IS FT8 DESTROYING AMATEUR RADIO?

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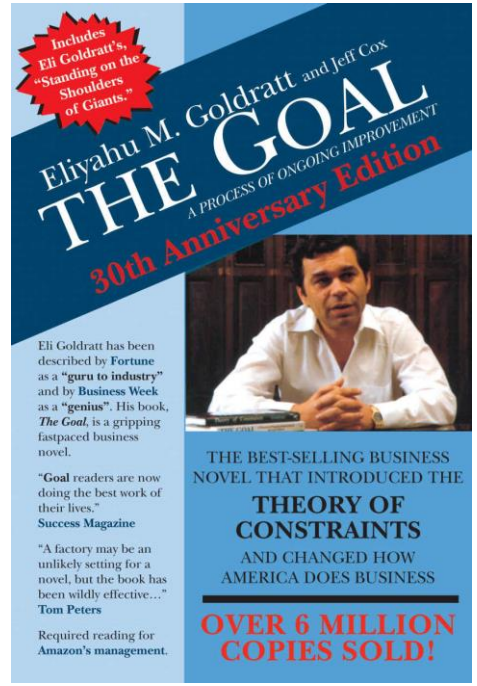
DISCLAIMER

I’m not an expert.

I only play one on the Interwebz

“Technology can bring benefits if, and only if, it diminishes a limitation.”

—Eli Goldratt



Technology (n)

dictionary.com:

the branch of knowledge that deals with the creation and use of technical means and their interrelation with life, society, and the environment, drawing upon such subjects as industrial arts, engineering, applied science, and pure science

Merriam-Webster:

a: the practical application of knowledge especially in a particular area
b: a capability given by the practical application of knowledge

2. a manner of accomplishing a task especially using technical processes, methods, or knowledge

FCC Title 47, PART 97 AMATEUR RADIO SERVICE

a) Recognition and enhancement of the value of the amateur service to the public as a voluntary noncommercial communication service, particularly with respect to providing emergency communications.

b) Continuation and extension of the amateur's proven ability to contribute to the advancement of the radio art.

c) Encouragement and improvement of the amateur service through rules which provide for advancing skills in both the communication and technical phases of the art.

d) Expansion of the existing reservoir within the amateur radio service of trained operators, technicians, and electronics experts.

e) Continuation and extension of the amateur's unique ability to enhance international goodwill.

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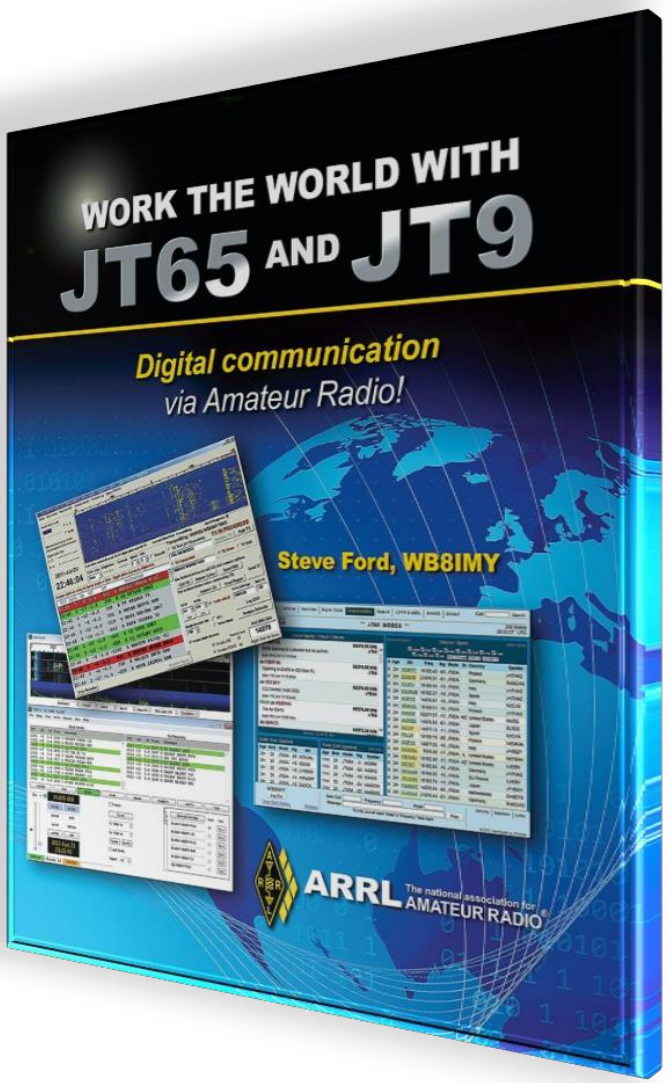
In the beginning – JT65

- Originally developed by Joe Taylor (K1JT) for EME (Earth-Moon-Earth) Communication
- Opened up EME for lower equipped stations
- Quickly spread to other bands (HF) allowing DX for small stations
- WSJT-X provides nine weak signal modes
- Software available as open source under GPL v3



JT65 IS SOOOOO EXCITING!!!!!

