WSPR

Weak Signal Propagation Reporter

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KA9EAK
Ozaukee Radio Club
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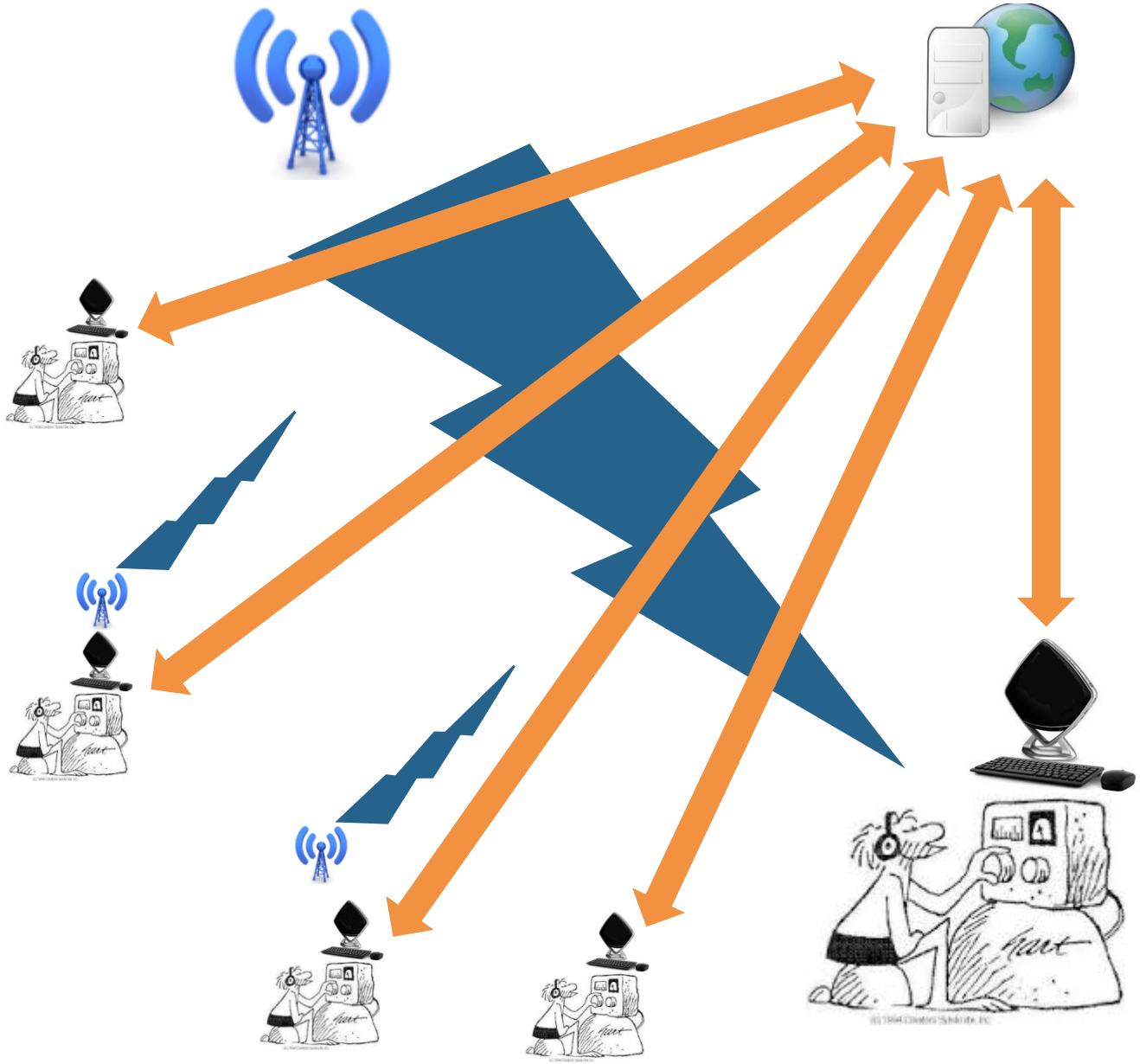
What is WSPR?

- Weak Signal Propagation Reporter
- Released in 2008
- Roots in Earth-Moon-Earth propagation
- Closed Loop Propagation Testing System



Where did WSPR come from?

