Zero Retries 0121 - by Steve Stroh N8GNJ and Orv Beach W6BI

zeroretries.org/p/zero-retries-0121

Steve Stroh N8GNJ, Orv Beach W6BI

Zero Retries is an independent newsletter promoting technological innovation in Amateur Radio, and Amateur Radio as (literally) a license to experiment with and learn about radio technology. Now in its third year of publication, with 900+ subscribers.

About Zero Retries

Steve Stroh N8GNJ, Editor

Jack Stroh, Late Night Assistant Editor Emeritus

In this issue:

Web version of this issue - https://www.zeroretries.org/p/zero-retries-0121

Request To Send

Editorial by Steve Stroh N8GNJ

New Founding Member and New Paid Subscriber

My thanks to Prefers to Remain Anonymous 08 who is now *Founding Member 0008* (they upgraded from a paid subscription) for their financial support of Zero Retries.

My thanks to Prefers to Remain Anonymous 15 who is now a paid subscriber to Zero Retries.

Financial support is a real vote of confidence for continuing to publish Zero Retries.

Meadow Day 2023 Article

I finally finished writing up my experience on 2023-06-24 (Field Day Saturday) that I called "Meadow Day", setting up my Starlink system using battery / solar power in the middle of my yard to simulate using Starlink under emergency conditions. Since it was an "operational"

story, I posted the article on my N8GNJ.org blog - N8GNJ's Meadow Day 2023 Experiment. Unlike Zero Retries, no size constraints on using photos, so there's quite a few photos in the story.

Sometimes I Get It Wrong, Redux

My apologies to Bruce MacKinnon KC1FSZ for stating he was "woefully misinformed" in my article Zero Retries 0102 - Thoughts on Amateur Radio Adjacent Technologies - LoRa. KC1FSZ wrote me a graceful email about several errors I made in that article regarding his WARS LoRa Birdhouse Project. That article is now annotated with corrections addressing my errors.

Please - *do keep me honest folks!* I'll happily fess up when I get it wrong.

Pacificon - Have Fun, Folks!

Between AREDN, FreeDV, the 44Net VPN demonstration, and many other cool seminars and exhibitors, and *especially the people behind all of that…* Pacificon this weekend in San Ramon, California, USA will be full of Zero Retries Interesting encounters. I wish I could have been there folks - take good notes and photos, please!

73,

Steve N8GNJ

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Requesting Help From the Zero Retries Readership - Inexpensive Generic Data Radio Recommendation?

By Steve Stroh N8GNJ

You 900+ subscribers are smarter than I am, thus I'm requesting this help from the smartest group of Zero Retries Interesting folks.

The subject of this request is very, very… *probably laughably* early considering all the other projects, *and radios*, I have queued up to work on. But this will be a long term project, thus it might be expedient to begin what will likely be something that will take months.

In 2024, I hope to set up a test lab of “typical” VHF / UHF radios that are connected to various modems, TNCs, etc. These radios would all be operated at low power, connected to a dummy load, and operated within my metal sided / metal roofed shop (N8GNJ Labs). Each radio / modem would be connected to a computer, and capable of being operated remotely.

The idea is to do various interoperability and other types of testing, such as:

- Test Modem A’s ability to interoperate with Modem B.
- Have reference radios / modems such as a Kenwood TM-D710A on frequency for use with 9600 bps, doing A/B comparisons of using the internal TNC in native mode and KISS mode.
- Test MMDVM-TNC’s 9600 bps and 19200 bps modes on various radios.

Software / hardware developers could do remote access into the system to test software versions against other radios and other modems.

Etc. The design of this project / system is very much a work in progress, and again, this is a project for 2024.

What’s become obvious in my very preliminary work on this project is that I will eventually need more radios to fill out this system. There will be more modems to test than I will have radios, and it would defeat the purpose of the system to constantly swap radios and modems. This system will be most useful if I’m able to maintain radios and modems that have been “characterized” online so that they can be tested *against new systems*.