FT8 – a new mode enters the world

Joe Taylor, K1JT wrote on 6/29/17:

Dear WSJT-X Beta-Test Colleagues, Steve (K9AN) and I have developed a potential new mode for WSJT-X. We're calling the mode "FT8" (Franke-Taylor design, 8-FSK modulation).

FT8 is designed for situations like multi-hop Es where signals may be weak and fading, openings may be short, and you want fast completion of reliable, confirmable QSOs.

FT8 - Details

Important characteristics of FT8:

- **T/R sequence length: 15 s**
- Message length: 75 bits + 12-bit CRC
- FEC code: LDPC(174,87)
- Modulation: 8-FSK, keying rate = tone spacing = 5.86 Hz
- Waveform: Continuous phase, constant envelope
- **Occupied bandwidth: 47 Hz**
- Synchronization: three 7x7 Costas arrays (start, middle, end of Tx)
- Transmission duration: 79*2048/12000 = 13.48 s
- **Decoding threshold: -20 dB (perhaps -24 dB with AP decoding)**
- Operational behavior: similar to HF usage of JT9, JT65
- Multi-decoder: finds and decodes all FT8 signals in passband
- **Auto-sequencing after manual start of QSO**

Modes over last 2 hours

Mode	Count
FT8	624559
JT65	3449
CW	2221
JT9	411
PSK31	391
VARA	94
SIM31	69
OPERA	32
MSK144	23
ROS	22
PSK	14
OLIVIA	10
PI4	9
RTTY	7
CONTESTI	2
PSK63	2
WSPR	1
SSB	1
T10	1

Weak Signal, not Low Power mode!

Block-Structured Messages

Information block size: 72 bits

Calls and locator:

DK5TRI K5TRI CN87

28 + 28 + 15 + 1 = 72

Free text:

TNX MIKE 73

71 + 1 = 72

Standard minimal QSO

```
CQ K5TRI CN87
                 K5TRI DK5TRI JO31
DK5TRI K5TRI -10
                 K5TRI DK5TRI R-11
DK5TRI K5TRI RRR
                 K5TRI DK5TRI 73
```