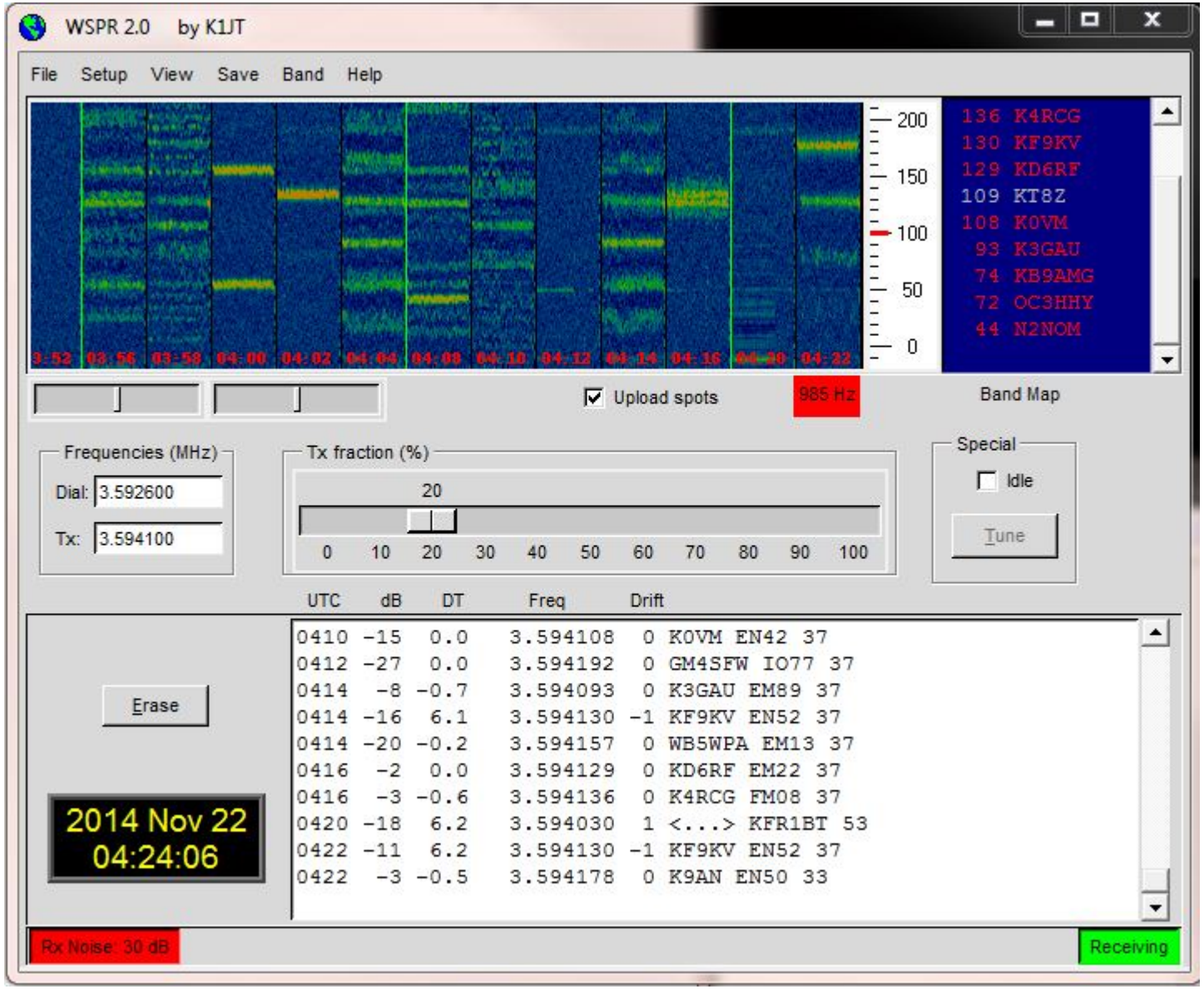
- Invented by Joe Taylor
  - Princeton University
    - James S. McDonnell Distinguished University Professor of Physics, Emeritus
  - Nobel Prize in Physics in 1993 for the discovery of a new type of pulsar
  - Licensed as teenager which led to his interest in radio astronomy
- Led an expedition to the Arecibo Radio telescope in April 2010 to operate EME

How does WSPR work?

