

Yaesu Fusion / C4FM Update



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A Quick Refresh:

What is Yaesu System Fusion / C4FM?

- System Fusion is Yaesu's answer to the digital radio market vs. Dstar (Icom & Kenwood) and DMR (Motorola, Hytera, Tetra, etc)
- C4FM : Continuous Four Level Frequency Modulation – A type of 4FSK / FDMA
 - This is the *same* mode used in P25 Phase1 used by emergency responders but the higher layer data framing isn't compatible
- FM envelope uses 12.5Khz BW (narrow FM)
- Uses DVSI AMBE2+ chip used in DMR & P25 but *newer* than D*star – patent encumbered

New Hardware since BayCon 2017



- DR2X repeater – 50w, Dual RX / Dual TX; IMRS board for private TCP/IP linking; DG/DP ID support



- FTM-3207 – inexpensive 70cm-only mobile radio (no APRS)



- FT-70DR HT with YSF support (no APRS)



- MMDVM + ZumSpot – Raspberry Pi HAT for DMR, Dstar, and YSF QSOs



- NanoSpot – an Rpi + Zum + MMDVM solution in a pretty case with screen, Wifi

C4FM Hardware Recap



New YSF News and Features

- DG-ID Technology enabled on DR2X and DR1X
 - Gives repeater operators Selective Call functionality similar to CTCSS/DCS on analog to manage co-channel repeater issues
 - Replaces previous DSQ concept
 - DG-ID: 00-99 – 00 is to monitor all repeaters
 - All Yaesu C4FM radios must run newest firmware to leverage
- DP-ID
 - Offers priority traffic preemption and callsign routing technology
 - Allows more secure remote ON-AIR management

Yaesu News and Features #2

- IMRS add-on to the DR2X repeaters allow digital linking over a private TCP/IP network (no Internet per se)
 - Disables HRI-200 direct connect support for WiresX but external RF node* functionality still works
- DR2X: built-in controller enhancements
 - Enhanced remote control via analog and C4FM (on/off, power levels, basic recorded voice record and playback)
- FTM320x line firmware updated to now support limited Wires-X control

Yaesu News and Features #3

- DR1X to DR2X trade-in program has been extended through 1H 2018
- Yaesu selling refurbished DR1X-DR units that are reworked for improved YSF enhanced features and operation usually found in the DR2X
 - 3yr warranty (same as new)

Related Digital C4FM News

- BrandMiester and XLX systems getting deployed for translational (bridging) services across modes DMR / Dstar / C4FM / P25
 - Some Yaesu WiresX rooms are hard-coded in FCS conferences for bridging
- NW Digital kicked off a KickStarter for a production level version of the XLX team's 6-channel AMBE 2+ transcoder (cheaper streams)



WiresX functionality @ BayNet Today

- BayNet's DR1X repeater, HRI200 linking box, and WiresX Internet system up on Black Mountain has been operating strong for over a year
- The system allows to connect to remote Wires-X nodes, repeaters, and rooms around the world. All via an easy to use interface

Digital Voice @ BayNet Tomorrow?

- Does BayNet have a preference of YSF over Dstar / DMR or even Analog FM?
 - No, this is just what we have today and we don't have enough repeater pairs to do everything
- Are we upgrading any of the hardware on the YSF side?
 - We are sticking with the DR1X for now
 - If we want more power (20w), we'll add an amp
 - IMRS is really for private digital linking
 - DP-ID is for private calling which isn't how BayNet operates.. :-)

Digital Voice @ BayNet Tomorrow #2

- Baynet is considering moving to BrandMeister / XLX gateway for cross-digital-mode bridging
 - Lots of experimentation and innovation is happening here
 - Offering an interoperability bridge would be unique to other C4FM systems in the Bay Area making other systems like DMR, Dstar, C4FM, P25, and even IRLP / Echolink / AllStar reachable!
 - We could choose to keep our WiresX controller running to bridge into WiresX rooms like “Americas Link”, etc
 - One HRI200 per room is required

