



BUILDING & OPERATING A MOBILE HF STATION

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Tonight's Presentation

- Mobile HF Antennas
- Mobile HF Radios and Accessories
- Bonding, Choking and Noise Control
- Stage 1 – A Basic 100W Station
- Stage 2 – A Multi-band 100W Setup
- Stage 3 – Amplifiers, Top Band and Serious DX
- Operating and DX'ing from a Mobile HF Station



Mobile HF Antennas – Theory and Practice

■ Efficiency – the “3 R’s”

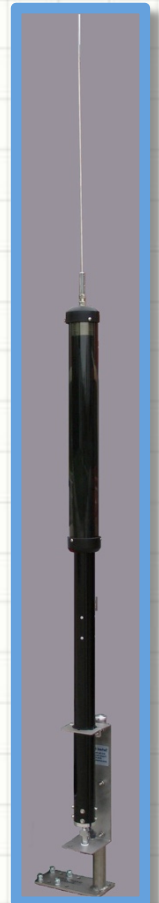
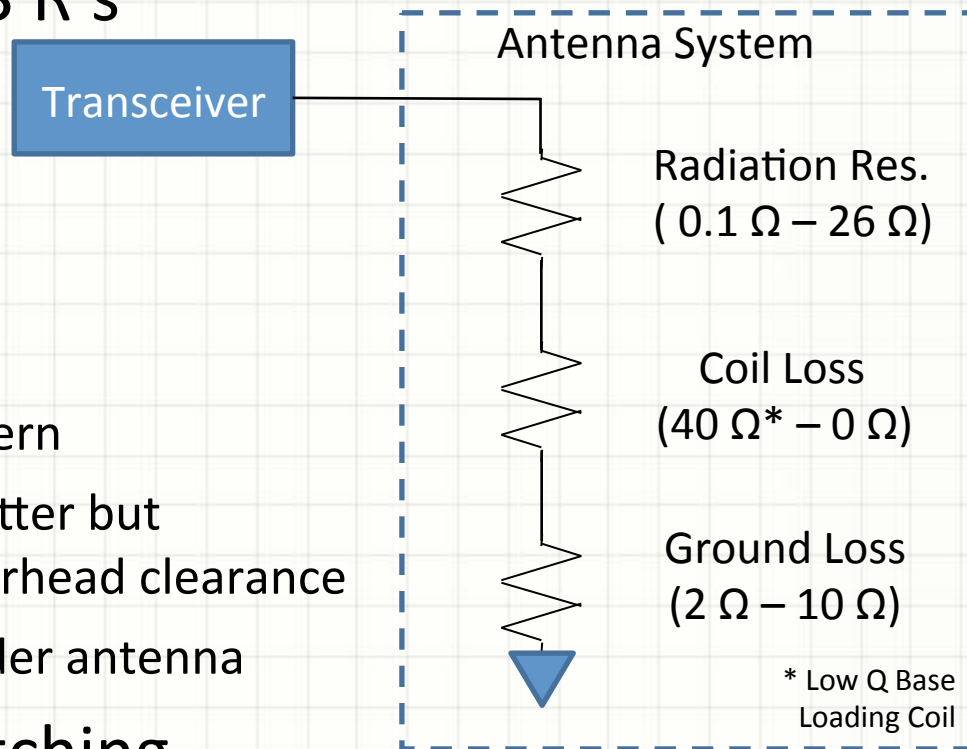
- High Q Coils
- Cap hats
- Vehicle size, and ...

■ Mounting

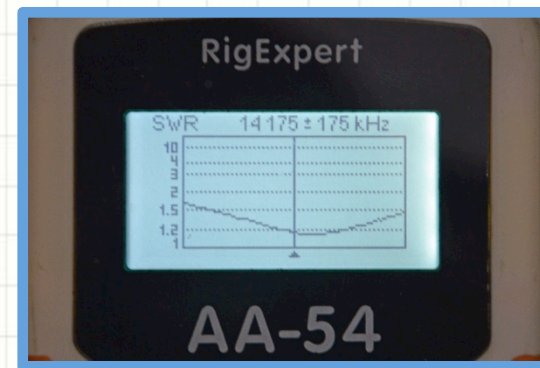
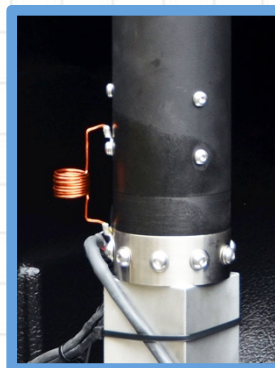
- Safety – the #1 concern
- Height – higher is better but consider trees & overhead clearance
- Location – metal under antenna

