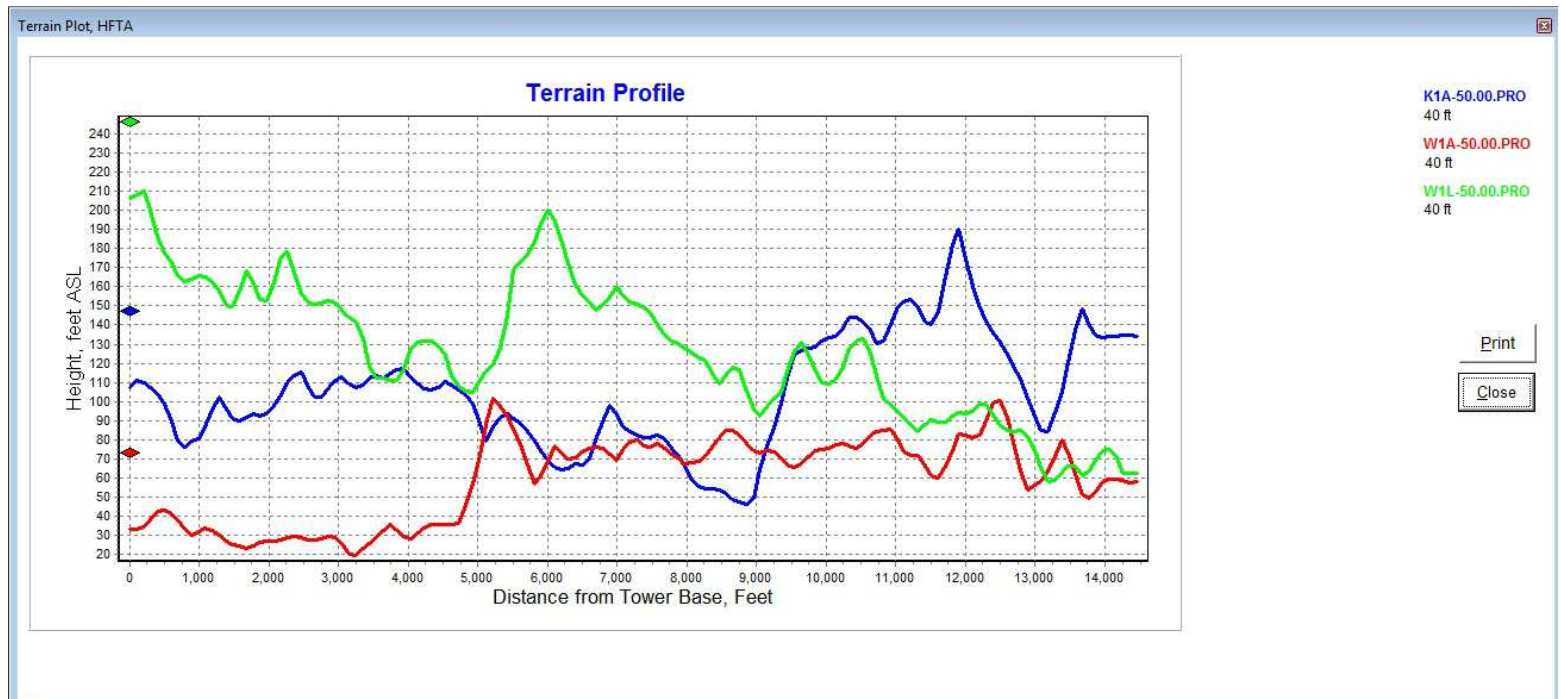


W1L
OM3BH/
OM3GI
2nd place

W1A
LY9A/LY4L

6th place

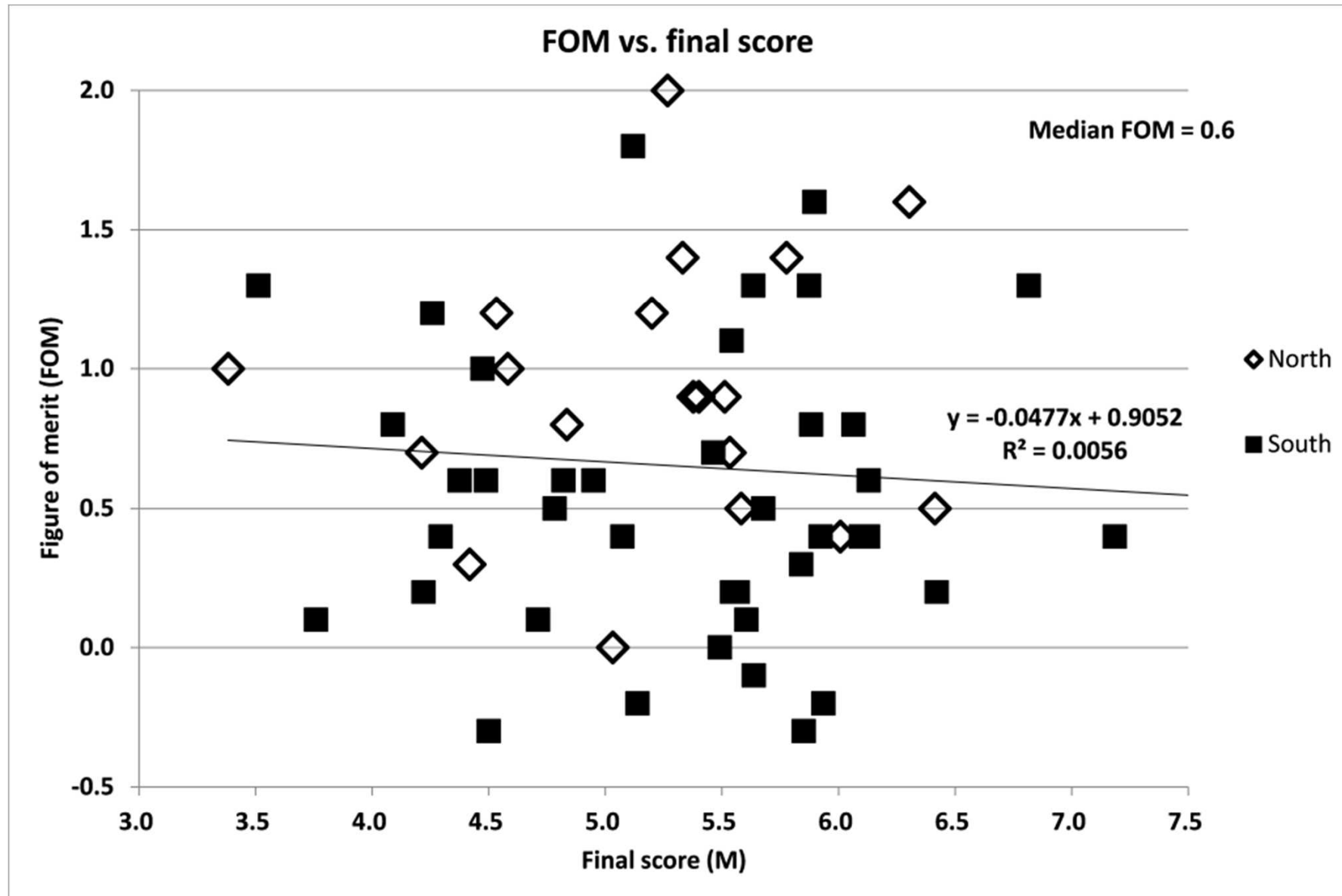
No
comments!



