Preparing your Station for Competition

Competitive success often depends more on what you've done before the contest than on what you do during the contest

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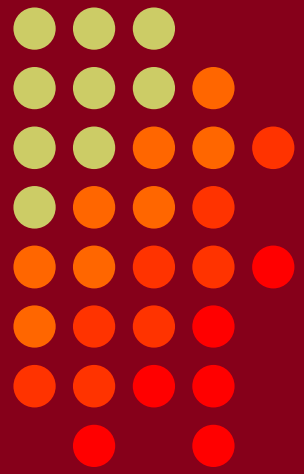

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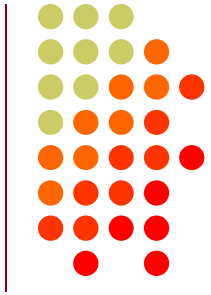
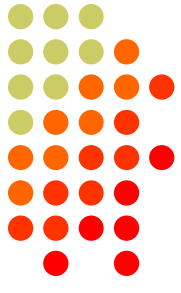
Necessary First Steps in Identifying Candidate Station Improvements



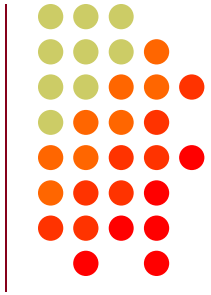
- Identify realistic time phased personal contest goals for selected contests, entry categories and competition region
  - first place winner, or
  - consistently placing in the top three, or
  - consistently placing in the top ten, or
  - successfully competing with selected peers
- Identify the realistic constraints that limit your station improvements
  - desired time frame for achieving your contest goals
  - amount of your available time to implement station improvements
  - available physical space for more antennas and station equipment
  - annual funds available to support your station improvements
- Achieve a balance between your goals and constraints

Well Before the Contest Evaluate Your Station's Strengths and Weaknesses Compared to Your Peer Competitors



- Identify your station's strengths and weaknesses -- including reliability -- relative to your peer competitors
  - transmitting and receiving antennas, feedlines and antenna switching
  - transceiver performance – focusing on receiver performance
  - amplifier output power and reliability
  - audio and CW keying quality
  - computers, software and their internal and external networks
  - all aspects of your station environment that limit operator performance
  - external and inter-station RFI problems
- Identify opportunities to improve your station's weaknesses and reliability relative to your peer competitors
  - in every category above
  - prioritize your total list of improvement opportunities

During and After Every Contest Prepare Notes Documenting Your Station's Strengths and Weaknesses Compared to Your Peer Competitors

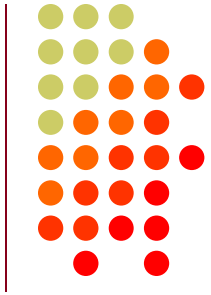


- Identify every aspect of your station's performance that was strongly competitive compared to your peer competitors
- Identify every aspect your station's performance that was not competitive compared to your peer competitors
- Identify improvements that your peer competitors can't match
- Identify every opportunity for station improvement that could have improved your score in this contest, in priority order by:
  - estimated score improvement resulting from each improvement
  - degree of difficulty in achieving each improvement
  - practicality of achieving each improvement
  - impediments to achieving each improvement
  - expense to achieve each improvement

Tower Inspections and Maintenance Will Help You Avoid Mid-Winter Failures and Reliability Problems During Your Next Contest

- Measure all guy wire tensions (7 to 15% of breaking strength)
- Inspect guy wires, guy hardware and guy anchors for damage
- Inspect tower plumb and twist
- Inspect the tower base for standing water and
  - corrosion, settling and cracks at the tower-to-concrete interface
  - regularly remove all debris from tower bases to avoid corrosion
- Inspect rotator performance and play
- Inspect the tower for wind damage
- Pay special attention to damaged, loose, missing or corroded:
  - diagonal and horizontal trusses, welds and hardware
  - especially adjacent to guy attachments

Antenna Inspections and Maintenance Will Help You Avoid Mid-Winter Failures and Reliability Problems During Your Next Contest



- Inspect coax cable for cuts, cracks, damage and moisture intrusion
  - cuts, chaffing and wear rotator loops
  - Water intrusion at electrical and physical attachments to antennas
- Compare coaxial cable losses to prior measurements
- Compare antenna VSWRs to prior measurements
- Inspect connector water proofing and PL-259 tightness
- Inspect for rope wear - replace rope before it fails
- Inspect antenna wire for wear and connections to feed lines
- Repair or replace unreliable, failing or overloaded rotators
- Inspect antennas and coaxial cables for lightning damage
- Inspect antennas, feed lines and rotators for wind damage

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Annual inspections are essential to antenna, rotator and coax cable reliability and performance

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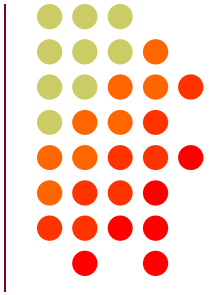
Improving the Competitive Performance of Coaxial Cables for Multi-tower Stations