■ Bandwidth & Matching

- Important on 40m & lower bands
- Antenna BW limitations, adjustability
- Matching via shunt coils



Courtesy Tarheel Antennas



20m Hamstick
Typical SWR

Mobile HF Radios and Accessories

■ Transceivers

- 100W Typical
- Effective noise blanker, DSP noise reduction
- Display readability, control ergonomics (remote control head desirable)
- Safety (in-use, in case of crash)



■ Popular Choices

- Icom – IC-7000, IC-7100
- Kenwood – TS-480HX (200w)
- Yaesu – FT-897D



Courtesy Icom

DATE	FREQ	MODE	POWER	TIME	STATION	SENT	RECD	TIME OFF	OPN
11/25	14.385	SSB	80W	21:22	WD4MRT	S7	S7		Bob
"	"	"	"	21:23	K2SEA	S9	S7		" Mike - Dubs - Frank
"	"	"	"	21:26	WX86/M	S4	S7		"
"	7.157	"	"	21:38	M2400/P	S7	S6		"
"	7.128	"	"	21:04	H65EA	S6	S6		"
"	9.823	"	"	21:57	W4HFO	"	"		Choy - South Korea +
"	14.170	"	"	21:57	W4HFO	"	"		Green Mt. Mt - VT, Steve
"	21:203	"	"	21:57	W4HFO	"	"		Texas - Soccer Team
"	21:276	"	"	21:57	W4HFO	"	"		DX - Fleap
"	14.385	"	"	21:57	W4HFO	"	"		W4HFO
"	14.385	"	"	21:57	W4HFO	"	"		IL
"	14.385	"	"	21:57	W4HFO	"	"		IL - low noise cont. report
"	14.385	"	"	21:57	W4HFO	"	"		Mike 5500 Long
"	14.385	"	"	21:57	W4HFO	"	"		Steve
"	14.385	"	"	21:57	W4HFO	"	"		Steve - New South light
"	14.385	"	"	21:57	W4HFO	"	"		Robert
"	14.385	"	"	21:57	W4HFO	"	"		Bob, Mike
"	14.385	"	"	21:57	W4HFO	"	"		" - J. Campbell
"	14.385	"	"	21:57	W4HFO	"	"		Don
"	14.385	"	"	21:57	W4HFO	"	"		Mike - Mike's sta. Field - Mike's signal
"	14.385	"	"	21:57	W4HFO	"	"		Steve
"	14.385	"	"	21:57	W4HFO	"	"		Mike - Mike's sta. - Sheldon
"	14.385	"	"	21:57	W4HFO	"	"		Mike - Mike's sta. - Sheldon
"	14.385	"	"	21:57	W4HFO	"	"		Mike - Mike's sta. - Sheldon

■ Accessories

- Connection to audio system or external speaker
- Voice recorder – key safety item
- Microphone upgrades
- Screwdriver antenna controller
- Voltage monitor



Noise Control, Bonding & Choking

- Noise Control

- #1 item that makes or breaks the installation
- Noise from motor electronic (Coil on plug, injectors, alternator)
- Exhaust bonding
- Engine grounding

- Body Section Bonding

- Antenna mounting surface
- Flat surfaces
- Vertical surfaces (ex. doors, especially on older vehicles)

