



2018 ARRL Field Day Strategy Overview

Carl Sibilski

Williamson County ARES
Williamson County Public Safety Building
Emergency Operations Center

June 18, 2018

Our Field Communications Site



- ▶ The Public Safety Building, Emergency Operations Center, is where WCARES will be called to action.
- ▶ Home of our primary served agency, Williamson County Emergency Management Agency (EMA), which has overall responsibility for coordinating interagency emergency communications with other public agencies such as the Tennessee Emergency Management Agency (TEMA), Williamson County law enforcement and Williamson County Department of Emergency Medical Services (EMS).
- ▶ Technical challenges for permanent antennas, deployment of temporary antennas and emergency power requirements.
- ▶ Demonstrate proficiency with High Frequency communications.
- ▶ Middle Tennessee has strategic importance for Southeast as well as national HF links (via direct or relay paths).
- ▶ Hurricane Katrina: [sample audio](#) of distress call via amateur HF radio beginning at 1:57mins.



A Field Day with WCARES brings you an opportunity to . . .

- ▶ **Learn technical skills:** Station engineering, computer networking and facility issues.
- ▶ **Work multiple modes** with experienced operators for CW / SSB / RTTY / PSK.
- ▶ **Be part of a team** for planning, setup, on-air operations, take down and after-action report.
- ▶ **Endurance test:** Put your radio gear, tools and kits through their paces and see what it's like to spend 24 hours at the EOC.
- ▶ **Reach out to new hams** and attract prospective hams.
- ▶ **Specialize:** Explore many pathways in amateur radio and determine where to invest your efforts in the hobby.



Field Day Essentials

- ▶ **Setup:** Friday, June 22, 1:00PM (Central)
- ▶ **QRV (ready):** Saturday, June 23, 1:00PM (Central)
- ▶ **Call Sign:** N4FR
- ▶ **Exchange:** 5F Tennessee.

"5" is the number of primary transmitters. "F" is the designation for an Emergency Operations Center category. Tennessee is our ARRL Section. Additional stations GOTA or Get On The Air (uses call sign W4SQD) and VHF (uses call sign N4FR)

- ▶ **SSB1 Station Captain:** Jeff Standifer
- ▶ **SSB2 Station Captain:** Peter Luttenbacher
- ▶ **CW1 Station Captain:** Tim Kreth
- ▶ **CW2 Station Captain:** Cliff Batson
- ▶ **Digital Station Captain:** Phil Sherrod
- ▶ **VHF Station Captain:** Al Pierce
- ▶ **GOTA Station Captain:** Janise Eng and Joe Nino-Hernes
- ▶ **Volunteers:** As noted throughout the presentation
- ▶ **HIC (Hams In Charge):** Cliff Batson and Carl Sibilski (aka "Suckers")



Field Day Scoring

QSO Points

- ▶ Phone contacts count one point each.
- ▶ CW contacts count two points each.
- ▶ Digital contacts count two points each.



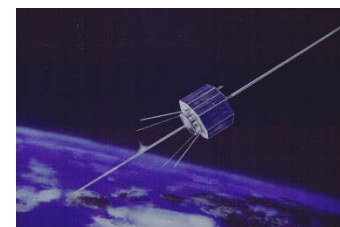
Power Multipliers

- ▶ If all contacts are made using a power of 5 Watts or less and if a power source other than commercial mains or motor-driven generator is used (batteries, solar cells, water-driven generator), the power multiplier is 5 (five).
- ▶ It is **CRUCIAL** that no station uses more than 5 watts during the contest.



Bonus Points (100 points each)

- ▶ **100% Emergency power** classification if all contacts are made only using an emergency power source. GOTA station and free VHF Station for Class A and F entries do not qualify for bonus point credit and should not be included in the club's transmitter total. All transmitting equipment at the site must operate from a power source completely independent of the commercial power mains to qualify.
- ▶ **Media Publicity:** A copy of the press release, or a copy of the actual media publicity received (newspaper article, etc.) must be submitted to claim the points. (Faith Arenth)
- ▶ **Public Location** with the intent for amateur radio to be on display to the public.
- ▶ **Information Table** to make appropriate handouts and information available to the visiting public at the site. A copy of a visitor's log, copies of handouts or photos is sufficient evidence for claiming this bonus. (Dave Matthews)
- ▶ **Message Origination to Section Manager** (Myron Manker, Hilton Dean)
- ▶ **Message Handling** 10 points for each formal message originated, relayed or received and delivered during the Field Day period, up to a maximum of 100 points for ten messages total. (Myron Manker, Hilton Dean)
- ▶ **Satellite QSO** (Jon Walker)



Bonus Points (100 points each)

- ▶ **Alternative Power** making a minimum of five QSOs using an "alternate" energy source of power, such as solar, wind, methane or water. (Tim Kreth)
- ▶ **W1AW Bulletin:** Test to see who can copy national emergency communications via voice, CW and digital modes. (Myron Manker, Carl Sibilski)
- ▶ **Educational Activity:** Winlink Global Radio Email (Phil Sherrod) and Amateur Radio Satellite Communications (Jon Walker)
- ▶ **GOTA** (Get On The Air) station for introducing ham radio, up to a maximum of 100 Bonus points per operator, depending on the number of QSOs. (Janise Eng and Joe Nino-Hernes)
- ▶ **Web Submission** A 50-point bonus may be claimed by a group submitting their Field Day entry via the www.b4h.net/cabforms web site. (Hilton Dean)
- ▶ **Youth Participation:** A 20-point bonus (maximum of 100) may be earned by any Class A, C, D, E, or F group for each participant age 18 or younger at your Field Day operation that completes at least one QSO. (Janice Eng, Mike Lee, Andrew Gosset)
- ▶ **Social Media** promoting your Field Day activation to the general public via an active, recognized and utilized social media platform like Facebook, Twitter, Instagram, etc.



ARRL Safety Officer Checklist (100 points)

- ▶ Safety Officer or a qualified designated assistant/s was on site for the duration of the event.
- ▶ Fuel for generator properly stored.
- ▶ Fire extinguisher on hand and appropriately located.
- ▶ First Aid kit on hand.
- ▶ First Aid, CPR and AED trained participant/s on site for full Field Day period.
- ▶ Access to NWS alerts to monitor for inclement weather.
- ▶ Tent stakes properly installed and marked.
- ▶ Temporary antenna structures properly secured and marked.
- ▶ Site secured from tripping hazards.
- ▶ Site is setup in a neat and orderly manner to reduce hazards.
- ▶ Stations and equipment properly grounded.
- ▶ Access to a means to contact police/fire/rescue if needed.
- ▶ Safety Officer is designated point of contact for public safety officials.
- ▶ Minimize risks and control hazards to ensure no injuries to public.
- ▶ As necessary, monitoring participants for hydration and ensures an adequate water supply is available.



Jeff Standifer
Former WCARES
Emergency Coordinator
And retired Fire Dept.