Site Evaluation Methodology

- <http://www.wrtc2014.org/site-selection-methodology/>
- there is no ideal level ground in New England
- every location will have varying terrain in different directions
- FOM model with a lot of complicated assumptions
- Did it work?

Negative correlation – good news?



Site	Call	Operators	Coordinates	Overall	EU	US	Site	Call	Operators	Coordinates	Overall	EU	US
01A	W1T	AD4Z W4UH	N 42,73222 W 71,59279	1,2	1,5	-0,4	10F	W1D	K1LZ YT6W	N 42,08238 W 71,32759	0,4	0,4	0,5
02A	W1Z	N5DX N2IC	N 42,70303 W 71,58863	0,5	0,6	0,5	10G	K1K	RL3FT RA3CO	N 42,09002 W 71,31741	1,6	1,8	0,3
02B	W1U	LZ4AX LZ3FN	N 42,70127 W 71,57982	0,9	1,1	-0,2	11B	N1G	RX3APM RV1AW	N 42,07739 W 71,32641	0,3	0,1	1
03A	K1U	KF5EYY YT1AD	N 42,68956 W 71,59410	1	1,2	0,1	11C	K1D	UR0MC VE3DZ	N 42,07470 W 71,32142	0,8	0,8	0,9
04A	N1M	K9VV VE3EJ	N 42,66727 W 71,62870	1,6	1,8	0,2	11E	W1S	F8DBF F1AKK	N 42,07891 W 71,31810	0,8	1	0
04B	K1Z	VE7CC VE7SV	N 42,67007 W 71,62269	1,4	1,6	0,3	12A	N1F	RW1A RA1A	N 41,99903 W 71,19228	-0,3	-0,3	0,2
05A	K1W	K6AM N6AN	N 42,68618 W 71,59022	2	2,3	0,2	12D	K1N	OE3DIA E77DX	N 41,99997 W 71,20113	0,1	0	0,2
05B	N1T	ES5TV ES2RR	N 42,68117 W 71,58812	0,9	1,2	-0,8	13A	K1R	N4YDU N3KS	N 41,88059 W 70,99020	-0,1	-0,5	1,3
06B	K1C	KE3X K0DQ	N 42,52024 W 71,60899	0,9	0,9	0,9	13B	W1G	F4DXW F8CMF	N 41,87113 W 70,98153	0,5	0,5	0,5
06C	W1F	CT1ILT CT1BOH	N 42,54489 W 71,62133	0	0	0	14A	W1L	OM3BH OM3GI	N 41,78610 W 71,05130	1,3	1,6	0
06D	N1V	K7RL KL2A	N 42,54663 W 71,63347	1,2	1,4	0,3	14C	N1K	DK6XZ DK9IP	N 41,81255 W 71,10927	0,4	0,5	0,1
06E	K1V	GOCKV M0DXR	N 42,53472 W 71,63042	0,4	0,3	0,9	14D	W1A	LY9A LY4L	N 41,83188 W 71,11659	0,6	0,7	0,2
06G	N1D	NR5M W2GD	N 42,53492 W 71,60117	1	1,1	0,3	15A	W1C	9A5K 9A1TT	N 41,83721 W 70,65687	0,2	0,2	0,5
06H	K1F	VY2ZM KK6ZM	N 42,54787 W 71,61504	0,7	0,7	0,5	15B	W1O	OM2VL OM3RM	N 41,83365 W 70,65223	0,6	0,7	0
06J	N1Z	PY1NX LZ3YY	N 42,52311 W 71,60373	1,4	1,5	0,9	15C	W1K	BA5CW BA7IO	N 41,83503 W 70,64477	0,8	0,9	0,4
06K	K1I	UU4JMG UU0JM	N 42,54299 W 71,63744	0,5	0,2	2	15D	W1I	W2RE WW2DX	N 41,83039 W 70,64612	0,4	0,4	0,4
06Q	W1N	5B4WN 5B4AFM	N 42,54138 W 71,60629	0,8	0,8	0,5	15E	K1S	W2SC N2NL	N 41,83243 W 70,65804	0,4	0,4	0,3
07B	K1P	M0CFW GI0RTN	N 42,48372 W 71,77833	0,7	0,5	1,6	15F	K1L	S50A S57AW	N 41,84834 W 70,69252	-0,2	-0,4	0,4
07C	N1P	CX6VM LU1FAM	N 42,48904 W 71,77934	0,3	-0,3	2,3	15G	K1T	IZ1LBG WQ2N	N 41,81350 W 70,67121	0	0	0,1
08A	K1M	IK1HJS I4UFH	N 42,21484 W 71,33339	1,3	1,5	-0,1	15H	N1N	KH6ND KH6SH	N 41,84928 W 70,68134	1,2	1,4	0,3
08B	N1A	DL1QQ DL8DYL	N 42,20961 W 71,33097	1,3	1,6	-0,4	15I	N1U	K8MR K9NW	N 41,84859 W 70,67522	-0,2	-0,1	-0,4
08C	W1R	OH2BH OH2MM	N 42,21174 W 71,33778	-0,3	-0,7	1,3	15J	N1B	YL1ZF YL2GQT	N 41,81724 W 70,67938	0,6	0,7	0,2
08D	W1M	4O3A HA1AG	N 42,20899 W 71,34627	1,3	1,6	-0,2	15M	N1W	PY2YU PY2NDX	N 41,86035 W 70,66443	0,4	0,3	0,6
09A	N1O	RC9O UA9PM	N 42,21764 W 70,83317	0,7	0,9	-0,3	15N	K1B	W9RE N5OT	N 41,85969 W 70,67053	0,2	0	1
09B	W1W	OH2UA OH6KZP	N 42,21911 W 70,84024	0,2	0,2	0,3	15O	W1V	R9DX UA9CDV	N 41,85283 W 70,67272	0,6	0,5	0,9
09D	K1G	9A6XX 9A1UN	N 42,22343 W 70,84605	1,1	1,3	0,1	15P	N1S	LX2A YO3JR	N 41,85925 W 70,68597	0,1	0,1	0
09F	K1O	JH5GHM JA1OJE	N 42,21499 W 70,85559	0,1	0,1	0,1	15R	N1C	IK2NCJ IK2QEI	N 41,85886 W 70,67814	1	1,1	0,6
09G	N1L	KU1CW EA5GTQ	N 42,21324 W 70,84757	1,8	2,2	-0,5	15U	K1A	N6MJ KL9A	N 41,82532 W 70,64618	0,4	0,3	0,9
09H	N1R	UA3DPX UA4FER	N 42,18258 W 70,84749	0,5	0,6	0,1	15W	W1P	DJ5MW DL1IAO	N 41,82787 W 70,65786	0,2	0,1	0,4
10A	W1B	OE2VEL OE5OHO	N 42,08580 W 71,32105	0,6	0,7	0,4	Average				0,87	0,95	0,36

CT1BOH

Common sense terrain topography

- horizon altitude
- terrain profile into Europe direction
- visibility cloak (or 360 degree line of site profile from tower location)

QTH topography is the most important aspect for optimizing a contest result because of:

- The ability to get to low angles and open new layers of weak stations in marginal conditions
- The ability to increase gain through terrain and have a better signal
- The ability to reduce / remove radiation pattern nulls

During WRTC2014, the European path was of particular relevance

- Significant percentage of QSOs
- Summer time marginal conditions on 10, 15 and 20 during the day
- Night time propagation on 20

In such conditions topography has even greater relevance because of low angles incidence and importance.

