WEST CENTRAL INDIANA AMATEUR RADIO

WC9IN

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West Central Indiana Amateur Radio is a division of West Lafayette GMRS, a 501(c)3 non-profit organization

Board Members:

Brent Reynolds K9NMT – President/Treasurer
Seth Goodwin K9XG – Trustee & Callsign Trustee
Brandon Hugues W9BDH – Trustee
Cade Rarick KD9RTX – Advisory to the Board
Michelle Davis W9CHL - Secretary

West Central Indiana Amateur Radio (WC-IND) was established with a mission to enhance communication, promote the amateur radio hobby, revitalize underutilized repeaters and to work together with local Amateur Radio groups, clubs, and repeater trustees. Our goal is to provide a broad network of reliable analog FM communications while fostering a vibrant and engaged community of radio enthusiasts.

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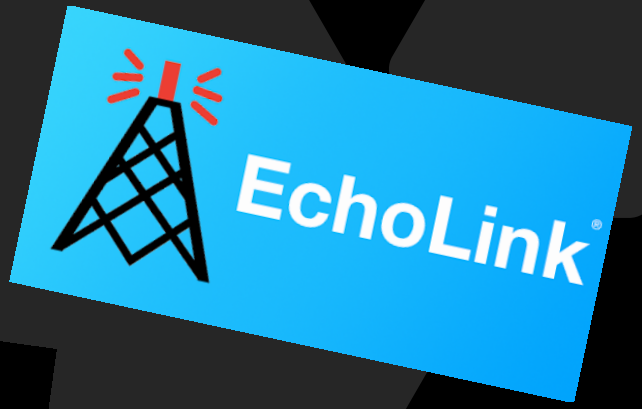
- Formed in November of 2024 as a division of West Lafayette GMRS
- Set up a dedicated server on the AllStarlink network for linking analog FM repeaters
- Put our first repeater on the air in Northeast Benton County under callsign KE9BYD
- Received Vanity Club Call Sign WC9IN on December 10th 2024
- Helped Steve Jones W9SMJ put his 442.575 Repeater back on the air in Frankfort, IN and linked it to our network.
- Helped put together and install a new UHF repeater in Williamsport for WB9ARC and linked it to our network.
- Added a remote receive site in West Lafayette for the W9SMJ Frankfort repeater to help lower power stations get into the system.
- Converted the W9SMJ Russiaville 442.525 and Galveston 146.955 Repeaters from RF link to the all-star network. Frankfort 147.045 Repeater will be coming soon.

What is the AllStar Link Network?

AllStar Link

AllStarLink is a network of Amateur Radio repeaters, remote base stations and hot spots accessible to each other via Voice over Internet Protocol.

AllStar Link, Echolink, IRLP…What's the difference???



AllStar Link

• AllStar is a VoIP linking system based on Asterisk, an open-source telephony platform. It uses standard VoIP protocols to connect repeaters, nodes, and individual users.

•**Hardware**: Requires a Raspberry Pi or a Linux-based computer, an interface board, and a radio.

•**Features**:

- Highly customizable and open-source.
- Supports multiple simultaneous connections.
- Better audio quality due to the use of modern codecs
- Provides flexible networking options for building large repeater networks.

•**Use Cases**: Ideal for advanced users or groups that want to build complex, scalable systems with greater control.

•**Advantages**: Open platform, high flexibility, modern features, and support for dynamic node linking.

Key Differences

Feature	AllStar Link	EchoLink	IRLP
Open/Closed	Open-source	Proprietary	Proprietary
Customization	Highly flexible	Limited	Minimal
Audio Quality	High (modern codecs)	Moderate (older codecs)	Lower (ADPCM codec)
Access	Repeater, simplex, and individual apps	App or repeater	Repeater only
Ease of Use	Moderate	Very easy	Moderate
Hardware Needed	Flexible setup	None for apps	Specific IRLP board
Best For	Advanced users or networks	Casual operators	Linking repeaters securely