#K5TRI calls CQ

#DK5TRI answers

#K5TRI sends report

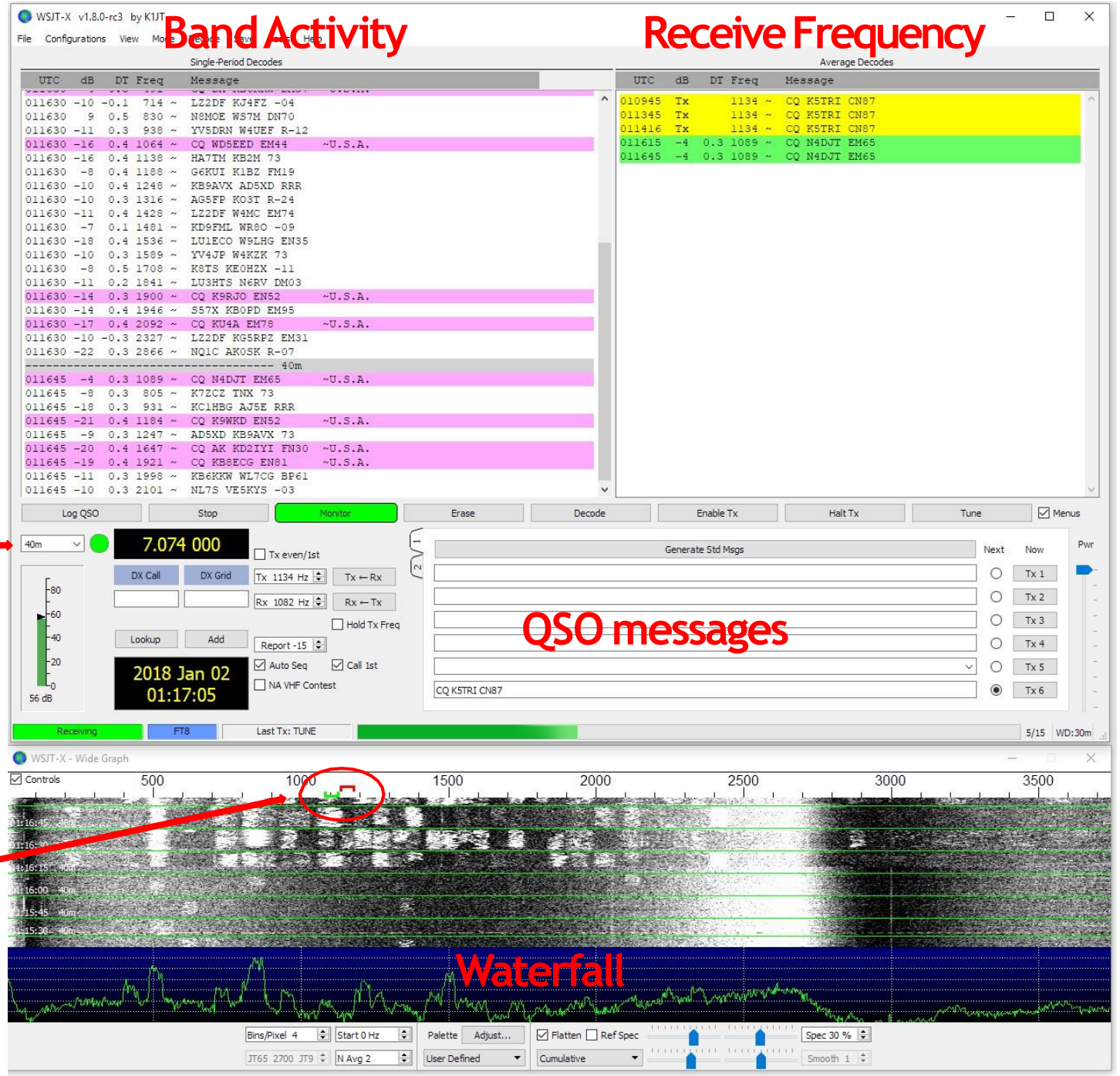
#DK5TRI sends R+report

#K5TRI sends RRR

#DK5TRI sends 73

a priori (known) decoding

Main View


Band Activity
Receive Frequency
Band
QSO messages
RX/TX indicator
Waterfall

KEEP CALM AND RTFM

Pre-QSO Checklist

- Your callsign and grid locator set to correct values
- PTT and CAT control (if used) properly configured and tested
- Computer clock properly synchronized to UTC within ±1 s