- Coaxial cables longer than 300 feet are often used in multi-tower stations
- Andrew Heliax is an ideal choice for lengths up to:
  - 10 meters: 600 feet of LDF5-50A or 300 feet of LDF4-50A
  - 15 meters: 700 feet of LDF5-50A or 350 feet of LDF4-50A
  - 20 meters: 900 feet of LDF5-50A or 450 feet of LDF4-50A
  - 40 meters: 1200 feet of LDF5-50A or 600 feet of LDF4-50A
- Be cautious of the windload and weight (including ice load) of large Heliax cables mounted on light duty towers

Improving the Reliability of Coaxial Cable Connectors

- N and UHF connectors are the most common choices
- No significant loss in either N and UHF connectors at HF
- No significant difference in the VSWR of N and UHF connectors at HF
- High quality silver plated UHF connectors provide much more center pin mating force than N connectors
  - eliminates cross-station interference and connector failures from potentially unreliable N connector center pin mating force
  - avoid saving a few dollars on cheap unbranded hamfest connectors
- Avoid use of adapters, but if necessary be sure they are name-brand silver plated adapters, not nickel plated
- Always use a wrench to tighten UHF connectors 1/4 turn
- Inspect SO-239 connectors for center pin mating pressure

Coaxial Cable
Amphenol 83-1SP PL-259 Connector

Shell labeled exactly:
Amphenol 83-1SP

Silver Plated
Center Pin

Silver Plated
Body

DX Engineering, Mouser Electronics and RF Connection

This is not the place to save money

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Coaxial Cable Connector Waterproofing

Cover the connectors with two 50% overlapped layers of Scotch 130C stretched to 50% of its original width, sticky side facing out

Cover the Scotch 130C with two 50% overlapped layers of Scotch 33+ or Scotch 88

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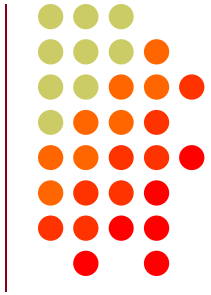
Indoor Station Performance and Reliability Improvements

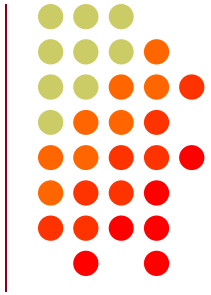
- Transceiver performance (sensitivity, dynamic range, filters)
- Amplifier output power and reliability
- Wattmeters
- Physical environment that degrades operator performance
  - noise, chair, ventilation, desk height, equipment placement, line of sight
- Keyers and paddles
- Microphones
- Computer keyboards
- Computer monitors
- Computers
- Antenna switching
- DX spotting network displays and alarms
- Propagation map displays from the Reverse Beacon Network
- Connector reliability, PL-259s tightly connected, SO-239 wear

Execute Your Proof of Performance Checklist Before Every Contest



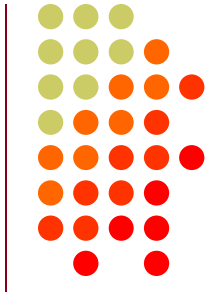
- Prove that everything in your station is in working properly
  - improve and update your checklist regularly
  - record all performance measurements
- Never enter a competition with unproven equipment
- Prove that all indoor and outdoor equipment is working far enough in advance so you can make necessary repairs

Single Operator (non SO2R) Station Improvement Ideas



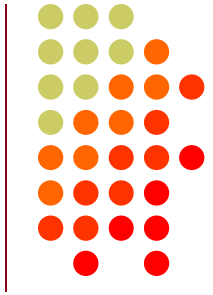
- Antenna improvements are almost always more effective and less expensive than any other station improvement and they improve both transmitting and receiving performance
- Receiving antennas make a big improvement on 160 and 80 meters
- Identify and mitigate RFI sources well before the contest
- Many modern transceivers have much improved receiver dynamic range and filter selectivity
  - know how to adjust your receiver for optimum dynamic range
  - test your receiver's sensitivity every time you sit in front of it
- A wattmeter allows you to monitor transmitter and antenna performance during the contest

Single Tower
Antenna Improvement Ideas



- 50-60 foot tower and a small rotator (e.g., HyGain Ham-IV)
  - small tribander, Hex-beam or quad
  - 40 and 80 meter dipoles and a 160 meter inverted-L
- 70-80 foot tower and a medium rotator (e.g. HyGain T2X)
  - Cushcraft XM-240 two element 40 meter Yagi
  - large tribander such as the SteppIR 4 element Yagi
  - 80 meter dipole and a 160 meter inverted-L
- 100-140 foot tower and a large rotator (e.g., M2 Orion)
  - Cushcraft XM-240 two element 40 meter Yagi
  - monoband Yagis such as the HyGain LJ series on ring rotators
  - 80 meter dipole and a 160 meter inverted-L

SO2R Station Improvement Ideas in Addition to Single Op Improvements



- Receiving bandpass filters are almost always necessary to protect transceivers from cross-band interference and physical damage
- Low power bandpass filters may be needed on transceiver outputs if your transceiver radiates broadband phase noise (many do)
- Stubs may be necessary on amplifier outputs if multiple antennas are in close proximity
- Multiband antennas can cause excessive cross-band interference
- Most operators find it more effective to use multiple computers and keyboards
- Identify and resolve all cross-band interference
  intermodulation caused by transmitted signals entering unprotected consumer electronic devices often re-radiate strong harmonics mixed with AC power or computer network signals creating broadband noise modulated sidebands on the transmitter harmonic