Getting Started on HF

Part 1 -- HF

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The World of Ham Radio

(from the ARRL Operating Manual)

It is all about operating to be prepared for Emergency Communications (and having fun).

- VHF/UHF FM, Repeaters
- VHF/UHF Beyond Repeaters
- Amateur Satellites
- DXing
  - CW
  - SSB
  - RTTY
  - PSK 31
  - FT8
- Casual Comm. (rag chewing)
- Traffic Handling
- Image Communications
- HF Digital Communications
- Operating Awards
- Contesting
  - CW
  - SSB
  - RTTY
  - QRP

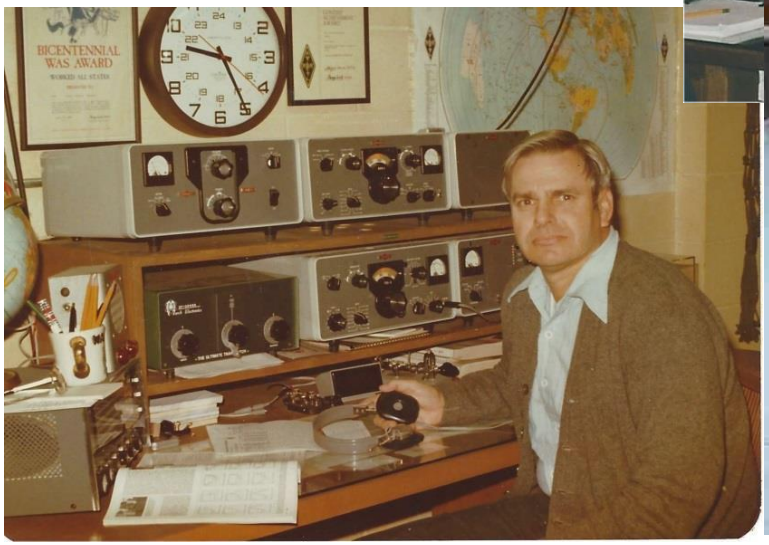
I work HF. My focus is DX I work contests, do casual communication, principally using CW and now just commencing with Digital.

Purpose

- Share 65 years of military and amateur radio operating experience.
  - Considerations for radio selection, station design and antennas.
- Part 1 – How to get on HF.
  - CW and SSB operating procedures and protocols.
  - Help you know what to expect to hear.
- Part 2 – How to get started with electronic logging.
  - Convert paper logs to digital format.
  - Logging software.
  - Logbook of the World (LoTW), eQsl and Club Log in addition to QSL cards.
- Part 3 – Why enter into contesting and Contest Software.
- Disclaimer:
  - There is an entire universe of opinion on these subjects.
  - Many different logging and contesting programs (such as DX4Win, Logger 32, Log Window, TRLog, HRD, N3FPJ,Writelog, N1MM).
  - Not here to advocate specific software.
  - Here to simply describe what I do, what I use and why.

You Need to Dream and Plan

Reese AFB MARS Station -- 1957



WB6FHK/0 – Offutt AFB – 1976-78

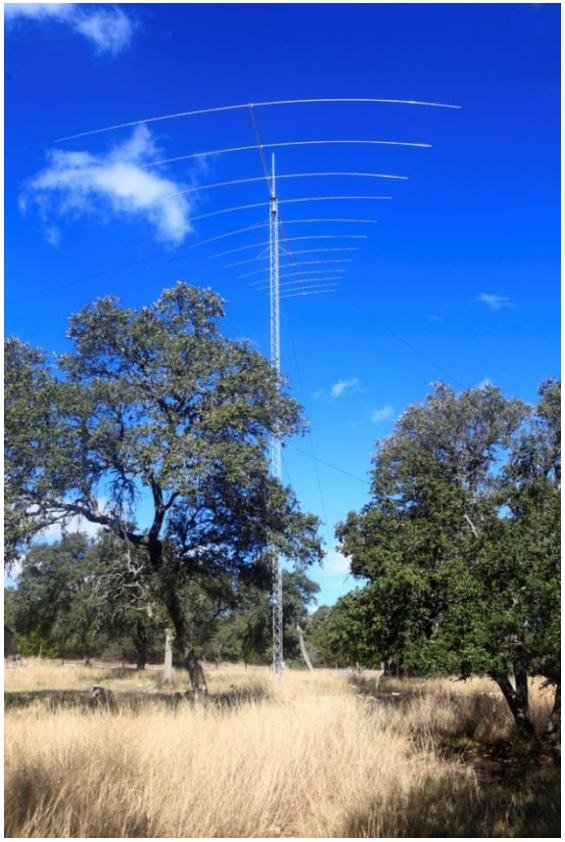
WB6FHK - K6NOF, Escondido, CA – 1983-2008

