



# ➤ DMR: A NEW MODE FOR AMATEUR DIGITAL RADIO

Copyright 2019-2020 N2CID :: Digital Amateur Radio Network



# Digital Mobile Radio

- An ETSI published worldwide standard
- Over a DOZEN manufacturers of radios (Connect Systems, Tytera, Vertex, Motorola, Kenwood and Alinco)
- Superior voice quality (AMBE+2) vs older digital modes (AMBE, IMBE, GMSK)
- Longer battery life! Automatic Roaming!
- Supports multiple talk groups on one freq.
- Supports data applications (tms, gps, gnss)

# DMR Association

## Equipment Mfg Members

**aselsan**

 **AVTEC**

consoles you can count on

 **BFDX**®  **emc**  
www.emc-spa.com

**FYLDE  
MIKRO**

**HARRIS**  **HQT**

**Hytera**™  
Respond & Achieve

 **ICOM**

**JVC** **KENWOOD**

**IRISUN**

 **LARIMART**

 **MOTOROLA**

  
Omsk Manufacturing Association  
named after A.S. Popov  
www.relsos.ru

**Radio Activity**  
∞ Solutions

**RADIODATA**

 **Selex ES**  
A Finmeccanica Company

**sepura**

**taii**  
communications

 **simoco**

  
**Vertex Standard**

**ZETRON**®



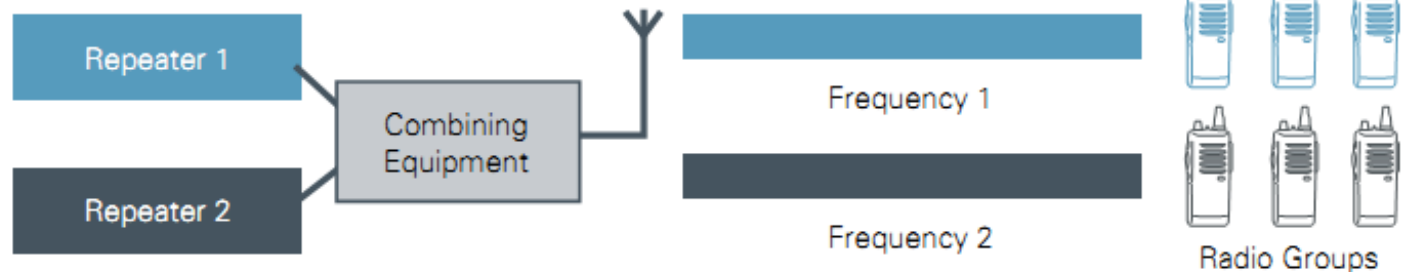
# DMR Standard-ETSI TS 102 361

- Tier 1 (Unlicensed)
  - FDMA, Consumer applications, .5 watt
  - dPMR (446 MHz European unlicensed service)
- Tier 2 (Conventional)
  - 2-slot TDMA
  - IP Site Connect (Vendor specific)
- Tier 3 (Trunked)
  - 2-slot TDMA
  - Multi-channel, Multi-Site

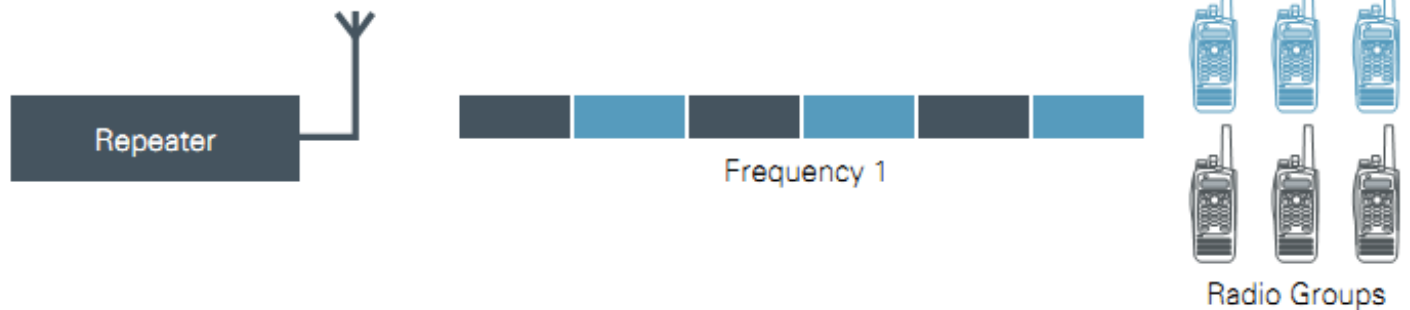
# TWO Repeaters in One!