Bonus Point Site Visitation (100 points each)



Dana Ausbrooks

Williamson County Commissioner serving the 12th District



Bill Jorgensen

Director of Williamson County Office of Public Safety



The Proof is in the QRP Pudding

- ▶ Historically, WCARES entered as a LP (low power <150 watts) station based at local parks and school facilities.
- ▶ In 2016, the inaugural Field Day at our brand new EOC facility produced subtle hints of performance issues—but was it coax? propagation? antennas? operators? location? LP tends to mask many issues in domestic HF radio links.
- ▶ In 2017, WCARES experimented with its first QRP (5 watts) entry during the (non ARRL) Winter Field Day event. It produced very strong results, with just a fraction of our usual Field Day operators using top-notch radios and well-tuned antennas. This served as an initial proof of concept.
- ▶ Later in 2017, with new solutions for antennas at the EOC, our QRP Field Day strategy made a big statement—WCARES placed first nationwide in its 5F category and Top 25 out of more than 3,000 entries.
- ▶ In 2018, WCARES entered as an LP for its Winter Field Day event. This produced only a modest difference in the total number of year-over-year **SSB QSOs**:

100 QSOs via QRP in 2017 WFD vs 123 QSOs via LP in 2018 WFD

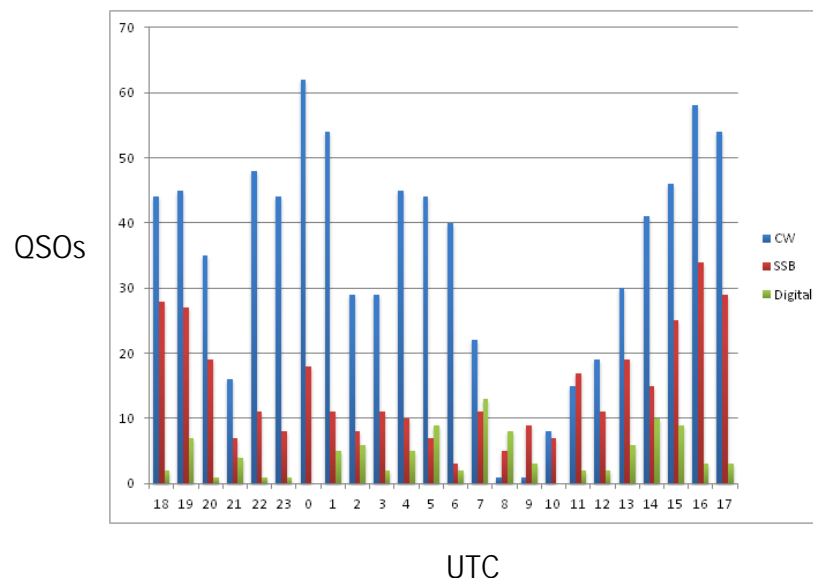
- ▶ A QRP strategy simply forces us to be better—with antennas, operating techniques and can-do spirit.
- ▶ The ARRL assigns a 5-point multiplier because QRP is critically important for emergency communications—requiring use of batteries, savvy operating skills and lots of experience working stations on the fringe of our coverage patterns.



Building on our 2017 Field Day Experience

- ▶ Special training for more WCARES members on the coax patch panel.
- ▶ New location for the digital station's antenna—more efficient wires and further away from interference. Note QSOs during 00:00Z hour last year when the station had to relocate.
- ▶ Cross-check the band plan with antenna assignments. Note CW QSOs in 21:00Z hour with 40M antenna issue.
- ▶ Enable pre-recorded audio features stored directly on the Elecraft KX3 radios.
- ▶ Add MF (Medium Frequency) antenna capabilities for SSB and CW to take advantage of the low solar cycle via 160M.

WCARES QSOs by Mode 2017



There will be more to build on from 2018 so keep your notebooks handy!



"Moonshot!"

- ▶ Last year it took 15,466 points to make the Top 10 list in QST Magazine. WCARES scored 12,870 points, so we need to find an additional 2,596 points.
- ▶ A 2- and a 4-transmitter entry made the list so we don't necessarily need another radio.
- ▶ Given our transmitter and mode composition, our weighted-average points per QSO is 8.
 $2,596 \text{ points} / 8 \text{ points} = \text{we need 325 more QSOs.}$
This is about 65 more QSOs per station.
Or roughly 3 more QSOs per operator-hour.

WE CAN DO THIS!

Top Ten Claimed Scores

Call	Score	Transmitters
W3AO	39,430	16A
W4IY	20,930	12A
W4EZ	19,760	9AB
K6EI	19,350	13AB
K2AA	18,154	7A
W6YX	17,420	7F
KSØMO	16,554	2A
K4BFT	16,452	4A
W2GSB	16,102	6F
N6HC	15,466	6A

www.arrl.org **December 2017** **75**



Training for our WCARES Operators

CW

- ▶ **RufzXP** is the abbreviation of the German word “Rufzeichen-Hören”, which means “Listening to Callsigns”. The software is used for improving code speed and CW practice, particularly (ultra) high speed memory copying of true amateur radio calls. RufzXP is a “must” for every serious high speed telegraphy operator and is an official competition of IARU High Speed Telegraphy Championships.
- ▶ **Morse Runner** is a program that simulates a contest—pileups, other stations grabbing your frequency, QRM, QRN, and major timing issues.

SSB

- ▶ **Weekly 10M local practice exercises.** The primary purpose is to encourage WCARES members to practice on-air operating tactics and learn how to be efficient and assertive with passing traffic in a high volume communications environment like Field Day. Experienced operators served as coaches (Jack Cox, Tim Kreth, Jeff Standifer) and produced a realistic contest environment for our members to exercise their voice and tactical skills like “search & pounce” and “running” a frequency.

ALL MODES

- ▶ **Comprehensive contesting overview.** Presentation covering equipment, antennas, propagation, band plan usage, logging and rate analysis. (Tim Kreth, Hunter Mills)



Training for our WCARES Operators

Equipment Training: WCARES Field Day application of the Elecraft KX3 radio and companion PX3 panadaptor.
(Cliff Batson)

<https://youtu.be/vS6liED9OS0>



Software Training: Field Day application of N3FJP contest logging software. (N3FJP)

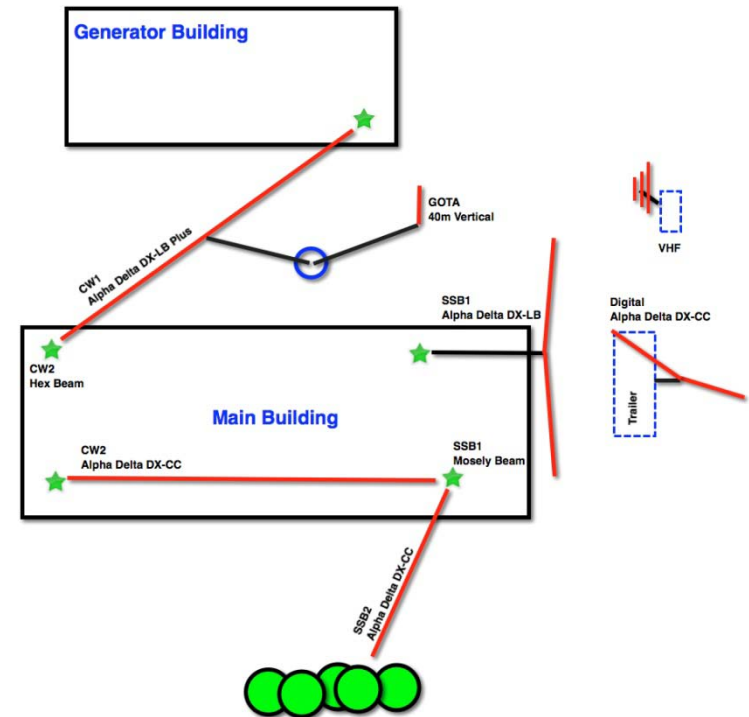
<https://youtu.be/DJEIXuoKWqc>



Antennas

- ▶ SSB1—Permanent Mosely beam for high bands, temporary Alpha Delta DX-LB for low bands (inverted vee from building corner extending over drainage field).
- ▶ SSB2—Permanent Alpha Delta DX-CC (south trees).
- ▶ CW1—Permanent Alpha Delta DX-LB-Plus (generator building).
- ▶ CW2—Permanent Hex Beam for high bands, Permanent Alpha Delta DX-CC (over middle of main building).
- ▶ DIG—Temporary Alpha Delta DX-CC (fence/drainage field).
- ▶ GOTA—Temporary monoband vertical (side parking lot).
- ▶ VHF—Temporary 6M beam on mast (near entrance gate)

Antenna Diagram for 2018 Field Day



Batteries are Mission-Critical for Emergency Communications

WCARES members are prepared for immediate emergency power needs.

