Strategic HF Radio Propagation

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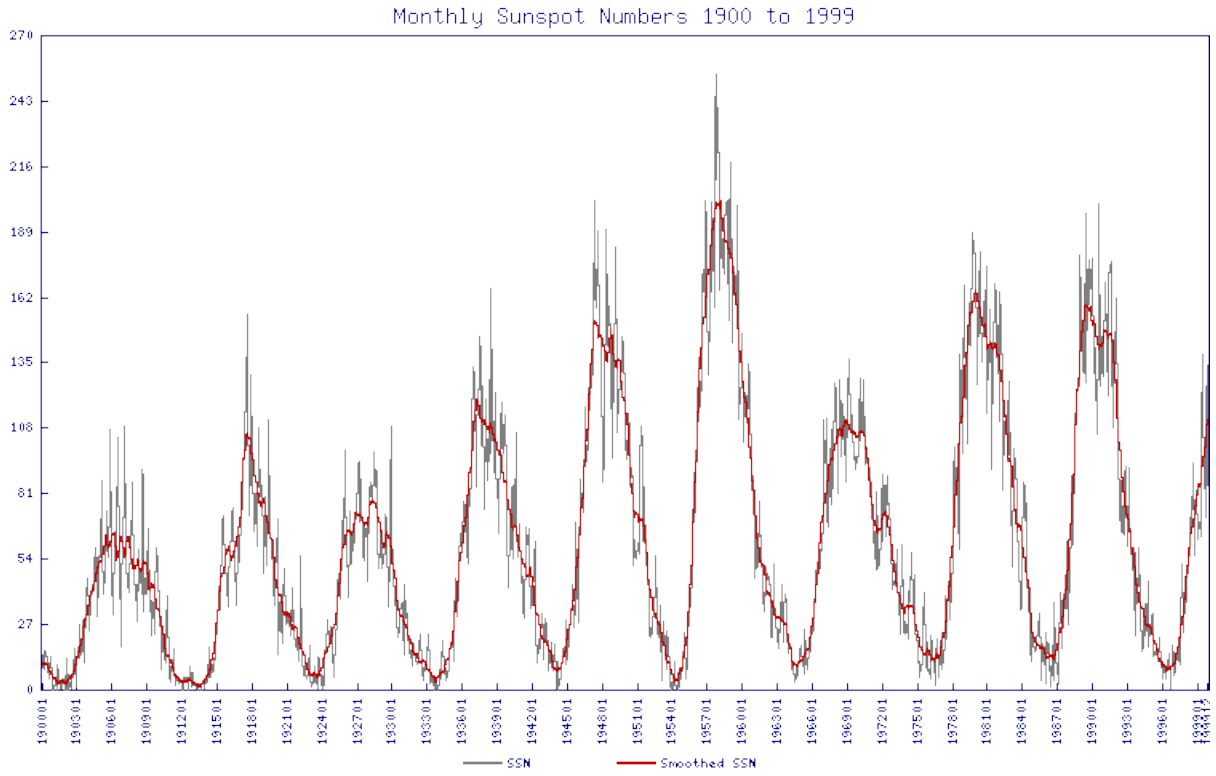
Terminology

- Fo is the F2 Layer Critical Frequency (used in NVIS)
- MUF is the Maxium Usable Frequency
- LUF is the Lowest Usable Frequency
- OWF is the Optimal Working Frequency
- SFI is Solar Flux Index, radiation measured at 2800Mhz
- SSN is Smoothed Sun Spot Number
- Planetary K Index is a measure of the magnetic field (log scale 0-9)
- Planetary A Index is a measure of the magnetic field (linear scale 0-400)

