Minutes of the February 5th 2020 KCRC Meeting

Our February   "Pre-Meeting Question and Answer Session" was loud and boisterous with many discussions taking place between the many members who came to this month's meeting.

The monthly meeting was called to order at 8 PM, by our President, Joseph AC2AE. Also present at tonight's meeting were Vice President Mitch N2RGA, , Treasurer Frank KD2QPU, General Secretary Roy AC2GS, Executive Board Member-At-Large Berlotte KD2MYF, Howard N2GOT, Bob KD2NVB, Simon K2FH, Richard KA2KDQ, Antonio K0ANV, Ray W2DEA, Melanie KC2LYV, and some new people to our meetings—Tom N2UFM, and Glenn N4ESU, that joined our club before the meeting ended, Steve KD2NYW, and William KD2TJH that planned to join our club in the next days, and Joe KC2LWP .

The vote to accept the minutes of the January meeting was passed unanimously.

Treasurer Report—Frank KD2QPU reported that our Treasury currently has $1,689.57 in our bank account as well as $160.83 in our PayPal account for a total of $1,850.40 in assets.

Repeater status was discussed by Joseph AC2AE and Mitch N2RGA - The voice announcements still need to be optimized for the controller's speech synthesis circuits—this is planned for the next routine maintenance visit to the repeater site. Work progresses on expanding our repeater link options while also streamlining necessary hardware and costs. Joseph AC2AE will be acquiring a static IP address, which will be used as part of our repeater's Internet gateway servers. He will continue to work with Ryan W4EAE to streamline the numerous gateway connections to our repeater to as few as possible—the plan is to use the XLX Server as the main gateway and feed other secondary gateways via XLX. There will be more to follow in future reports.

2 Meter Net Report—Joseph AC2AE reported consistent activity at about 5-7 check-ins weekly.

10 Meter Report—Roy AC2GS reported that general 10M propagation conditions continue to be poor during our present sunspot minimum period, but that local activity is steady and the Net often goes over 2 hours most Sundays.

KCRC TechNet—Roy AC2GS reported that participation in the Technical Net remains a problem. We still need people to join in with either questions, topics, or their own observations. As mentioned previously this isn't a podcast, or a radio show—it is a technical Net, and requires participation in order to thrive.

Fusion Net Report—Joseph AC2AE informed us that the Fusion Net is receiving a lot of national and international attention, with check-ins as far as the Philippines!

Old Business: Our next VE exam will be Sunday, March 15th, at 1 PM at Room 6B of The Wesley House 501 Sixth Street, between 7th and 8th Avenue. For ANY individuals interested in joining our VE Team, please contact any Executive Member of the Club or the return email address for these emails of our Club Meeting's minutes. People took time out of their busy lives to help get you licensed – pass on the favor!

Our Club presently has 90 members, our new member for December Katherine. 58 members have paid their 2020 dues (a 64% compliance rate).

We are still selling Club patches at $5 a piece and $1 shipping and handling. You can save the shipping and handling fee by buying them at our monthly meetings. Roy AC2GS will contact the company that manufactured the patches to arrange for another purchase in the near future, and report back at next month's General Meeting.

Our Winter Field Day 2020 was cancelled due to possible flooding at Floyd Bennet Field, where it was planned, but later that night Joseph AC2AE took some of his equipment and operated mobile at that location..

Plans for regular practical Club sessions where technical subjects and techniques would be demonstrated and discussed. The Executive Board could use some help form other members that would be interested in such kinds of activities to plan something that might be well attended by our members.

Plans for small, informal social get-togethers was discussed by Joe AC2AE—anyone interested in arranging a semi-regular calendar for these informal meetups, please email Joe AC2AE. There was a suggestion to set up the final Sunday of each month to arrange an informal get-together for club members interested.

The club purchased of 500+ custom pencils to advertise our Club. It is hoped that they will arrive prior to LIMARC's Hamfest, where will offer them to Hamfest participants.

Field Day 2020 was discussed, as well as the suggestion to schedule practicle tech sessions at the Field Day event, where issues like risk issues of soldering in Hospital areas would be moot.

