ALLSTAR AND YAESU WIRES-X ON THE BARC REPEATERS

DARA MEMBERSHIP MEETING

MARCH 6, 2026

JOHN WESTERKAMP, W8LRJ

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- Always interested in radio and have always been a SWL
- Extra Class Operator and DARA Member since April 2018
- Hamvention Media Volunteer and VE
- Manage the BARC and District 3 ARES repeaters and networks

- Bachelor of Electrical Engineering from University of Dayton
- Ph.D. in Electrical Engineering from Purdue University
- Specialized in Digital Signal Processing/Communications
- Electrical Engineering Faculty at U.D. for 17 years
- Computers and Networking for 10 years
- Retired and enjoying a great hobby

- **LRJ stands for Lori, Rachel, and Jacob (wife and two kids)**
- Nephew is Jordan Westerkamp, football player University of Nebraska

BELLBROOK AMATEUR RADIO CLUB (BARC)

BARC 147.045 Repeater
(+ offset, 118.8 Hz tone, analog only)
BridgeCom BCR-50 VHF

Connects analog voice repeaters over the Internet

AllStar Link

BARC 443.675 Repeater
(+ offset, 118.8 Hz tone, analog)
Yaesu System Fusion DR-1X (digital)

Connects Yaesu digital voice and data repeaters over the Internet

YAESU
WIRES-X
Wide-Coverage Internet Repeater Enhancement System

ALLSTAR VS. IRLP

IRLP – Internet Radio Linking Protocol

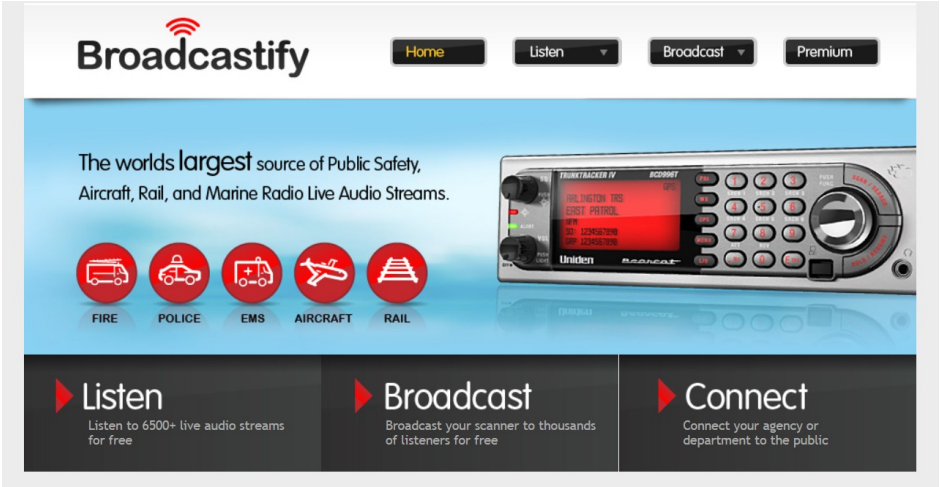
- Not open source – requires hardware purchase
- Good audio quality – ADPCM – half duplex
- Smaller user base
- Only radio originated
- Low number of nodes
- Limited linking ability

AllStar Link

- Fully open source hardware & software – free
- Excellent audio quality – full duplex
- Full repeater control!!
- Choice of codecs to meet available bandwidth
- Currently 23,165 nodes online now
- Radio, SIP phone or smart phone, or computer originated
- EchoLink, D-STAR, DMR, C4FM, P25 and other service bridges
- Requires some LINUX knowledge; strong user base support

ALLSTAR FEATURES

- Full Feature Repeater Controller
- VoIP Full Duplex Linking with *great audio*
- Simplex (half-duplex) Station
- EchoLink
- APRS
- Based on Asterisk - the Open Source PBX
- Autopatch
- Real-time status reporting
- Broadcastify



ALLSTAR LINK AT BARC (NODE 53017)

allstarlink.org

Raspberry Pi
Running AllStar Link
Connected to Internet

URIx USB Radio Interface

BridgeCom BCR-50V
147.045+ (118.8 Hz tone)

ALLSTAR LINK AT HOME (W8LRJ NODE 51403)