K5NOF Today

K5NOF

SteppIR
w/120 radials

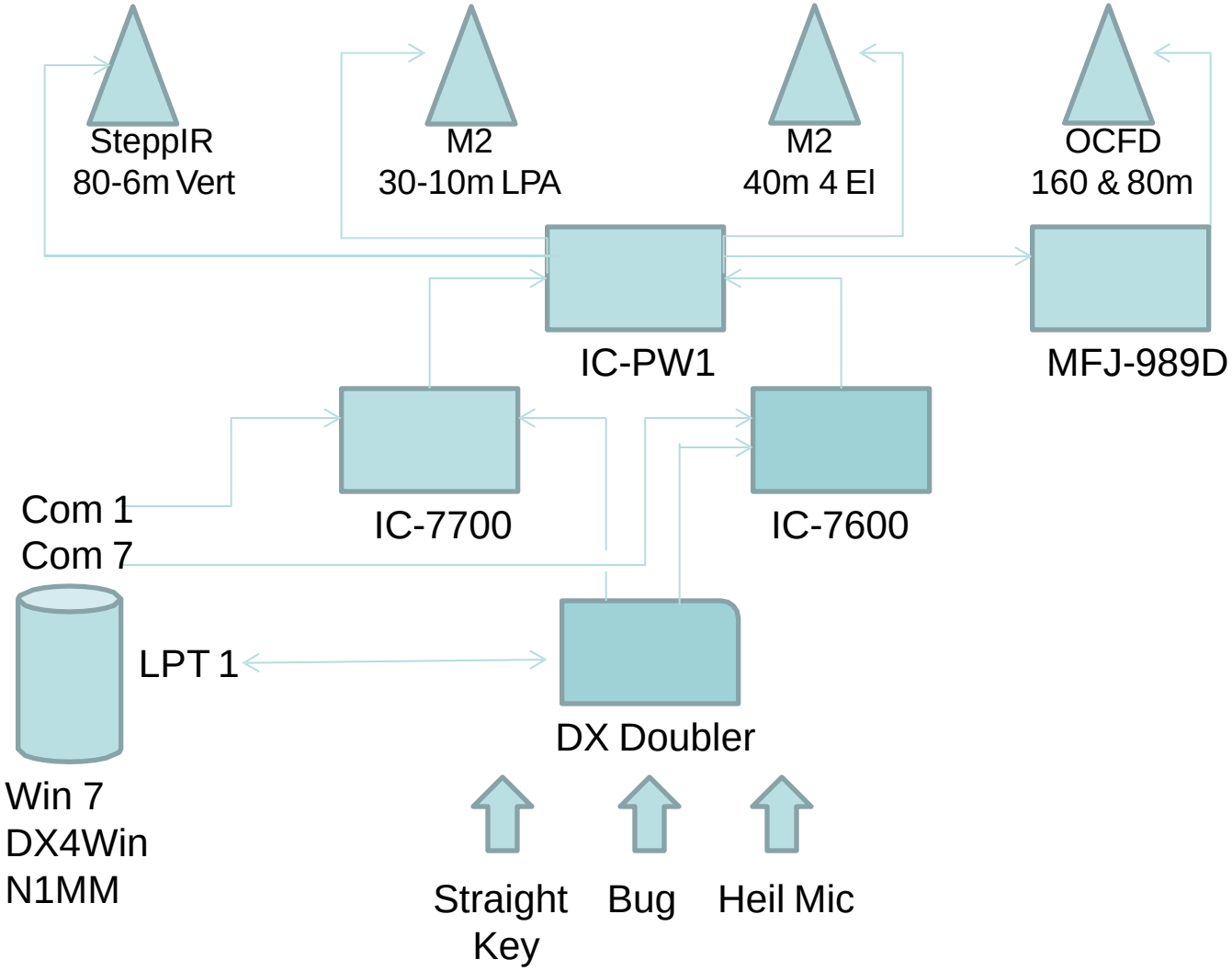
4 El Yagi



LPA &
OCFD

K5NOF Station Architecture

The Dream from USCG days



Considerations for Radio

- Try to buy a radio & accessories you can still use ten years from now.
- There are many good choices on the used and new market.
  - Almost any modern 100 Watt transceiver, less than 10 years old, will have what you need for now and the future.
  - You will want a radio you can communicate with using a laptop or desk top PC.
  - Computer control is becoming a must.
- Keep in mind that almost all DXpeditions will operate "split.“
  - This means they will transmit on one frequency and listen on another, usually a few kHz up.
  - Best practice is to have a radio that will allow you to listen to the DX transmit while turning through the pile-up to find the station he/she is working.
  - Try for a radio with "dual watch" (Icom) or the Elecraft and Yaesu equivalent.
  - This will allow you to listen to the DX and tune through the pile-up at the same time. Otherwise use RIT to track who and what frequency the DX is working.
  - This becomes your frequency to send your call sign. More about this later.

Antenna or Amplifier?

- Where next to spend the money? Antenna or Amplifier?
  - This is an age old question.
  - It seems that if you are space or deed restriction limited to a vertical, then the choice is a modest amplifier to begin; something with more punch later.
  - But if you can erect a tower, then the choice becomes a modest beam first and then the amplifier.
  - Think about this: most modest beams will give at least 3 to 5 dB of gain.
  - Attached to a 100 Watt transmitter, this means 200 to 300 Watts of Effective Radiated Power (ERP), minus coax loss.
  - All coax will have some degree of loss.
  - Something like RG-213 or LMR-400 will provide good performance for runs up to 200 feet or so.
  - Longer runs will require something with less loss.