- Digital mode
  - Frequency Shift Keying (FSK)
  - Defined windows
  - Bandwidth = 6 Hz
- Time synchronized transmissions
  - Start one second into an even UTC minute
  - Each station varies it's percentage of transmit time
    - Default setting of 20% means that you will transmit approximately once every ten minutes and receive the rest of the time. The exact T/R sequence will be randomized so as to maximize your chances of receiving other WSPR stations
- Defined protocol
  - Exchange
    - Call sign
    - Grid locator
    - Transmission power

Band	Dial freq (MHz)	Tx freq (MHz)
160m	1.836600	1.838000 - 1.838200
80m	3.592600	3.594000 - 3.594200
60m	5.287200	5.288600 - 5.288800
40m	7.038600	7.040000 - 7.040200
30m	10.138700	10.140100 - 10.140300
20m	14.095600	14.097000 - 14.097200
17m	18.104600	18.106000 - 18.106200
15m	21.094600	21.096000 - 21.096200
12m	24.924600	24.926000 - 24.926200
10m	28.124600	28.126000 - 28.126200
6m	50.293000	50.294400 - 50.294600
2m	144.488500	144.489900 - 144.490100

How does WSPR work?



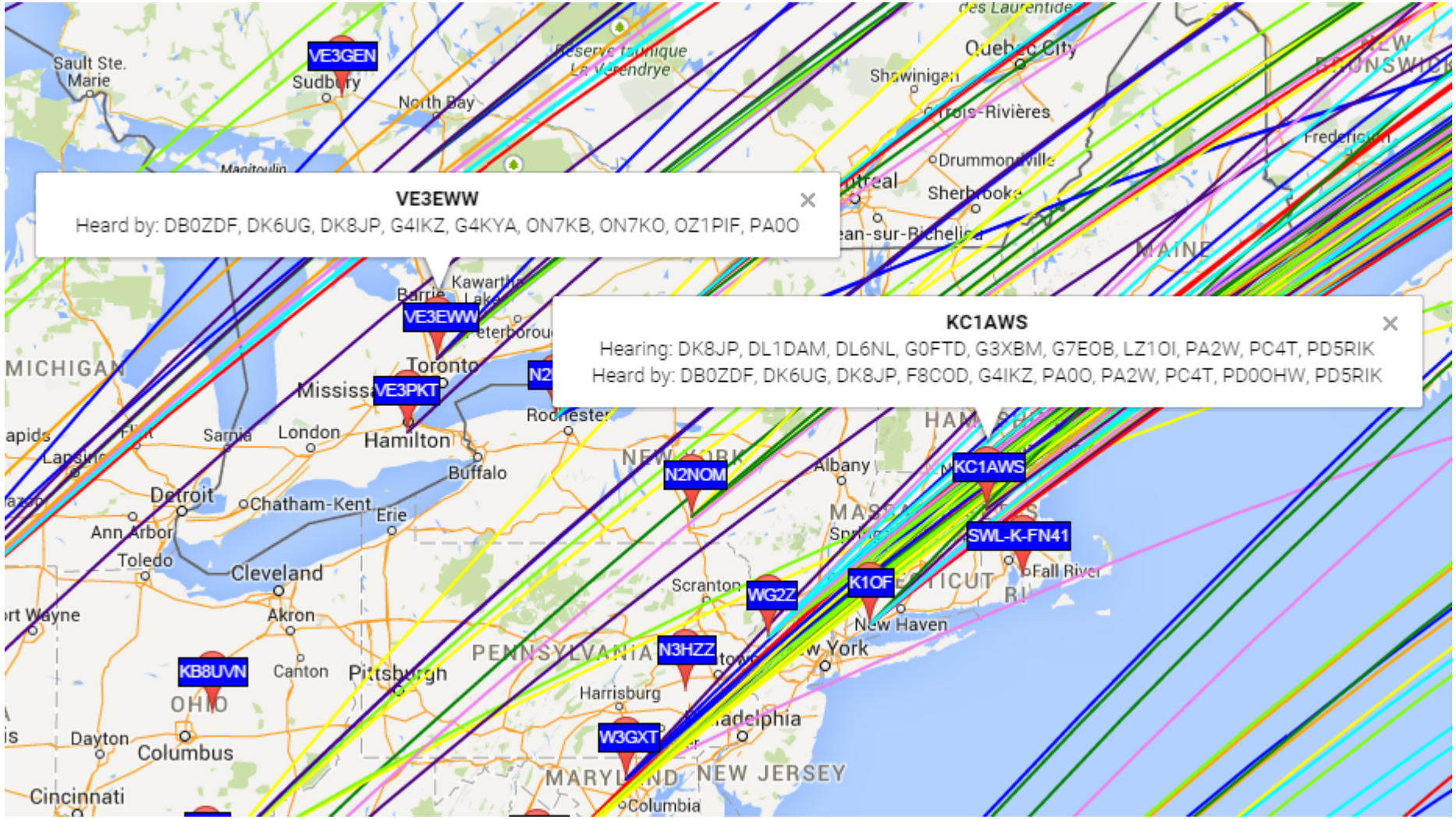
How does WSPR work?