Raspberry Pi
Running AllStar Link
Connected to Internet

USB

URIx USB Radio Interface

DB-25 to 6-pin Mini-DIN

Icom IC-207
445.950 simplex

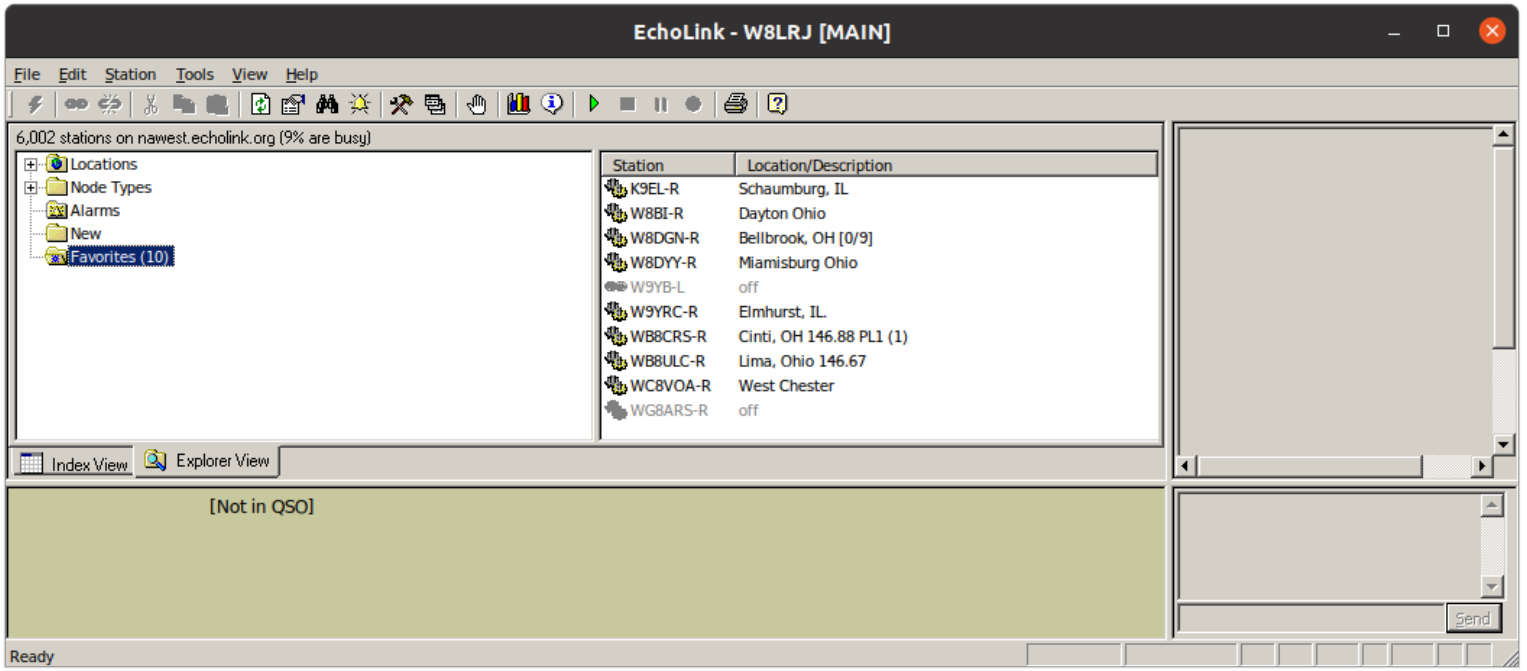
Note: Use HT to communicate with AllStar node.

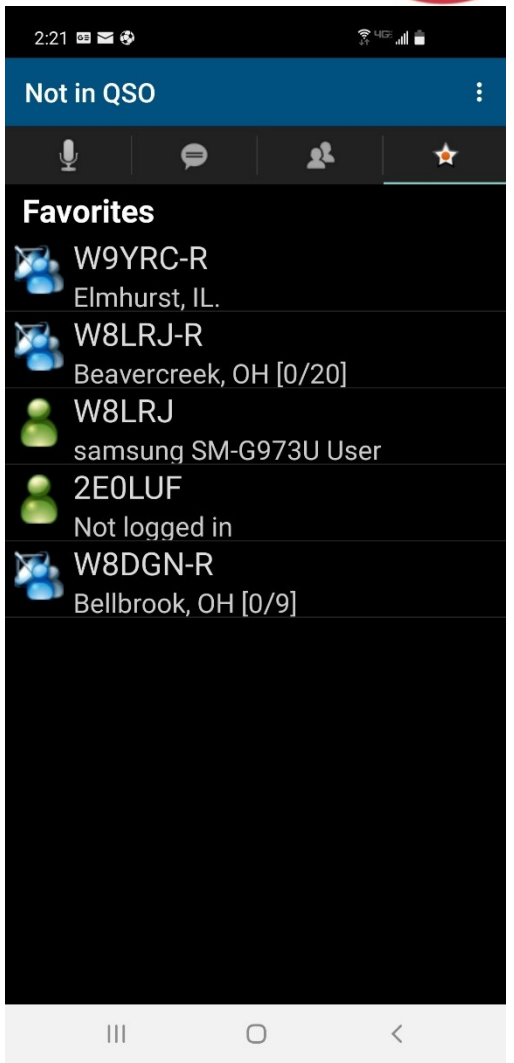
USING ALLSTAR LINK (BELLBROOKARC.ORG)