Thus, this question - what surplus commercial land mobile radio would you recommend that meets these requirements (in order of preference):

- Can be retuned to the Amateur Radio 144 - 148 MHz and or 440-450 MHz band… or (dare I dream) the 222-225 MHz band,
- Reasonably priced - preferably no more than $50 / unit,
- Reasonably available (as in, over the course of a couple of months, will appear on eBay),
- Power level can be adjusted to (hopefully) no more than 5 watts,
- Has “flat audio” accessible (preferably without having to modify hardware),
- Frequency can be changed remotely (perhaps with a microcontroller emulating microphone or front panel button pushes).

Some examples:

- I briefly considered using inexpensive portable radios; the price is right and they would be suitably low power, but many of them have terrible transmit / receive turnaround times and that would impair reasonable testing for data communications. Some inexpensive portables will only charge (won't operate) while external power is applied.
- The TYT TH-9000 series for 144-148 MHz, 222-225 MHz, and 440-450 MHz are widely available and can be "easily" modified for flat audio, but they're ~$150 each.
- There are various models of Motorola, Kenwood, Vertex, Tait radios available as surplus, but I've read enough to be leery of my ability to parse out the configuration of a surplus radio that meets my requirements above.

So, please tell me which radio you think I should keep an eye out for and is worth buying on eBay?

To be clear, I'm not asking for "absolute safety" in buying a radio. I know "on eBay, I pays my money, I takes my chances" and I know I'll end up with at least a few radios that don't work or are otherwise unsuitable for this purpose.

Or, perhaps direct me to a two-way radio dealer that might be willing to work with me in acquiring and setting up surplus radios in the configuration I need?

Thanks for your ideas!

Leave a comment

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AREDN News Roundup - October 2023

By Orv Beach W6BI

Here are several updates on AREDN developments.

AREDN Supernodes

Amateur Radio Emergency Data Network - AREDN is software that, when loaded on supported wireless devices, changes them into ham radio network "nodes". As such they become network aware, locating other nodes and creating routing information for a ham radio TCP/IP network.

A recent development rolled into nightly builds enables an AREDN node to be configured as a "supernode". As such it can join disparate AREDN networks together into a larger network by linking to other supernodes. Here's how it works from one of the AREDN developers, Tim

Wilkinson KN6PLV:

> Essentially it's building a mesh of meshes. Each mesh network maintains its complete independence. The only difference is that when you attach a supernode to the mesh, this adds a default route (10.0.0.0/8) so if any node on the mesh has traffic for an IP not on that mesh, the traffic is sent to the supernode. The supernodes see all management traffic on all meshes, so they know how to reach all the other nodes, and can forward traffic where it needs to go. The practical upshot is that mesh nodes can access any node on any mesh, but won't get flooded with thousands of routes and names from all those meshes.

An AREDN node running a recent build will find a supernode if there's one in the vicinity.

Important Note: a supernode is NOT intended to replace a standard AREDN tunnel.

You can see the total linked network at https://arednmap.xojs.org/

That map has an improvement over most mesh network maps in that if you click on a colored icon in the upper-right hand corner the map will display only those nodes. Feel free to explore!

Product Updates Affect AREDN Firmware Installation

Recent software updates to both Mikrotik and Ubiquiti products have necessitated changes to the AREDN first install procedures for both product lines. If you're going to buy a device from either of these vendors, make sure you go over the appropriate first install procedure prior to installing AREDN firmware. You'll may save yourself a large portion of aggravation 😊.

Adapter for AREDN Node to Use a Satellite Television Dish

Image courtesty of Orv Beach W6BI

With the addition of an eight dollar adapter from Amazon, any satellite TV dish can be adapted for use with a MikroTik LDF 5, or even better, an LDF 5 ac. While the bracket and installation of the LDF 5 / LDF 5 ac isn't plug and play, the required modifications and adjustments are pretty modest. This hack was developed for AREDN by Bob Pestolesi KE6GYD. Full details are available as a PDF - Mikrotik Light Dish Feed on Sat Dish Install Experience (Ver 1.0 2021-3-22).