It was assumed **Site and Acquisition and Testing Committee** had built a protocol to rate possible sites and from there choose level playing field sites, removing bad ones.

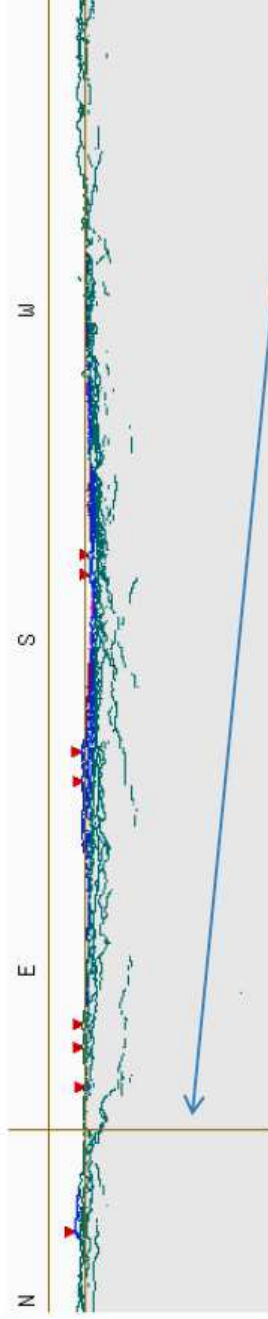
CT1BOH

- Teams with better WRTC2014 results come from sites with clear horizon altitude, flat or down-hill terrain profile into Europe, good 360 degree line of site all around. You don't need HFTA nor RBN studies to have a basic idea if a site is good. All you need is some basic common sense about terrain topography.
- There were stations that could work almost 1000 RUN QSO on 15 meters (K1A 976, W1L 903, K1D 912) while others could only work about half of it, like WRTC2010 Champions N1F (573 QSOs) and WRTC2010 Vice-Champions (534 QSOs). Did they turn all of a sudden bad operators not able to keep a RUN or was it QTH bad QTH topography that denied them the opportunity for a fair play?

Sites 15 - cluster 2 - K1A

2

Panorama

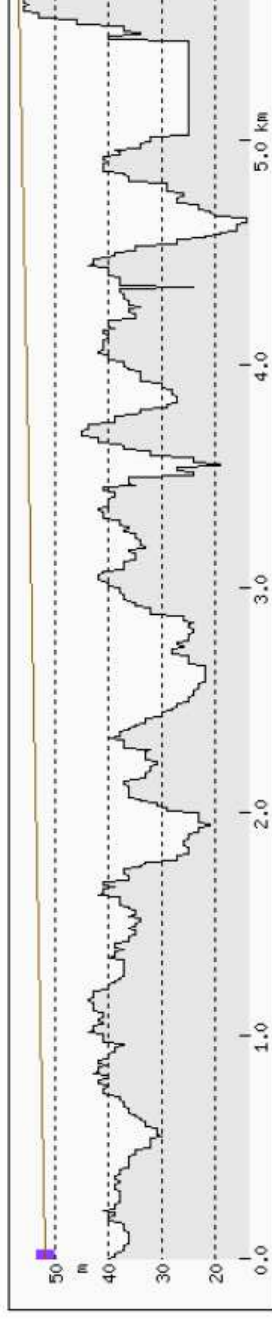


1 degree altitude
0 degree altitude

(vertical scale exaggerated 10x)

az 50° alt -0.97° show 0° and 1° alt

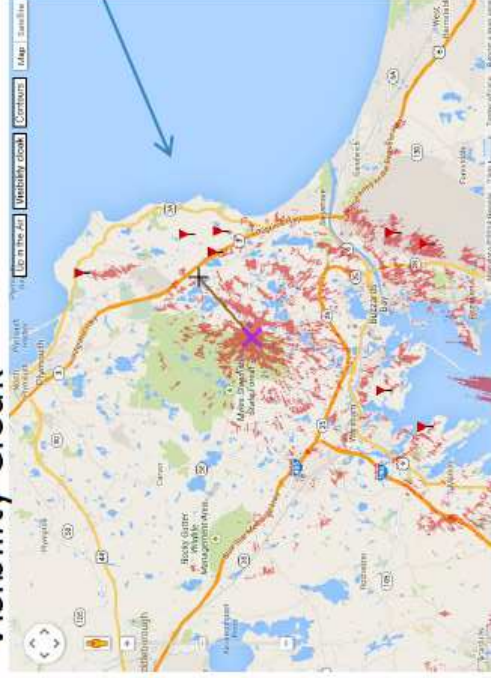
Terrain profile



Europe Azimuth

Europe Azimuth
terrain profile

Visibility Cloak



Visibility cloak from up the tower
@ 40 feet (approx 12m)

K1A N6MJ KL9A QTH is excellent:

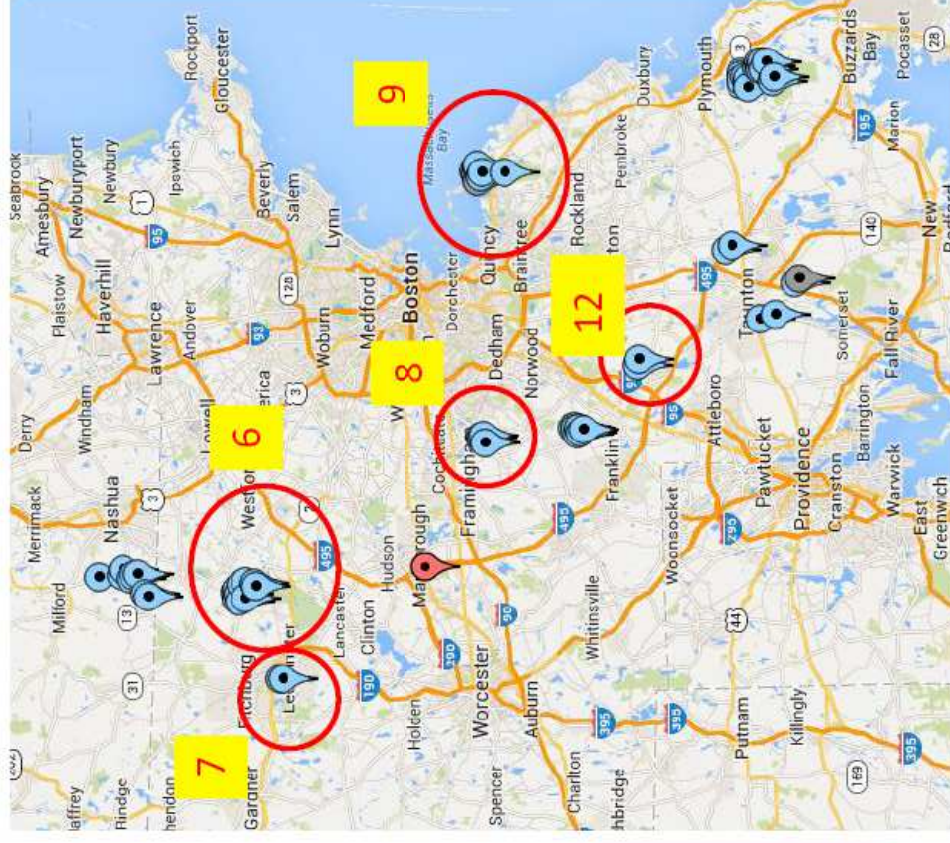
- Clear all around panorama (access to 0 degrees)
- No up-hill terrain profile
- Excellent 360 degree visibility cloak