  - Don't economize on coax! The low loss stuff is worth every penny.

Antenna

- A vertical antenna will get you many, many DX contacts into your log.
  - There are many choices, elevated without radials or ground mounted with radials.
  - Ground mounted, many short radials are better that a few long ones.
  - See the ARRL Antenna book and the Handbook.
  - These will tell you that 16 ground mounted radials are minimum, 32 better, 64 good enough.
  - As long as you can up to ¼ wave for the lowest frequency. (But, I have four connected to my cattle fence.)
  - More than the number and length is certainly OK but you will be dealing with diminishing returns from your wire investment.
  - Keep in mind that Ham Radio is all about tradeoff's.

Understand Propagation

- K and A Indexes; quantify past geomagnetic activity.
- K and A Indexes announced every hour at :18 as part of the WWV time "tick." (Listen to WWVH at :46 for these announcements and to get an idea of propagation into the Pacific.) Freqs: 2.5, 5, 10, 15, 20 mHz.
  - K Index: highest geomagnetic reading over a three hour period commencing at 0000Z; updated every three hours.
  - Each three hourly K Index corresponds to an A Index. An average of eight forms the A Index value; the lower the better.
  - But, unpredictable things happen on the high bands as the K Index commences to rise; particularly over or nearly over the pole.
- Gray Line Propagation works best from 160 to 40m; sometimes 30m. (Example -- Dawn east – sunlight illuminates F layer first increasing ionization; D layer still in darkness and yet to form).
  - Optimum: station pair in sunrise east and sunset west or vice versa.
  - Peak signal occurs between dawn and sunrise or sunset and dark. You will have 5 to 15 minutes depending on season.
- Other Times of Day? Noon at midpoint of the path for high frequencies; midnight at midpoint at night for low frequencies.