Using the dish, you'll get about 23 dBi gain, and no one will ever notice the dish isn't pointed at a geosynchronous satellite 😊.

Editor's Note *- My thanks to Zero Retries Pseudostaffer Orv Beach W6BI for his tireless promotion and education about AREDN to us Amateur Radio Operators, and his willingness to share AREDN information here in Zero Retries. Stealth AREDN -* ***love it****!*

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ZR > BEACON

By Steve Stroh N8GNJ

Short mentions of Zero Retries Interesting items.

Module 17 *Was* Available on AliExpress

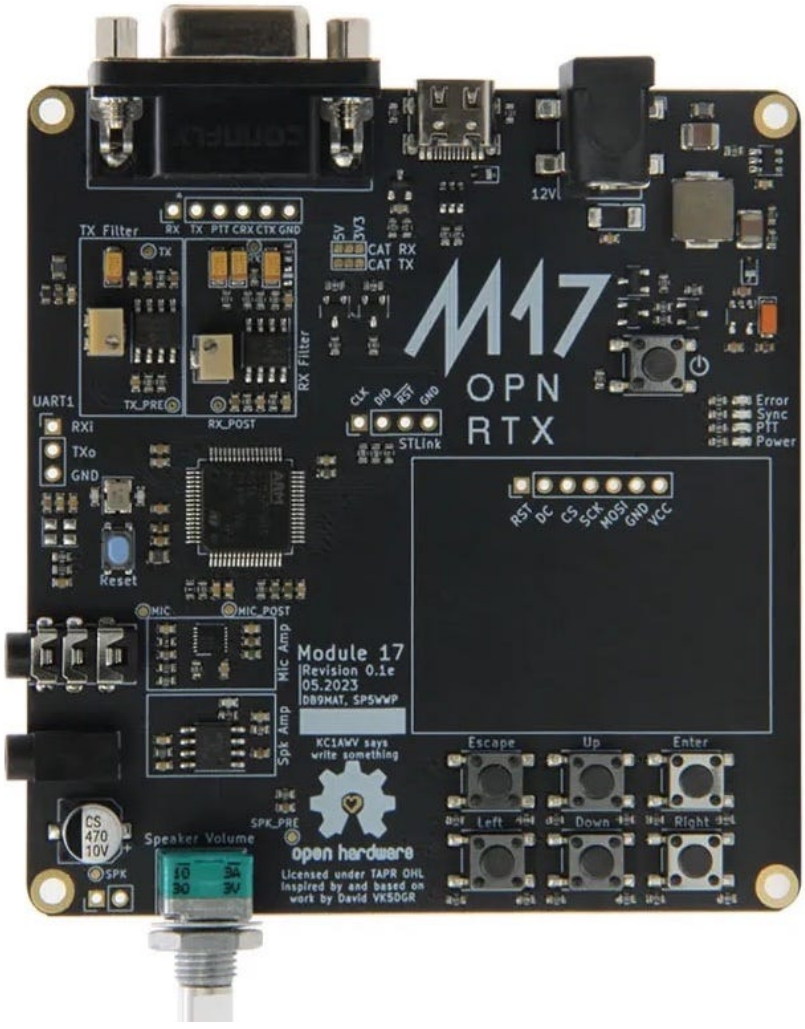

Image courtesy of M17 Project / AliExpress

There was a brief announcement on one of my feeds that the M17 Project's "Module 17" board was available on AliExpress. Module 17 is basically a modem for M17 digital voice and data, and intended for connection to radio that has "flat audio" connections (also known as

“data connector or 9600 connector - 6 Pin MiniDIN).

Apparently this batch was a small run as they sold quickly.