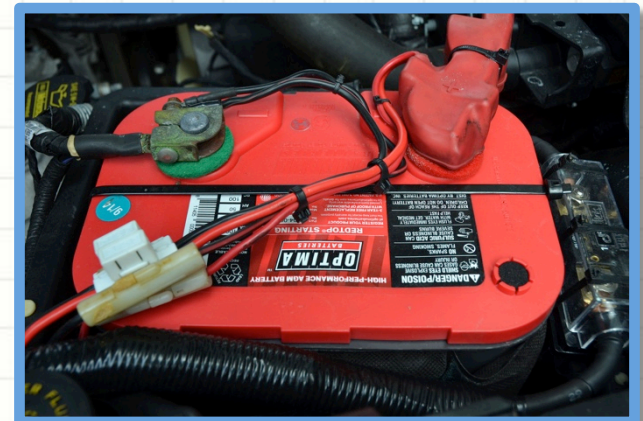
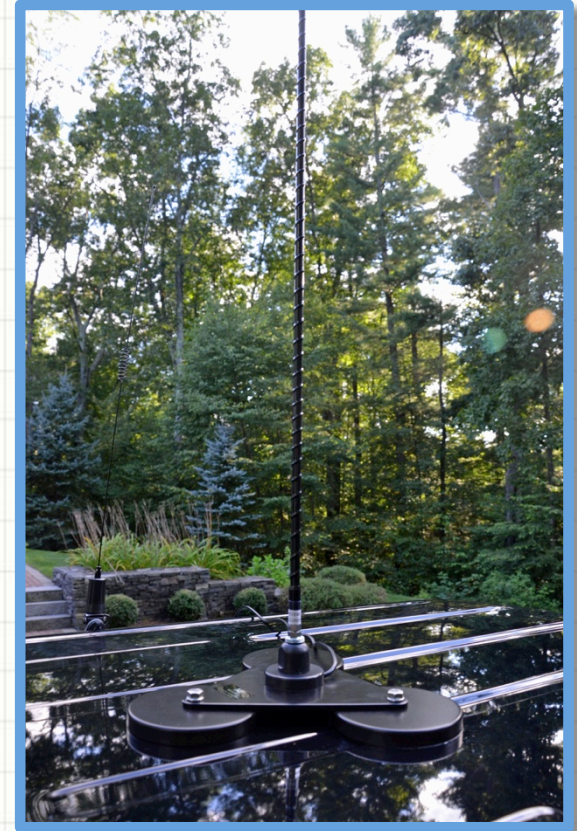
- Coax and Control Lead Choking

- Keep RF out of the vehicle
- Feedline and control leads (screwdriver antenna)
- Two places – at the antenna and again at interior penetration point (inside)
- DON'T stagger chokes



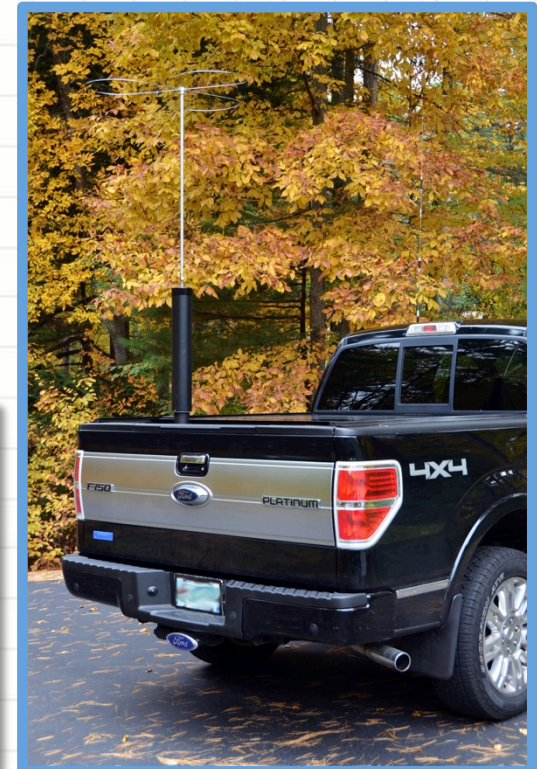
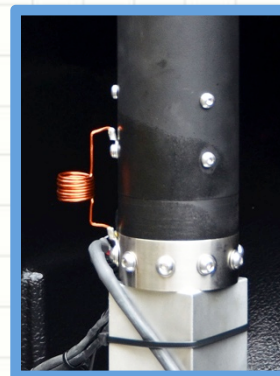
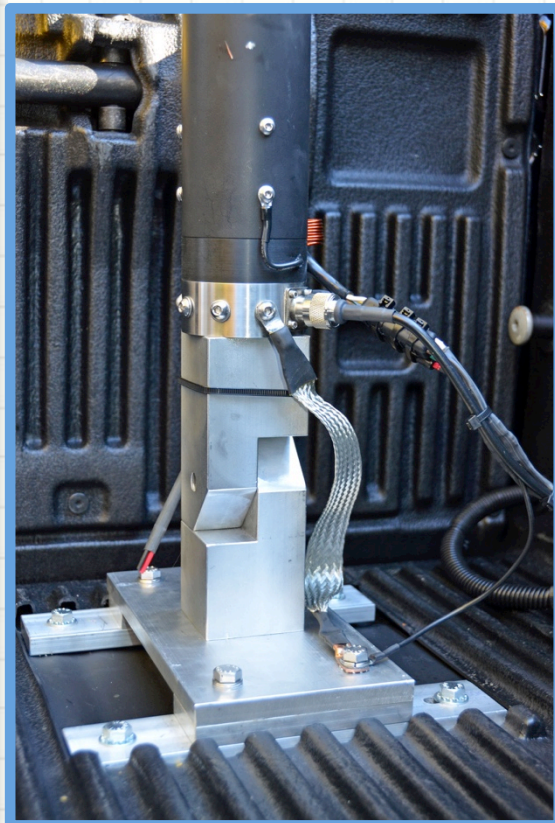
Mobile HF - Building In Stages