Band Characteristics

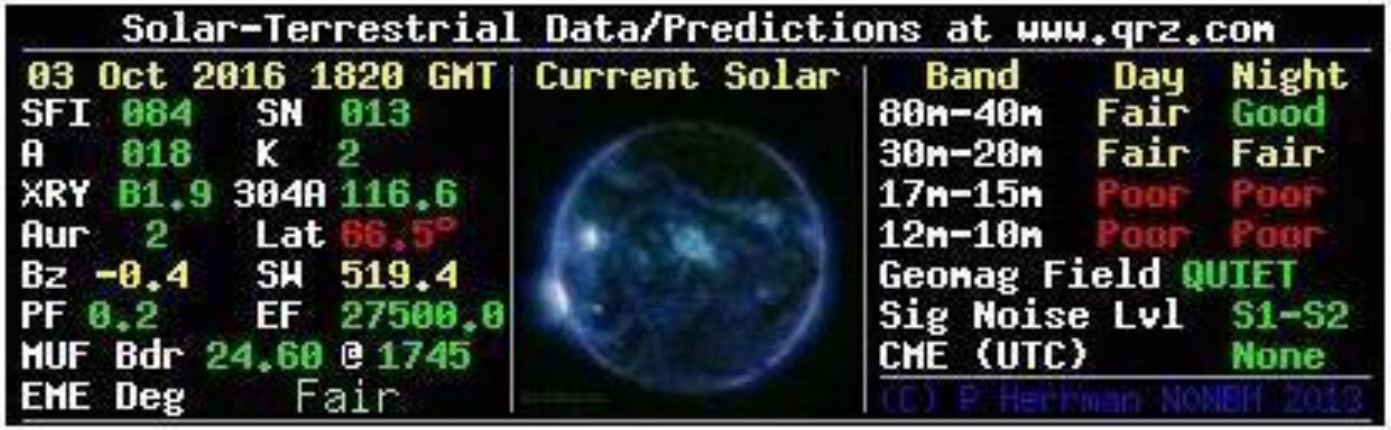
- 10 meters: Listen for beacons on 28.200 to see if the band is open.
- 12 meters: Sometimes open at mid-day when 10 is closed. Bcn 24.930.
- 15 meters: Often open at mid-day when 24 and 10 are closed. Beacons on 21.150.
- 17 meters: Usually open during the day to different parts of the world. Beacons on 18.110
- 20 meters: The “king” of day-time DX bands. Beacons on 14.100.
- 30 meters: Usually open 24 hours to different parts of the world.
- 40 meters: The “queen” of night-time DX bands.
- 80 meters: Opens to the east at evening, moving south/north toward local midnight, moving to the west approaching local dawn. (No D Layer to absorb signal at night.)
- 160 meters: Follows darkness from east to west; direction and conditions depend upon season of the year.
- Under current solar conditions:
  - Listen to 17, 20 and 30 meters during the day.
  - Listen to 30, 40 and 80 meters during the night.
  - Shift one band downwards as solar flux diminishes.

Things to know about SSB

- Use the standard phonetic alphabet.
- Developed by the military to provide a common understanding across many languages.
  - Used by military and civil aviation around the World.
- Avoid the home brew alphabet.
  - Z is Zulu and not Zanzibar
  - GMT (UTC) is also “Zulu Time”, the 26th of 26 time zones around the World.
- Sometimes it is best to avoid using Q signals
  - Simply say the meaning. Examples:
    - (QSL) “roger, copy all.”
    - (QRX) “ I will call you back in xx minutes.”
    - (QRN) “ we have heavy static here”
    - (QRM) “ we have heavy interference here”
- Examples of procedure signal use:
  - (AS) wait.
  - (BT) break.
  - (DE) this is.
  - (K) over.
  - (R) roger, copy all.
  - (SK) clear.
- See the ARRL Operating Manual for these and other examples.
- Watch the mic. gain.

Propagation Prediction Aids

Look at www.qrz.com first.