Interesting Tease for Pacificon Seminar from Elecraft’s N6KR

Larry Makoski W2LJ reported this interesting tease from Wayne Burdick N6KR, Co-founder of Electraft:

> The new title of my Pacificon talk (at 8 AM, no kidding) is:
>
> Answering the Call of the Wild:
>
> Anywhere / Anytime HF
>
> It'll feature serious musings on the ergonomics of pedestrian mobile operation, a bit of personal travel photography, and some big ideas about……something… very small.

My thanks to Pseudostaffer Jeff Davis KE9V for spotting this item.

Overview of the Status of RM-11953

Article from Radio World about RM-11953 (Petition to the FCC from the “Shortwave Modernization Coalition”) - **Hams Worry About Shortwave Proposal**.

This mention jumped out at me:

> The United States Coast Guard, the principal federal agency responsible for maritime mobility, safety and security, told the FCC that the Maritime Mobile Service or MMS is used extensively in multiple bands between 2 MHz and 25 MHz, and important for communications that go beyond line-of-sight.
>
> In its opposition, the USCG said the proposed new data service will likely result in a “high use percentage as the market makers and liquidity providers update their bid / ask price continuously based on the most up-to-date information.”
>
> The Coast Guard is also concerned about cybersecurity issues “such as spoofing or jamming” that could cause interference with MMS.

When you get the beloved and respected *US Coast Guard* concerned about your proposed radio system, you have a *problem* on your hands.

My thanks to Pseudostaffer Dan Romanchik KB6NU for spotting this item.

ITU-R WP5A meeting #30 could not achieve consensus on the measures needed to protect the RNSS in the 23cm band

> …the meeting did not reach a consensus on the technical and operational measures required to ensure the protection of the RNSS (radio navigation satellite service) in the amateur 23cm band. The measures aim to identify parts of the frequency band with associated amateur transmitter power limits that can help protect the RNSS operations.

These discussions are in preparation for ITU World Radiocommunication Conference 2023 (WRC-23) which will convene 2023-11-20 through 2023-15.

The “Amateur 23cm band” is 1240 - 1300 MHz, which Amateur Radio is (currently) allowed to use on a secondary basis to Radio Navigation Satellite Service (RNSS) systems such as Europe’s Galileo and Russia’s GLONASS.

That a consensus hasn’t yet been reached is worrisome for Amateur Radio’s continued usage of 1240 - 1300 MHz. If a consensus can’t be reached that’s acceptable to the primary user, the most expedient way to resolve fears interference by a secondary user is to… ban secondary usage - *Amateur Radio use of 1240 - 1300 MHz*.

That would be a real loss for Amateur Radio as technology is finally beginning to make 1240 - 1300 MHz more accessible to Amateur Radio Operators. Icom’s IC-9700 and the new IC-905 both support the 1240 - 1300 MHz band. Icom also offers a 1240 - 1300 MHz repeater, the ID-RP1200VD. The Amateur Radio 1240 - 1300 MHz band doesn’t have adjacent commercial operations, so it’s a lot easier to put up 1240 - 1300 MHz repeaters with minimal worries about interference with other repeaters on heavily used sites such as mountaintops, skyscrapers, and shared towers. Amateur Radio Operators are increasingly comfortable with microwave operations such as using dish antennas. Lastly, Earth Moon Earth (EME / Moonbounce) operation is becoming increasingly popular, and 1240 - 1300 MHz is a popular band for EME.