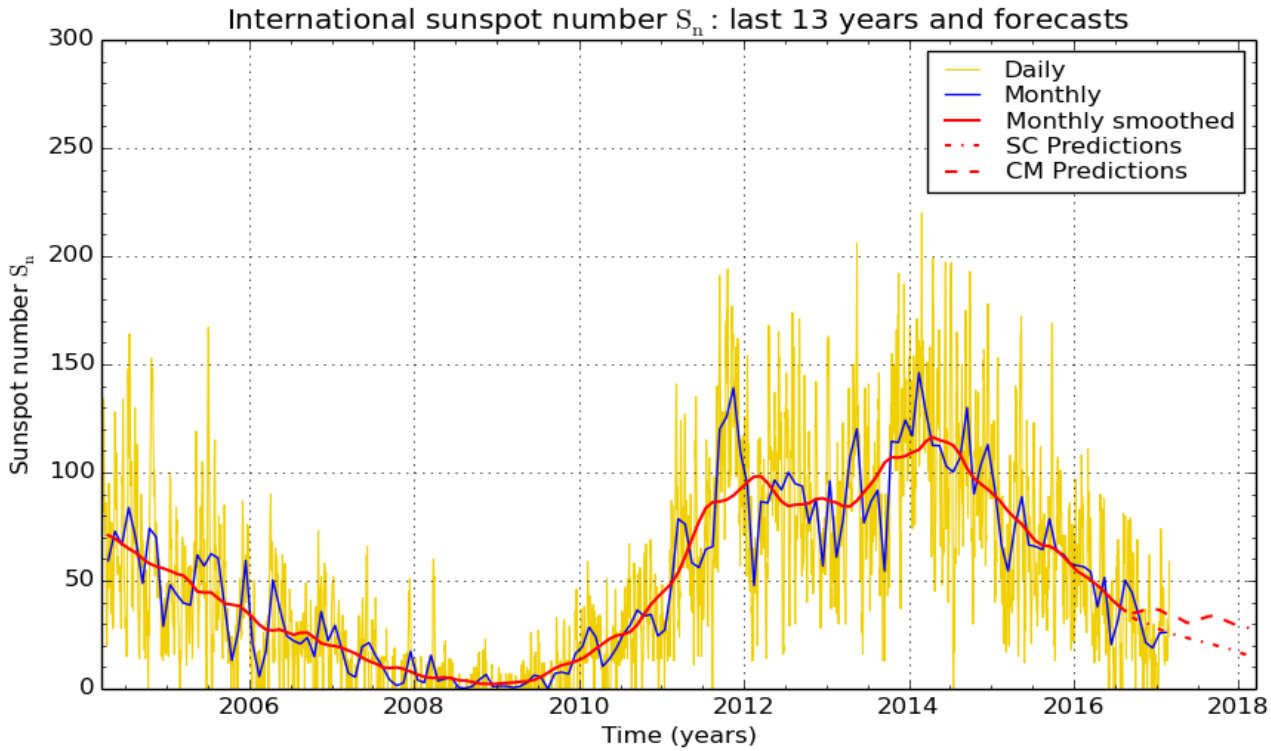
Cycles

- 11 year solar cycle
- Earth Orbit around the Sun: Summer/Winter and Spring/Autumn Equinox
- 28-day rotation on the Sun's axis
- 24-hour rotation on the Earth's axis