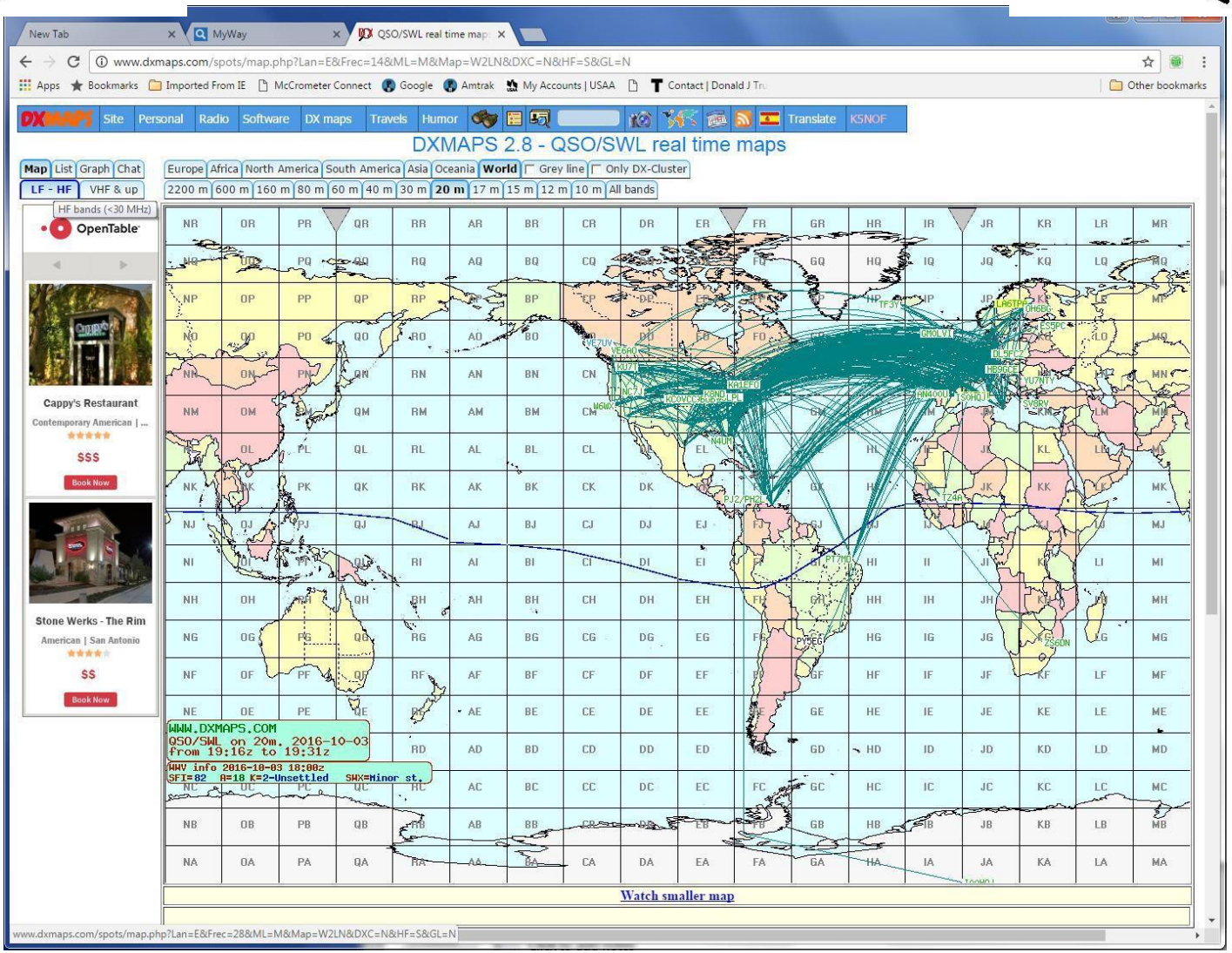
A *few* definitions

XRY -- relative Intensity of solar radiation
304A – relative strength of solar radiation
Aur Lat – aurora latitude
BZ – cancels mag. field when negative
SW -- speed of particles passing earth