New Business: There was some discussion regarding making our Club a 501(c)(3) tax exempt charitable organization. The legal requirements will be looked into and discussed in future meetings, but at this time we will need a copy of our Club charter to arrange a new Club bank account, now that Frank will be managing the treasury accounts.

Requesting permission and advice on using the AV equipment in the Carrington Conference Room were discussed.

Some possible planned special event stations were discussed for 2020.

At 9:37 PM the meeting was concluded.

See you March 4th for our next meeting!

These minutes were respectfully recorded and submitted by Roy AC2GS on this day, February 5th, in the two thousandth and twentieth year of our Lord of Propagation...

The Kings County Radio Club is at www.KC2RC.com or
www.KingsCountyRadioClub.com
KCRC is an ARRL affiliated club (see: www.ARRL.org)

What Are the Differences Between The Digital Modes, i.e. Fusion, D-Star and DMR?

Digital voice modes have very similar 'stages' in their designs, but unfortunately, their designers decided to change things around just enough to make them all incompatible with each other technology.

All transmissions begin with an analog to digital converter - a DAC. The digital stream is compressed in AMBE vocoder chips. D-Star, being the oldest technology, designed by the Japanese Amateur Radio League and licensed to Icom and Kenwood uses an older version of the AMBE vocoder than the relatively newer modes DMR and Fusion.

The compressed data stream then is configured into specifically sized data packets and appended with handler data to better identify each packet being sent. All different types of digital voice use different data packet protocols.

The final results are transmitted as digital zero's and one's, using different, incompatible implementations of a group of radio transmission modes called Frequency Shift Keying (FSK).

D-Star uses something called Gaussian Minimum Shift Keying or GMSK. Fusion uses Continuous Four Frequency Modulation, C4FM. And DMR uses something called Four Frequency Shift Keying.

All reasonably similar, while still being completely incompatible with each other.

In addition, while D-star and Fusion can transmit a series of digital packets, one after the other, DMR uses TDMA - Time-Division Multiple Access, which can seamlessly interlace two completely independent channels, or *time slots* for the same frequency. The user gets twice as many repeater channels to work with, but since most linear amplifiers are not designed for the 30 msec switching between the two-time slots, old linear amp designs will burn themselves out trying to amplify just one of the two available time slots.

The consumer-friendliness is different in each of these technologies. DMR was born from the commercial mind of Motorola and was never meant to be a consumer or ham friendly device. It cannot ID itself with the letters found in amateur radio callsigns, which is why a third party started to hand out unique numeric IDs to everyone, and ham software can store the ID's other information and display it some radios. DMR has slightly different metaphors to grapple before you can use it with some ease - color codes, time slots, Talk Group and individual IDs, Zone, Digital Monitoring (Promiscuous Mode). Most people still rely on previously written 'code plugs' handed down from one ham to another, to another, to another (you get the idea!), to run their DMR radios.

D-Star was more friendly, but there were still some oddities to that mode that newbies had to deal with at first. As Icom improved its implementation, this became more foolproof.

Fusion, the most recent addition to digital voice, is the most user-friendly, requiring that the user just enter their callsign when the radio is first brought to life.

Each mode has its own 'metaphors' for Internet-based networks that connect their radio's digital stream -

Fusion has 'Rooms,' D-Star has 'Reflectors,' and DMR has 'talk groups.'

And secondary Internet-accessible networks have been jerry-rigged by the amateur radio community - Brandmeister, XLX, YSF. The list will probably grow longer over time.

Is one technology heads and shoulders better than the others?

Well, there is a lot of arguments regarding that. Some use the standard bandwidth; others use narrow bandwidth, some share voice with a separate data stream, others time slice two separate channels simultaneously.