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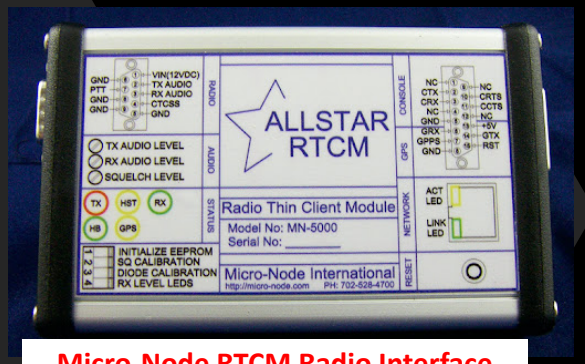
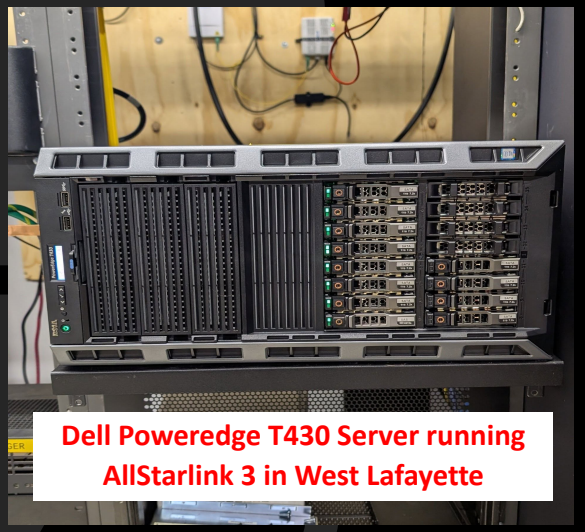
Why did we choose AllStar Link for our host?

- We were already used to the platform. myGMRS and GMRS Live! Networks were all built off the same exact software.
- Extremely customizable! Being able to build a server from the ground up using Debian 12 to host everything and customize everything to our needs.
- All-Star Network was not in the local area as far as repeater systems. There is large repeater network in Southern Indiana (W9ILS) and some scattered repeaters across the state that are All-Star capable.
- All-Star Network uses analog FM, the easiest and cheapest way for a newly-licensed operator to get into the hobby.
- Ability to host Micro-Node RTCM's all on one server with ability to add GPS units for receiver voting
- Excellent audio quality
- Ability to view all connected nodes and see live status of each node
- Multiple ways to connect in if out of range of a repeater including: Hotspot, mobile apps like RepeaterPhone for iOS, DV Switch for Android, or desktop software like Transceive for macOS and DV Switch for Windows. These is also ability to use DV Switch to link to digital protocols like DMR, P-25, or D-Star, and even the option to connect a VOIP telephone via services like Hamshack Hotline.
- Ability to add on-demand weather alerts from Skywarn Plus or announcements that can be played back to an individual repeater.
- Ability to stream ARRL Audio News or Amateur Radio Newsline over a specific repeater



Micro-Node RTCM Radio Interface



Dell Poweredge T430 Server running AllStarlink 3 in West Lafayette

WC-IND Allmon3 Live Status Page – wc9in.duckdns.org/allmon3

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WC-IND Repeater/RTCM Monitoring Dashboard

626480 - WC9IN WC-IND Hub Fowler, IN

Conns: 12 Up: 2d 20:49:04

Transmit - Idle

	Node	Description	Last Recv	Conn Time	Direction	Connect State	Mode
	57301	KD9EJE 440.500 Front Royal, VA	00:06:52	19:42:11	IN	ESTABLISHED	Transceive
	523900	W9SMJ HUB Russiaville, IN	00:07:43	59:19:26	IN	ESTABLISHED	Transceive
	626482	WC9IN WC-IND Hub-B Fowler, IN	01:14:54	55:04:17	IN	ESTABLISHED	Transceive
	59677	N9MTF 147.270 Columbia City, Indiana	07:49:15	07:02:23	IN	ESTABLISHED	Transceive
	626481	WC9IN 444.825 Repeater Fowler, IN	18:44:34	59:17:57	IN	ESTABLISHED	Transceive
	626484	WB9ARC 443.675 Repeater Williamsport, IN	21:45:49	59:18:07	IN	ESTABLISHED	Transceive
	523903	W9SMJ 146.955 Repeater Galveston, IN	26:30:00	59:19:26	IN	ESTABLISHED	Transceive
	626485	WC9IN TG 79507 TGIF Bridge Fowler, IN	63:52:42	59:19:26	IN	ESTABLISHED	Transceive
	63882	W9BDH Lafayette, IN	Never	58:00:32	IN	ESTABLISHED	Transceive
	525350	KD9QGN 446.1000 Dyer Indiana	Never	58:30:38	IN	ESTABLISHED	Transceive
	632891	WC9IN Simplex Hotspot Crawfordsville, IN	Never	59:19:26	IN	ESTABLISHED	Transceive
	ZELLO	Direct Client	Never	59:17:26	IN	ESTABLISHED	Transceive