- AllStar Node: 53017 (BARC 147.045+, 118.8 Hz tone, repeater)
- To use AllStar on the W8DGN repeater, simply listen to be sure the repeater is not in use, then identify your station and state that you are connecting to AllStar.
- Using DTMF codes, every command must begin with a *Star* character (*). If a * is issued as part of a command string, it causes a reset of the decoder and the decode begins from the last entered * character. This is useful if you make a mistake; you just start again. Decoding is abandoned if the gap between digits is too long.
- Available Functions:
  *1 nnnn Disconnect from node nnnn
  *3 nnnn Connect to node nnnn
  *73 Shortcut to disconnect from any node
- *Be sure to disconnect when you are finished!*

ECHOLINK ON ANDROID

- EchoLink app on Android phone, PC, or connected to my AllStar Link node via radio
- Using the EchoLink application, connect as usual
- From AllStar Link, need to know the EchoLink node number for my phone or PC
- Using radio DTMF codes, enter *33989747 (phone)
- Disconnect with *73





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YAESU
WIRES-X
Wide-Coverage Internet Repeater Enhancement System

YAESU DIGITAL REPEATER TERMINOLOGY

- System Fusion is *Yaesu's implementation of Digital Amateur Radio*, utilizing C4FM Technology to transmit digital voice and data over the amateur radio bands.
- C4FM (Continuous Four Level Frequency Modulation) is the *digital signaling mode* (4-level Frequency Shift Keying plus FDMA or Frequency Division Multiple Access).
- AMS (Automatic Mode Select) is a part of the System Fusion operating system which automatically detects whether a transmission is C4FM digital or analog FM.

WIRES-X (YAESU REPEATERS)

- WIRES (Wide-coverage Internet Repeater Enhancement System) is an *analog* system which expands the range of amateur radio communication by linking analog repeaters together over the Internet.
- WIRES-X (digital version with the X) is a *digital* system which expands the range of amateur radio communication by linking System Fusion repeaters together over the Internet.
- An amateur can communicate with other amateur stations all over the world using a Wires-X node within their radio range.
- *Requires extra hardware (HRI-200) and dedicated PC (Windows only).*

YSF AND FCS REFLECTORS (HOTSPOTS)