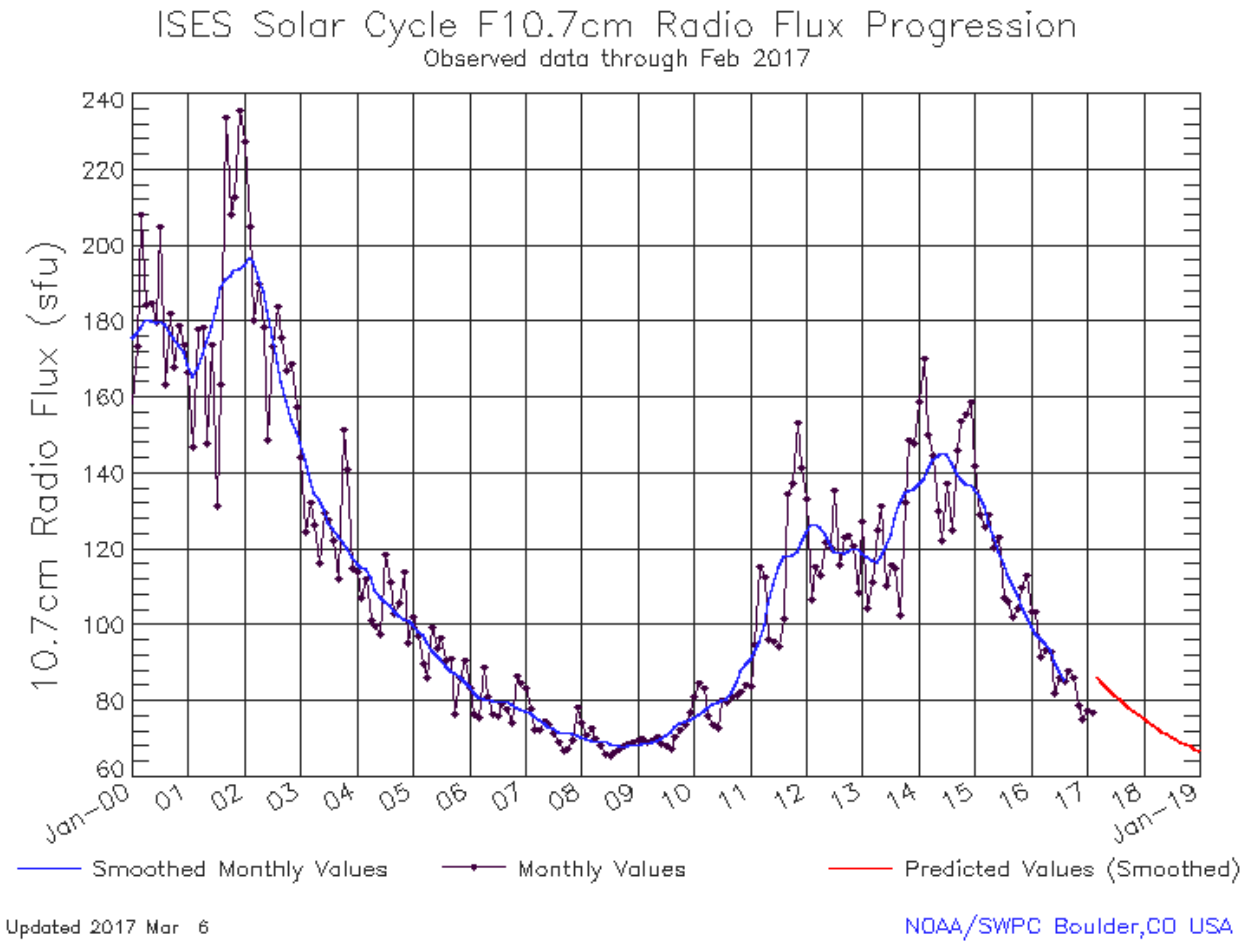
Sun Spot Cycle



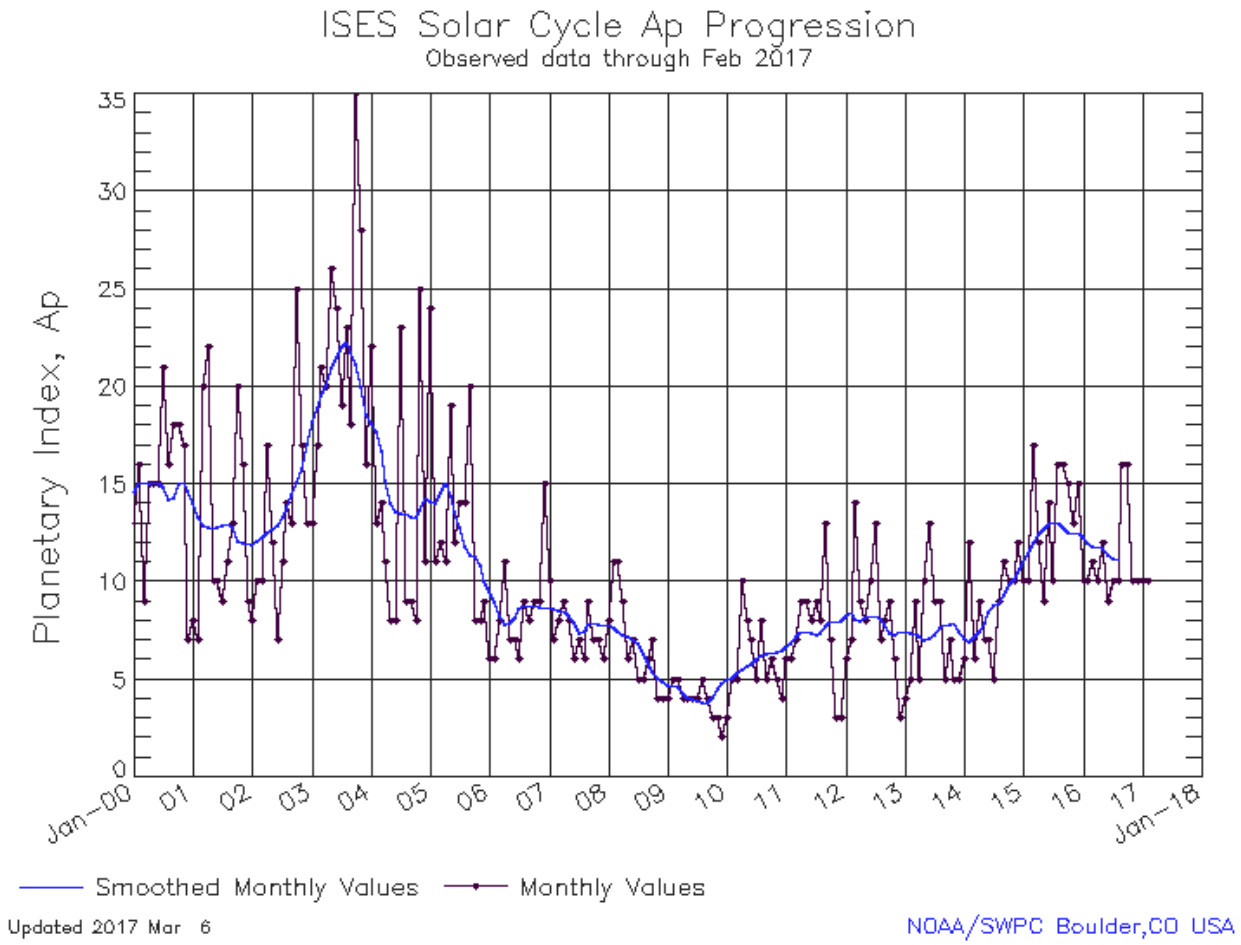
Solar Cycle 24 Ends



Solar Flux Index



Planetary A Index