TDMA saves licensing and equipment costs by enabling the equivalent of two 6.25 kHz channels within a single licensed 12.5 kHz channel

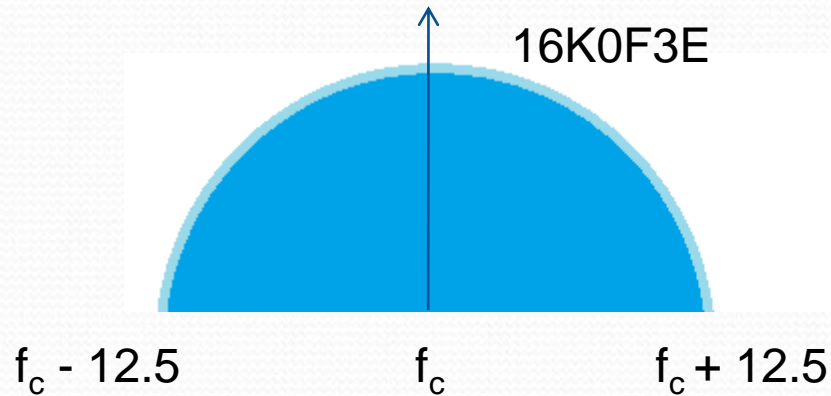
Two-channel Analog or Digital FDMA System



