WHERE DO I GO FROM HERE?
Radios, Antennas, Accessories, Personal Items, & More
But First ...

Do we need to backup a little?
The Beginners Track

• Getting your first radio
• I have my radio, how do I turn it on?
• Safety for Beginners
• But I’m afraid to talk into the microphone
• This is fun, What’s Next?
• I Get it Now! Where do I Go From Here?
Some Broad Radio Categories

• Handheld
  – Small, portable, light weight
  – Easily transported
  – Use much less power (battery)

• Mobile
  – Much higher transmit power
  – Better audio (volume & quality)
  – Easier to use controls and displays

• Amateur
  – Field programmable – frequency, tone, power
  – Very wide receive capability ("DC to daylight")
  – Multi-band capability
  – Only legal on amateur frequencies

• Commercial
  – Less susceptible to intermod
  – Better selectivity, less sensitive to de-sense
  – Some are much more rugged
  – Legal on business, public safety, and amateur
DE-SENSE

When a nearby powerful transmitter totally overwhelms your receiver.

For example, you are parked beside another vehicle, you both have mobile ham radios and are both tuned to the same repeater. The person in the other car is talking on the repeater, but you can’t hear him on your radio.

Or, two of you are sitting at the same table with handheld radios, same situation. The other person is transmitting, talking on the repeater and you can’t hear him on your radio.
SOLVING DE-SENSE

• USE LOWEST POWER POSSIBLE (ALWAYS)

• ANTENNA SEPARATION
  – Free space attenuation is about 6db (or about 75%) every time you double the distance between antennas.
  – 10 feet of vertical separation is equal to 40 feet of horizontal separation. At 150 MHz that provides about 35 db of isolation.

• WIDER FREQUENCY SEPARATION
BUT WE’RE ON DIFFERENT BANDS

• Amateur UHF (70 cm) is roughly the third harmonic of Amateur VHF (2 meter).
  \[ 147.80 \times 3 = 443.40 \]

• Intermod products are very complex calculations. For example, if we have 146.36, 448.55 and 467.55 all transmitting at the same time, there are 72 3\text{rd}, 5\text{th}, 7\text{th} and 9\text{th} order harmonics ranging from 70 MHz to 1.7 GHz

Again, lowest possible transmit power and maximum possible antenna separation are your solutions.
A QUICK LOOK AT (DC) POWER
Battery Power Consumption

• Wouxun Handheld
  – On, idle 0.02 amp
  – RX low volume 0.09 amp
  – RX high volume 0.20 amp
  – TX low power 0.55 amp
  – TX high power 1.50 amp

• Kenwood TM-V71A Mobile
  – Off 0.02 amp
  – On, idle 0.58 amp
  – RX low volume 0.60 amp
  – RX high volume 0.70 amp
  – TX low power 2.75 amp
  – TX high power 7.40 amp
BATTERY CAPACITY

• Rated in Amp Hours (or milli-amp hours)
  – Can’t totally deplete – figure 60% of rated capacity
  – If draw down faster than rating plan, figure 90% of the previously calculated 60%.

  – Example: a 7.5 amp hour gell cell
    • 60% = 4.5 amp hour and 90% of that = 4.05 amp hour
  – Example: an 80 amp hour car battery
    • 60% = 48 amp hour and 90% of that = 43 amp hour

(A quick & conservative estimate is 50% of rated capacity)
HOW LONG WILL MY RADIO RUN?

Assume higher than normal radio traffic – let’s use 65% receive, 10% transmit and 25% idle (most HT batteries are rated at 5%, 5% and 90%)

<table>
<thead>
<tr>
<th>Battery Size</th>
<th>V71 hi (mAh)</th>
<th>V71 low (Hrs)</th>
<th>Wouxun (Hrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1700</td>
<td>2.5 Hrs</td>
<td>4.8 Hrs</td>
<td>16 Hrs</td>
</tr>
<tr>
<td>7.5 Ah</td>
<td>27.2 Hrs</td>
<td>51.3 Hrs</td>
<td>171 Hrs</td>
</tr>
</tbody>
</table>

So the HT will run approximately 3 times longer than the mobile radio on the same sized battery given the same transmit power & usage pattern.