Skywave Propagation

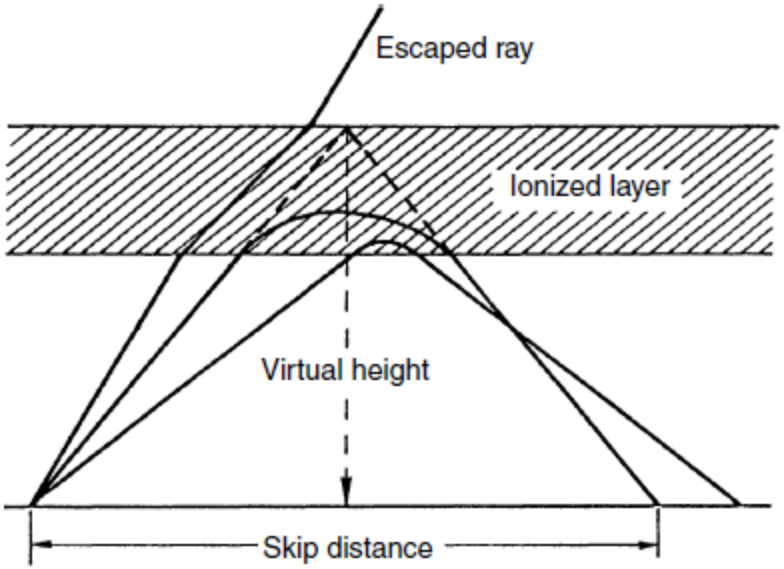
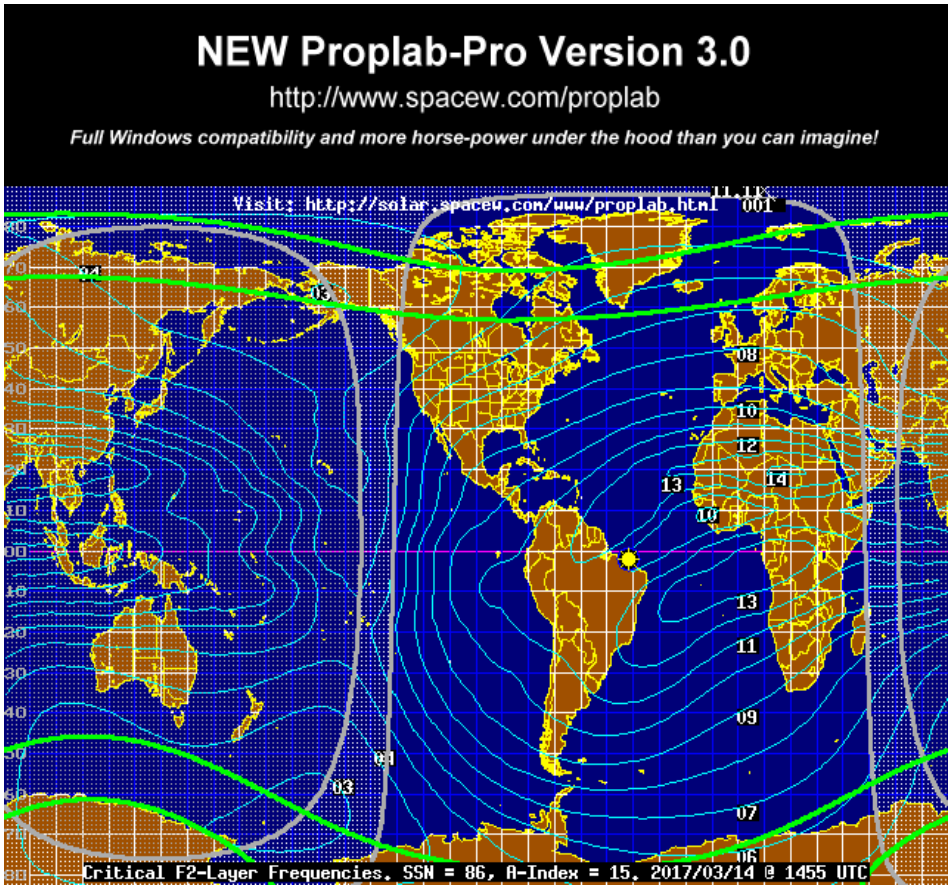
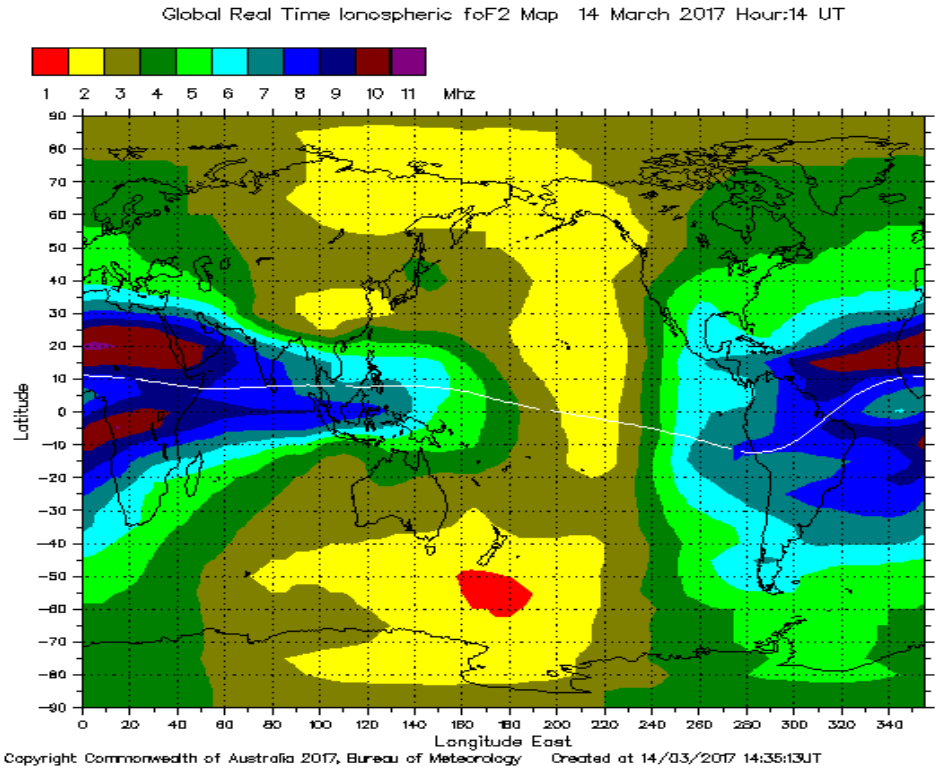