Welcome to EastNet New Packeteers

This was an informative message posted on the EastNetPacket mailing list by Chris Lance WW2BSA:

> Welcome to EastNet Packet! I see you stumbled upon one of the user ports of a FlexNet node.
>
> EastNet Packet is a group of amateur radio operators that enjoy promoting packet amateur radio through a network of nodes, bulletin boards, gateways and more for individual use as well as emergency communication preparedness.
>
> The Network is primarily connected visa RF although in recent years, that policy has been relaxed to include other types of nodes (ie: (X)Net, URONode) and connections (ie: via the internet).
>
> The workhorse node of the group is FlexNet. FlexNet is a flexible, modular and user-friendly program for organizing efficient packet radio networks. The first ideas for developing this software appeared in 1987 and the first version of FlexNet was developed by DK7WJ in 1988.
>
> The advantage of FlexNet is that it is a very intelligent node. Let's say there are a series of nodes: A through D. You want to get to D from A. All you need to know is the call sign of station D. When you initiate a connect command, node A will determine the best path to D.
>
> FlexNet also uses DAMA - masters and slaves nodes that eliminate “hidden node syndrome,” although I confess, I don't know how well implemented that system is in our Group. FlexNet has other advantages I won't get into right now.
>
> The majority of the nodes use PC/Flexnet which are DOS based. Each node has a user channel and at least one backbone channel that links all of the members. Side note: As a user with limited technical networking knowledge, I am pretty proud of myself to have found the Windows (XP, 7, 10) version of FlexNet. I have 3 proof of concept Flexnet32 systems running on XP with a 4th one in the works - the first Windows version in in the USA.
>
> In response to the lack of current data, I have two papers I am authoring: "The Incomplete Guide to Getting Started with AX.25 Packet Radio: A Guide for Amateur Radio Operators" as well as "AX.25 Packet for Amateur Radio: FlexNet Node Configuration" both are works of love for the community and available for gratis very soon.
>
> More info on EastNet www.EastNetpacket.org
>
> You'll find maps, files and a member roster.

A Bit of Background Research on FlexNet

Not only did I find it interesting that the EastNet network is based on FlexNet, I found it interesting that a significant number of FlexNet stations in EastNet used in the present day are “DOS based”. After doing some research1234, I think that’s because folks in EastNet adopted FlexNet early in the Packet Radio networking era and found that FlexNet provided a much more stable and efficient network than Net/ROM and TheNet which were the Packet Radio networking systems then in wide use.

FlexNet largely configures its own channel access parameters based on channel loading. In short, FlexNet largely “just works”. Like Net/ROM and TheNet, FlexNet does hop-by-hop acknowledgements; if a packet is lost along the way, the two nodes where the packet was lost regenerate the packet instead of the entire connection timing out.

My guess is that FlexNet’s author decided to take advantage of the greater processor power, memory, and storage available of DOS PCs to create a packet radio network node. This is in contrast to the approach taken by Net/ROM and TheNet of “cramming” a network node into the much more limited processor power, memory, etc. of a TNC-2 type TNC . Thus FlexNet was able to make its channel access parameters adaptive, rather than fixed / configured by the network user.

FlexNet was never made available as open source, though the DOS application was available free for use by Amateur Radio. Some EastNet users continue to run DOS PCs, and others have had some success in “encapsulating” the FlexNet DOS app using DOS emulators in Linux and other operating systems. FlexNet protocols (or “encapsulation” of DOS FlexNet - not clear) has also been implemented in XNET (which is also a binary that’s never been released as source, available in DOS or Linux versions) and URONODE.

One historic problematic issue with FlexNet was that it was designed to work with legacy TNC-2 type TNCs with special firmware (6-PACK, SMACK?). But FlexNet could also work with KISS TNCs, and there’s been some success in getting a DOS FlexNet system to talk, via serial KISS, to a Dire Wolf (software) TNC, which eliminates the dependency on legacy TNCs, 6-PACK, etc. and leverages Dire Wolf’s superior on-air performance for Packet Radio.

Revisiting Demand Assigned Multiple Access (DAMA)?

To my knowledge, the DAMA - Demand Assigned Multiple Access capability in FlexNet has never been implemented in the US, though I verified that DAMA “client”5 capability is implemented in current Kantronics TNCs such as the KPC-3 Plus (PDF - search for DAMA). I’ve seen references to DAMA being used in Europe, and hope to research that in depth in a future Zero Retries article.