- Audio input and output devices configured for sample rate 48000 Hz, 16 bits
- Radio set to USB (upper sideband) mode
- Radio filters centered and set to widest available passband (up to 5 kHz).

What you need

- A copy of WSJT-X, available at http://physics.princeton.edu/pulsar/K1JT/wsjtx.html

  (Windows, Linux, macOS)

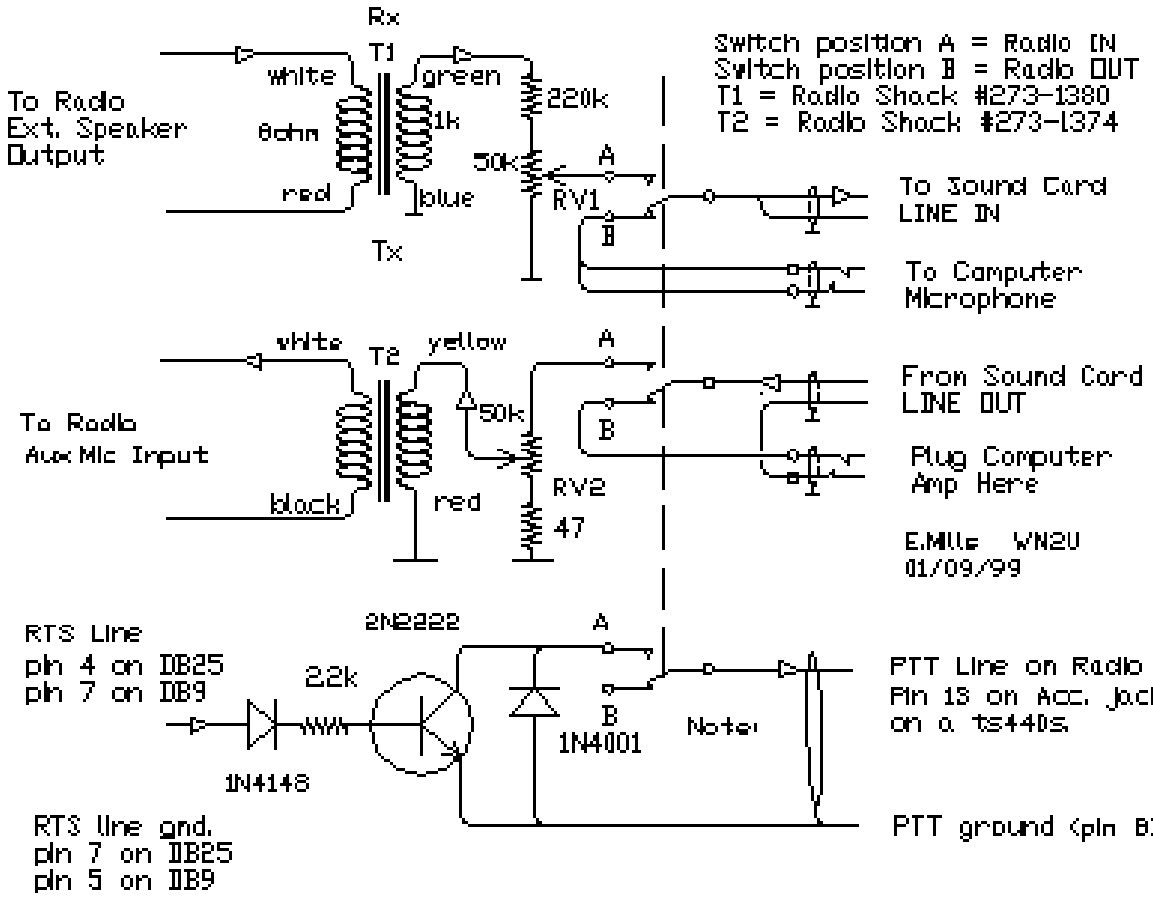
- A frequency stable radio
- A sound card interface to connect to your radio
- Computer clock synchronized +/- 1 sec UTC