Use the link to interact <http://www.heywhatsthat.com/?view=P4GAK31A>
with the different plots

Stations with most QSOs

Let's take a look at stations that were able to work the most QSOs during WRTC2014:

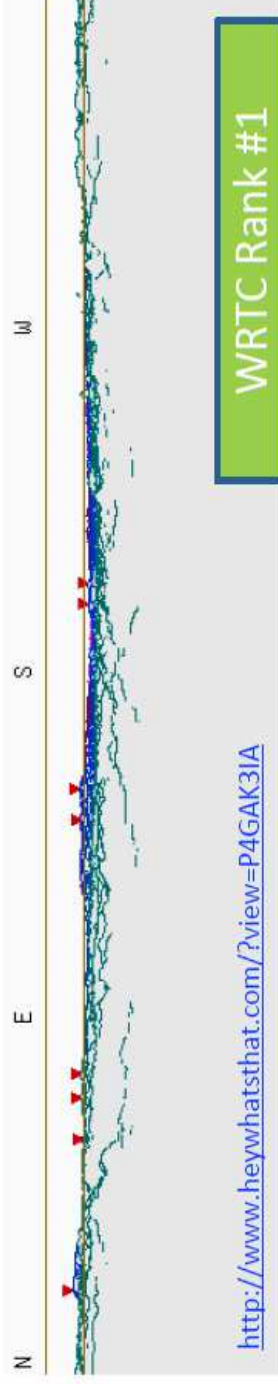
Callsign	Team Leader	Team Mate	Site	QSOs	Mult	Rank
K1A	N6MJ	KL9A	15U	4,572	436	1
W1L	OM3BH	OM3GI	14A	4,508	422	2
N1M	K9VV	VE3EJ	4A	4,499	402	5
W1Z	N5DX	N2IC	2A	4,472	416	4
K1D	UR0MC	VE3DZ	11C	4,416	390	9
K1R	N4YDU	N3KS	13A	4,363	387	20
W1P	DJ5MW	DL1IAO	15W	4,347	417	3
W1A	LY9A	LY4L	14D	4,301	407	6
N1K	DK6XZ	DK9IP	14C	4,298	405	8
W1C	9A5K	9A1TT	15A	4,222	375	25



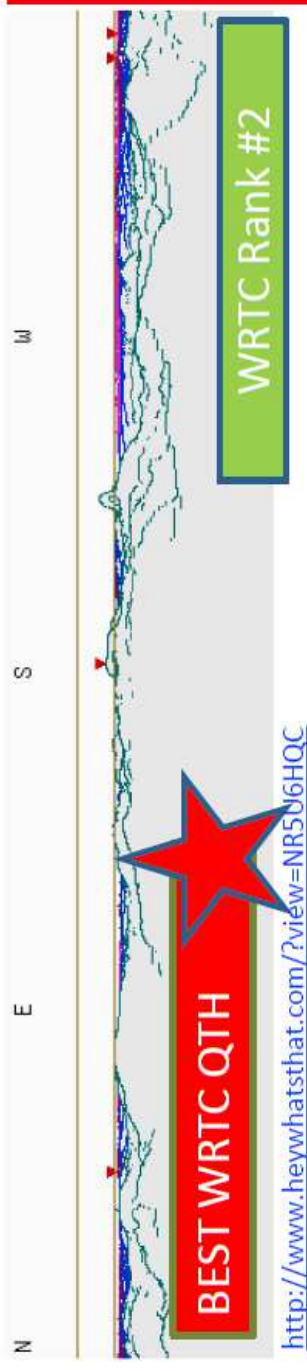
It's interesting to note that:

- No stations from sites 6,7,8,9,10,11,12,

Panorama of stations with most QSOs

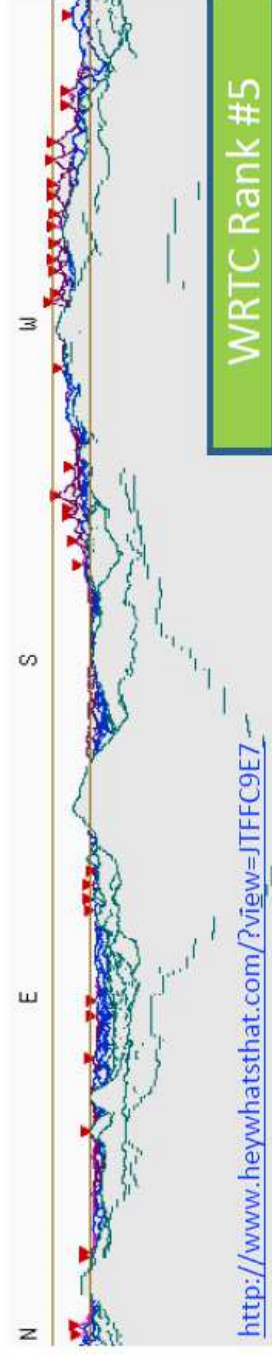


K1A N6MJ KL9A
Excellent QTH
4572 QSOs



W1L OM3BH OM3GI
Fantastic QTH
Negative horizon
everywhere
4508 QSOs (read note below)