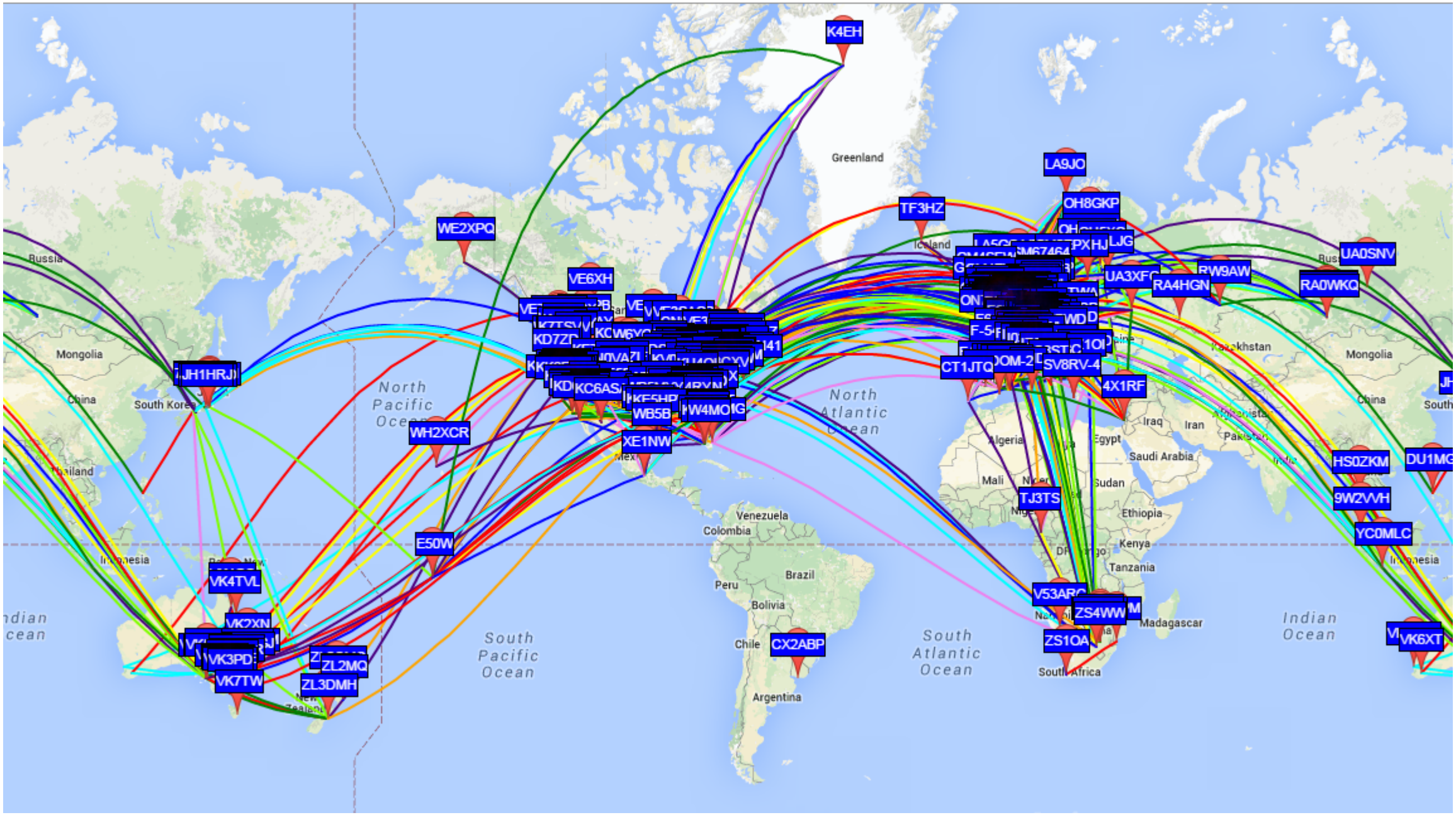
Database

Specify query