10% transmit is only 6 minutes per hour! And in an emergency situation, it is not realistic to expect even 25% idle time.
BATTERY CAPACITY IN PRACTICE

The graph illustrates the relationship between percent of full capacity and temperature for different discharge rates:
- **Slower discharge** (green line)
- **Moderate discharge** (blue line)
- **Fast discharge** (red line)

The graph shows that the percent of full capacity increases as the temperature increases, with slower discharge rates having a higher percent of capacity at any given temperature compared to faster discharge rates.
Sources of Emergency Power

- STORAGE BATTERY
- GENERATOR
- SOLAR
- HUMAN GENERATED
- MOTOR VEHICLE
CONNECTIONS THAT WORK TOGETHER
THE ANDERSON POWER POLE

ADVANTAGES
• Has become an Amateur EMCOMM standard
• Can be plugged and unplugged countless times
• Polarity easy to see and maintain
• Little danger of short in a dry environment

DISADVANTAGES
• Requires specialized crimpers and parts
• Crimping technique requires some training or practice
• Supplies not readily available locally
• Connection does not positively lock
• Connection not waterproof
Radio Summary

• Many variables, pick based on your specific needs for your specific situation (mobile, handheld, etc.)

• Environmental considerations – some radios are rated for wet/moist environments.

• Accessories – external power, external antenna adapter, spare battery, manual for the radio.
IT’S ALL ABOUT THE ANTENNA
IT’S ALL ABOUT THE ANTENNA
BASIC ANTENNA RULES

1. Use the best antenna possible
2. Get it as high as possible
3. Keep it away from other antennas
4. Remember RF exposure safety requirements.
5. Have the proper adapters/connectors.

Beams can help, especially when receiving and for reducing multipath.

Speaker-microphones and the Statue of Liberty
Safety and Security

TRAINING or DISASTER
New or Rarely Practiced Activities
New or Rarely Visited Locations
May be Hazardous Locations
Likely to be Unsecured Locations

DISASTER
Likely to be Hazardous Locations
Panicked People and General Disorder

Can You Deploy? – personal safety, family, property
Keep Yourself Safe – don’t become a casualty and a liability
Think About What You Do – Is it Safe?
Ask For Help – If you have any doubt, ask for advice or assistance
Pay Attention to What Others Do – Is it Safe? Speak Up
Heed Warnings from Others – Stop, Listen, Adjust

JUST A FEW THINGS TO CONSIDER:
Cold/Wind/Rain – Hypothermia
Sun/Heat – Heat Exhaustion
Dehydration
Cuts, Scrapes, Bumps, etc
Head and Eye Injuries
Guy Wires and Stakes – Tripping
Free Standing Antenna Masts – Injury from falling mast
Preparing for radio operations
Recommended radio supplies from the ARES Field Manual:

➢ Toolbox
➢ Electrical and duct tape
➢ Soldering iron and solder
➢ Safety glasses
➢ VOM
➢ Additional radios
➢ Digital gear
➢ Microphones
➢ Headphones
➢ Power supplies, chargers
➢ RF Connectors
➢ Antennas with mounts
➢ Patch cords
➢ SWR bridge
➢ Extra coax
➢ Extra batteries
Personal preparation

Be prepared to live off your own resources, carried in your “go kit,” for the duration of the deployment. This includes food, water, replacement clothing, medical supplies, and so on.
Personal preparation
Recommended personal supplies for a 72 hour go kit from the ARES Field Manual:

- Snacks
- Liquid refreshments
- Throat lozenges
- Aspirin
- Prescriptions
- Toilet articles
- First aid kit
- Message forms
- Log books
- Shelter (tent and sleeping bag)

- 3 day change of clothes
- Foul weather gear
- 3 day supply of water and food
- Portable stove; mess kit with cleaning kit
- Flashlight
- Batteries
- Candles
- Water proof matches
- Alarm clock
For More Information

WWW.N7KUW.COM/CommAcad/
Copy of this presentation

Email me: Carl@n7kuw.com