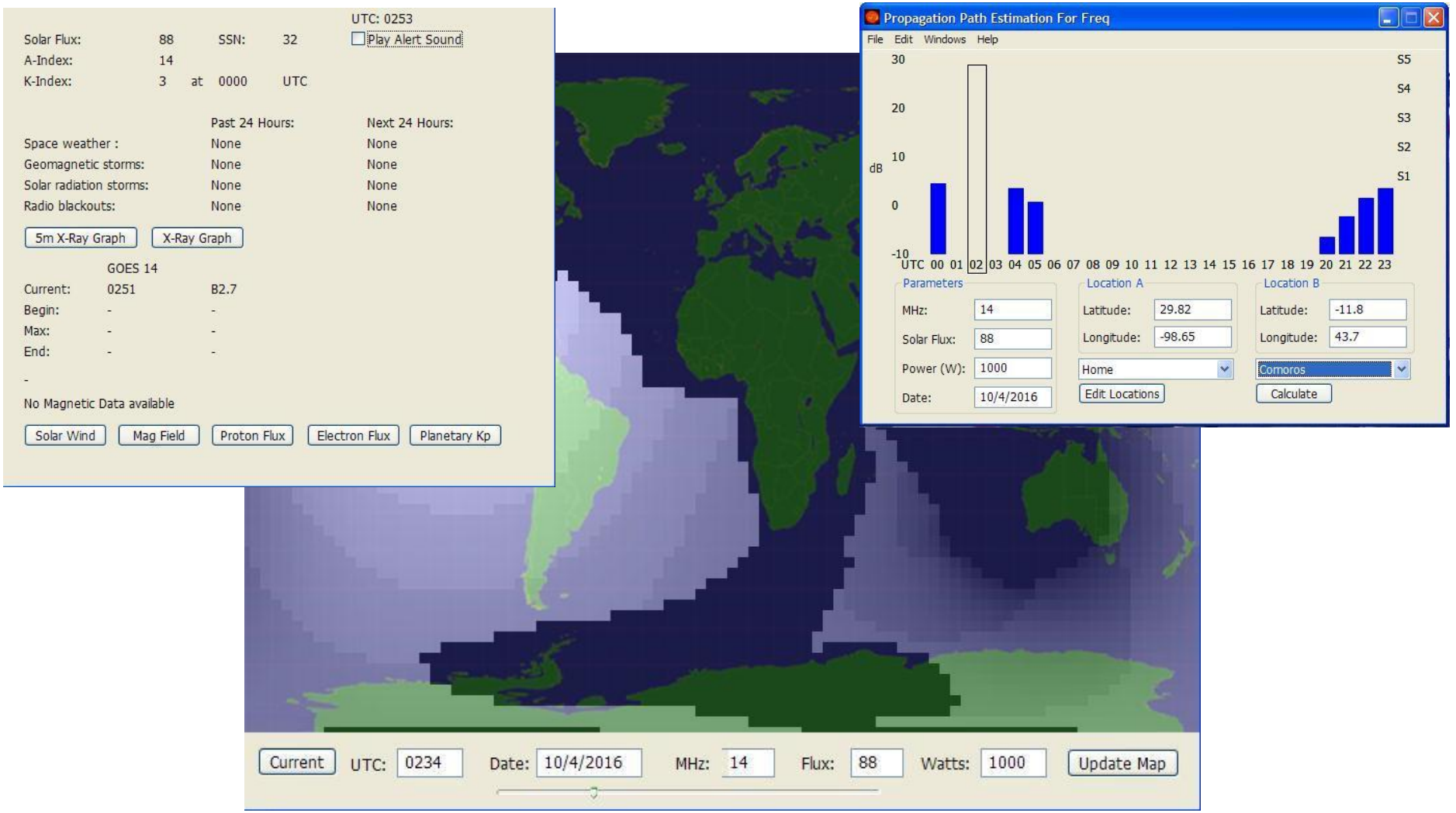
PF – proton flux primarily effects E
EF – elec flux density of chgd particle
MUF – Maximum usable frequency
EME Deg – eme path attenuation.
CME – coronal mass ejection est.