Fusion Repeaters in the Bay Area

- **WW6BAY - Bay-Net – Black Mountain**
 - 444.425 “+” pl:127.3 – WiresX enabled
- **W6PW – San Francisco**
 - Sutro tower: AMS 145.150 “+” DCS:664 - WiresX enabled and linked to BrandMeister reflector FCS002/64
 - SF VA near Golden Gate Park: AMS 444.225 pl:114.8 soon to be DCS:664 – Stand alone repeater
- **2x N6ZX – Skyline, Woodside – AMS: 145.370 “-” & 440.450 “+” : Stand alone repeaters**
- **W6RTF – Salinas - 440.700 “+” pl: 100.0**

Helpful URLs and Links

- Yahoo email group:

<https://groups.yahoo.com/neo/groups/YaesuSystemFusion> - 3503 subscribers as of 1/17/17 and growing!

- Yaesu's Digital Fusion Facebook page

– <https://www.facebook.com/pages/Yaesu-C4FM-FDMA-System-Fusion>

- Live Wires-X / Fusion status

– https://www.yaesu.com/jp/en/wires-x/id/id_active.php

– http://jq1yda.org/i/db-x/x_activeroom.html

– <http://fusion.kf5way.com/country/USA>

– <https://fusionlive.net/>

– <https://register.ysfreflector.de/>

Even More URLs

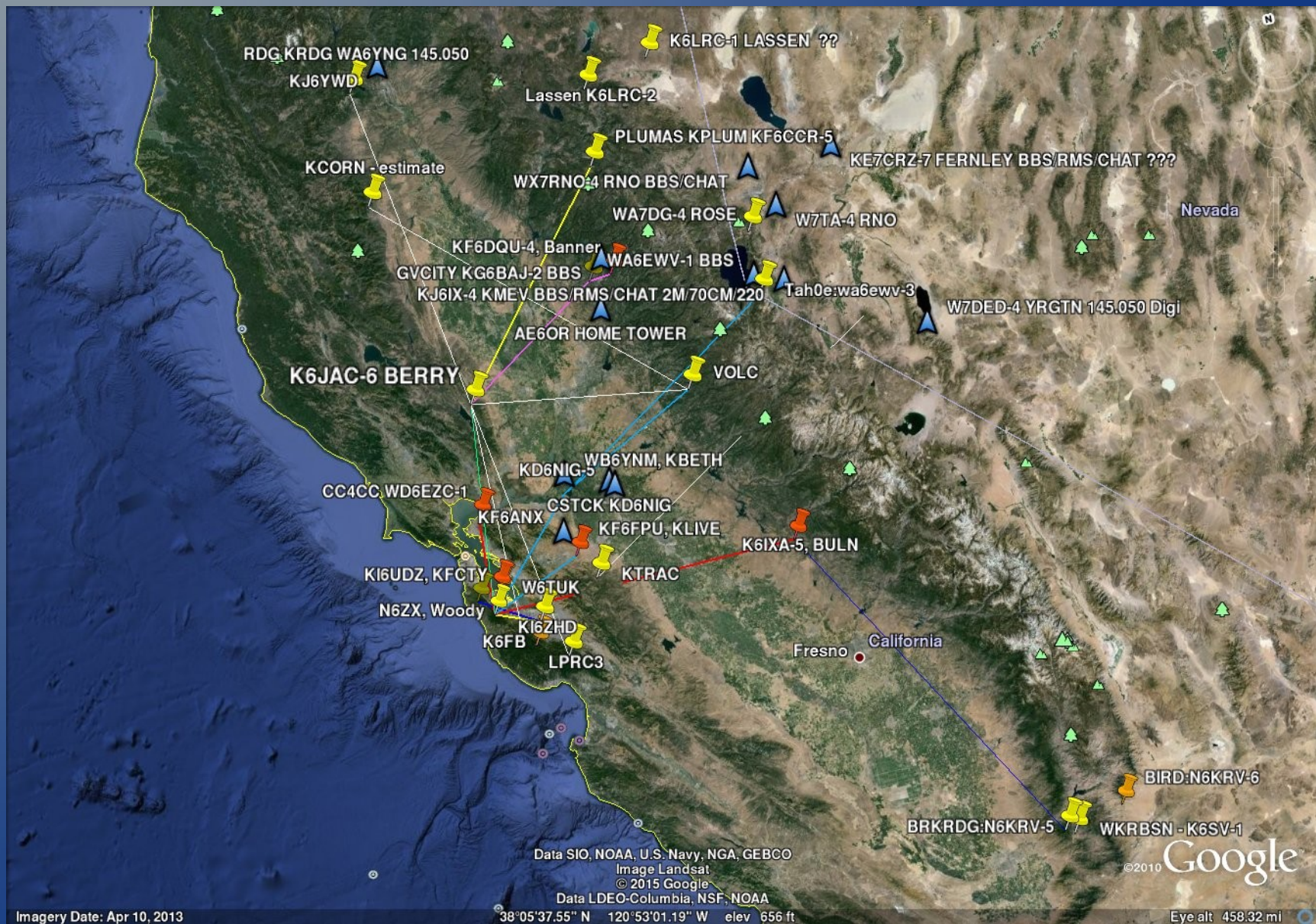
- Technical specs on the Fusion framing, etc for possible homebrewing (on Yaesu's Digital area)
– <http://www.systemfusioninfo.com/>
- Technical details of C4FM, etc
http://www.cmsara.org/wp/wp-content/uploads/2015/10/Fusion-Presentation_N5WDG.pdf