Figure 1.13 Sky wave propagation

F2 Layer Critical Frequency



Ionosounding NVIS Predictions



NVIS Tests

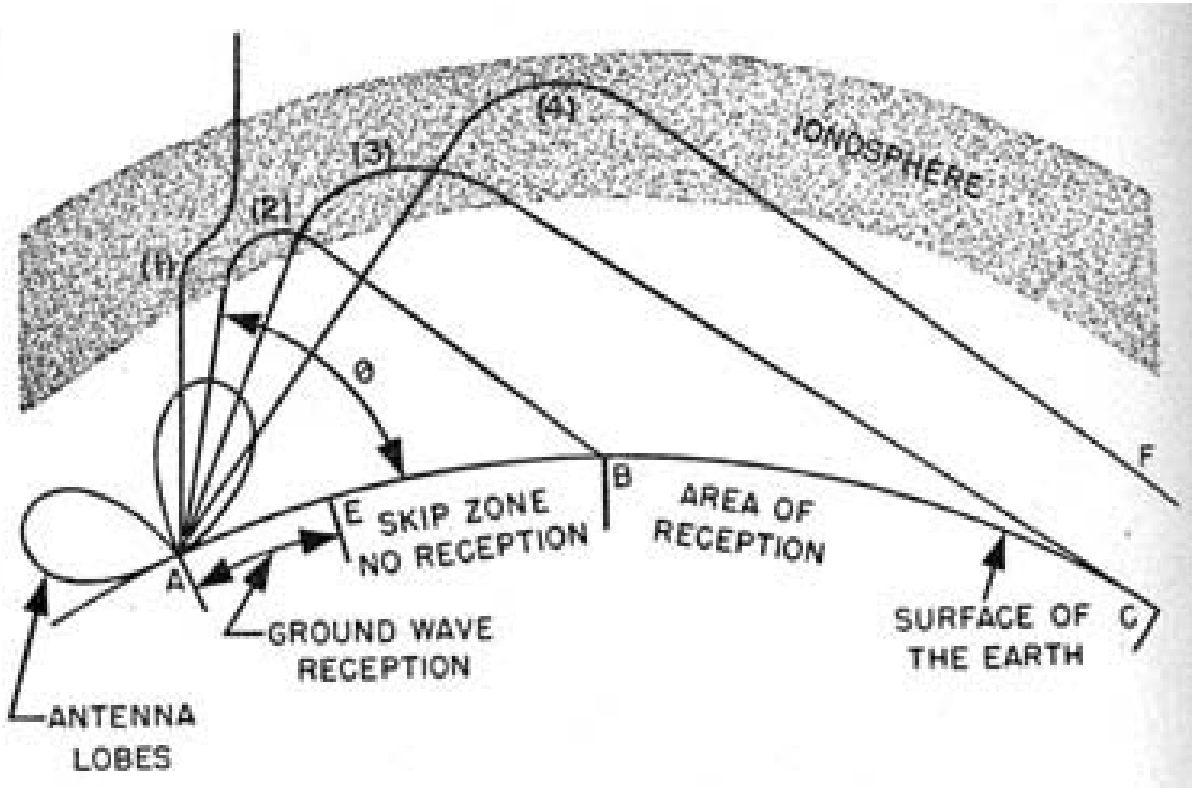
February 6, 2017
N4YOU, Carolina Windom @30ft
KB9DKR, Alpha-Delta DXLB-Plus @28ft

Distance: 15 miles

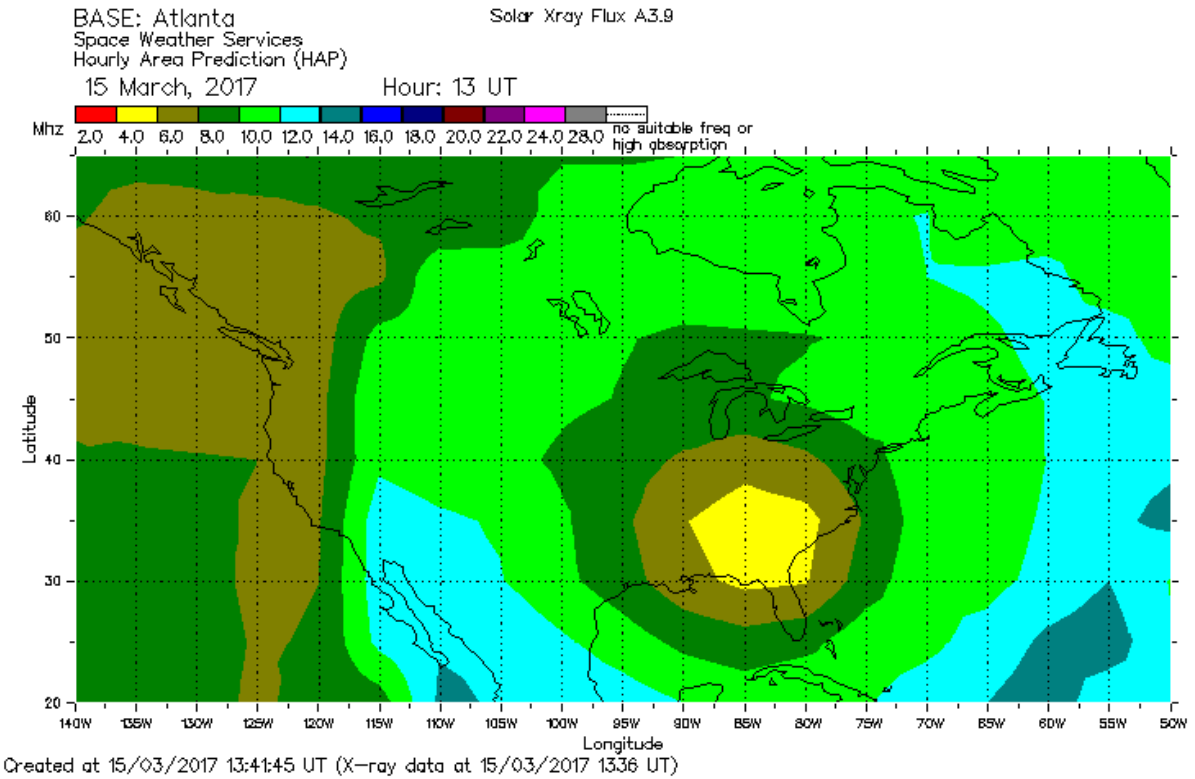
Time (Z): 19:00

Band (mode)	Result
2-meters (FM)	No copy
40-meters (SSB)	No copy
60-meters (SSB)	59+ copy locally and also Indianapolis
80-meters (SSB)	52 copy locally
80-meters (CW)	599 copy locally