- Stage 1 – Basic Mobile HF (20m – 10m)
 - 100W HF Transceiver
 - QRV 20m – 10m
 - US contacts and decent DX (Europe, Caribbean)
 - Simple, inexpensive antennas (ex Hamsticks), one band (20m – 10m) at a time
 - Offset antenna towards driver's side of vehicle
 - Direct battery connection (power and ground), proper fusing and protection of power leads
 - Safety inside and outside the vehicle
 - Focus on noise control and bonding



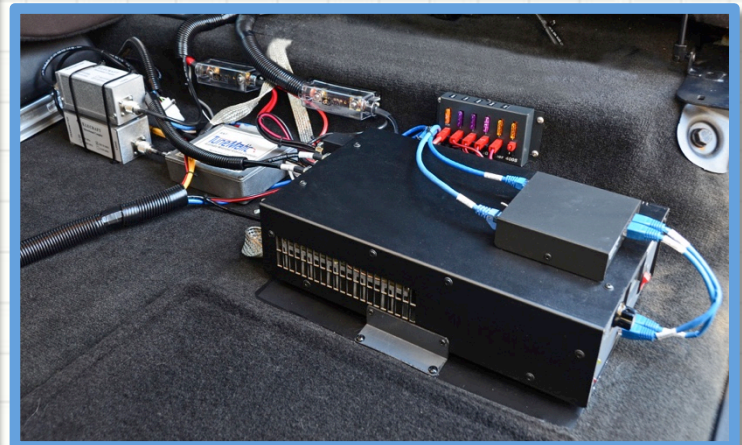
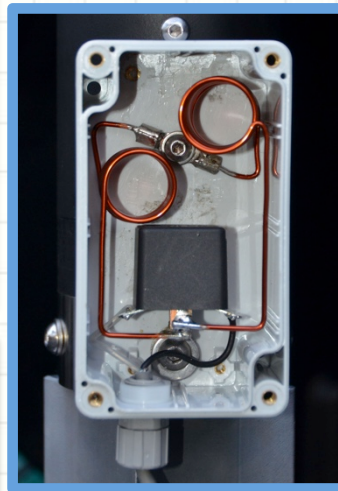
Mobile HF - Building In Stages

- Stage 2 – Multi-band Mobile HF (QRV 80m – 10m)
 - Add screwdriver antenna & possibly a cap hat
 - Improved DX, easy to change bands
 - Screwdriver antenna controller a wise investment
 - Careful attention to solid mounting for safety and reliability (inspect components regularly)
 - Proper matching on 40m and 80m



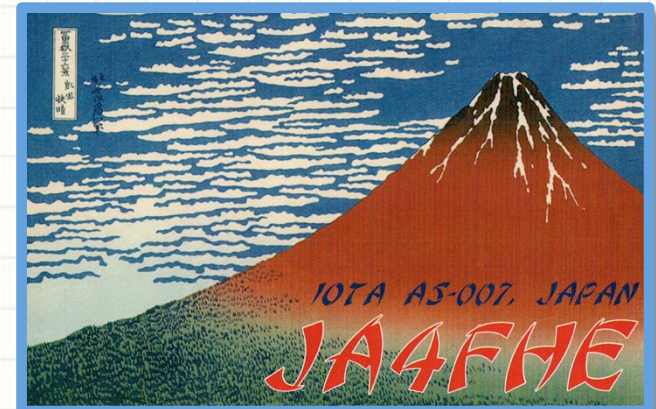
Mobile HF - Building In Stages

- Stage 3 – Amplifiers, Top Band Setup
 - “500W” Mobile Amplifier
 - Antenna System for 160m (additional loading, switchable matching network, cap hat becomes essential)
 - Serious Low-Band operation and “Work the World” DX
 - Heavy duty power system (100A+, 13.8V supply)
 - H-D alternator, secondary battery, proper fusing & cabling
 - Careful attention to electrical safety issues
 - Wattmeter, amp bypass & automatic band switching