FlexNet and DAMA may be worth revisiting to be integrated into current Amateur Radio systems6, especially the (open source) Dire Wolf software TNC which could make FlexNet and DAMA much more accessible and deployable (versus the fussiness of operating a

legacy DOS application). DAMA is basically an implementation of network polling or a central node assigning “clients” either time slots or permission to transmit. Despite having better packet radio technologies such as MMDVM-TNC (9600 bps and possibly 19200 bps, 12.5 kHz channel, IL2P Forward Error Correction), the issue of Hidden Nodes can impact network throughput, and integrating DAMA could, potentially, mitigate the Hidden Node issue.

Demo of 44Net VPN at Pacificon

John Hays K7VE on the ARDC Net-44-Vpn mailing list:

> **Pacificon Demo VPN**
>
> If you are going to Pacificon we are planning a demo at the ARDC table.
>
> There is an ARDC forum on [Saturday] covering both 44Net and grants.

A demo of the long-discussed Virtual Private Network enhancement of 44Net at Pacificon is nice… and if I were able to attend Pacificon I certainly would have availed myself of a demo there.

Perhaps K7VE will be doing a demo of the VPN during the ARDC presentation, and that presentation will be recorded and made available publicly.7

Otherwise, it saddens me to make the observation that it seems completely lost on ARDC and the ARDC Technical Advisory Committee (TAC) to take a few minutes to do such a demonstration about 44Net VPN for the *worldwide Amateur Radio population* via a video demonstration that *anyone, worldwide* could benefit from… *not just the lucky few people* that would be interested in 44Net VPN that will be attending Pacificon.

If ARDC / TAC isn’t comfortable creating their own video, perhaps they could work with one of these Zero Retries Interesting YouTube creators to do so - HB9BLA Wireless (Andreas Spiess HB9BLA), KM6LYW Radio (Craig Lamparter KM6LYW), Modern Ham (Billy Penley KN4MKB), or Tech Minds (Matthew Miller M0DQW).

Leave a comment

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Join the *Fun* on Amateur Radio

If you're not yet licensed as an Amateur Radio Operator, and would like to join the fun by *literally having a license to experiment with radio technology*, check out **Join the Fun on Amateur Radio** for some pointers.

Zero Retries Frequently Asked Questions (FAQs) — In development 2023-02.

Closing the Channel

In its mission to highlight technological innovation in Amateur Radio, promote Amateur Radio to techies as a literal license to experiment with radio technology, and make Amateur Radio more relevant to society in the 2020s and beyond, Zero Retries is published via email and web, and is available to everyone at no cost. Zero Retries is proud *not to participate* in the Amateur Radio Publishing Industrial Complex, which hides Amateur Radio content behind paywalls.

My ongoing ***Thanks*** to:

- Tina Stroh KD7WSF for, well, *everything!*
- ***Founding Members* who generously support Zero Retries financially:**
  Founding Member 0000 - Steven Davidson K3FZT
  Founding Member 0001 - Prefers to Remain Anonymous 01

  Founding Member 0002 - Chris Osburn KD7DVD
  Founding Member 0003 - Don Rotolo N2IRZ
  Founding Member 0004 - William Arcand W1WRA
  Founding Member 0005 - Ben Kuhn KU0HN
  Founding Member 0006 - Todd Willey KQ4FID
  Founding Member 0007 - Merik Karman VK2MKZ
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- Numerous Annual and Monthly subscribers who also generously support Zero Retries financially!

Want to Support Zero Retries?

- The *most* effective way to support Zero Retries is to simply mention Zero Retries to your co-conspirators that are also interested in knowing more about technological innovation that is occurring in Amateur Radio and encourage them to become a fellow subscriber.

- One particularly effective method of promoting Zero Retries is to add a mention of Zero Retries to your QRZ page (or other web presence) and include a link:

  https://www.zeroretries.org

  If you'd like to financially support Zero Retries, becoming a paid subscriber is *greatly* appreciated and helps offset expenses incurred in publishing Zero Retries. Paid subscriptions for Zero Retries are *entirely optional*, as explained in this special issue of ZR:
  Zero Retries Administrivia - Activating Payment Options.