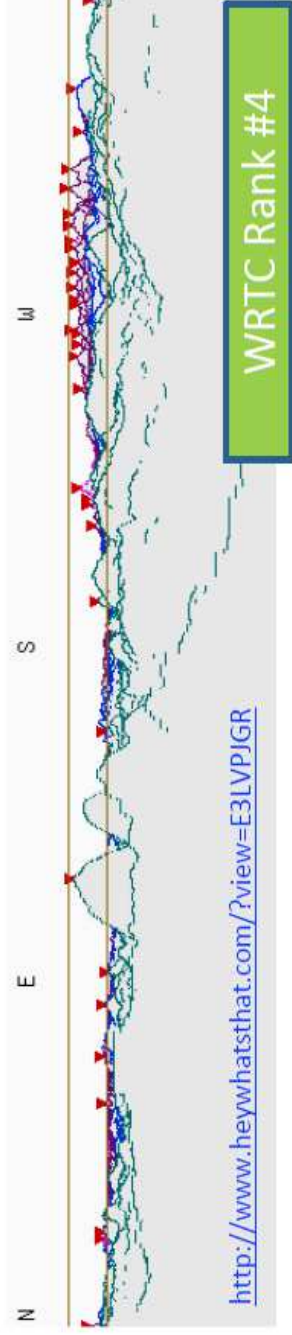
BEST WRTC QTH



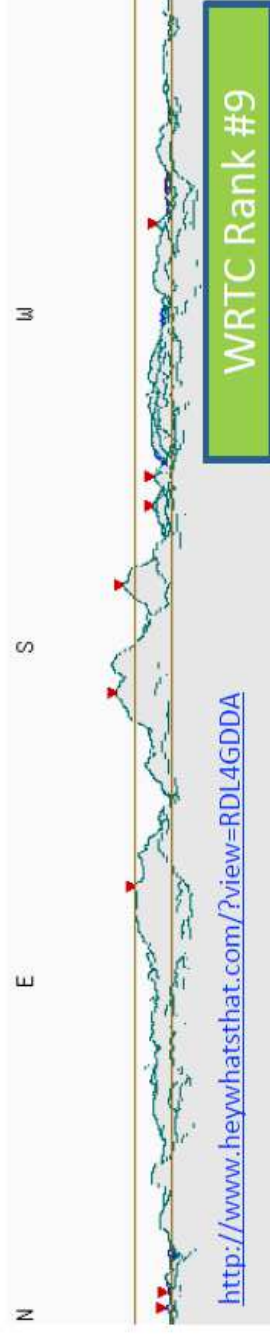
N1M K9VV VE3EJ
Excellent QTH Europe
4499 QSOs

Note: WRTC organizing committee stated that some sites were not accepted because they were too good. It is incredible how W1L site was given the green light compared to others. Negative horizon everywhere....