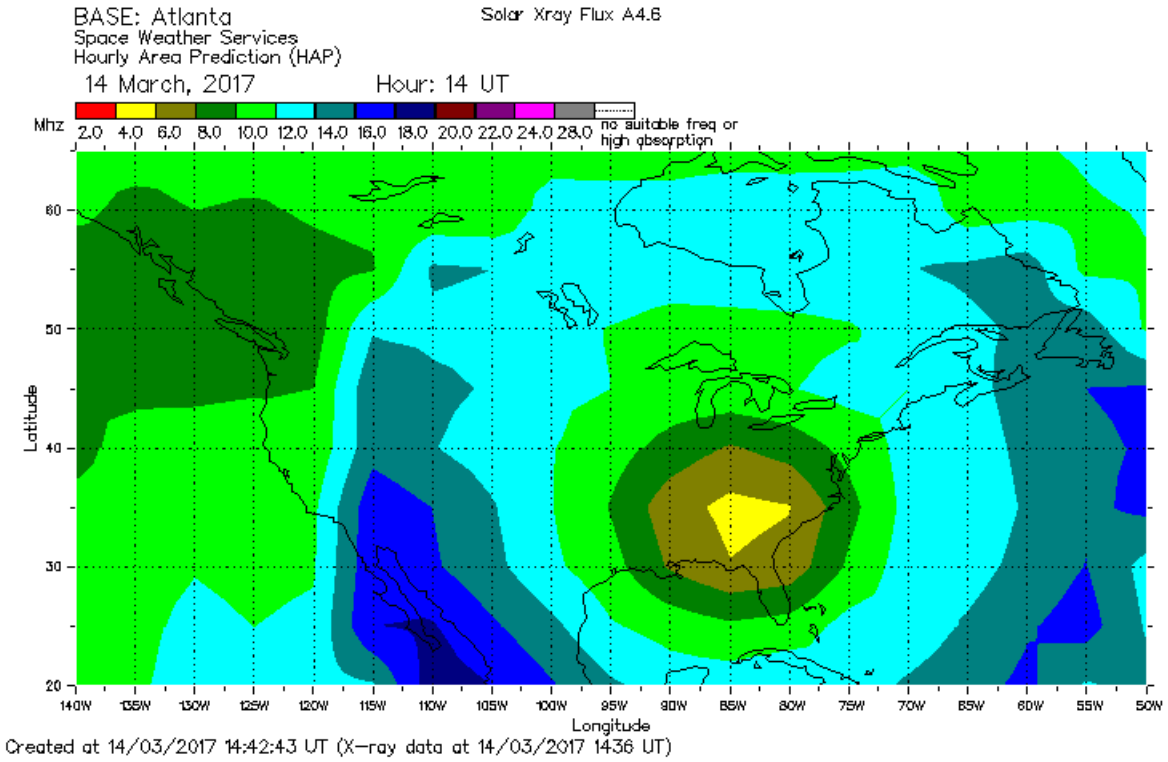
Reaching Further than NVIS



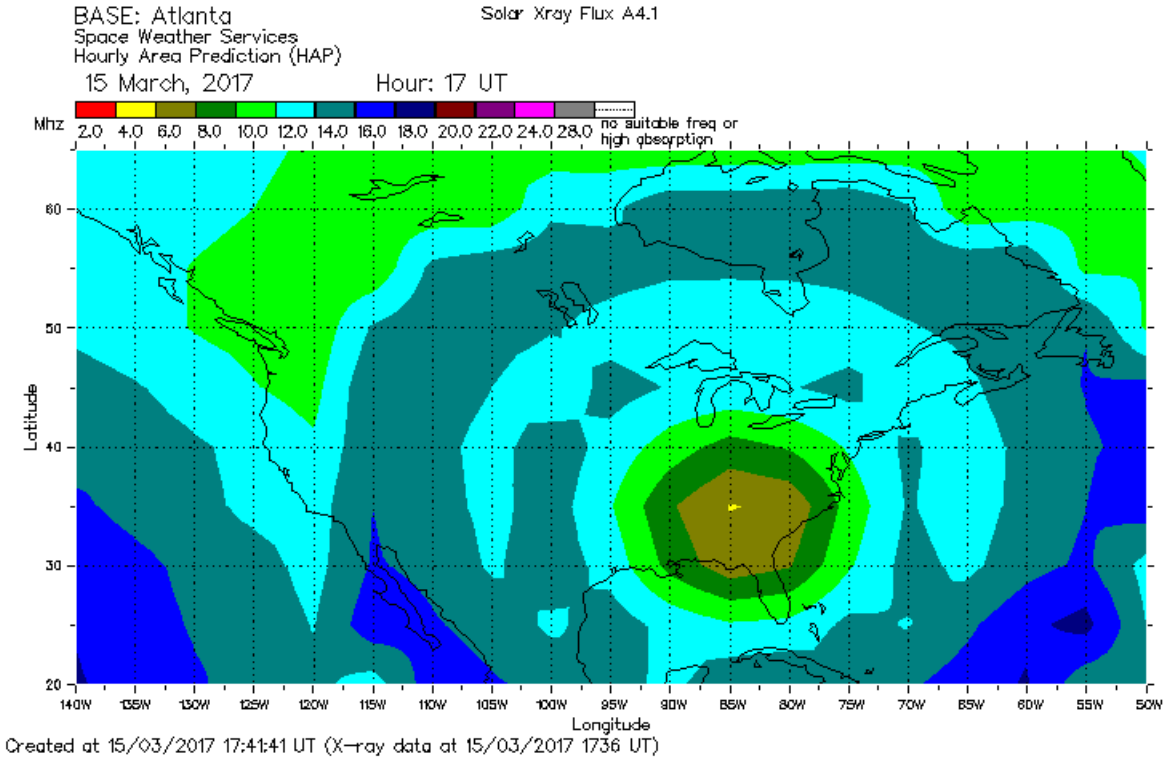
HAP Chart 13:00Z



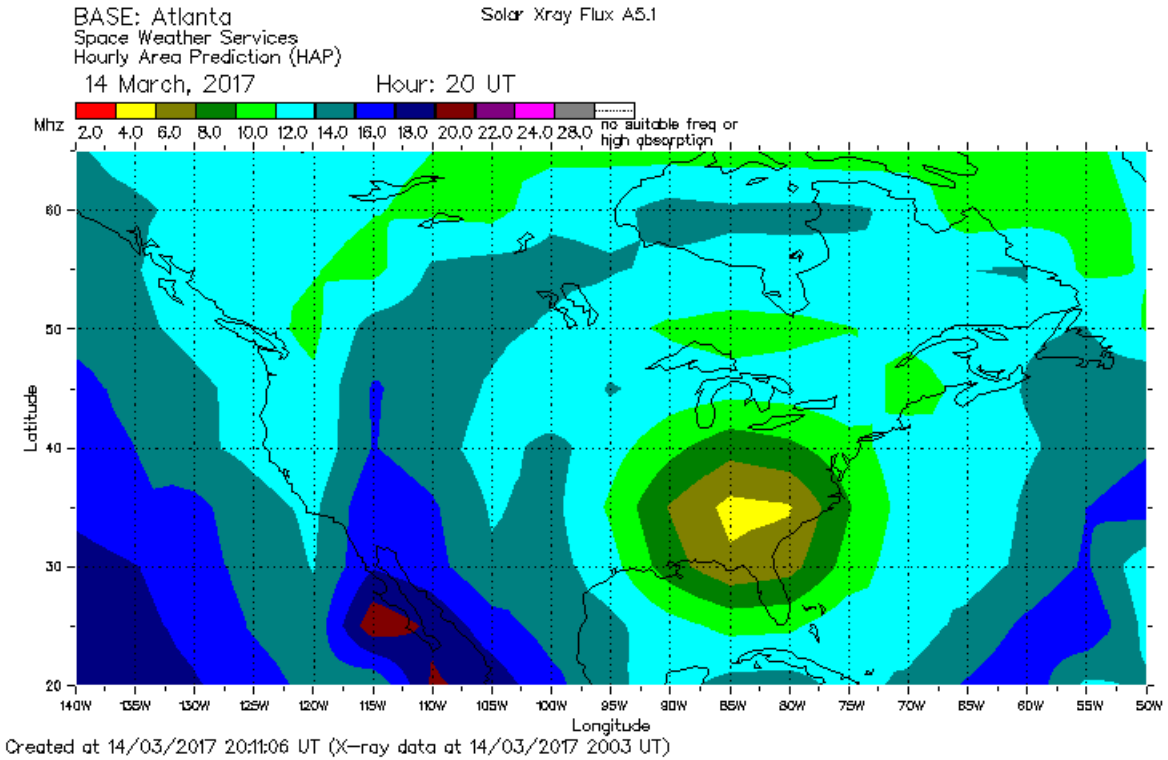
HAP Chart 14:00Z



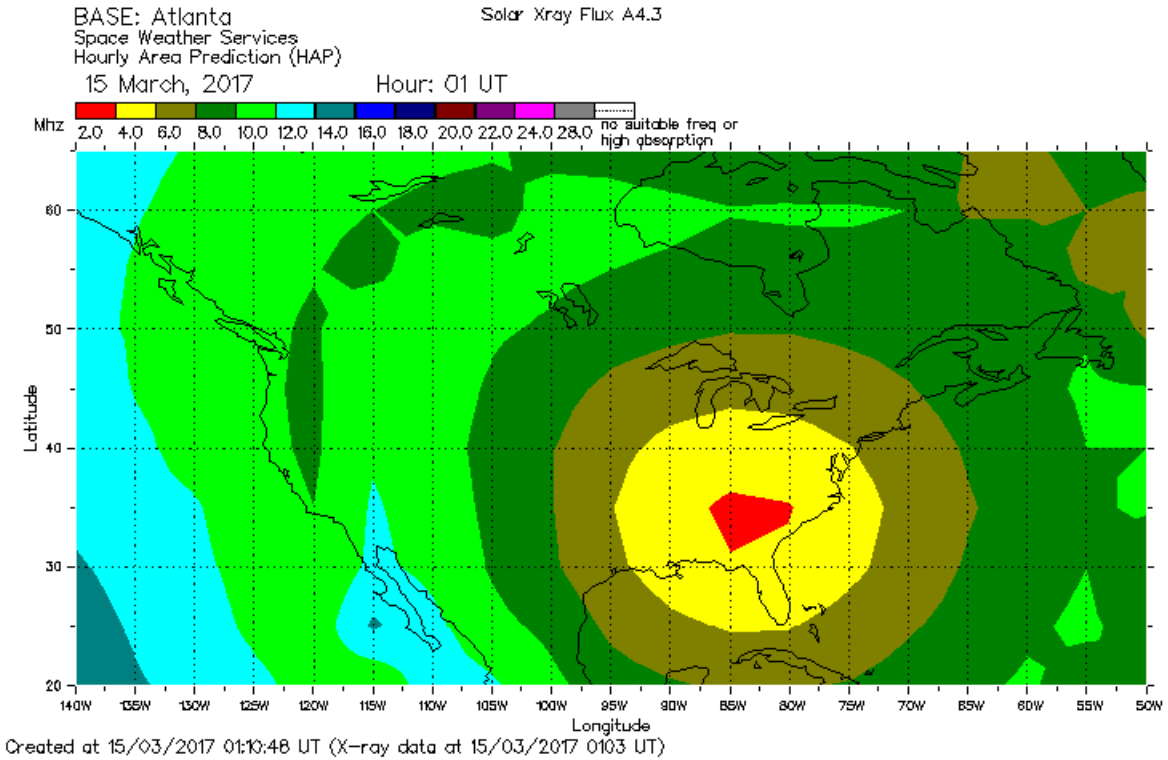
HAP Chart 17:00Z



HAP Chart 20:00Z



HAP Chart 01:00Z



Winter Field Day Scouting 28 Days in Advance

- 2017 Winter Field Day Propagation Data
  December 31, 2016 - January 1, 2017
  Collected by KB9DKR and KK4SW
- Reverse Beacon Tests:
  100 watts power: 80-40-20-10M bands
  30 watts power: 15M band
  Antenna: Dipoles @~25ft

- Incidental Rag Chews:
  1330Z, 40M, NJ, extreme QSB
  1350Z, 80M, MI, extreme QSB
  1920Z, 20M, FL, solid path
  2227Z, 80M, TN, solid NVIS
  0133Z, 40M, PA, solid
  0500Z, 40M, AZ, QSB (logged by KK4SW, he also had solid Qs in IA and KS)

  Notes: SFI-73, K-1 and zero spots. The Hourly Area Prediction charts didn't update after 2000Z. I will have to collect these again or we can use VOACAP to create custom predictions for different antennas.

Hourly Summary

Zulu	RB Propagation Notes
19:00	20M favored, solid QSO FL, some 15M potential, shot at HI and AK