Look at Current Activity (20m)

www.dxmaps.com



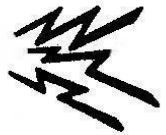
DX Toolbox


UTC: 0253
Solar Flux: 88 SSN: 32
Play Alert Sound
A-Index: 14
K-Index: 3 at 0000 UTC
Past 24 Hours:
Next 24 Hours:
Space weather : None None
Geomagnetic storms: None None
Solar radiation storms: None None
Radio blackouts: None None
5m X-Ray Graph
X-Ray Graph
GOES 14
Current: 0251 B2.7
Begin: - -
Max: - -
End: - -
No Magnetic Data available
Solar Wind
Mag Field
Proton Flux
Electron Flux
Planetary Kp
Propagation Path Estimation For Freq
File Edit Windows Help
dB
S5
S4
S3
S2
S1
UTC 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Parameters
MHz: 14
Solar Flux: 88
Power (W): 1000
Date: 10/4/2016
Location A
Latitude: 29.82
Longitude: -98.65
Home
Edit Locations
Location B
Latitude: -11.8
Longitude: 43.7
Comoros
Calculate
Current
UTC: 0234
Date: 10/4/2016
MHz: 14
Flux: 88
Watts: 1000
Update Map

Things to Know about CW

- Procedures and protocols date from late1800's.
  - Railroad telegraphy/Western Union.
  - Commercial traffic handling between ship and shore.
  - US Navy & USCG procedures adopted by other military services.
  - These procedures form the basis of amateur communication procedures.
- "Q" Signals.
  - First used in commercial traffic handling to speed communication.
  - Adopted by Navy, USCG and other military before WWII.
  - Examples*: QTH – position, QSA -- signal strength, QRM – interference, QRN – static, QRO – increase power, QRP – reduce power, QRX – call back, QRL – busy, QRZ – who is calling, QSB – fading, QSL – receipt, QSY – change freq.
  - Q Signals gave way to "Z" Signals in the military after WWII.
- Procedure Signals.
  - Commenced with early amateur, commercial and military communications.
  - Examples**: AR – end of message, AS – wait, BT – break, CQ – any station, DE – this is, GL – good luck, IMI -- ?, K – invitation to transmit, NIL – not in log, R – receipt, TU – thanks, 73 – best wishes (male), 88 – best wishes (female), VA (SK) – end of my work (clear).
- * See ARRL Operating Manual for others.
- ** See ARRL Operating Manual for abbreviations.

Why Learn CW



If low ERP, you will have a huge advantage with CW

- Contrary to popular belief, CW is alive, well and growing.
  - Rare DX with modest stations seem to favor CW.
    - CW will have more punch at any given power level due to less bandwidth.
    - 100W into a 6dB gain antenna (without calculating feed line loss) sounds like 400W.
    - Relatively easy and not too expensive to become competitive on 14 mHz and above.
    - On any given day, you will hear as much DX on CW as SSB.
  - CW uses a modest, English based vocabulary, almost universally understood.
    - No struggle to understand the DX's accent.
- So the rewards seem well worth the effort to learn CW.
- How?
  - Key and some type of sender to learn the alphabet by sending.
  - Listen to code practice sessions on W1AW.
  - Get a "code buddy" to practice with.
- Finally, when working DX, there is a DX Code of Etiquette to adhere to:

DX Code of Conduct

- Listen, listen, listen, listen, listen, listen, and then listen some more –
  - **Never** tune up on the DX's frequency.
  - Don't trust the call on the DX packet cluster, listen to what the DX says.
  - Don't call unless the DX's signal is strong enough to copy.
  - Don't call on the DX's frequency unless you are **sure** he is not working split.
  - Don't call until your are sure DX has completed the current QSO.
  - Don't call when the DX responds to another call sign.
  - Don't call when the DX queries another call not like yours.
  - Don't call when the DX queries other geographic areas.
- When you call –
  - Send your complete call, once, listen -- twice, listen – three, four times max.
  - When DX answers –
  - Send your exchange or signal report once and only once.
  - DX will ask for fills if needed.
- If DX answers with your correct call sign –
  - (Generally) don't send your call again unless part of the exchange.
  - He already told you he knows who you are!

Extras are the biggest violators; particularly those nearing or on the "Honor Roll".

World Time Zones

Getting Started on HF
Next

- Part 2 – How to get started with electronic logging.
  - Convert paper logs to digital format.
  - Logging software.
  - Logbook of the World (LoTW), eQsl and Club Log in addition to QSL cards.
- Part 3 -- Contest Software.