- ▶ Jeff Standifer
- ▶ Jason hay
- ▶ Robin Patty
- ▶ Paul Havlik
- ▶ Peter Luttenbacher
- ▶ Scott Gray
- ▶ Doug Miller
- ▶ Andrew Gosset
- ▶ David Ausbrooks
- ▶ Randy Paulson
- ▶ Rob Smith

Example Power Consumption Estimate for the Digital Station

Assuming RX time is 66% and TX 33% @ 100% duty cycle
IC-7300 RX current = 1.15A, TX current @5W = 5.6A

$$(0.66)(1.15A) + (0.33)(1.00)(5.6A) = 2.6A$$

2.6A (24 hours) = **62Ah consumption for the radio**

Assuming laptop PC is rated 42W @ 120V and 75% inverter efficiency

$$42W / 120V = 0.35A \sim \text{converting to } 12V \sim 0.35A (120/12) = 3.5A$$
$$3.5A / 0.75 = 4.7A @ 12V$$

4.7A(24 hours) = **113Ah consumption for the computer**

$$62Ah + 113Ah = \mathbf{175Ah \text{ total consumption for the Digital Station}}$$

~ roughly about 4 large batteries ~



WCARES 2018 Field Day Station Operating Rosters

SSB1 Station - Jeff Standifer's KX3				SSB2 Station - Peter Luttenbacher's KX3			
When	Operator 1	Operator 2		When	Operator 1	Operator 2	
1:00 PM	Paul Havlik	Gene Cheatham		1:00 PM	Trey Spain	Randy Moore	
2:00 PM	Paul Havlik	Gene Cheatham		2:00 PM	Trey Spain	Randy Moore	
3:00 PM	Jack Cox	Doug Miller		3:00 PM	Ed Hudgens	Cliff Batson	
4:00 PM	Jack Cox	Doug Miller		4:00 PM	Ed Hudgens	Cliff Batson	
5:00 PM	Doug Miller	Adrien Pepin		5:00 PM	Robin Patty	Joe Nino-Hernes*	
6:00 PM	Doug Miller	Adrien Pepin		6:00 PM	Robin Patty	Joe Nino-Hernes*	
7:00 PM	Jeff Standifer	Bill Jorgensen		7:00 PM	Phil Sherrod	Rob Smith	
8:00 PM	Jeff Standifer	Bill Jorgensen	SUNSET	8:00 PM	Phil Sherrod	Rob Smith	
9:00 PM	Tim Kreth	Gene Aker		9:00 PM	Scott Gray	Bob Weller	
10:00 PM	Tim Kreth	Gene Aker		10:00 PM	Scott Gray	Bob Weller	
11:00 PM	Joe Nino-Hernes	Tom Wiggers		11:00 PM	Scott Gray	Peter Luttenbacher	
12:00 AM	Joe Nino-Hernes	Tom Wiggers		12:00 AM	Scott Gray	Peter Luttenbacher	
1:00 AM	Joe Nino-Hernes	Tom Wiggers		1:00 AM	???	???	
2:00 AM	John Almon	???		2:00 AM	???	???	
3:00 AM	John Almon	???		3:00 AM	David Ausbrooks	???	
4:00 AM	John Almon	???		4:00 AM	David Ausbrooks	???	
5:00 AM	Jeff Duncan	Rich Knox	SUNRISE	5:00 AM	Daivd Holmes	David Ausbrooks	
6:00 AM	Jeff Duncan	Rich Knox		6:00 AM	David Holmes	David Ausbrooks	
7:00 AM	Jon Kessel	Gene Aker		7:00 AM	David Holmes	Janise Eng	
8:00 AM	Jon Kessel	Gene Aker		8:00 AM	David Holmes	Janise Eng	
9:00 AM	Phil Sherrod	Hook Hookassian		9:00 AM	Jeff Standifer	Mark Elrod	
10:00 AM	Phil Sherrod	Hook Hookassian		10:00 AM	Jeff Standifer	Mark Elrod	
11:00 AM	Randy Moore	Robin Patty		11:00 AM	Gene Cheatham	Louie Sharp	
12:00 PM	Randy Moore	Robin Patty		12:00 PM	Gene Cheatham	Louie Sharp	



WCARES 2018 Field Day Station Operating Rosters

CW Stations - Combined Schedule				Digital Station - Phil Sherrod's Gear		
When	CW1	CW2		When	Operator 1	Operator 2
1:00 PM	Tim Kreth	Myron Manker		1:00 PM	Phil Sherrod	Rob Smith
2:00 PM	Tim Kreth	Myron Manker		2:00 PM	Phil Sherrod	Rob Smith
3:00 PM	Tim Kreth	Myron Manker		3:00 PM	Andrew Gossett	Jason Hay
4:00 PM	Tim Kreth	Carl Sibilski		4:00 PM	Andrew Gossett	Jason Hay
5:00 PM	Louie Sharp	Carl Sibilski		5:00 PM	Peter Luttenbacher	???
6:00 PM	Louie Sharp	Carl Sibilski		6:00 PM	Peter Luttenbacher	???
7:00 PM	Louie Sharp	Carl Sibilski		7:00 PM	Jeff Duncan	Gene Aker
8:00 PM	Louie Sharp	Hunter Mills	SUNSET	8:00 PM	Jeff Duncan	Gene Aker
9:00 PM	Cliff Batson	Hunter Mills		9:00 PM	Rob Smith	Randy Paulson
10:00 PM	Cliff Batson	Hunter Mills		10:00 PM	Rob Smith	Randy Paulson
11:00 PM	Cliff Batson	Hunter Mills		11:00 PM	Jason Hay	???
12:00 AM	Cliff Batson	Hunter Mills		12:00 AM	Jason Hay	???
1:00 AM	Tim Kreth	Hunter Mills		1:00 AM	Jason Hay	???
2:00 AM	Tim Kreth	Hunter Mills		2:00 AM	Jason Hay	???
3:00 AM	???	???		3:00 AM	Joe Nino-Hernes	???
4:00 AM	???	???		4:00 AM	Joe Nino-Hernes	???
5:00 AM	Carl Sibilski	Louie Sharp	SUNRISE	5:00 AM	Jon Kessell	Hook Hookassian
6:00 AM	Carl Sibilski	Louie Sharp		6:00 AM	Jon Kessell	Hook Hookassian
7:00 AM	Carl Sibilski	Louie Sharp		7:00 AM	Hook Hookassian	Rich Knox
8:00 AM	Carl Sibilski	Louie Sharp		8:00 AM	Hook Hookassian	Rich Knox
9:00 AM	Tim Kreth	Cliff Batson		9:00 AM	Rich Knox	Jon Kessell
10:00 AM	Tim Kreth	Cliff Batson		10:00 AM	Rich Knox	Jon Kessell
11:00 AM	Tim Kreth	Cliff Batson		11:00 AM	Phil Sherrod	Jason Hay
12:00 PM	Tim Kreth	Cliff Batson		12:00 PM	Phil Sherrod	Jason Hay