These blogs and newsletters regularly feature Zero Retries Interesting content:

- Dan Romanchik KB6NU mentions "Zero Retries Interesting" topics so regularly on his blog (that I otherwise wouldn't know about) that I've bestowed on him the honorific of Pseudostaffer.

- Jeff Davis KE9V also mentions "Zero Retries Interesting" topics so regularly on his blog (that I otherwise wouldn't know about) that I've bestowed on him the honorific of Pseudostaffer.

- Amateur Radio Weekly by Cale Mooth K4HCK is a weekly anthology of links to interesting Amateur Radio stories.

- Experimental Radio News by Bennet Z. Kobb AK4AV discusses (in detail) Experimental (Part 5) licenses issued by the US FCC. It's a *must-read-now* for me!

- RTL-SDR Blog - *Excellent* coverage of Software Defined Radio units.

- TAPR Packet Status Register has been published continuously since 1982.

- Other Substack Amateur Radio newsletters recommended by Zero Retries.

These YouTube channels regularly feature Zero Retries Interesting content:

- HB9BLA Wireless by Andreas Spiess HB9BLA

- KM6LYW Radio by Craig Lamparter KM6LYW (home of the DigiPi project)

- Modern Ham by Billy Penley KN4MKB

- Tech Minds by Matthew Miller M0DQW

Zero Retries is currently using the Substack email publishing platform to publish Zero Retries. It's particularly suitable for small newsletters as you can get started for no cost.

If you're reading this issue on the web and you'd like to see Zero Retries in your email Inbox every Friday afternoon, just click below to join ~~100~~ ~~200~~ ~~300~~ ~~400~~ *500* ~~600~~ ~~700~~ ~~800~~ *900*+ other subscribers:

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If you're a fellow smart person that uses **RSS**, there *is* an **RSS feed for Zero Retries**.

Zero Retries (N8GNJ) is on Mastodon — n8gnj@mastodon.radio — just click:

Zero Retries / N8GNJ on Mastodon

Email issues of Zero Retries are "instrumented" by Substack to gather basic statistics about opens, clicking links, etc.

More bits from Steve Stroh N8GNJ:

- SuperPacket blog — *Discussing new generations of Amateur Radio Data Communications — beyond Packet Radio (a precursor to Zero Retries)*
- N8GNJ blog — *Amateur Radio Station N8GNJ and the mad science experiments at N8GNJ Labs — Bellingham, Washington, USA*

Thanks for reading!
Steve Stroh N8GNJ / WRPS598 (He / Him / His)
These bits were handcrafted (by a mere human, not an Artificial Intelligence bot) in beautiful Bellingham (The City of Subdued Excitement), Washington, USA, and linked to the Internet via **Starlink *Satellite* Internet Access**.

2023-10-20

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All excerpts from other authors or organizations, including images, are intended to be fair use.

Blanket permission granted for TAPR to use any Steve Stroh content for the TAPR Packet Status Register (PSR) newsletter (I *owe* them from *way* back).

1
DCC 1995 paper - An Introduction to FlexNet

2
The EastNetPacket web page links to a presentation about FlexNet, but the site hosting that paper is almost as spammy as a bot takeover of an abandoned domain registration, thus not worth linking to.

3
Thread on Reddit r/amateurradio - What happened to FlexNet?

4
Tadd Torborg KA2DEW - On-Line FlexNET Manual

5
Kantronics uses an older terminology for server / client technology that many / most consider to have been deprecated.

6
Notably, New Packet Radio (NPR) uses a similar technique for Point to Multipoint NPR networks.

7
In my many visits to the Pacificon website in writing about it and in preparation for attending (which, in the end, I wasn't able to do), I haven't seen any hint that Pacificon presentations will be recorded and made available.

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