20:00	40M path to OH PA and NH, 20M okay, some 15M and 80M
21:00	40M path 20M path to west, some 80M and no 15M
22:00	40M, 20M path to west, 80M NVIS QSO Cookville, TN
23:00	40M, 80M and limited 20M
0:00	40M, 80M
1:00	80M short, 40M starts to go long w solid QSO PA, and 160M NVIS
2:00	80M short, 40M long and 160 NVIS
3:00	
4:00	80M long, 40M long and 160 NVIS
5:00	40M long New Eng and west QSB QSO AZ, 80M long, 160 NVIS
6:00	40M long, 80M long, 160 NVIS
11:00	80M, 40M
12:00	40M, 80M
13:00	40M favored but QSB on NJ QSO, 20M starting to open and 80M closing and QSB on MI QSO
14:00	40M favored, 20M viable
15:00	40M, 20M
16:00	20M, 40M
17:00	20M favored, 40M okay and some 15M

Winter Field Day 2017 Sunday Morning (Reverse Beacon report, 5 watts)

KO7SS	N4FR	7043CW CQ [LoTW]	9 dB	17 wpm1432z 29 Jan
K3PA	N4FR	7043CW CQ [LoTW]	16 dB	16 wpm1432z 29 Jan
K1TTT	N4FR	7043CW CQ [LoTW]	15 dB	17 wpm1430z 29 Jan
W2LB	N4FR	7042.9CW CQ [LoTW]	12 dB	17 wpm1429z 29 Jan
K3LR	N4FR	7043CW CQ [LoTW]	35 dB	17 wpm1428z 29 Jan
VE2WU	N4FR	7038.4CW CQ [LoTW]	19 dB	17 wpm1428z 29 Jan