WCARES 2018 Field Day Volunteer Response

Cliff Batson	Phil Sherrod	Rachel Swicord	Doug Miller
Trey Spain	<u>Rich Knox</u>	Jimmy Driver	Peter Luttenbacher
Randy Moore	Rob Smith	Bob Weller	Paul Havlik
Randy Paulson	Gene Cheatham	Mike Jagers	Chuck Sugar
Andrew Gossett	Zareh "Hook" Hookassian	James Smith	John Almon
<u>Jason Hay</u>	Ronnie Brewer	Louie Sharp	<u>Gene Aker</u>
Carl Sibilski	Jeff Duncan	Scott Gray	Jon Kessell
David Ausbrooks	Larry Franklin	<u>Tim Kreth</u>	Bill Jorgensen
Robin Patty	Ed Hudgens	<u>Hunter Mills</u>	Adrien Pepin
Jack Cox	David Holmes	Myron Manker	Brian Boulden
Mike lee	Janise Eng	Stevie Moore	Tom Wiggers
Jeff Standifer	Mark Swicord	Dave Matthews	Joe Nino-Hernes

Names in **Red** indicate availability that included critical "thin" hours: late night, graveyard and early morning shifts

Names in **Red Underlined** indicate availability across all operating periods. These are the members who said **"send me!"**



Propagation Condition Summary

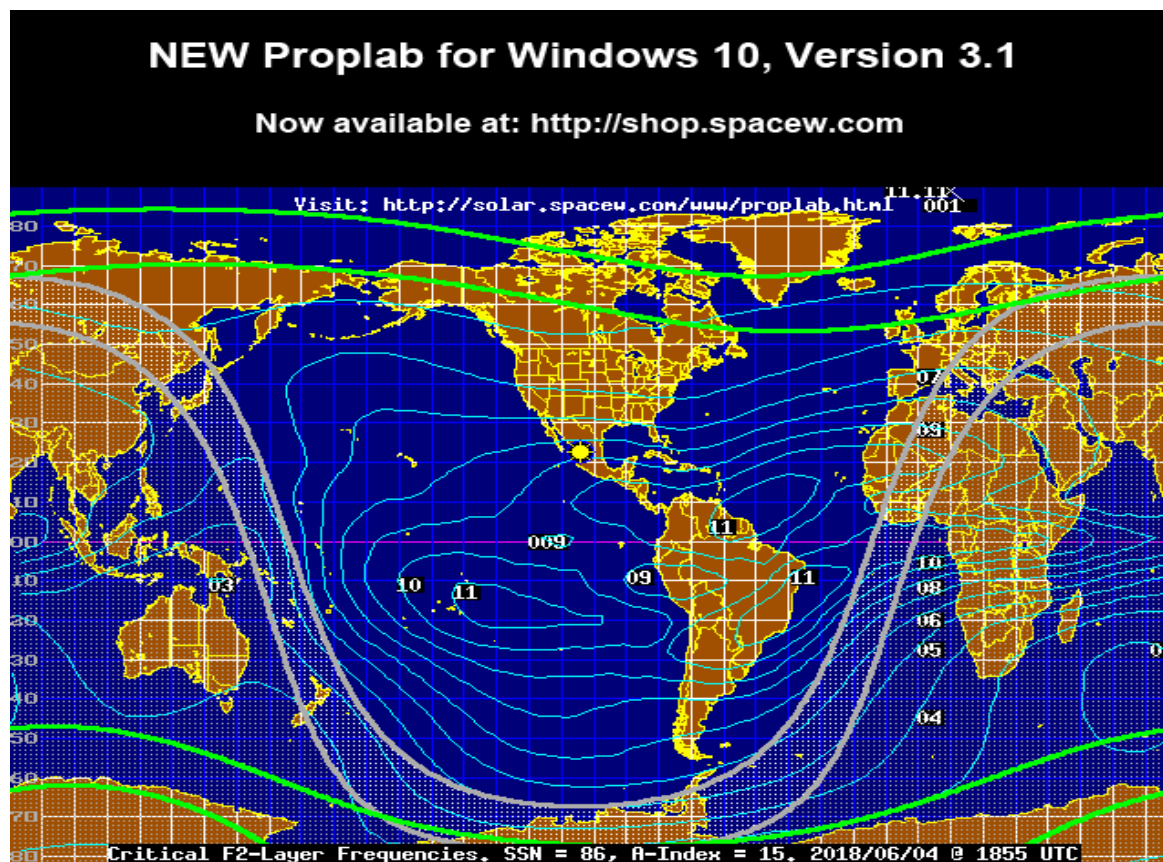
- ▶ 11 year solar cycle bottom, the low bands are highly favored for domestic QSOs via F2
- ▶ Earth orbit around the Sun: Summer pattern--longer daylight, lower ionization relative to winter position
- ▶ E layer season is in its prime (May-Aug), should produce intermittent short skip potential on the high bands
- ▶ SFI: 70
- ▶ SSN: very low <20

IMPORTANT NOTES:

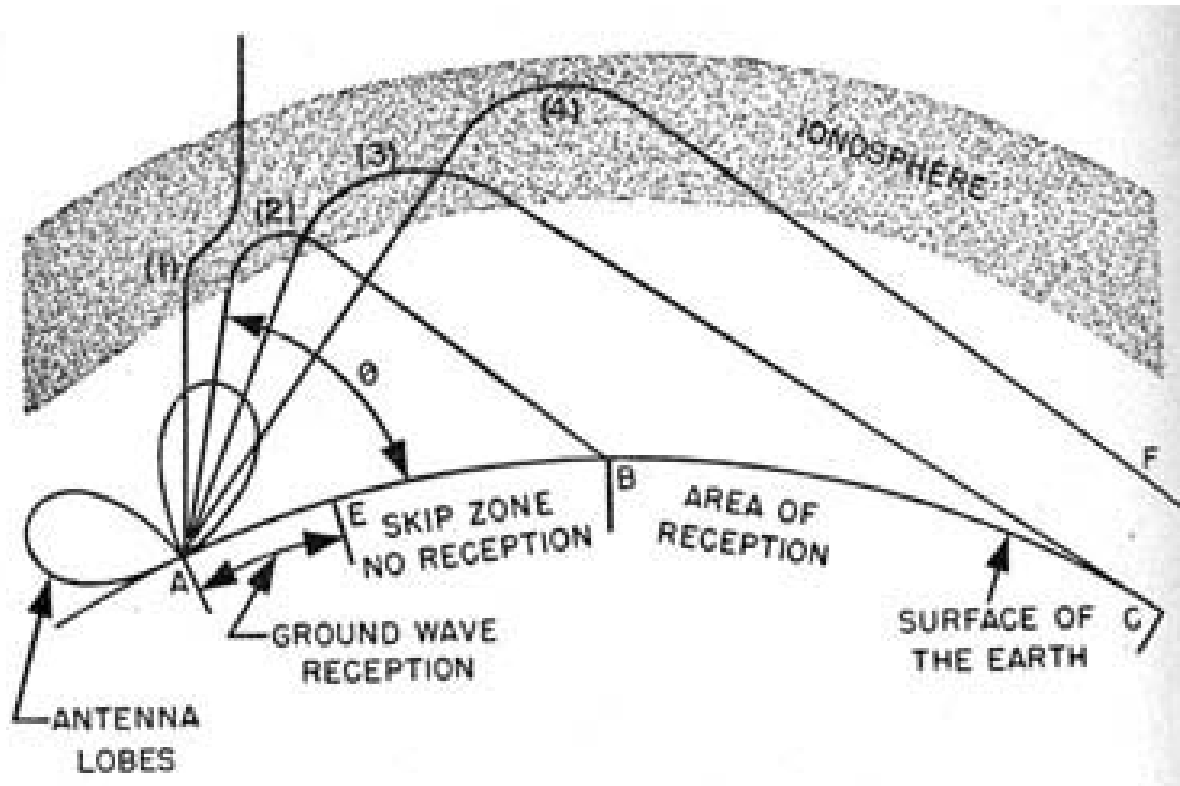
- Propagation assessment focuses heavily on SSB and AM voice modes as the benchmarks
- No reverse beacon reports were collected
- *The included HAP (Hourly Area Prediction) Charts are centered on Atlanta, GA. Users must adjust the patterns ~200 miles NW in order to obtain accuracy for Middle Tennessee locations. These charts illustrate the predicted SSB coverage between a base and a mobile station. Adjustments can also be made for mode or power by roughly extending the LUF by 2 MHz for each 10dB of signal enhancement.*
- *Propagation data (charts, broadcast reports and scheduled QSOs) was collected between June 3, 2017 and June 6, 2017 with updates June 4, 2018*
- *All other QSO data is from activity between June 6, 2017 and June 12, 2017*



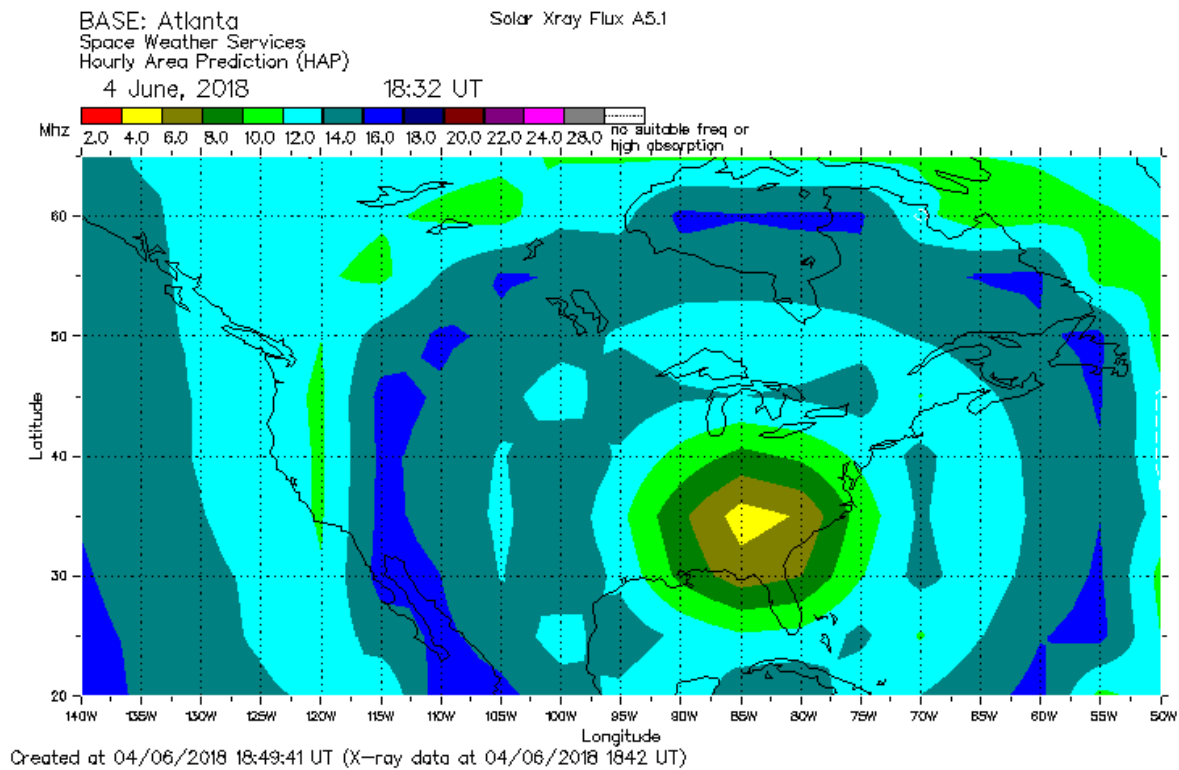
F2 Layer Critical Frequency ~6 MHz @ 1855 UTC