Two-channel Digital TDMA System

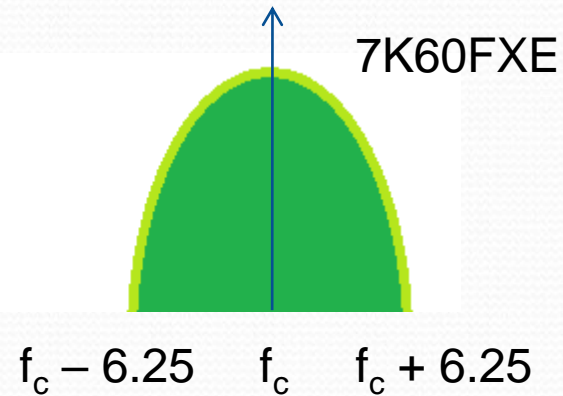


# Half the Channel Bandwidth



Traditional Analog  
25 kHz  
Channel Bandwidth

1 Channel  
1 Repeater

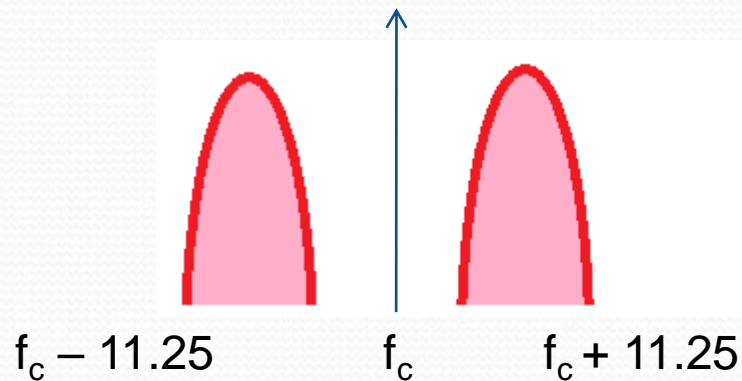


DMR  
**12.5 kHz**  
Channel Bandwidth

**2 Channels**  
1 Repeater

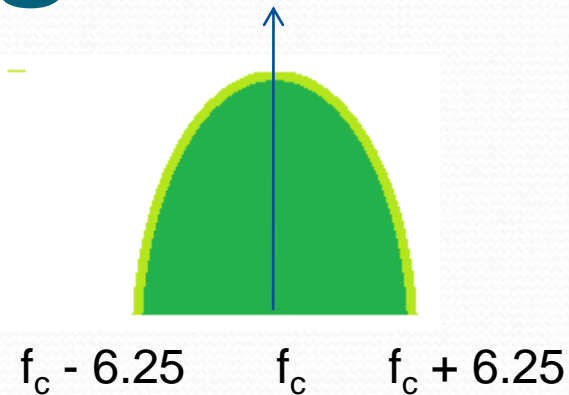


# More Spectrum Efficient than Older Digital Modes



Guard Band  
as large as 10 kHz  
between channels

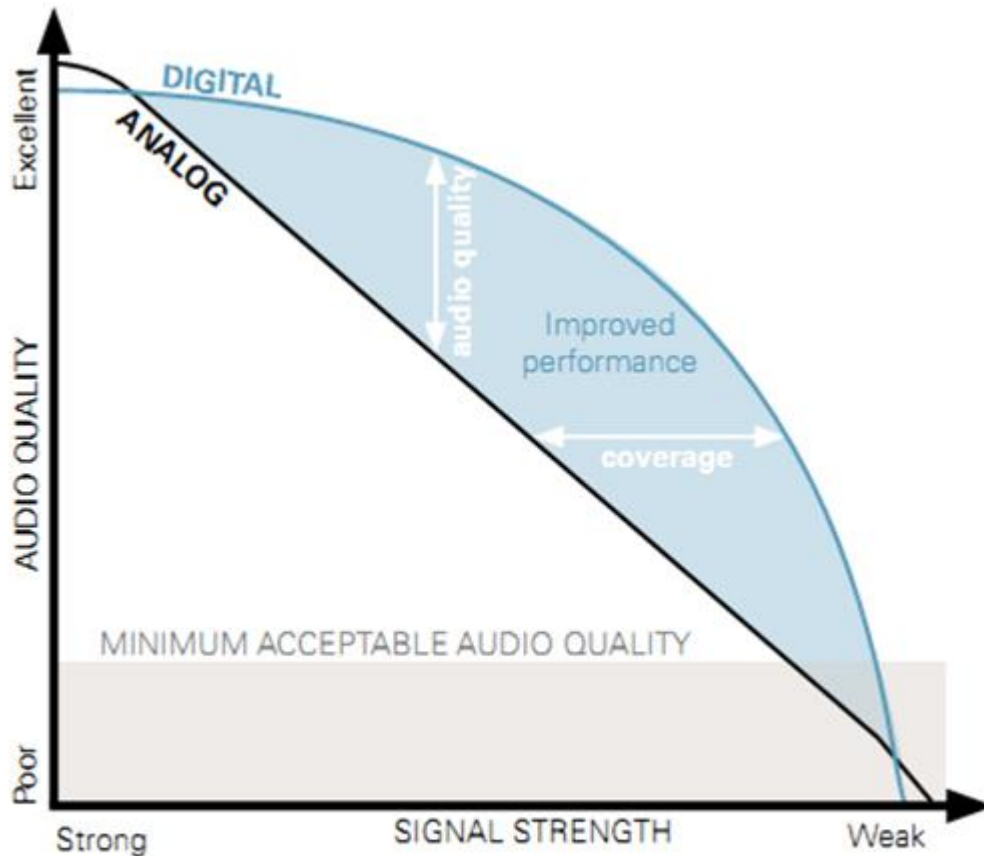
**Total BW= 22.5 kHz**



No Guard Band  
between 2  
channels

**Total BW= 12.5 kHz**

# Better Signal Quality



Digital voice retains better quality than analog as signal strength decreases.