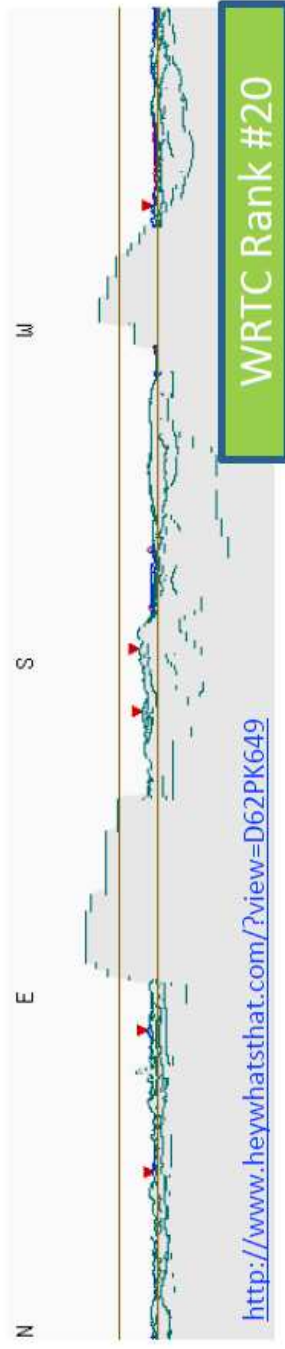
Panorama of stations with most QSOs



W1Z N5DX N2IC
Excellent QTH Europe
4472 QSOs

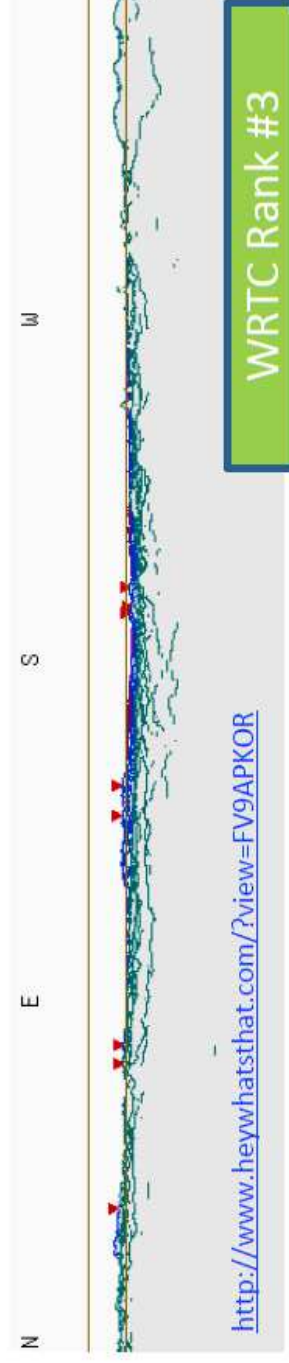


K1D UR0MC VE3DX
Average QTH
4416 QSOs

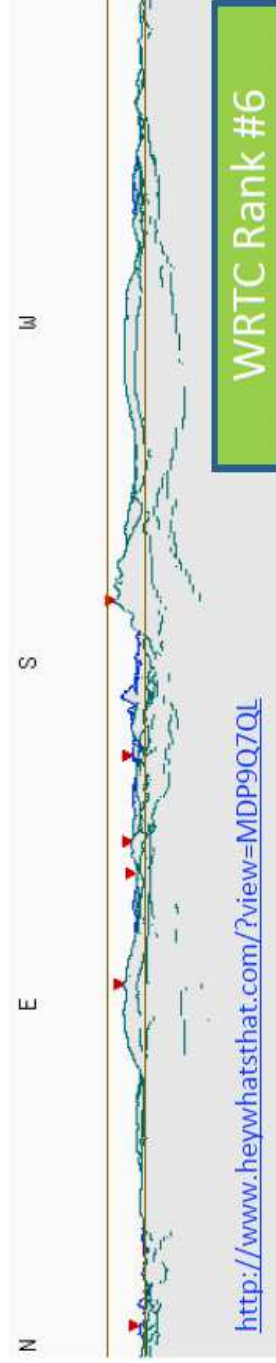


K1R N4YDU N3KS
Good QTH
4363 QSOs

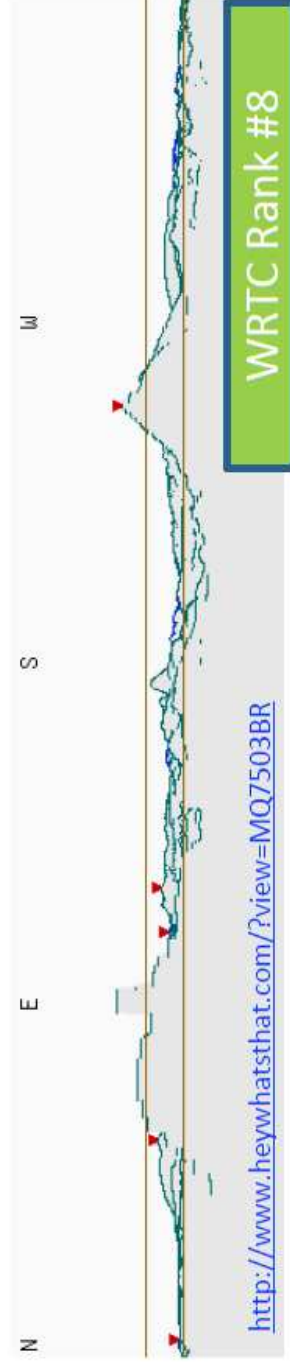
Panorama of stations with most QSOs



W1P DJ5MW DL1IAO
Excellent QTH
4347 QSOs



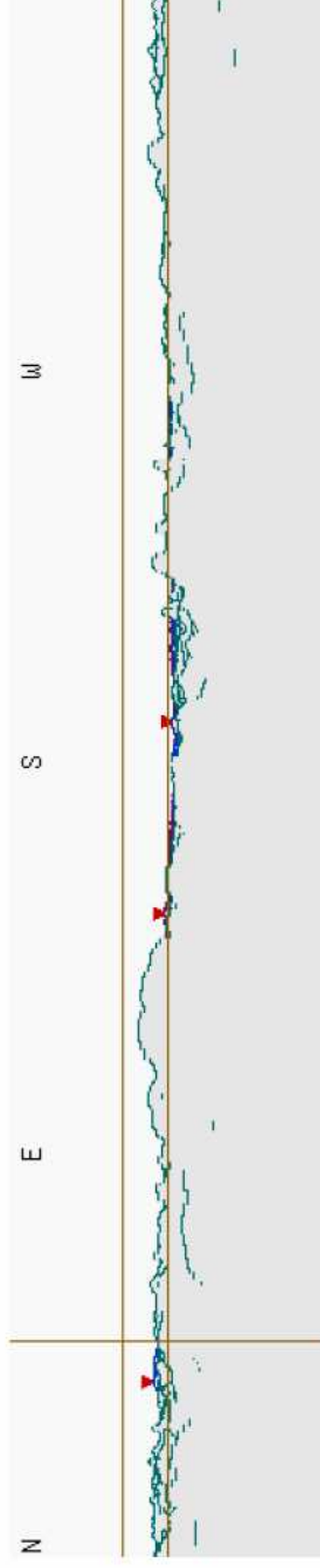
W1A LY9A LY4L
Good Europe QTH
4301 QSOs



N1K DK6XZ DK9IP
Good Europe QTH
4298 QSOs

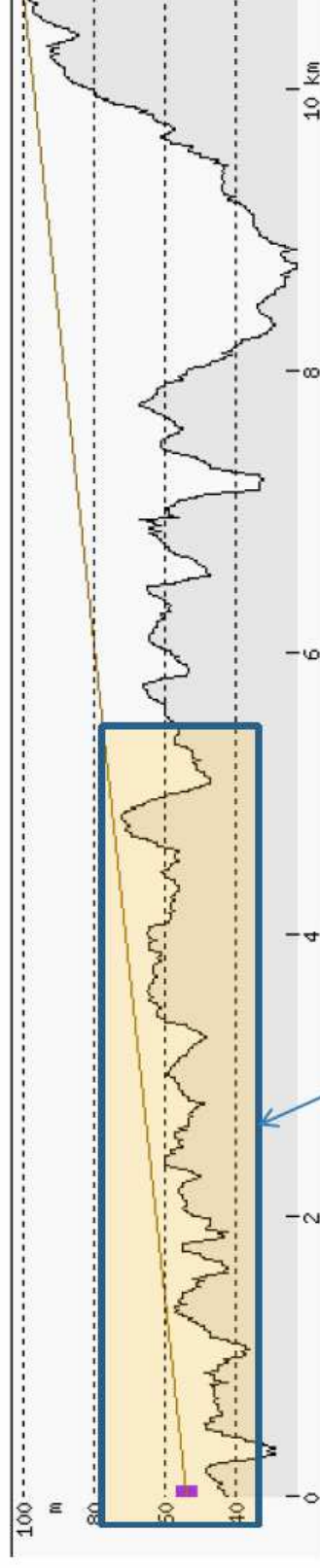
Complain 1

Public competitor complains – N1N KH6ND KH6SH



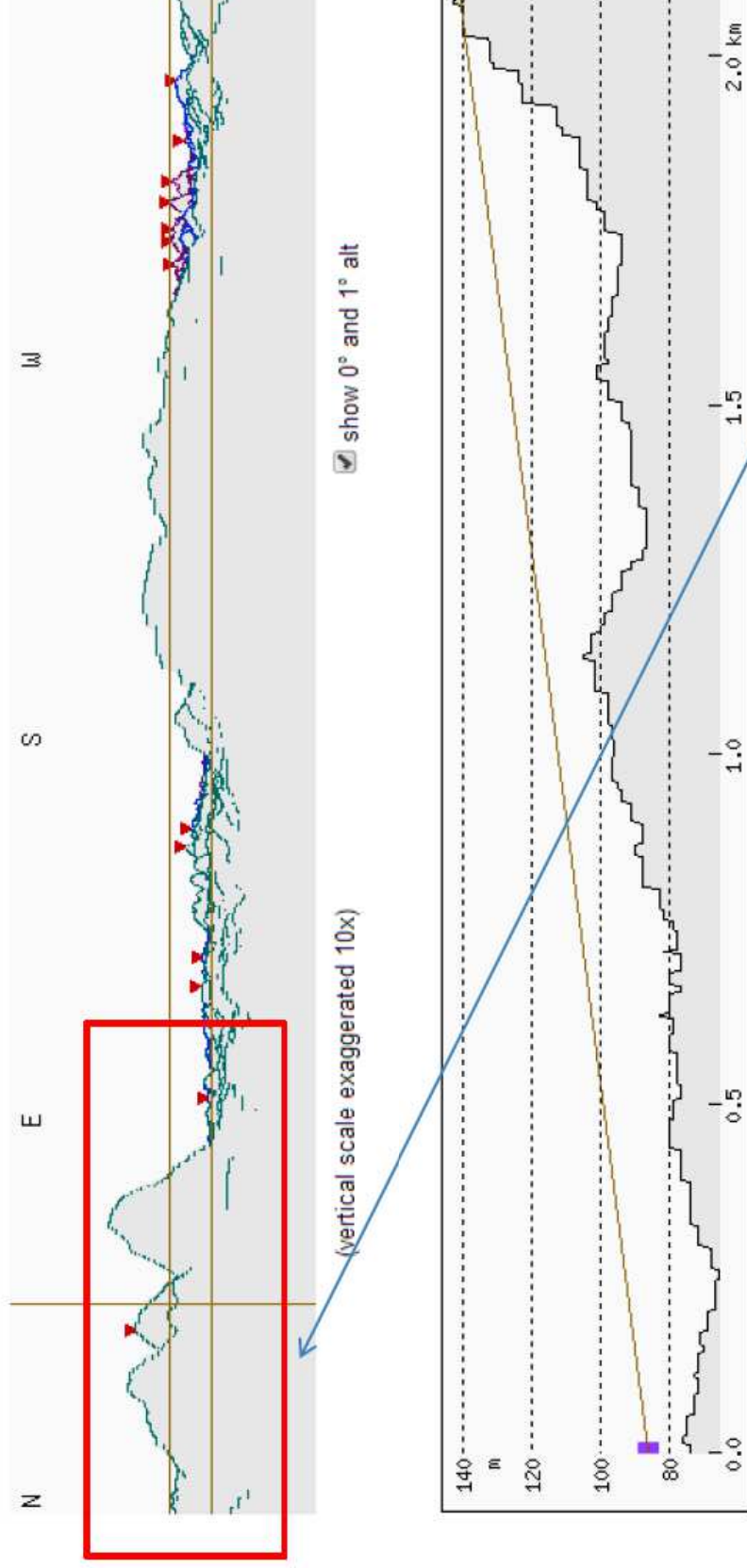
(vertical scale exaggerated 10x)