Coverage Distance Relative to Critical Frequency

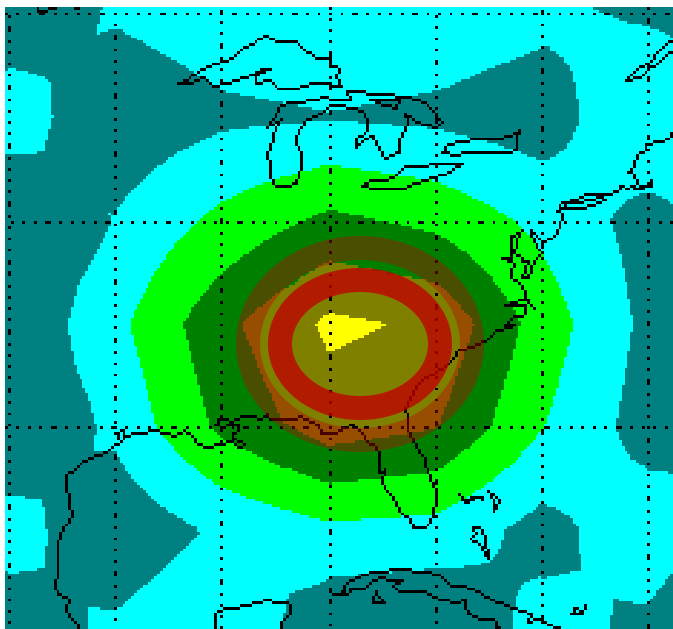


HAP Chart 1800 Z

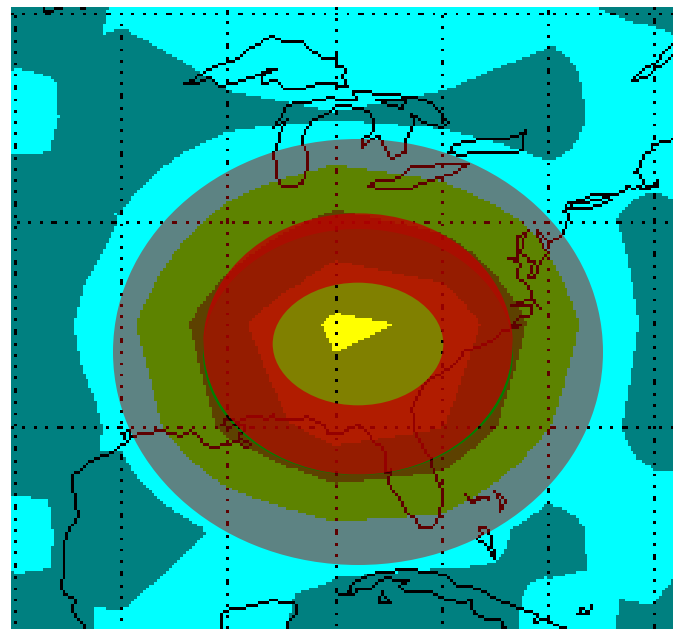


40M Coverage Patterns Relative to Mode

SSB



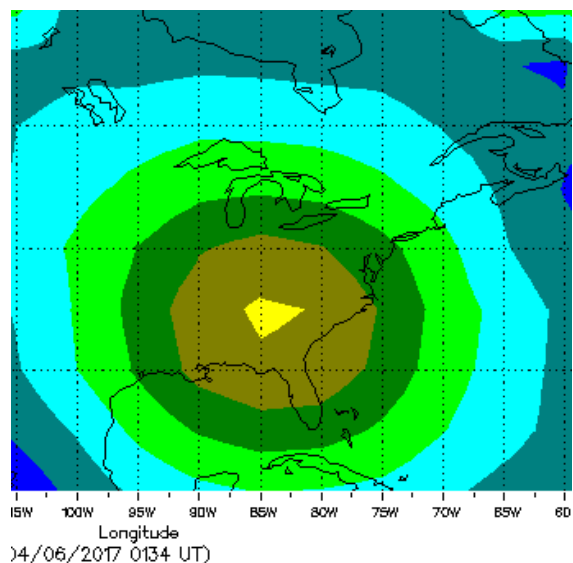
CW



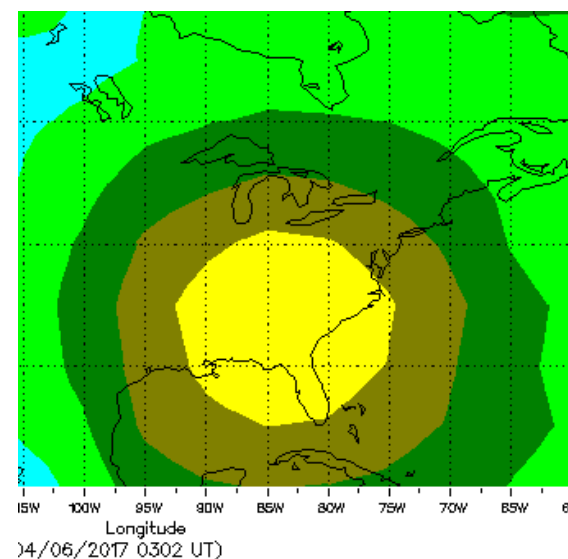
Important Conditions Change at Sunrise and Sunset

- ▶ Fantastic QSO rate potential is available when conditions change. Operators need to be very efficient.
- ▶ 40M SSB goes from a stable daytime range of 250-450 miles and stretches out to 800 miles, crossing extremely dense U.S. population areas.
- ▶ Pattern moves at 200+ miles per hour and provides "loiter" time of about 45 minutes over the target areas. Excellent SSB QSO conditions.
- ▶ CW and Digital modes have more extensive reach, but the condition changes at sunrise/set are just as important.

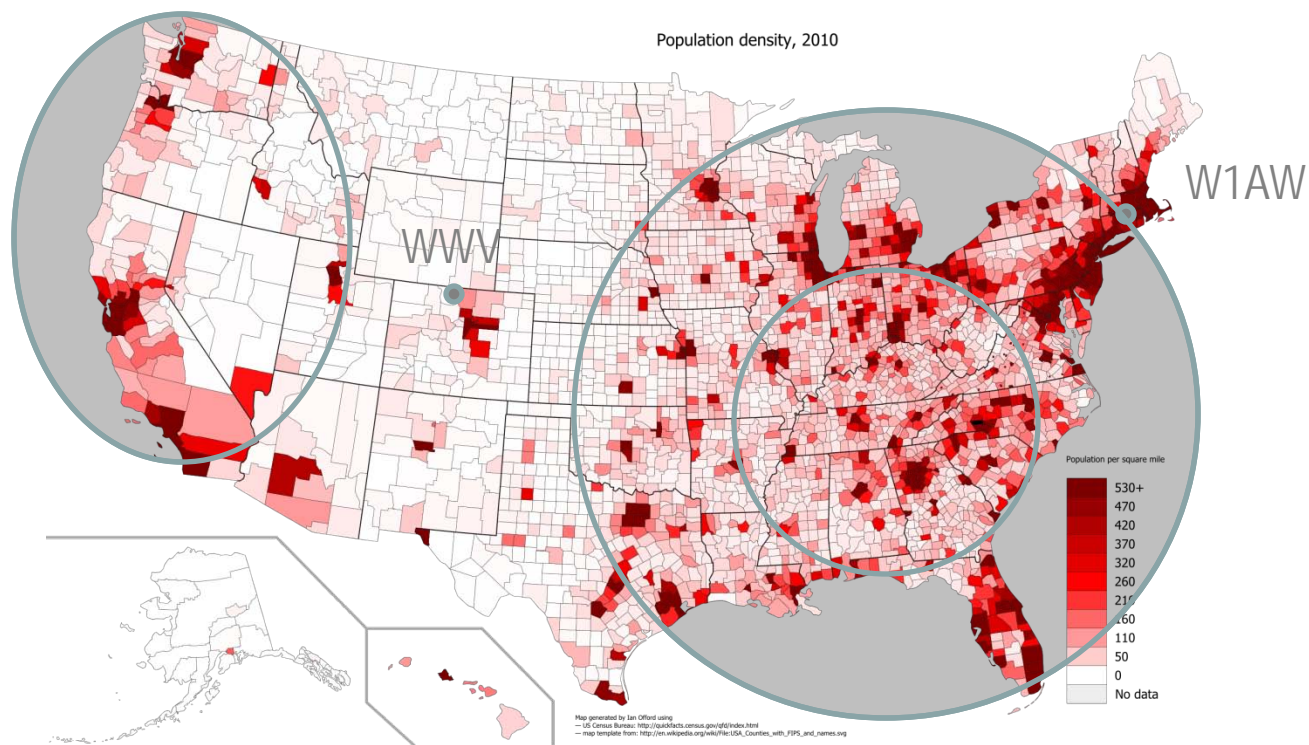
Stable Daytime Pattern



Stretches Out at Sunset



High Density QSO Opportunities via F2



W1AW (CW broadcast) Newington, CT (1,000 miles Northeast)

<u>UTC</u>	<u>1.8 MHz</u>	<u>3.5 MHz</u>	<u>7 MHz</u>	<u>14 MHz</u>	<u>18 MHz</u>	<u>21 MHz</u>	<u>28 MHz</u>
1335	-	-	-	Weak	Strong	-	-
2000	-	-	-	Strong	Strong	Strong	Weak
2100	-	-	-	Strong	Strong	-	-
0000	-	-	-	Strong	Strong	Strong	Weak
0055	-	-	-	Strong	Strong	Weak	Weak
0200	-	Strong	Strong	Strong	Weak	-	-
0300	Strong	Strong	Strong	Weak	Weak	-	-
0400	Strong	Strong	Weak	-	-	-	-