- No hiss, popping, or static
- Better RF range than older digital technologies
- Forward Error Correction and Cyclic Redundancy Check coders



# Better Audio Quality

- Listen for yourself. DMR does sound better than older digital technologies.



# Longer Battery Life



Older Digital Modes  
(FDMA)



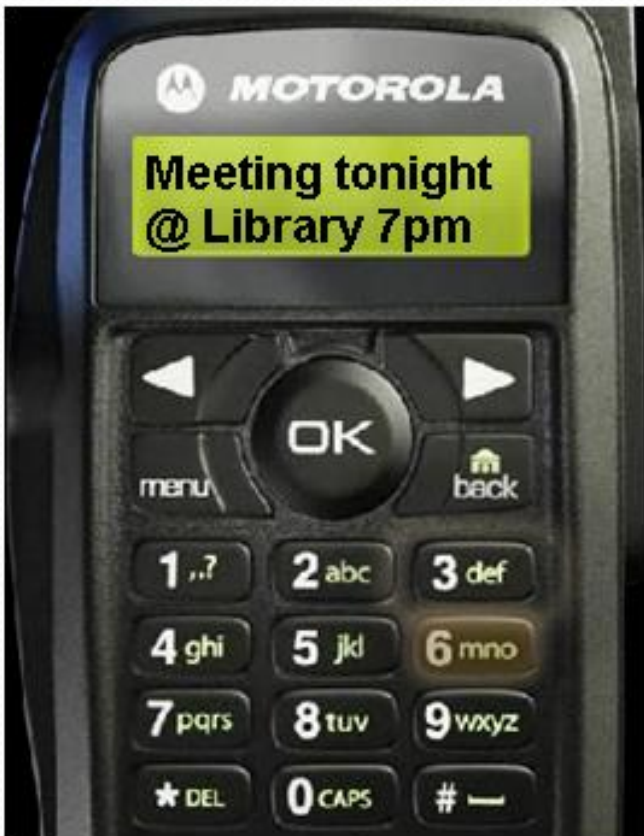
DMR  
(TDMA)

“For each hour of usage the TDMA radios show between 19% and 34% less battery capacity is required than for the FDMA models.”

“40 percent improvement in talk time in comparison with analog radios “



# Free Text Messaging

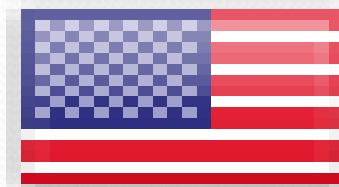


Send to one person, or a group of people.