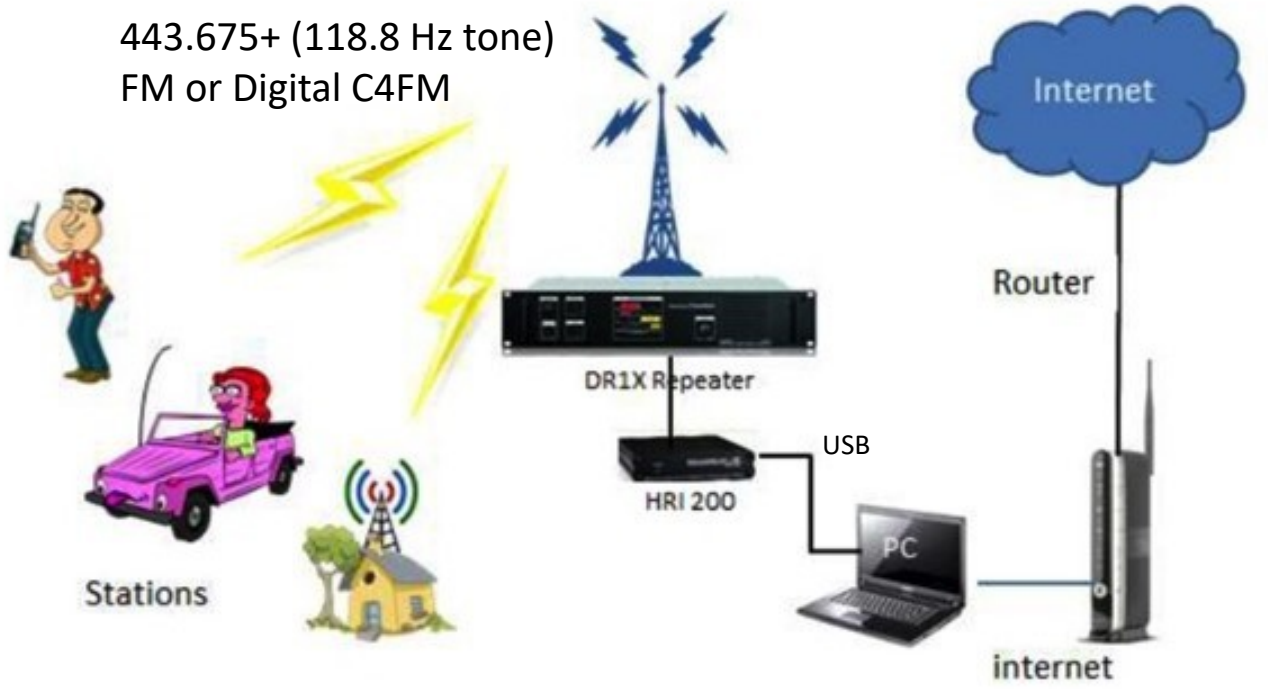
- Wires-X is Yaesu proprietary
- YSF (Yaesu System Fusion; *but not Yaesu*) and FCS (Fusion Connect System) are Open Source alternatives
- FCS is centralized; YSF is distributed and run by individual hams
- YSF and FCS reflectors are what you see on your hotspot
- Use a hotspot to connect to a reflector and talk to other hams using System Fusion radio through hotspots

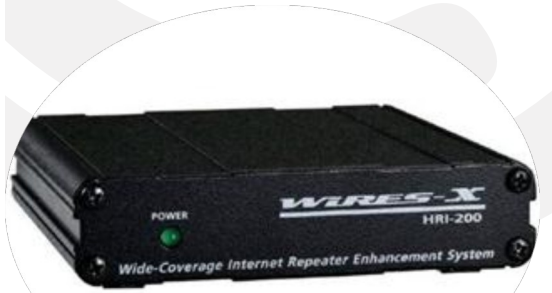
- *Neither YSF nor FCS can talk directly to Wires-X*
- Hams have built *bridges* from YSF/FCS reflectors to Wires-X rooms

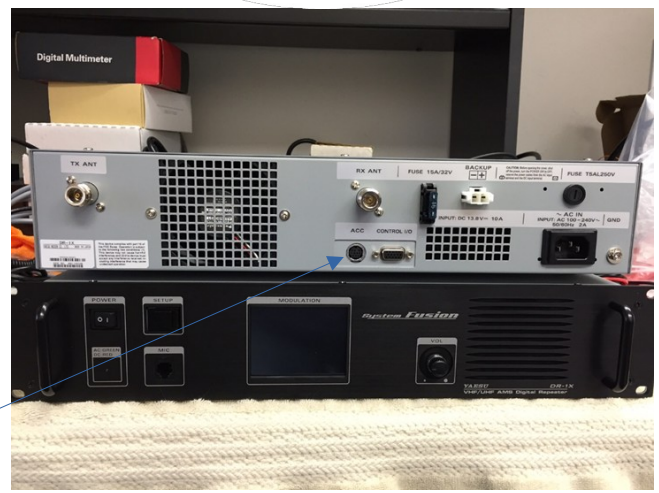
WIRES-X REPEATER AT BARC

The WIRES-X Repeater is a repeater that is in a location where access to the internet is available. The WIRES-X Interface, HRI-200 and a dedicated PC can be directly connected to the DR-1 repeater. The PC via the HRI-200 now becomes the controller for the DR-1 repeater.