parameters

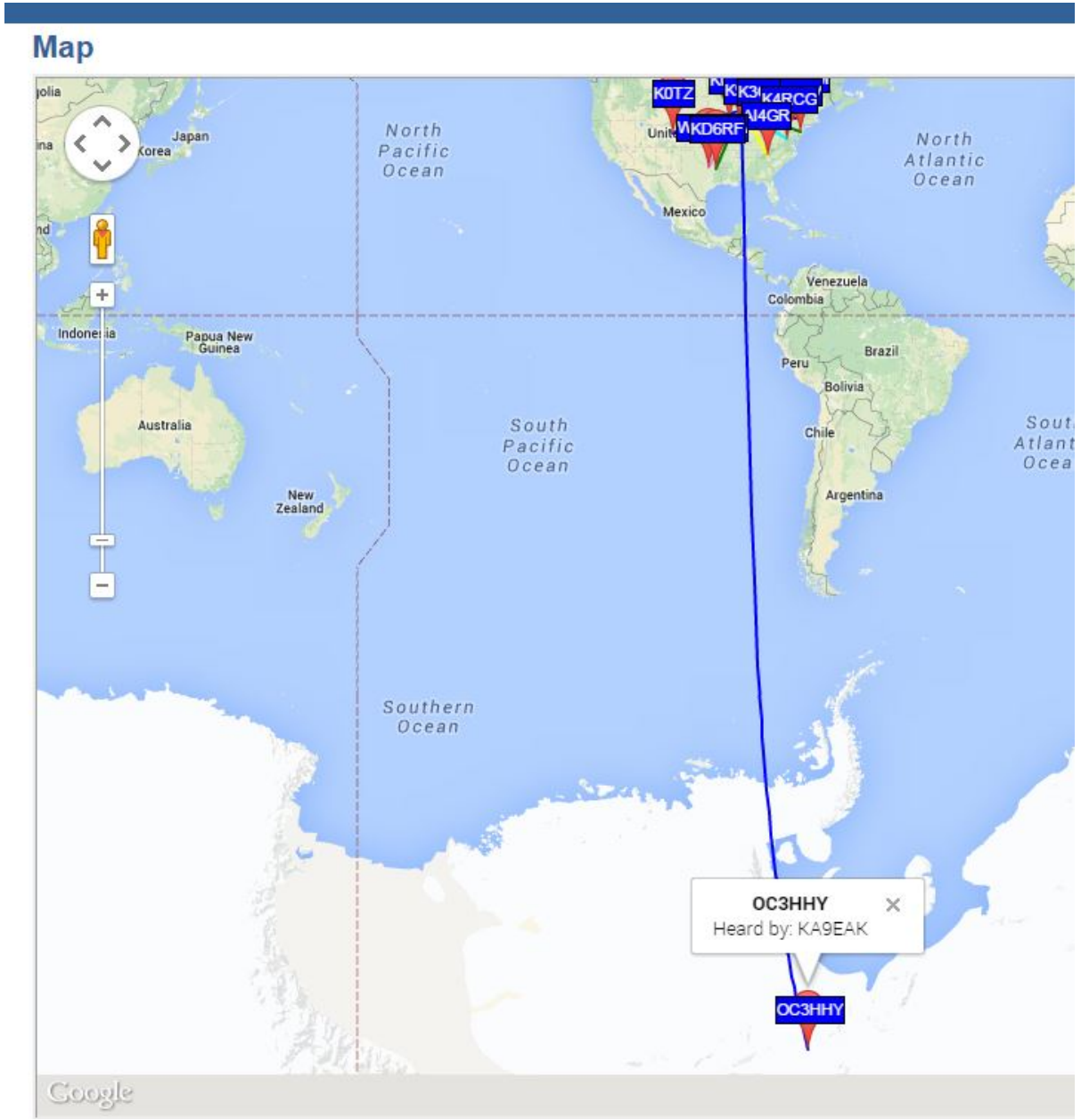
50 spots:

Timestamp	Call	MHz	SNR	Drift	Grid	Pwr	Reporter	RGrid	km	az
2038-01-19 03:14	SM0VYI	10.140288	-13	0	JO99aj	5	DG6RCH	JN68hp	1246	199
2015-03-09 13:48	WA3DNM	14.097049	-7	0	FM29fw	0.002	K4COD	EM73sc	1100	229
2015-03-09 13:48	W3HH	10.140290	-19	0	EL89vb	1	N6RY	DM13id	3355	287
2015-03-09 13:48	DL1GCD	14.097108	-23	0	JN48ar	2	GM4SFW	IO77sn	1284	325
2015-03-09 13:48	G0PKT	10.140168	-13	0	JO01mt	0.2	ON4CAF	JO21rf	312	100
2015-03-09 13:48	G0MBA	10.140128	-2	0	JO01nt	0.2	ON7KO	JO21ce	224	107
2015-03-09 13:48	EA5ZL	3.594181	-19	0	IM99wv	2	SM3ULC	JO89ul	2509	24
2015-03-09 13:48	G0FTD	10.140144	-19	0	JO01mi	1	ON7KO	JO21ce	221	94
2015-03-09 13:48	KJ6MKI	14.097090	-4	2	CM88oi	5	K4COD	EM73sc	3484	88
2015-03-09 13:48	G0PKT	10.140166	+4	0	JO01mt	0.2	ON7KO	JO21ce	230	106
2015-03-09 13:48	SI9AM	14.097120	-15	2	JP82	0.2	GM4SFW	IO77sn	1301	255
2015-03-09 13:48	GM8XBZ	10.140262	-13	0	IO75jv	0.2	ON4CAF	JO21rf	873	122
2015-03-09 13:48	DL3NGN	28.126100	-15	0	JN59mk	2	4X1RF	KM72ls	2708	124
2015-03-09 13:48	GM8XBZ	10.140283	-22	0	IO75jv	0.2	DK4TJ	JO31fc	936	120
2015-03-09 13:48	W3GXT	14.097100	+1	0	FM19ol	5	K4COD	EM73sc	986	226
2015-03-09 13:48	KV0S	10.140124	-24	-1	EM38tv	5	KD7ZD	CN73wb	2689	290
2015-03-09 13:48	GM8XBZ	10.140259	-21	0	IO75jv	0.2	ON7KO	JO21ce	812	126
2015-03-09 13:48	DL8RCB	28.126036	-11	0	JN68rs	1	F6FLQ	JN24lu	779	239
2015-03-09 13:48	K6PZB	14.097126	-21	0	CM88nk	5	K4COD	EM73sc	3491	88
2015-03-09 13:48	IK1WVQ	10.140112	-11	0	JN44cb	0.5	SM0EPX	JO89sj	1818	17
2015-03-09 13:48	PA3GFE	14.097142	-13	1	JO21rk	0.2	GM4SFW	IO77sn	933	321
2015-03-09 13:48	K4RCG	10.140188	-20	-1	FM08xl	5	KD7ZD	CN73wb	3865	293
2015-03-09 13:48	G8FIK	14.097034	-17	0	IO92ob	5	W3CSW	FM19kd	5823	288
2015-03-09 13:48	IK1WVQ	28.126134	-9	0	JN44cb	2	4X1RF	KM72ls	2630	109
2015-03-09 13:48	DL8RCB	28.126069	-10	0	JN68rs	1	PA0O	JO33hg	691	319