Computer interfacing

- If you are already setup for other audio based digital modes (e.g. PSK31, JT65, Olivia, Hell) you're already 99% there

Computer interfacing

Build your own



- DI

Operating Tips

- FT8 is 100% duty cycle, watch for transceiver limitations
- Audio settings are critical to not overdrive input stage
- Check ALC for optimal reading (depends on transceiver)
- Turn AGC off or reduce RF gain to minimize AGC action
- Shift-click on desired TX frequency to enable split operation
- Use auto sequencing for QSOs

Myth: One must only run 20W or less

- FT-8 can be used with 100W, radio permitting without problems if your signal is clean.
- Problems arise when inexperienced operators overdrive the input stage of their radios and splatter across the band
- FT-8 is a weak signal mode pertaining to the decoding of signals, not the emission
- Monitor your signal with an oscilliscope

Part 97 defines power regulations:

An amateur station must use the minimum transmitter power necessary to carry out the desired communications.

Myth: One must only run 20W or less

- FT-8 can be used with 100W, radio permitting without problems if your signal is clean.
- Proble… …he input
- FT-8 i… …f signal
- Monit… …

Here in Europe, I receive many FT8 signals registering +15 dB or more, and they are no wider than the -18 or -19 dB signals on adjacent frequencies. (forum post)

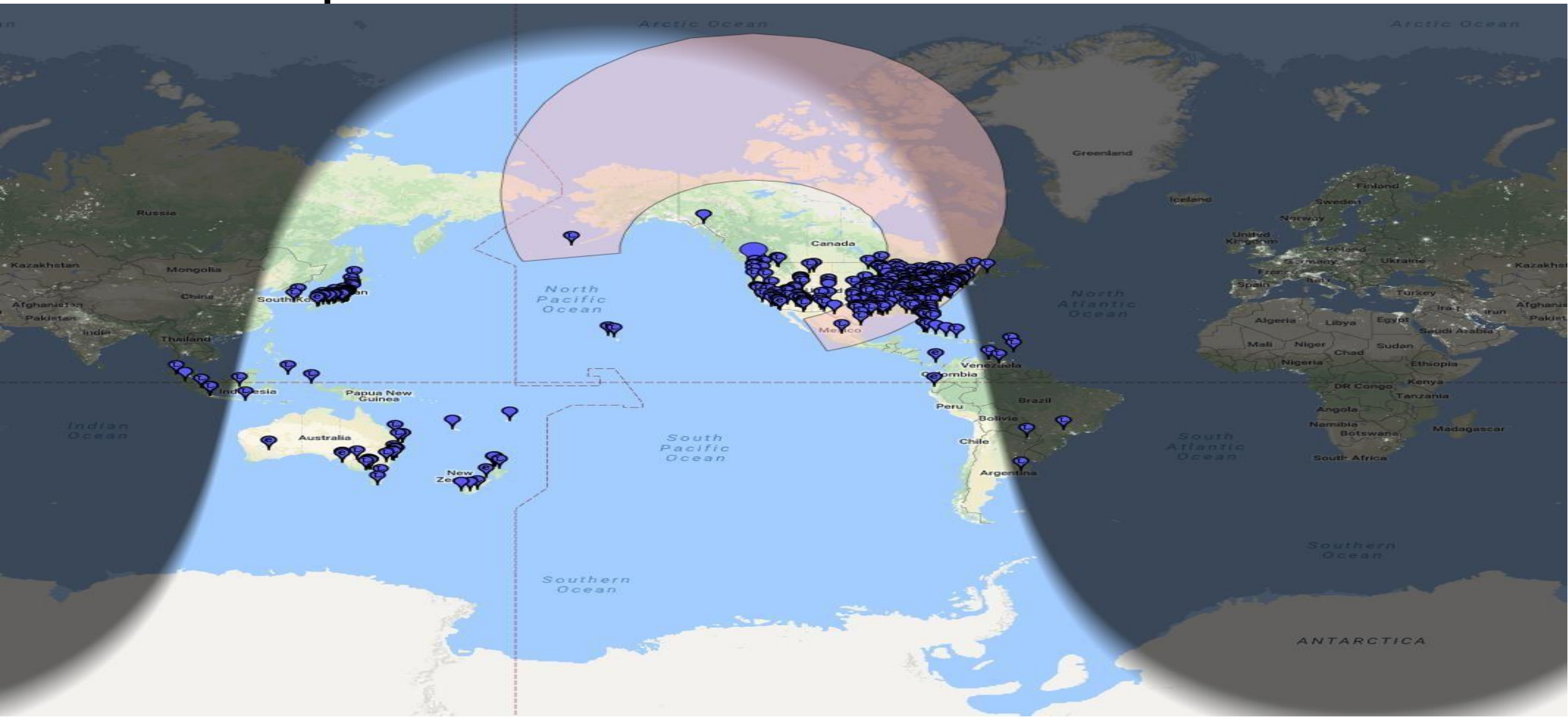
Part 97 defines power regulations:

An amateur station must use the minimum transmitter power necessary to carry out the desired communications.

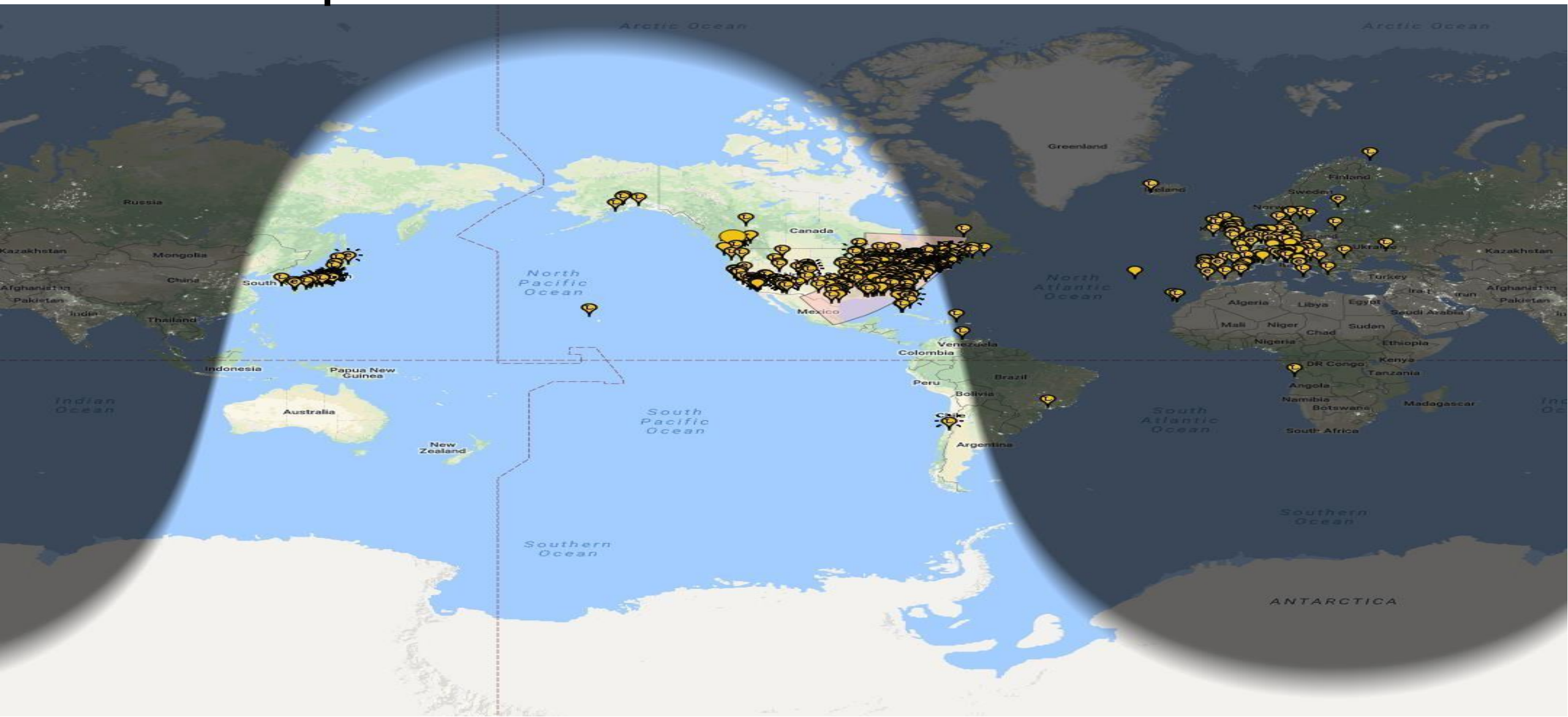
Activity

Lots of it

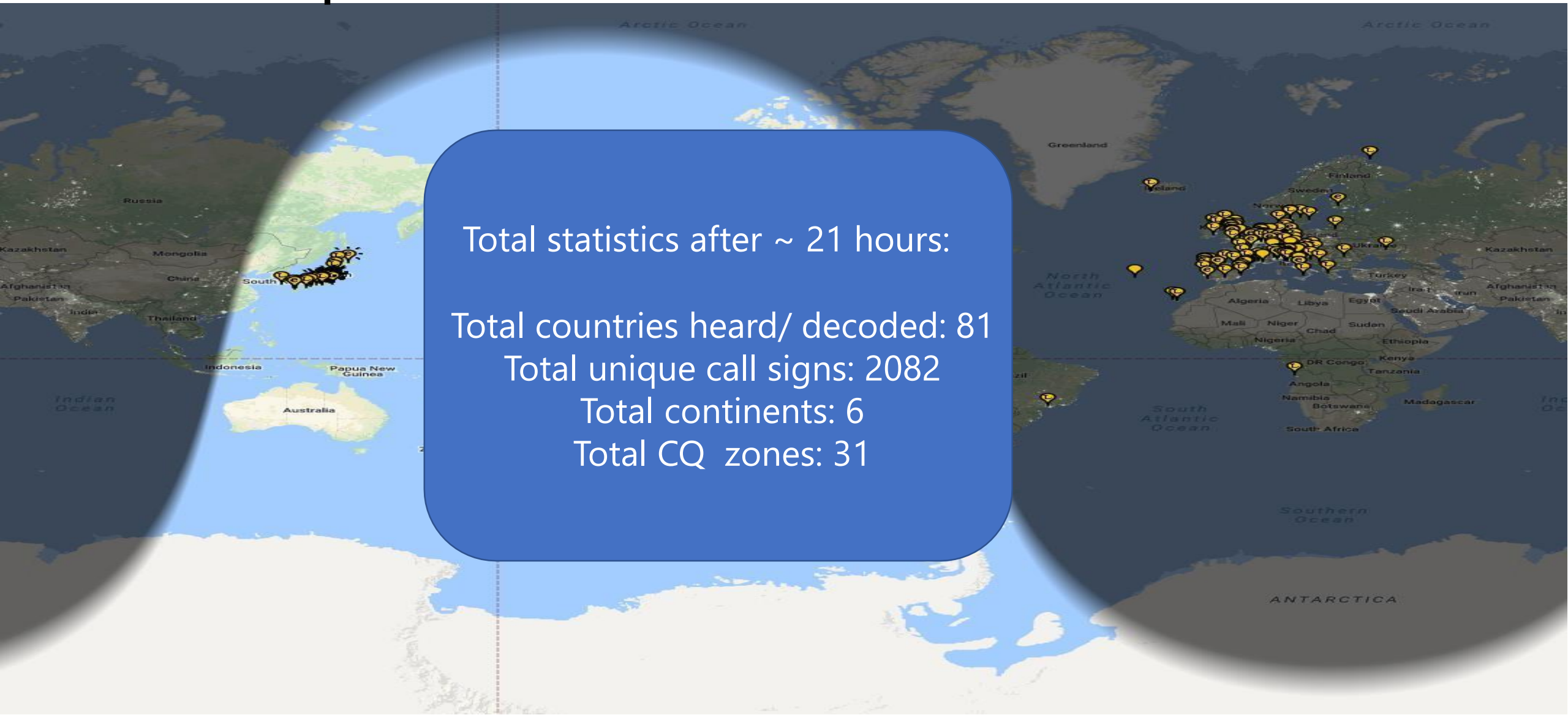
PSKReporter 40m



PSKReporter 20m



PSKReporter 20m



So everybody's happy, RIGHT?

Maybe?

HATERS GONNA HATE

Voices from the arm chair experts

This stuff not Radio.....It`s noise crap.....

Sorry FT8 is not ham radio. Its machine to machine.