443.675+ (118.8 Hz tone)
FM or Digital C4FM







AUX connector for HRI-200

USING WIRES-X

- BARC 443.675+, 118.8 Hz tone (analog only), repeater
  W8DGN-ND Wires-X Node ID: 70262
  W8DGN-BARC Room ID: 80262
- To use Wires-X on the W8DGN repeater, simply listen to be sure the repeater is not in use, then identify your station and state that you are connecting to Wires-X.
- You must have a Yaesu radio that supports System Fusion. Every radio has a different method for connecting to Wires-X, but generally there is a DX or X button that connects you to Wires-X and allows you to get a list of nodes to which you can connect. See the radio manual for details.
- *Be sure to disconnect from the room when you are finished.*
- *Note: To avoid hearing the digital noise on your analog FM receiver, add a receive tone 118.8 Hz (Tone Squelch).*
- *https://www.yaesu.com/jp/en/wires-x/user/index.php*

YAESU FT3D

- Program repeater info
- Set channel to repeater
- ID and announce Wires-X
- Press *X* (YMMV)
- *Check manual for items below before using!*

Press *X* button
to connect to Wires-X

Press and hold
X button to disconnect
from Wires-X

Press and hold
BAND button
to disconnect
from Room

Yaesu FT-70DR
https://www.youtube.com/watch?v=nTdIjGOI3b0

POPULAR WIRES-X ROOMS

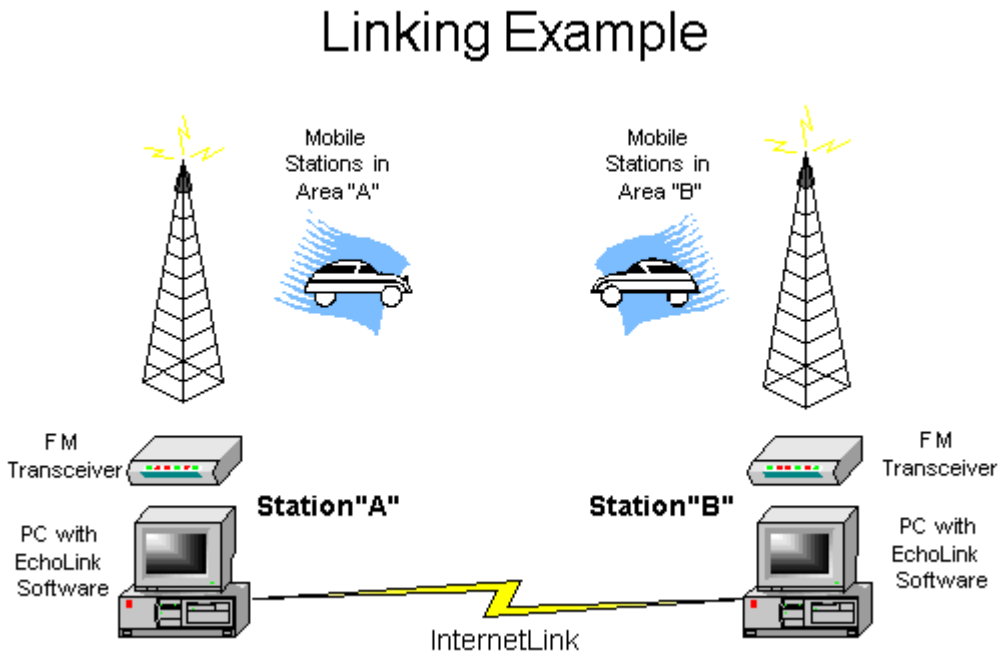
- America-KC-Wide Room #28054 (see BARC February 2025 Newsletter article) bellbrookarc.org
- AmericaLink Room #21080
- CQ America Room #21000
- OhioLink Room #40557 (net Sunday nights at 8:30 pm ET, see https://www.olnradio.digital/ for more info)
- QuadNet Array #83453 (see https://www.openquad.net/ for net info)

THANK YOU!

Questions?