VE3EWW
Heard by: DB0ZDF, DK6UG, DK8JP, G4IKZ, G4KYA, ON7KB, ON7KO, OZ1PIF, PA0O
KC1AWS
Hearing: DK8JP, DL1DAM, DL6NL, G0FTD, G3XBM, G7EOB, LZ1OI, PA2W, PC4T, PD5RIK
Heard by: DB0ZDF, DK6UG, DK8JP, F8COD, G4IKZ, PA0O, PA2W, PC4T, PD0OHW, PD5RIK
VE3GEN
VE3EWW
VE3PKT
N2NOM
KC1AWS
SWL-K-FN41
K1OF
WG2Z
N3HZZ
KB8UVN
W3GXT
Sault Ste. Marie
Sudbury
North Bay
Quebec City
Shawinigan
Trois-Rivières
Drummondville
Sherbrooke
Kawartha Lakes
Barrie
Peterborough
Toronto
Mississauga
Hamilton
Rochester
Buffalo
Albany
Sarnia
London
Detroit
Chatham-Kent
Erie
Ann Arbor
Toledo
Cleveland
Akron
Canton
Pittsburgh
Scranton
New Haven
Fall River
Harrisburg
Columbus
Dayton
Cincinnati
Columbia
MICHIGAN
OHIO
PENNSYLVANIA
NEW JERSEY
MAINE


K4EH
Greenland
LA9JO
TF3HZ
OH8GKP
WE2XPQ
VE6XH
UA0SNV
RW9AW
RA4HGN
RA0WKQ
UA3XF
CT1JTQ
SV8RV-4
4X1RF
JH1HRJ
WH2XCR
XE1NW
WB5B
W4MO
E50W
TJ3TS
HS0ZKM
9W2VVH
YC0MLC
DU1MG
VK4TVL
VK3PD
VK7TW
ZL2MQ
ZL3DMH
CX2ABP
V53ARC
ZS4WW
ZS1OA
VK6XT
Russia
Mongolia
China
South Korea
Thailand
Indonesia
Iceland
Kazakhstan
Iraq
Iran
Pakistan
Egypt
Saudi Arabia
Algeria
Mali
Sudan
Ethiopia
Kenya
Tanzania
Madagascar
South Africa
Venezuela
Colombia
Peru
Brazil
Bolivia
Chile
Argentina
North Pacific Ocean
South Pacific Ocean
North Atlantic Ocean
South Atlantic Ocean
Indian Ocean


WM-2
QRP WATTMETER
Autek Research
QF-1A SSB/CW/AM FILTER
AUX. NOTCH FREQ.
NOTCH PEAK
LOWPASS HP
SELECTIVITY
FREQUENCY
ICOM
IC-718
HF TRANSCEIVER
14.095.60


Map
North Pacific Ocean
North Atlantic Ocean
South Pacific Ocean
Southern Ocean
Japan
Korea
Mexico
Venezuela
Colombia
Brazil
Peru
Bolivia
Chile
Argentina
Indonesia
Papua New Guinea
Australia
New Zealand
K0TZ
K4RCG
KD6RF
OC3HHY
Heard by: KA9EAK
OC3HHY
Google

What do I need to WSPR?

- Amateur Radio Transceiver
  - No need for a lot of power
  - 20-30 Watts max
    - Less may better and more challenging\rewarding
    - Ideal for QRP
- Soundcard interface
  - Unified Microsystems - SCI-6 PC Sound Card Interface Kit
    - http://www.unifiedmicro.com/sci6.htm
- Time sync software
  - NISTIME 32
    - http://www.nist.gov/pml/div688/grp40/its.cfm
- WSPR software
  - http://physics.princeton.edu/pulsar/K1JT/wspr.html

Resources

- WSJT Home Page - http://physics.princeton.edu/pulsar/k1jt/
  - WSPR page - http://physics.princeton.edu/pulsar/K1JT/wspr.html
- WSPRnet - http://wsprnet.org/drupal/
- Time Sync application
  - NISTIME 32
    - http://www.nist.gov/pml/div688/grp40/its.cfm
- QST, November 2010
  - WSPRing Around the World
    - Joe Taylor, K1JT and Bruce Walker, W1BW
- G4ILO blog post - http://www.g4ilo.com/wspr.html