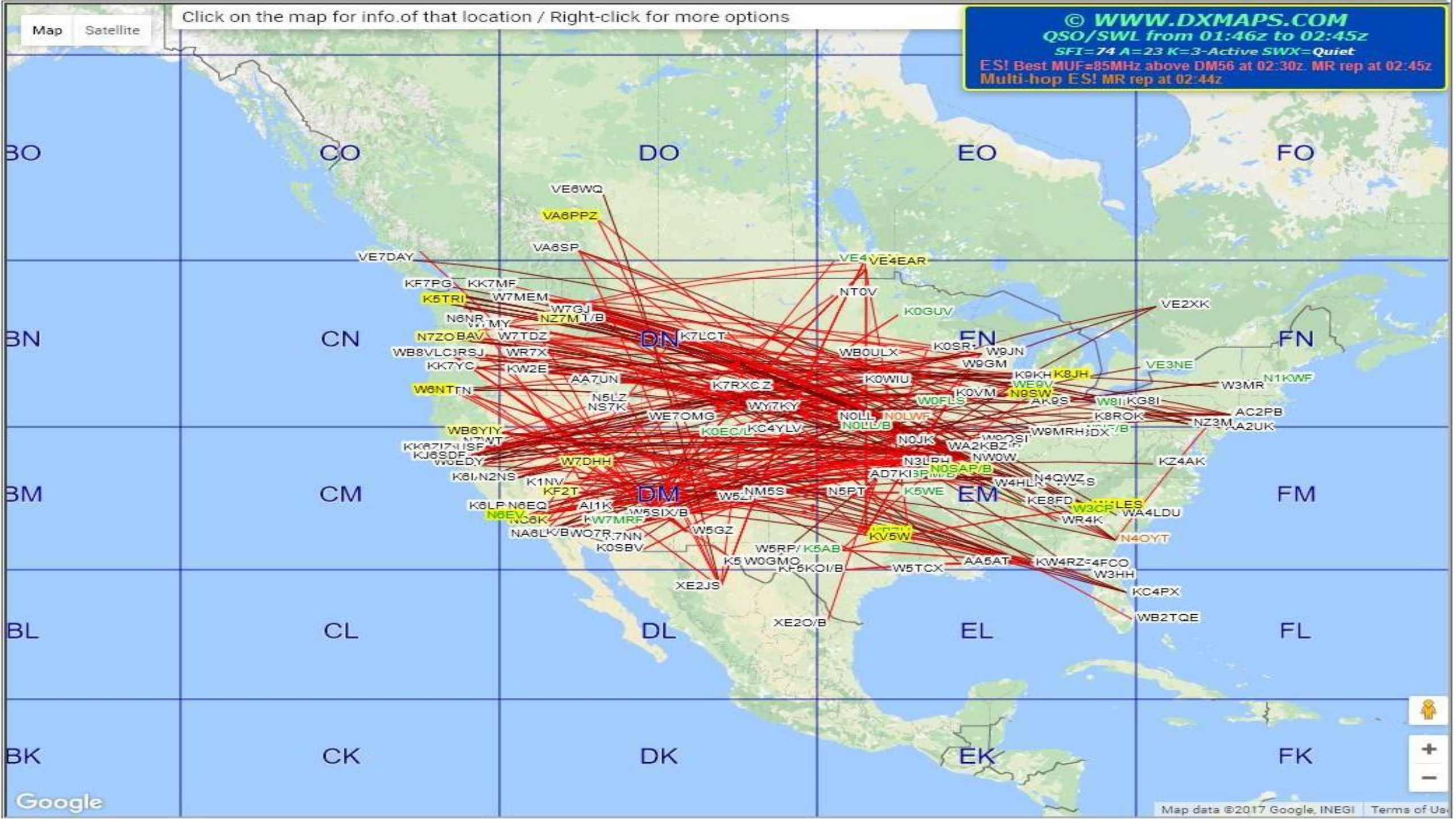
YES FT8 has turned the data modes into a zoo full of morons that have no idea about propagation or power and how to set up the radio.....

It now appears hams want to take the easy way out to making contacts.
FT8 is one step closer to making qso's without human contact.

It's just another 599 TU 73 mode. .....
Current FT8 activity levels are just a fad, and it will eventually fade and be like other digimodes. You can only say 599 TU 73 so many times before it gets old.

Why bother taking decades to achieve DXCC on 6 meters the difficult old-fashioned way when you can earn your wallpaper over a weekend or two spent in front of your computer monitors instead?

Oh, but they *are* affecting **my** phone QSOs as well as everyone else's **non-digital** QSOs---they harken many (especially new) operators further up and away from **our trusty watering** holes so that far fewer possible contacts are now being made. For a band that is already sparsely populated to begin with it narrows our possibilities tremendously. The small herd is thinning further every day.