D-Star uses the older AMBE vocoder chipset, which might be recognized as a less elegant attempt at voice compression/resynthesis. There are just too many variables to the different modes to suggest one is incredibly better than the other.
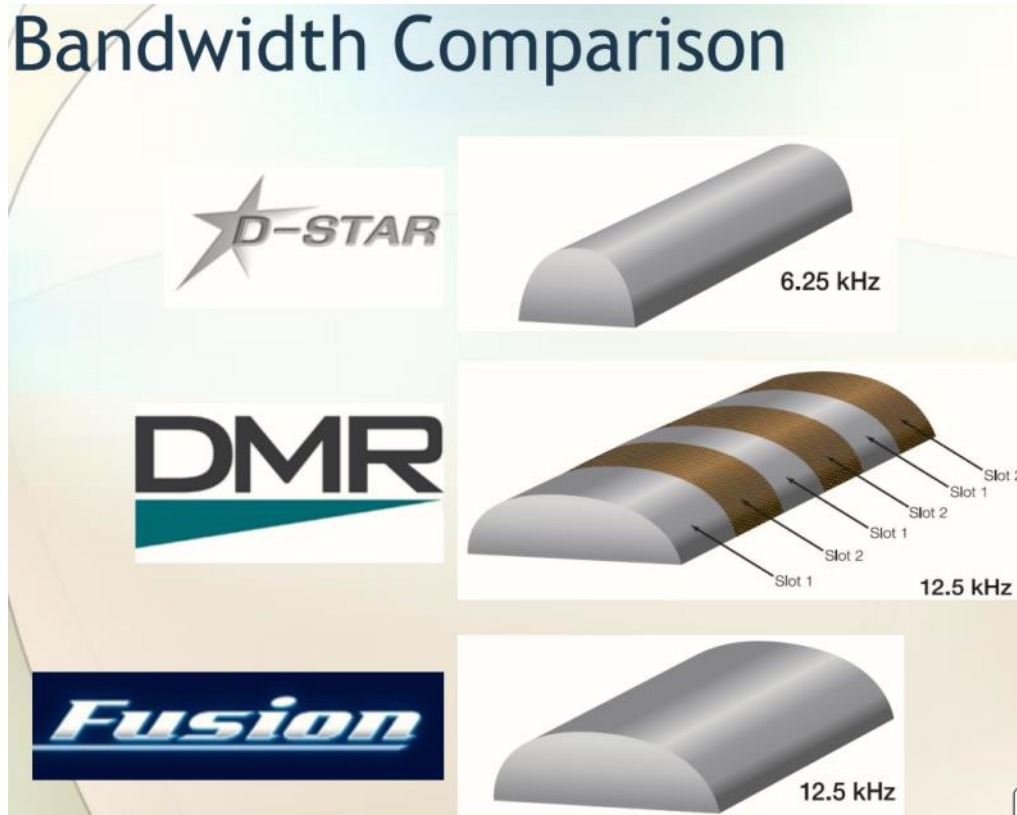
Here's a nice chart of the differences:

	D-Star	DMR	Fusion
Vocoder	AMBE+	AMBE+2	AMBE+2
Forward Error Corr.	Voice Only	Voice Only	Voice Only
Modulation	GMSK	4FSK	C4FM
Multiplex Method	FDMA	TDMA	FDMA
Transmission Rate	4.8 kbps	4.8 kbps x 2	9.6 kbps
Bandwidth	6.25 kHz	12.5 kHz	12.5 kHz
Channels	1	2	1
Developer	JARL	ETSI	Yaesu

Here's what the different data packets look like:

And here's what the different bandwidths look like:

If anyone has a favorite, that should be enough for them to continue using it.

And if not, well that's why God created hotspots <grin>!

73,
Roy AC2GS

(This article is based on a presentation that was made on a KCRC FusionNet/TechNet. If you are interested in science and technology (and why would you still be reading this if you aren't), stop by the LIMARC Tech-Net every Sunday night at 8 PM, and bring questions, or answers, or email your questions to mail-bag@AC2GS.com! Or check out my other Technical Net on KC2RC 146.730, at 9 PM on the second and fourth Wednesdays of every month, or the KCRC Fusion Net, every Thursday at 9 PM – if you don't have a Yaesu Fusion radio for the latter Net, you can always use a YSF or XLX link from a Hotspot, or listen to the audio stream via http://stream.KC2RC.com)