show 0° and 1° alt



Terrain goes up-hill consistently for 5 kilometers

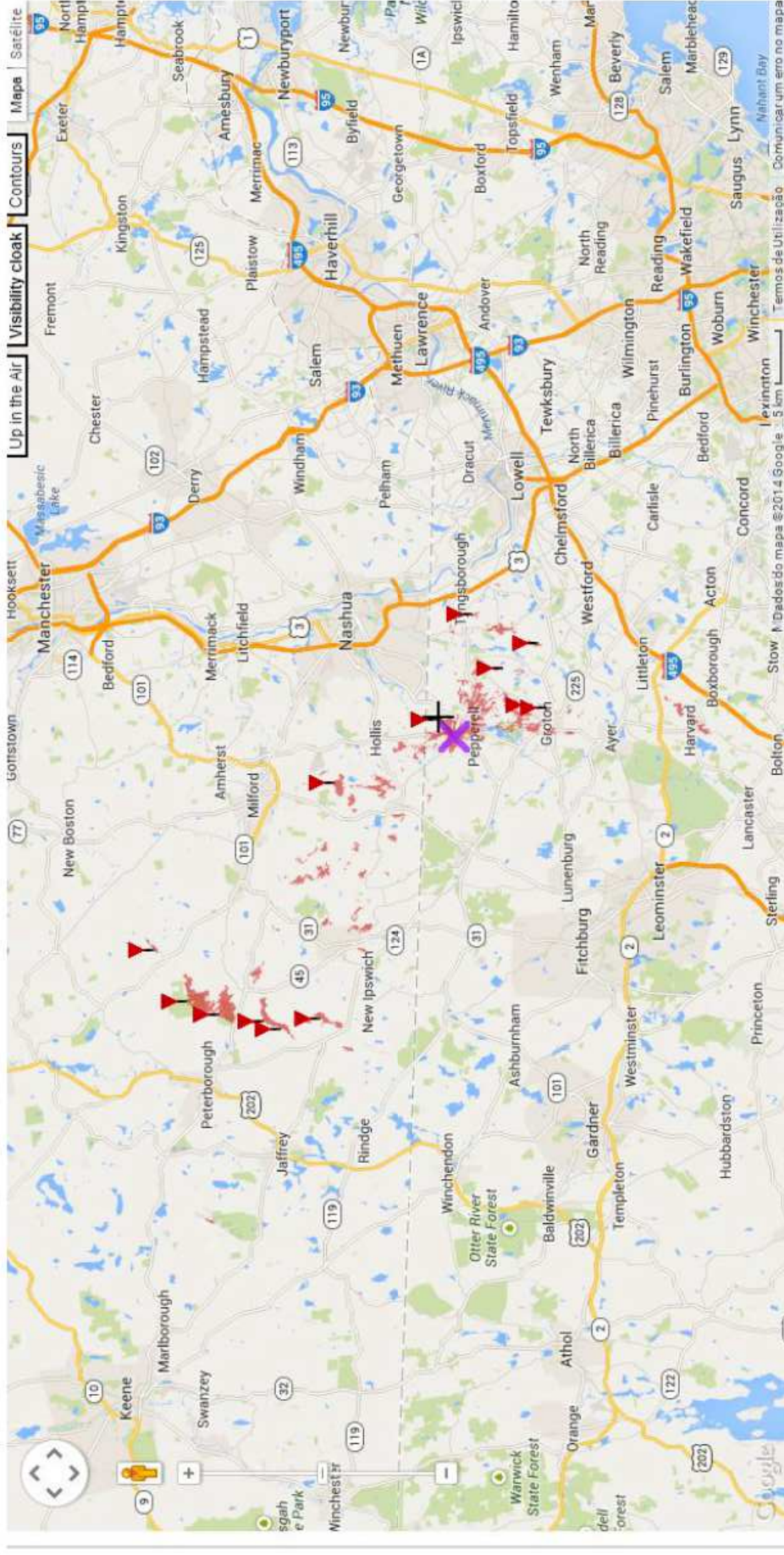
Public competitor complains – N1T ES5TV ES2RR



Terrain profile is bad towards Europe at low angles and also towards USA
Up-hill going for 2 kms

Complain 2

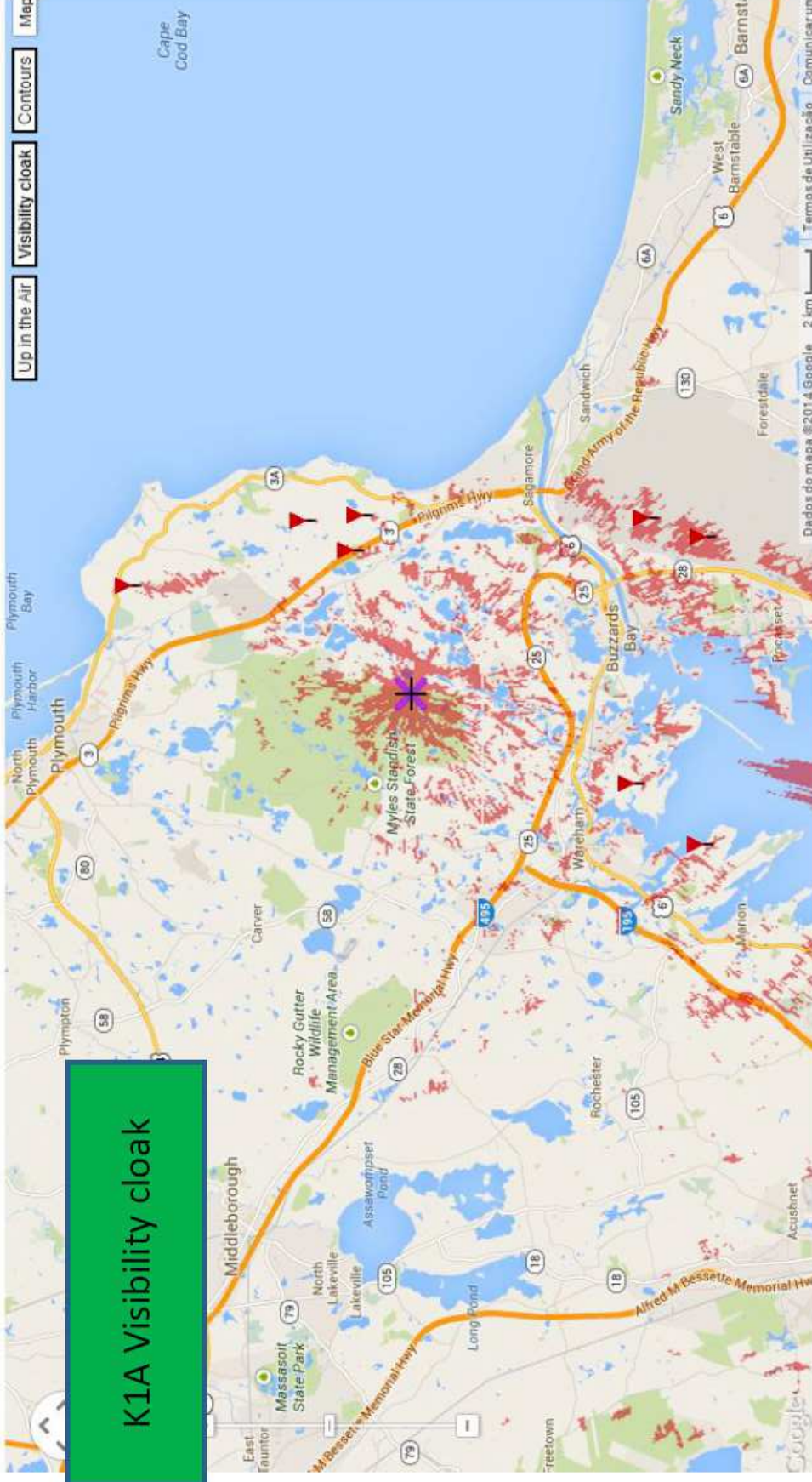
Public competitor complains – N1T ES5TV ES2RR