- Weather Alerts
- Club Meetings
- Announcements

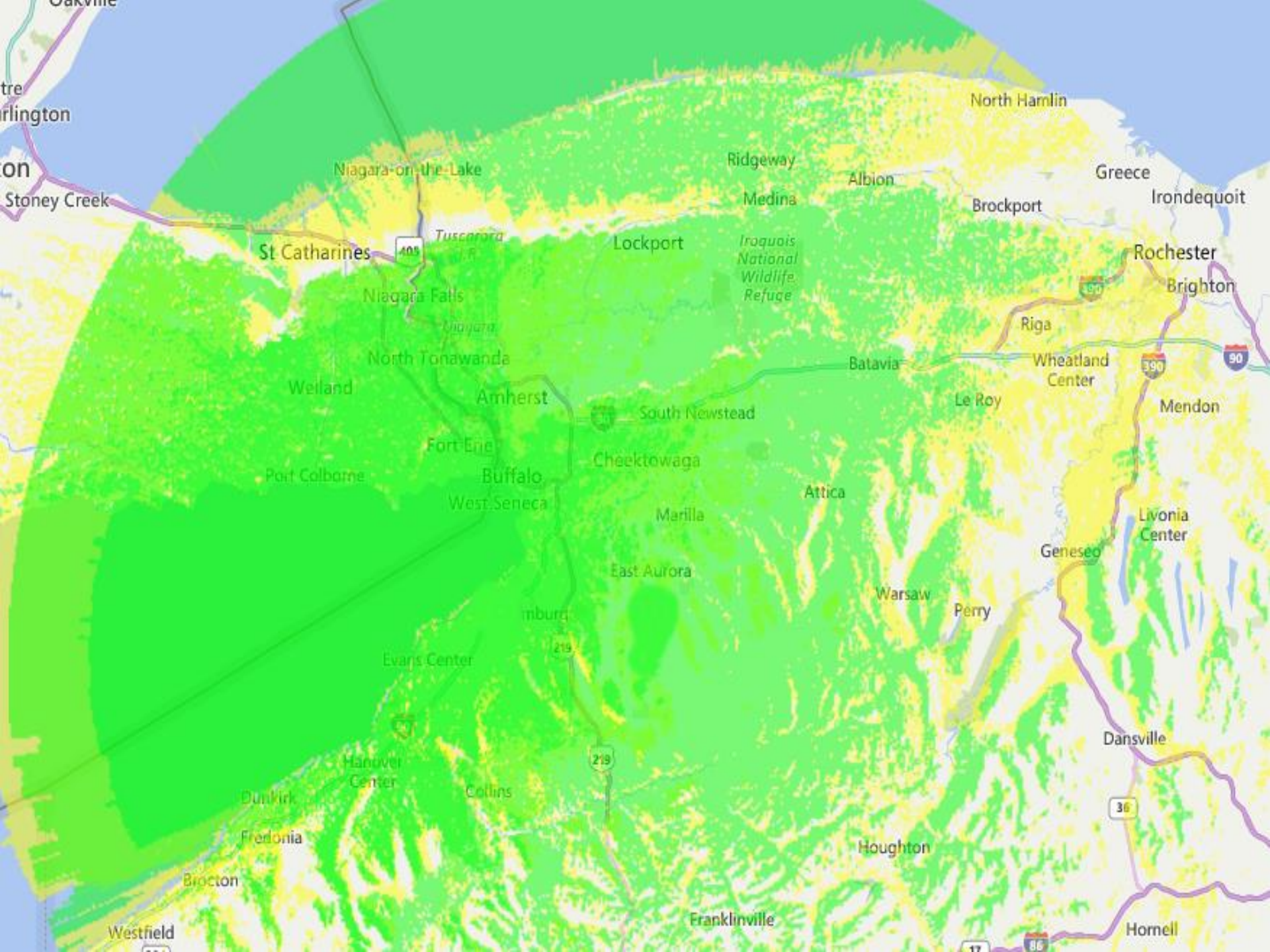


## **N2CID :: Digital Amateur Radio Repeater Network**



- Largest Digital Repeater Network in the area.
- Providing DMR Repeater coverage to roughly 100sq Mi. between Olcott, NY and Delevan, NY.
- Also bridged to other DMR/D-STAR networks.
- 100% Advanced Pure Digital network with 99.999% uptime!
- Open Repeater system supporting TMS, GPS, GloNaSS, Telemetry, DPRS/APRS, Peering and more!
- Completely IPv6 Compliant Network.