Mobile Operating & DX'ing

- Safety First
 - Keep eyes on road, hands on wheel
 - Automated controls and a voice recorder help
 - Logging via a paper log or a partner with a laptop
- Working a DXCC Mobile HF is possible from New England
- Operating tips
 - Know areas where best propagation and fades lie along your route
 - Utilize local hilltops, quiet spots, good grounds areas for that rare DX
 - Speak slowly and clearly, don't use the speech compressor
 - Pileup timing, use "stroke mobile" when calling
 - Safely pull over when you need to focus on an important contact
 - Try calling CQ, you will be surprised
 - County activations, operation in contests, busting pileups, ...



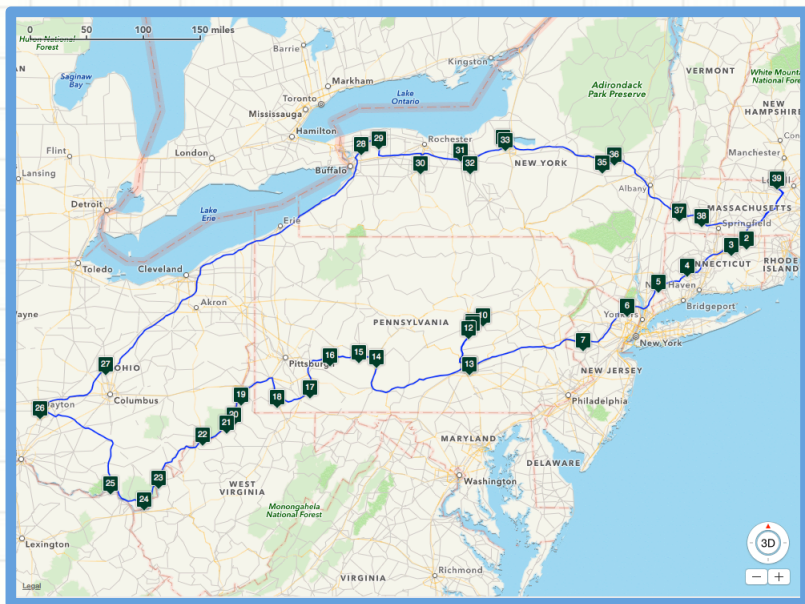
75m SSB from Japan with AB10C/M



40m SSB - Ulleung Island, South Korea with AB10C/M



Mobile HF - County Hunters Tour



- CQ's US-CA Award for confirming 3,077 U.S. Counties (500 Counties reqd. for base award)
- Mobile HF Operators activate most needed counties on trips
- Anita and I will be operating as N1FD/M on our trip to the 2015 Dayton Hamvention (May 10th – 18th). Plan to activate 86 counties
 - See stationproject.wordpress.com for more information and frequencies
- Also operating an APRS Station – track us using AB1QB-15 on aprs.fi
- iPhone Apps used to determine County, Grid Square and position on APRS in real-time
- DXLab Suite running on a PC connected to our transceiver for logging and real-time uploads to ClubLog



Equipment, Info. & Resources



Type	Elements	Link
Antennas	Scorpion SA-680 and Accessories Tarheel Antennas MFJ Hamsticks and Mounts	www.scorpionantennas.com www.tarheelantennas.com/mobile_antennas www.mfjenterprises.com
Antenna Mounts	Breedlove Antenna Mounts	breedlovemounts.com
Screwdriver Antenna Controller	TuneMatic Antenna Controller	www.tunematic.us
Mobile HF Radios	Icom IC-7000, IC-7100 Yaesu FT-897D, FT-992 Kenwood TS-480HX	www.icomamerica.com/en/amateur/ www.yaesu.com www.kenwoodusa.com
Microphone Upgrades	AB5N Microphone Upgrades	www.7000mic.com
Mobile HF Amplifier	Ameritron ALS-500M and Accessories	www.ameritron.com
Wattmeter	Elecraft W2 Wattmeter	www.elecraft.com/W2/W2.htm
Bonding and Choking	DX Engineering Ultrabond bonding strap material	www.dxengineering.com www.electricmotioncompany.com
Good Sources for Mobile HF Information	Alan Applegate's Mobile Amateur Radio Website ARRL Antenna Book, Chapter 21	k0bg.com www.arrl.org/arrl-antenna-book

Thank You!