**Terrible visibility cloak.
No 360° all around visibility cloak from up the tower @ 40 feet**

Complain 1

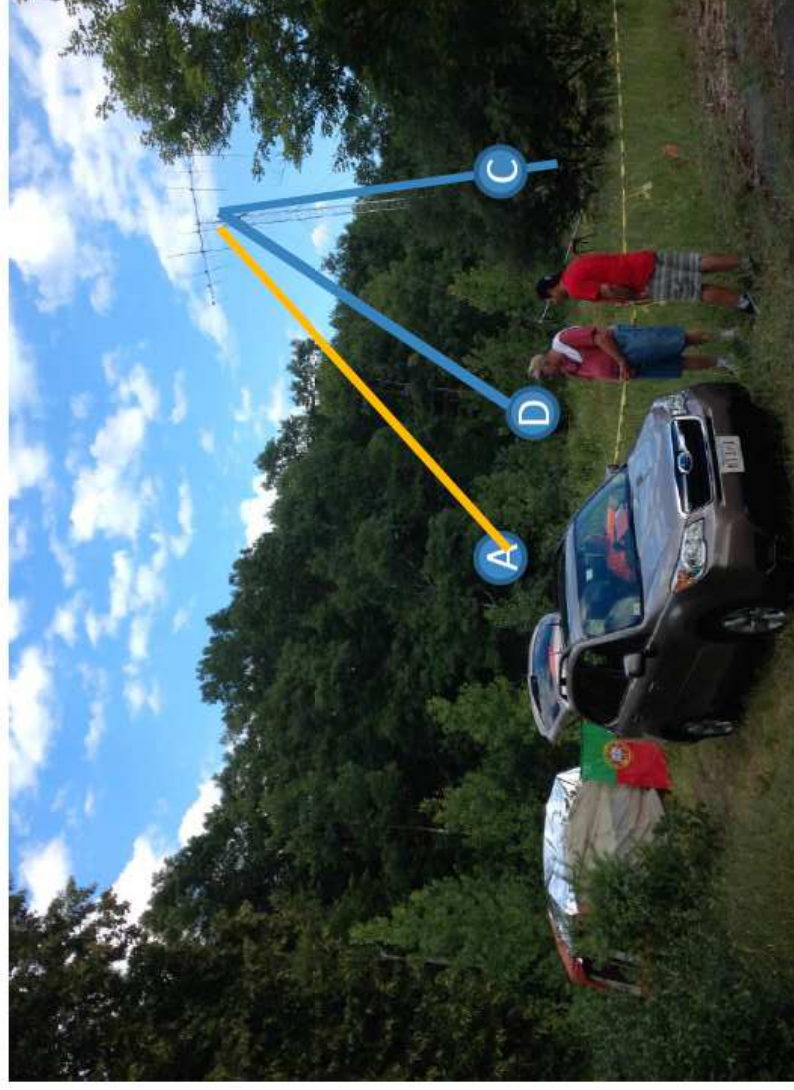
Public competitor complains – N1N KH6ND KH6SH



Compare K1A nice 360 degree visibility cloak above, with N1N visibility cloak in previous slide, only 4 kilometers (2.5 miles) away

Public competitor complains W1F CT1ILT CT1BOH

And because a picture is worth a thousand words...



- Check the beam, pointing Europe with the 20-30 wall hill in front of it. Even the boom was pointing down
- The ends of our 80 meter dipole were at the base of the hill **A** mark in the middle of the trees and bushes
- The north side of our 40 meter dipole **D** mark was not parallel to the beam elements, because it would hit the tree at **C**, therefore not in line with the other side of the dipole

K5ZD when visiting allowed us to move the end of the 40 meter dipole a tick to the right, but still not where it should be at C mark. We couldn't cut the small tree...

CT1BOH conclusions and suggestions

- In spite of statements of level playing field to competitors, that was not the case for all WRTC 2014 sites. Although there were a good number of “good” sites, there were still too many “bad” places
- It is my belief, there was an underestimating of the importance of low angles, taking into account the importance of Europe path and marginal conditions due to summer season in the Northern Hemisphere
- Future WRTC organizations should make available **well before** WRTC event:
 - Exact QTH locations (latitude and longitude)
 - Detailed and exact topographic maps of QTH locations
 - Detailed visibility cloak of QTH locations
 - Detailed HFTA analysis with terrain profile and figure of merit weighted according to % of expected QSO from each continent (one azimuth per continent)
 - Minimum acceptable difference in the take off curve at each angle
 - Rate of each QTH according to a protocol with above variables

My additions

- Bring back TX interlock
- Look for flat area not close to water
- Bring the stations closer together
- Rely more on logical terrain analysis than RBN spots at some specific time and conditions
- Micro is much more important than macro
- Test the score submission in RF environment
- Give scoreboard info to competitors
- Don't do that:

K1DG in an interview on Aug 19

- ...Levelling the playing field was a big challenge...
- ...We used a variety of tools to select sites. **First, we visited each site to confirm that there were no hills blocking important directions – in this competition, there is a premium on contacts with stations outside the country, and Europe has the highest concentration of hams...**
- ...We then used a tool called HFTA (High Frequency Terrain Assessment) to evaluate the effect of local terrain at each proposed site...
- ...We gathered signal-strength data from specially equipped receiving sites in Europe and the U.S. on the Reverse Beacon Network...
- **...In the end, the results showed very low correlation with the site models as we had hoped.** The winning station was almost exactly in the middle of the pack from an RF performance standpoint, i.e., they had no advantage due to location but simply were the better operators...