WZ7I	N4FR	7043CW CQ [LoTW]	36 dB	17 wpm1428z 29 Jan
K9IMM	N4FR	7043CW CQ [LoTW]	13 dB	17 wpm1428z 29 Jan
VE3EID	N4FR	7043CW CQ [LoTW]	17 dB	16 wpm1427z 29 Jan
NY3A	N4FR	7043CW CQ [LoTW]	28 dB	16 wpm1427z 29 Jan
WE9V	N4FR	7043.1CW CQ [LoTW]	18 dB	16 wpm1427z 29 Jan
KM3T	N4FR	7043CW CQ [LoTW]	13 dB	16 wpm1427z 29 Jan
AA4VV	N4FR	7043CW CQ [LoTW]	18 dB	16 wpm1427z 29 Jan
AC0C	N4FR	7043CW CQ [LoTW]	24 dB	16 wpm1427z 29 Jan
K3PA	N4FR	7043CW CQ [LoTW]	24 dB	16 wpm1427z 29 Jan
W4KKN	N4FR	7043CW CQ [LoTW]	29 dB	16 wpm1427z 29 Jan

Frequencies to Gauge Conditions

- With a couple of reference points, your HF receiver can provide the information needed to make a real-time prediction.
- Determine NVIS frequency as a initial benchmark and use W1AW and WWV as calibration points.
- W1AW (CW), about 1000 miles to the NE from Franklin, TN. Very frequent operating schedule: (MHz) 28.0675, 21.0675, 18.0975, 14.0475, 7.0475, 3.5815, 1.8025.
- WWV (AM), about 1000 miles to the West from Franklin, TN. 24-hour schedule: (MHz) 2.5, 5, 10, 15, 20.

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