WWV (AM voice broadcast) Fort Collins, CO (1,000 miles West)

<u>UTC</u>	<u>2.5 MHz</u>	<u>5 MHz</u>	<u>10 MHz</u>	<u>15 MHz</u>	<u>20 MHz</u>
1900	-	-	CW	Strong	Weak
2043	-	-	CW	Strong	Weak
2200	-	-	Weak	Strong	Weak
2300	-	-	Weak	Strong	Strong
2349	-	CW	Weak	Strong	Weak
0026	-	Weak	Weak	Strong	CW
0046	-	Weak	Strong	Strong	CW
0118	-	Weak	Weak	Strong	Weak
0207	-	Strong	Strong	Strong	Weak
0248	-	Strong	Strong	Strong	Weak
0326	CW	Strong	Strong	Strong	Strong
0440	CW	Strong	Strong	Strong	Weak
1040	CW	Strong	CW	Weak	-
1200	-	Weak	Weak	Weak	-
1334	-	Weak	AM	Strong	Strong
1418	-	-	Weak	Strong	Weak
1531	-	-	CW	Strong	Weak
1636	-	-	CW	Weak	Weak
1704	-	-	CW	Strong	Strong



10M Beacons (28.190-28.300 MHz) via E Layer (gauge the high bands)

<u>UTC</u>	<u>BEACON(S)</u>
1423	N2PDX-NY, KA3JOE-PA, K5GJR-TX, N2MH-NJ
1535	AB8Z-OH, K5GJR-TX, K5AB-TX
1622	K5AB-TX, K5GJR-TX, KE5OXC-LA, NT4F-NC
1905	N2PD-NY, AA1TT-NH, KJ3P-PA, KG2GL-NJ, N2MH-NJ
2005	K5AB-TX, KG5BZI-TX
2116	WB5DXZ-OK
2300	nil



QSO Samples Document Expected Times for SSB QSO Targets

<u>UTC</u>	<u>BAND</u>	<u>MODE</u>	<u>QTH & RST</u>	<u>NOTES</u>
0115	40	SSB	Milwaukee, WI 54	
0130	40	SSB	Northern WI 53	
0135	40	SSB	Milwaukee, WI 57	
0143	40	SSB	Austin, TX 55	
0145	40	SSB	Branson, MO 57	QRP 55
0147	40	SSB	Rochester, NY 59	
0205	40	SSB	Woodstock, GA 57	mobile
0205	40	SSB	Milwaukee, WI 57	
0210	40	SSB	Dawson, GA 53	
0215	40	SSB	Ohio 59	
0245	40	SSB	Northern WI 57	
1643	10	SSB	Tampa, FL 59	
1649	10	SSB	Syracuse, NY 55	
			Southampton, NJ	
1655	10	SSB	52	
1659	10	SSB	Hoboken, NJ 59	
2237	40	CW	Ohio 589	mobile



Enhanced Operating Techniques aka "Contesting"

- ▶ Our WCARES members have been very successful with single operator QRP contest entries and have graciously made themselves available to share their operating strategies, mentality and other secrets to winning the air waves with only 5 watts of power.

Presenting today are:

Tim Kreth, AD4CJ

1st Place Delta Division

QRP CW Entry

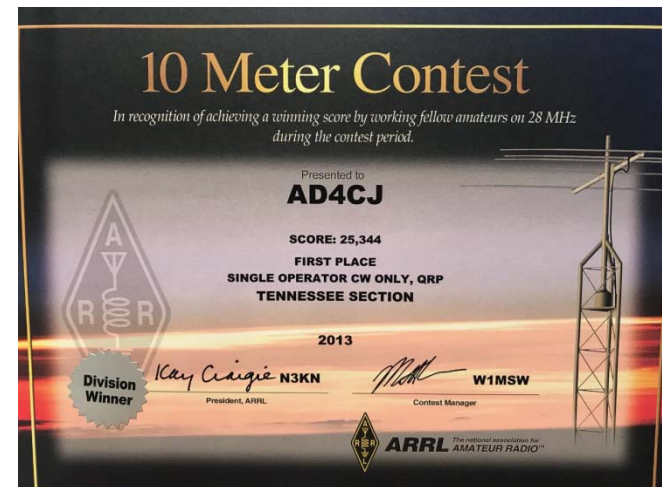
2013 ARRL 10 Meter Contest

Hunter Mills, K3IE

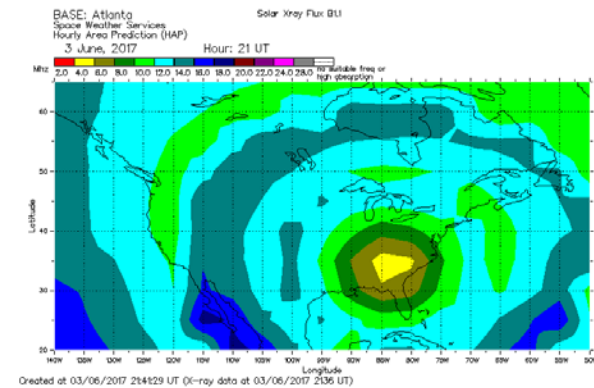
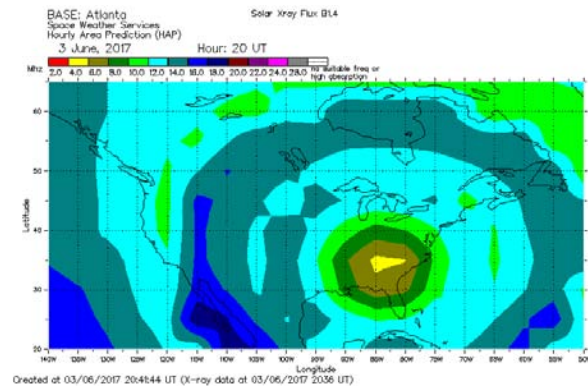
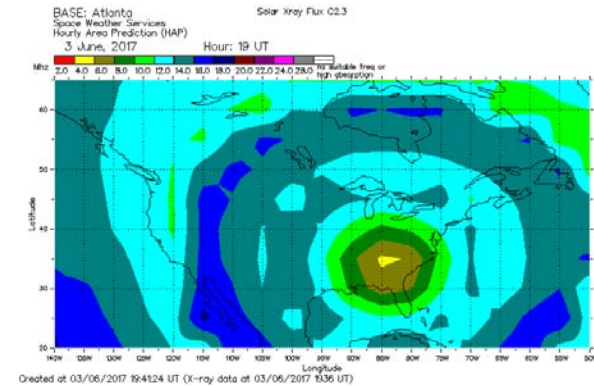
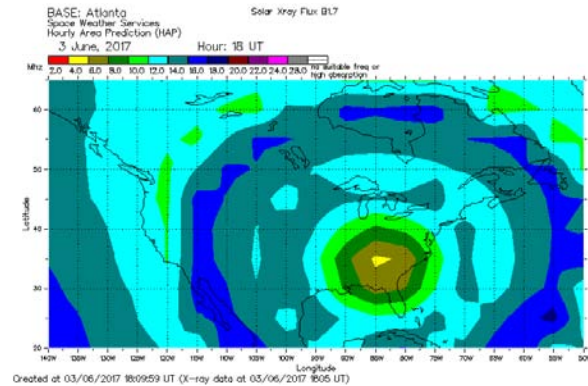
1st Place (In-State)