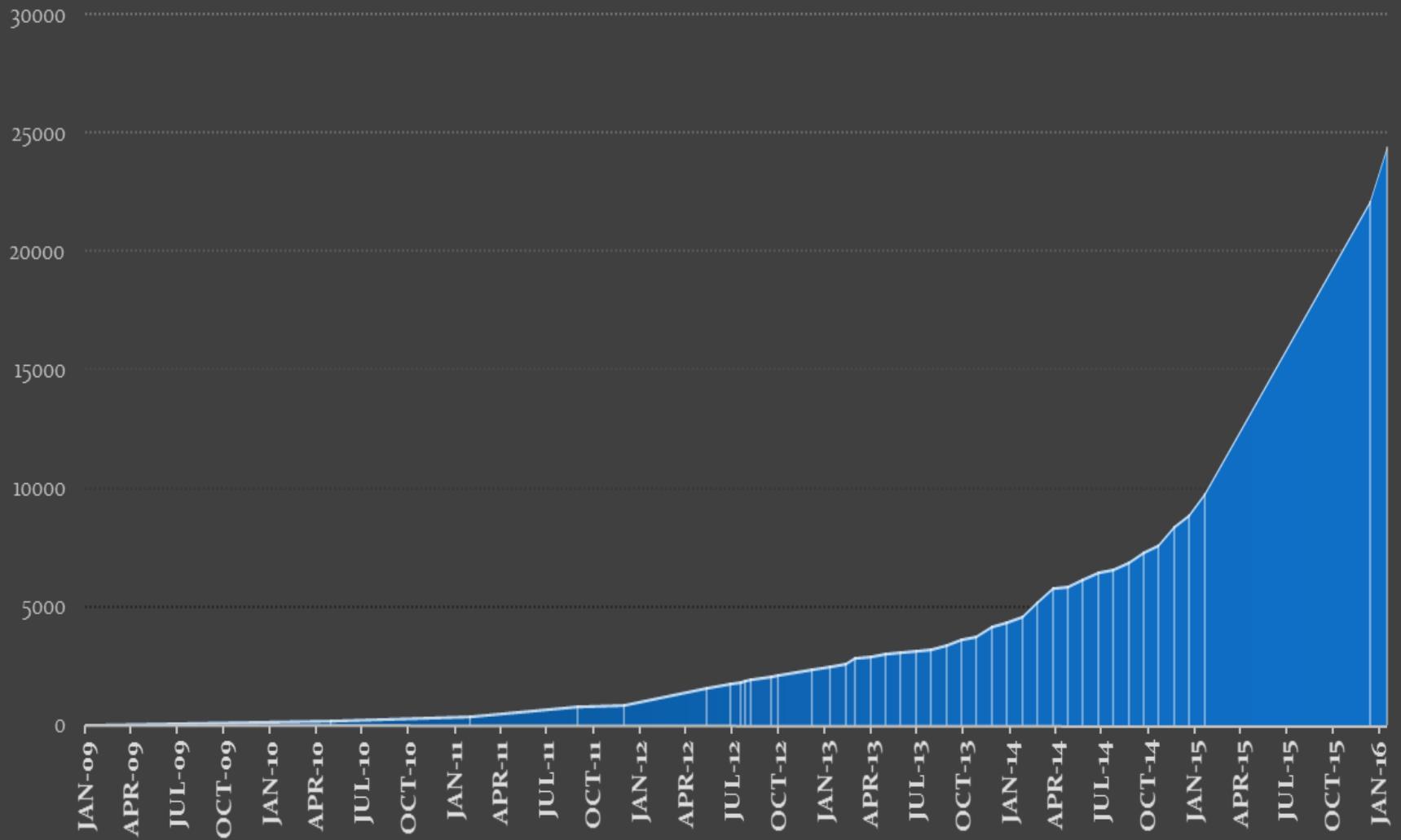


# Local DMR/D-STAR Repeaters

- DMR<sub>1</sub> – 442.3625
- DMR<sub>2</sub> – 444.200
- D-STAR – 444.1875



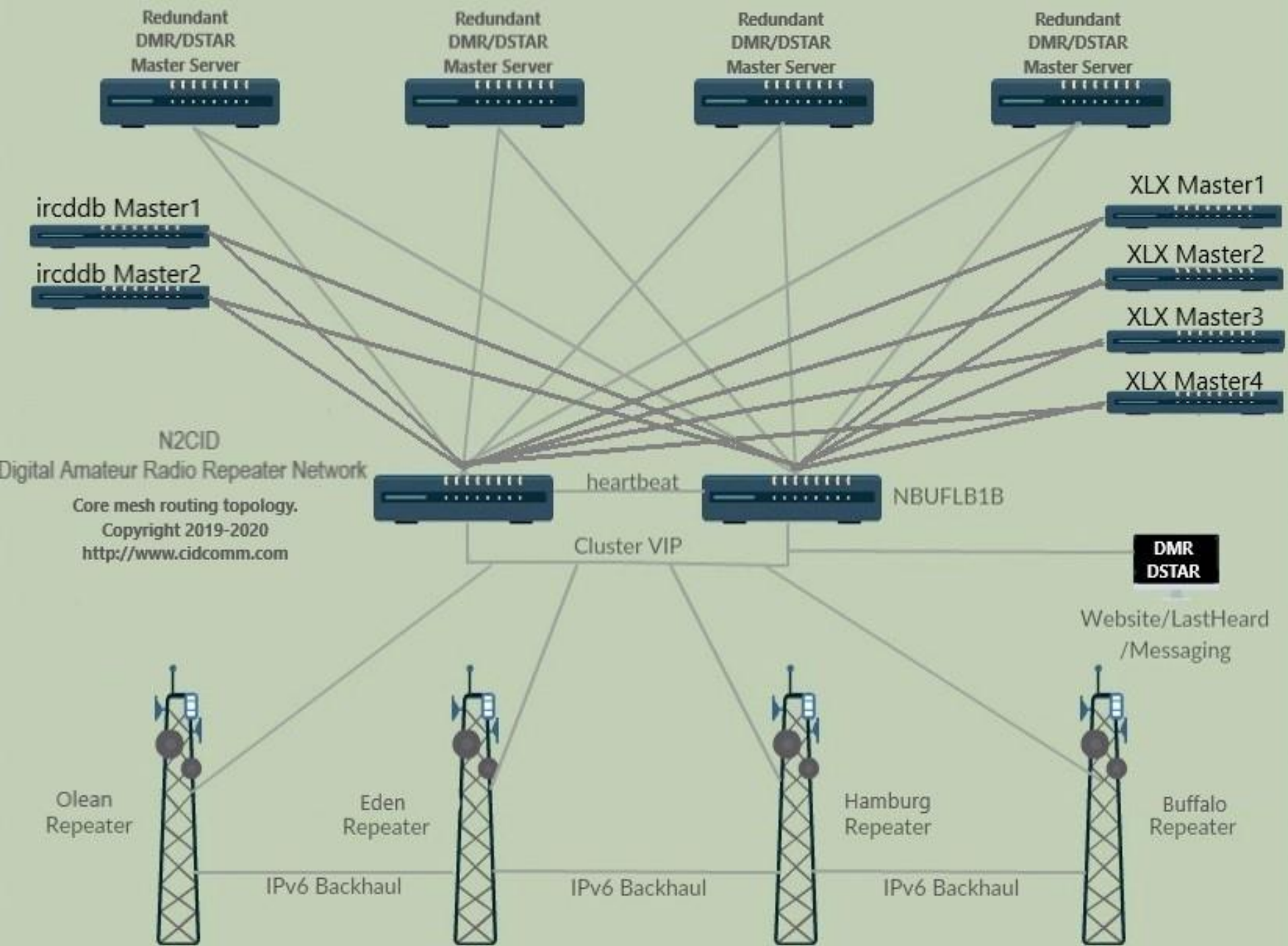
# Amateur DMR Growth by # Radio IDs



# Amateur DMR is Trending

- Jan 2013 = 2511 Users
- Jan 2014 = 4618 Users
- Jan 2015 = 9802 Users
- Jan 2016 = 24,388 Users
- April 2016 = 29,520 Users

This past year, a 149% increase. Primarily fueled by the competition among radio manufacturers and features offered.





# DMR: A NEW MODE FOR AMATEUR DIGITAL RADIO

- Spectrum Efficient!
- Supported by multiple manufacturers!
- Automatic Roaming for Safe Driving!
- Longer Battery Life!
- Resilient All-Digital ipv4/IPv6 Networks

# Questions?

- Contact N2CID,  
[websupport@cidcomm.com](mailto:websupport@cidcomm.com)
- [http://www.cidcomm.com/?page\\_id=73](http://www.cidcomm.com/?page_id=73)