Oh.. One more thing.. PACKET!

- I wanted the group to know that I love classic 1200bps packet, AMPR, & I love to mentor HAMs
 - I'm one of the Sysops for 145.050 KB2KB
 - Maintainer of the Linpac terminal program on SF.net
 - You don't need hardware TNCs anymore.. \$50 in parts (Raspberry Pi, little USB soundcard, etc is it (not including your classic analog FM radio HT/Mobile)



The NorCal 145.050 Network



Thank you!

Any Questions?

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P25 Phase2 uses CQPSK instead of
C4FM

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- MH-85A11U Camera Mic

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- Rooms can be connected via a browsable list, search, user-created categories, or direct node entry
- Rooms can be open/closed
- “Up/Downloaded” files are locally displayed. “Imported” files are only saved to local micro-SD card
- Only supported file types can be Im/Exported (no list found so far)
- Audio can only be played, not imported
- Can mix Wires-X with Fusion GM feature
- 25 Wires-X nodes listed in Ca – all So.Cal

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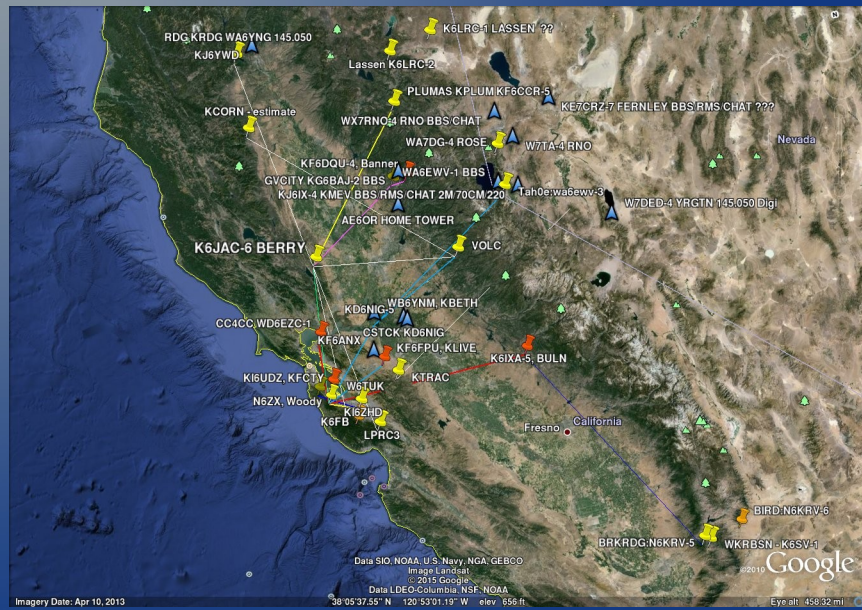
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