Mixed Mode QRP Entry

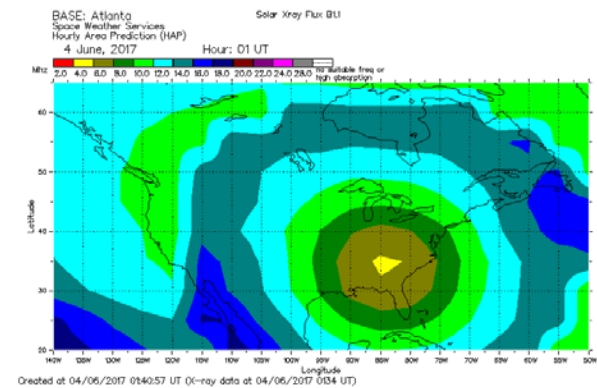
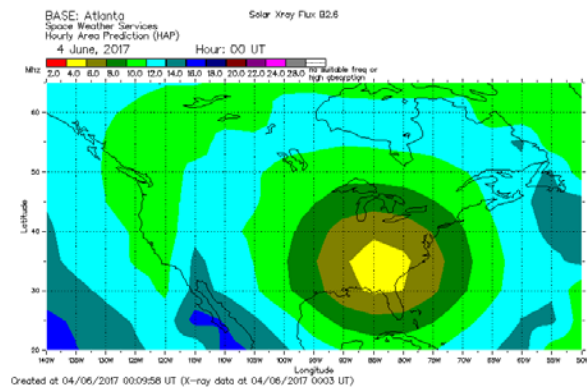
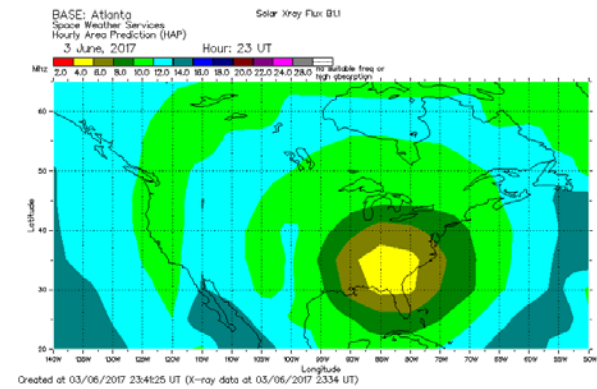
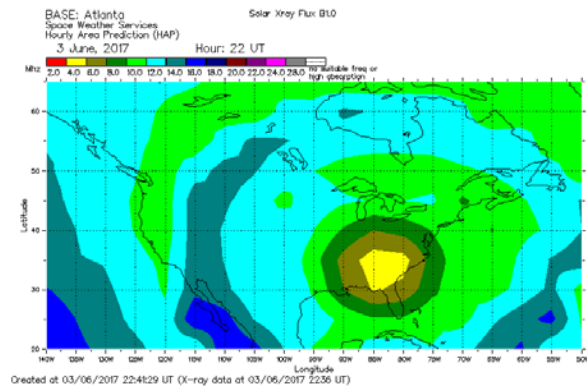
2017 Tennessee QSO Party



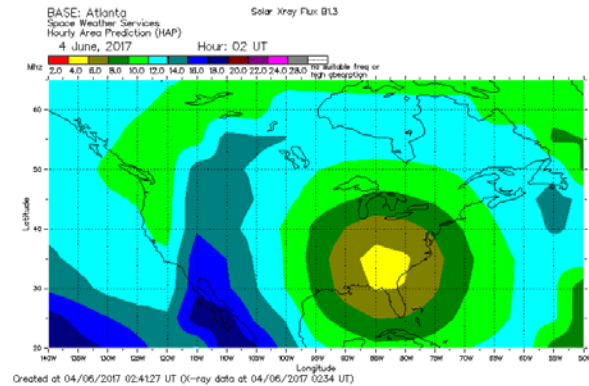
Appendix: HAP Charts 1800 – 2100 Z



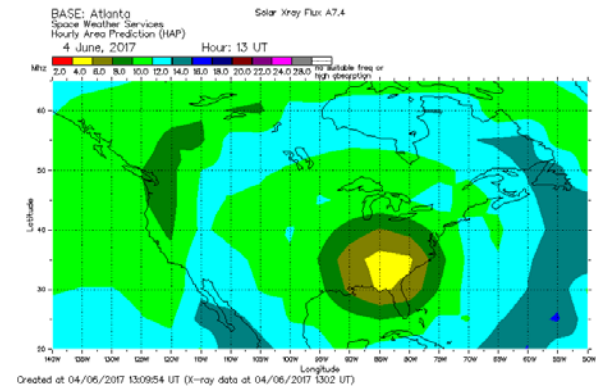
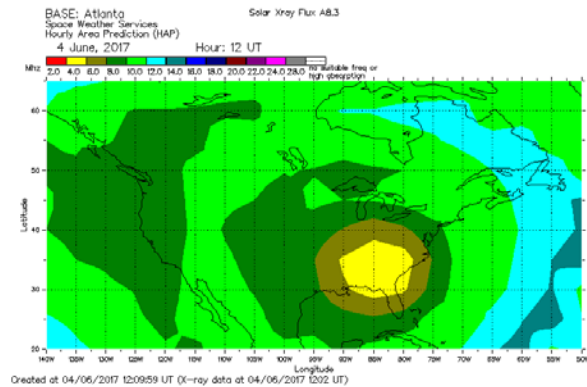
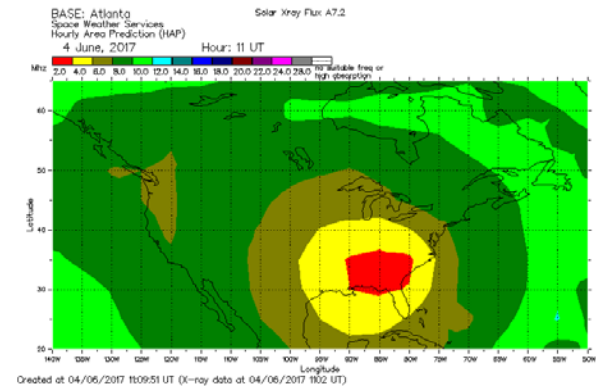
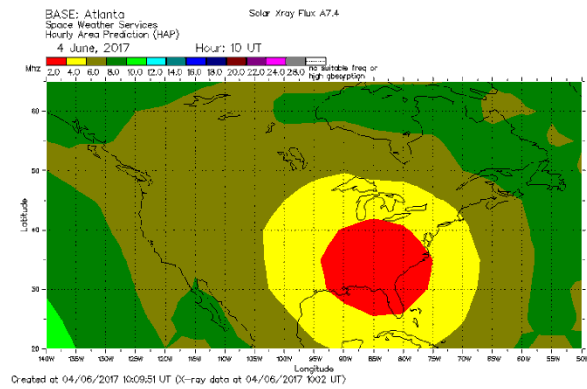
Appendix: HAP Charts 2200 – 0100 Z



Appendix: HAP Charts 0200 – 0400 Z



Appendix: HAP Charts 1000 – 1300 Z



Appendix: HAP Charts 1400 – 1700 Z