ECHOLINK

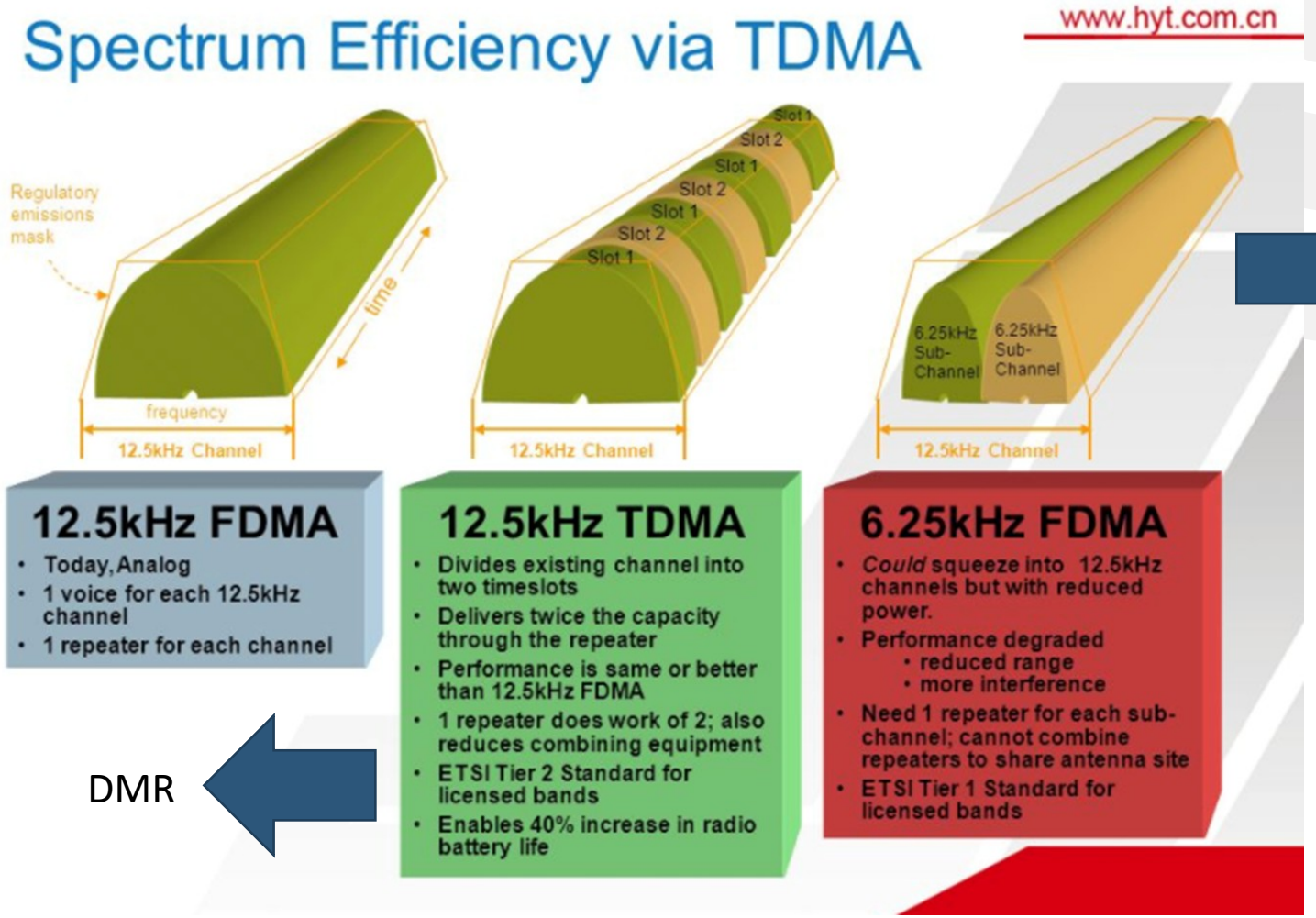
- EchoLink® software allows licensed Amateur Radio stations to communicate with one another over the Internet, using streaming-audio technology. The program allows worldwide connections to be made between stations, or from computer to station, greatly enhancing Amateur Radio's communications capabilities.



USING ECHOLINK

- EchoLink Node: 353955 (BARC 147.045+, 118.8 Hz tone, repeater)
- To use EchoLink on the W8DGN repeater, simply listen to be sure the repeater is not in use, then identify your station and state that you are connecting to EchoLink.
- AllStar treats *ALL* EchoLink node numbers as 6-digits long. Nodes with shorter numbers need to have leading zeroes added.
  e.g., EchoLink node 1234 = AllStar Node 001234
- Also, to distinguish EchoLink node numbers from AllStar numbers, the 6-digit number has to he prepended with a "3". So the example above becomes 3001234; a total of 7 digits.
- Having constructed the number of the desired node, we need to issue the command to make the link. To call EchoLink node 1234, you would dial *33001234
- Finally, please remember to disconnect from any call using *1nnnn or *73.
- *http://www.echolink.org*

FDMA VS. TDMA



Analog FM

DMR

System Fusion (and D-Star)