Map
Satellite
Click on the map for info.of that location / Right-click for more options
© WWW.DXMAPS.COM
QSO/SWL from 01:46z to 02:45z
SFI=74 A=23 K=3-Active SWX=Quiet
ES! Best MUF=85MHz above DM56 at 02:30z. MR rep at 02:45z
Multi-hop ES! MR rep at 02:44z
BO
CO
DO
EO
FO
BN
CN
DN
EN
FN
BM
CM
DM
EM
FM
BL
CL
DL
EL
FL
BK
CK
DK
EK
FK
VE6WQ
VA6PPZ
VA6SP
VE7DAY
VE4EAR
NT0V
K0GUV
VE2XK
KF7PG
KK7MF
K5TRI
W7MEM
W7GJ
N6NR
NZ7M
N7ZO
BAV
W7TDZ
K7LCT
WB8VLC
RSJ
WR7X
KK7YC
KW2E
AA7UN
W6NTN
K7RXC
Z
N5LZ
NS7K
WY7KY
WE7OMG
WB0ULX
K0SR
W9JN
W9GM
K9KH
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K0EC/L
KC4YLV
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DX
WB6YIY
KK6ZI
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KJ6SDF
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WA2KBZ
NW0W
KZ4AK
W7DHH
N3LRH
N0SAP/B
AD7KI
N4QWZ
K6I
N2NS
K1NV
KF2T
NM5S
N5PT
K5WE
KE8FD
W3CP
LES
WA4LDU
K6LP
N6EQ
AI1K
N6EV
W5SIX/B
W7MRF
WR4K
N4OYT
NA6L
K/B
WO7R
7NN
W5GZ
K0SBV
KV5W
W5RP/
K5AB
K5
W0GMO
KF5KOI/B
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AA5AT
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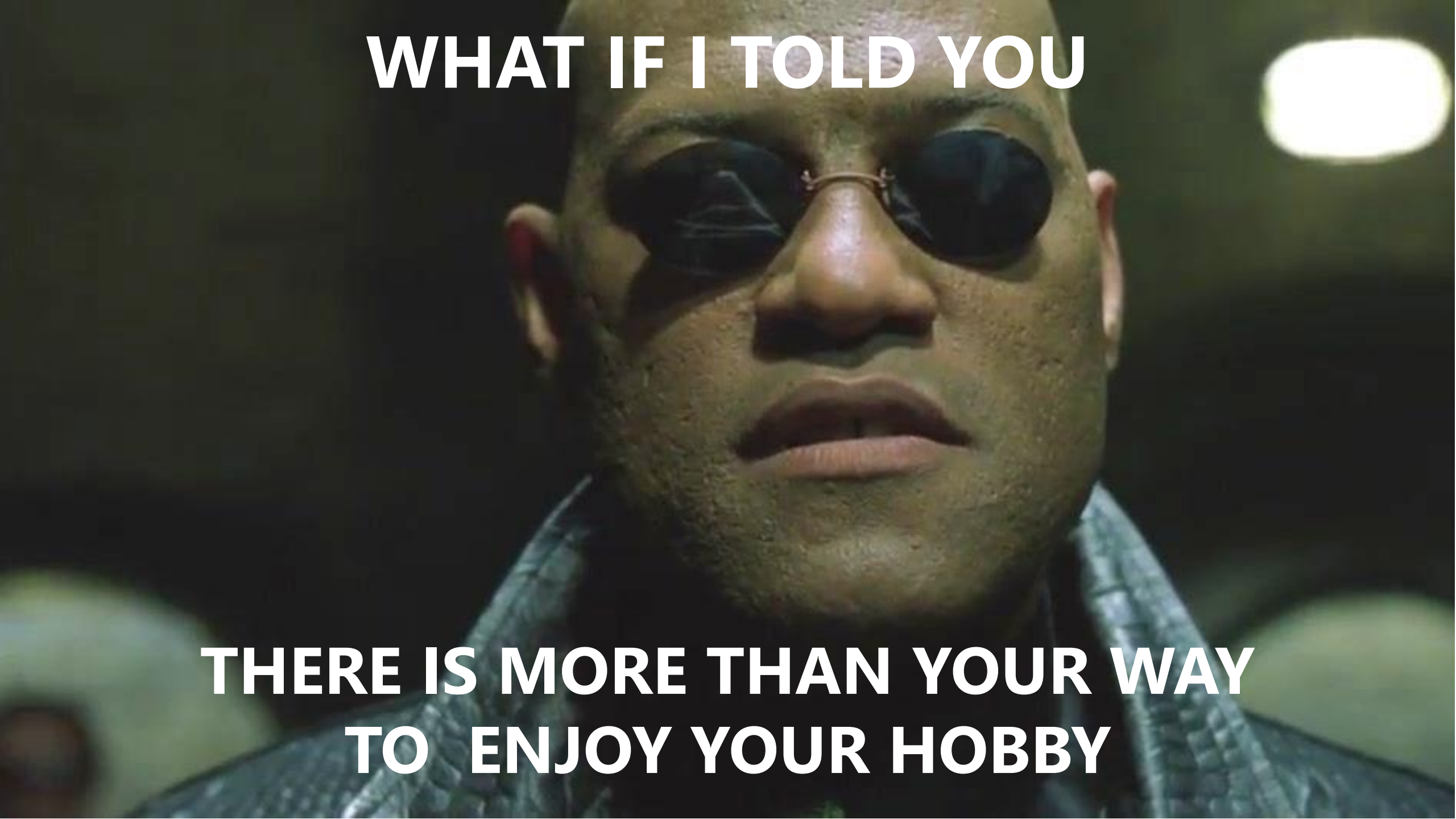
WHAT IF I TOLD YOU
THERE IS MORE THAN YOUR WAY
TO ENJOY YOUR HOBBY

Summary

- FT8 is not destroying Amateur Radio, it’s making it more awesome
- FT8 provides amazing weak signal capabilities
- Strong adoption within the ham radio community equals more use of spectrum
- Continuous improvement of protocol and software
- There still many operators using other modes. Don’t despair.


Questions?

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