523900 - W9SMJ HUB Russiaville, IN

Conns: 5 Up: 20d 20:01:17

Transmit - Idle

	Node	Description	Last Recv	Conn Time	Direction	Connect State	Mode
	626480	WC9IN WC-IND Hub Fowler, IN	00:06:51	68:49:01	OUT	ESTABLISHED	Transceive
	523906	W9SMJ 442.525 Repeater Russiaville, IN	00:07:43	471:44:26	IN	ESTABLISHED	Transceive
	523907	W9SMJ 442.575 Repeater Frankfort, IN	18:11:04	68:48:00	IN	ESTABLISHED	Transceive
	523908	W9SMJ 447.575 Remote RX Lafayette, IN	21:46:01	24:16:53	IN	ESTABLISHED	Transceive
	523904	W9SMJ 147.045 Repeater Frankfort, IN	Never	255:07:06	IN	ESTABLISHED	Transceive

All nodes (repeaters/hotspots/links) connected to these “Hubs” would hear the same traffic

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Fowler WC9IN 444.825 Repeater

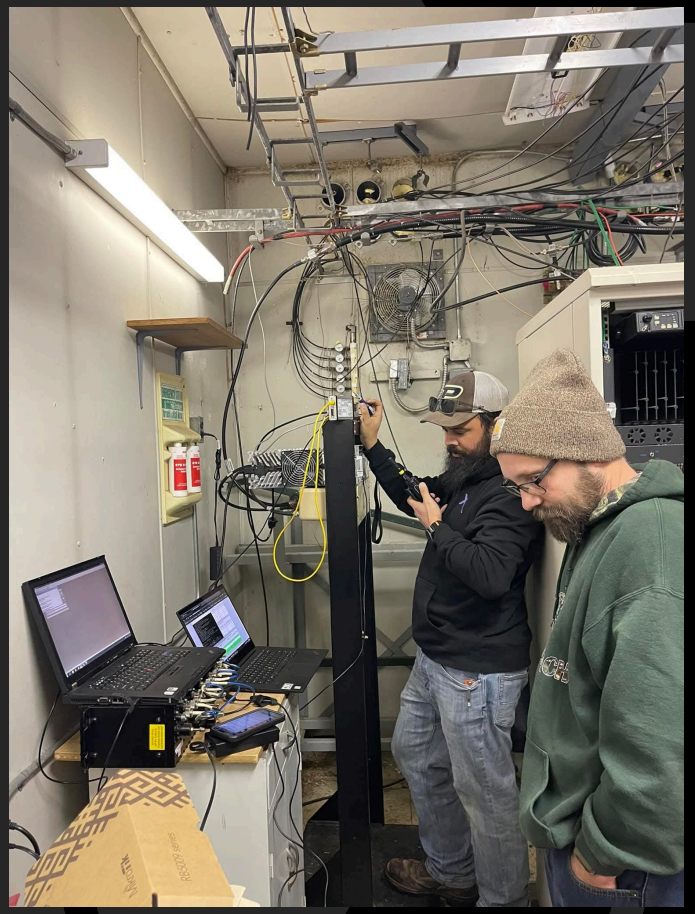
- Motorola Quantar running 110 watts
- DB-408 UHF Folded Dipole at 195’
- Currently the only HAM repeater in Benton County
- Located in Northeast Benton County just north of Wadena
- Provides excellent coverage for Benton, Newton, White, Jasper, NW Tippecanoe, and parts of East Central Illinois
- Has backup batteries for Repeater and Internet with runtime of almost 3 days.
- PL Tone of 173.8

Williamsport WB9ARC 443.675 Repeater

- Motorola CDM 750 Radios (running 4 watts) connected to a Kenwood 100-watt amplifier
- DB-420 16-Bay UHF Folded Dipole at 225’
- Equipment donated to build this repeater by K9NMT, W9SMJ, and the Benton County EMA.
- Warren counties only HAM repeater, had very little use before upgrading.
- Excellent coverage for Fountain/Warren Counties plus Montgomery, Parke, Danville, IL, and more.
- Site has generator backup
- PL Tone of 88.5

Frankfort W9SMJ 442.575

- Motorola MTR2000 UHF 100 Watt Repeater
- DB-420 16 Bay UHF Folded Dipole at 300’
- Formally the Frankfort 625 GMRS repeater which was decommissioned. The 442.575 has not been on the air since around 2020 and was formerly a YSF repeater.
- Located on the Clinton/Boone county line providing excellent coverage for both counties plus Montgomery, Tippecanoe, and more.
- Remote Receive site added in West Lafayette to help lower power stations in Tippecanoe county get into the system.
- PL for repeater is 173.8, PL for remote receive is 131.8



Repeaters converted over to All-Star Link

- W9SMJ Russiaville 442.525 PL 131.8 – Antenna at 200’
- W9SMJ Galveston 146.955 PL 131.8 – Antenna at 300’
- W9SMJ Frankfort 147.045 PL 173.8 (Coming soon) – Antenna at 300’

WC9IN 444.825 Repeater Coverage

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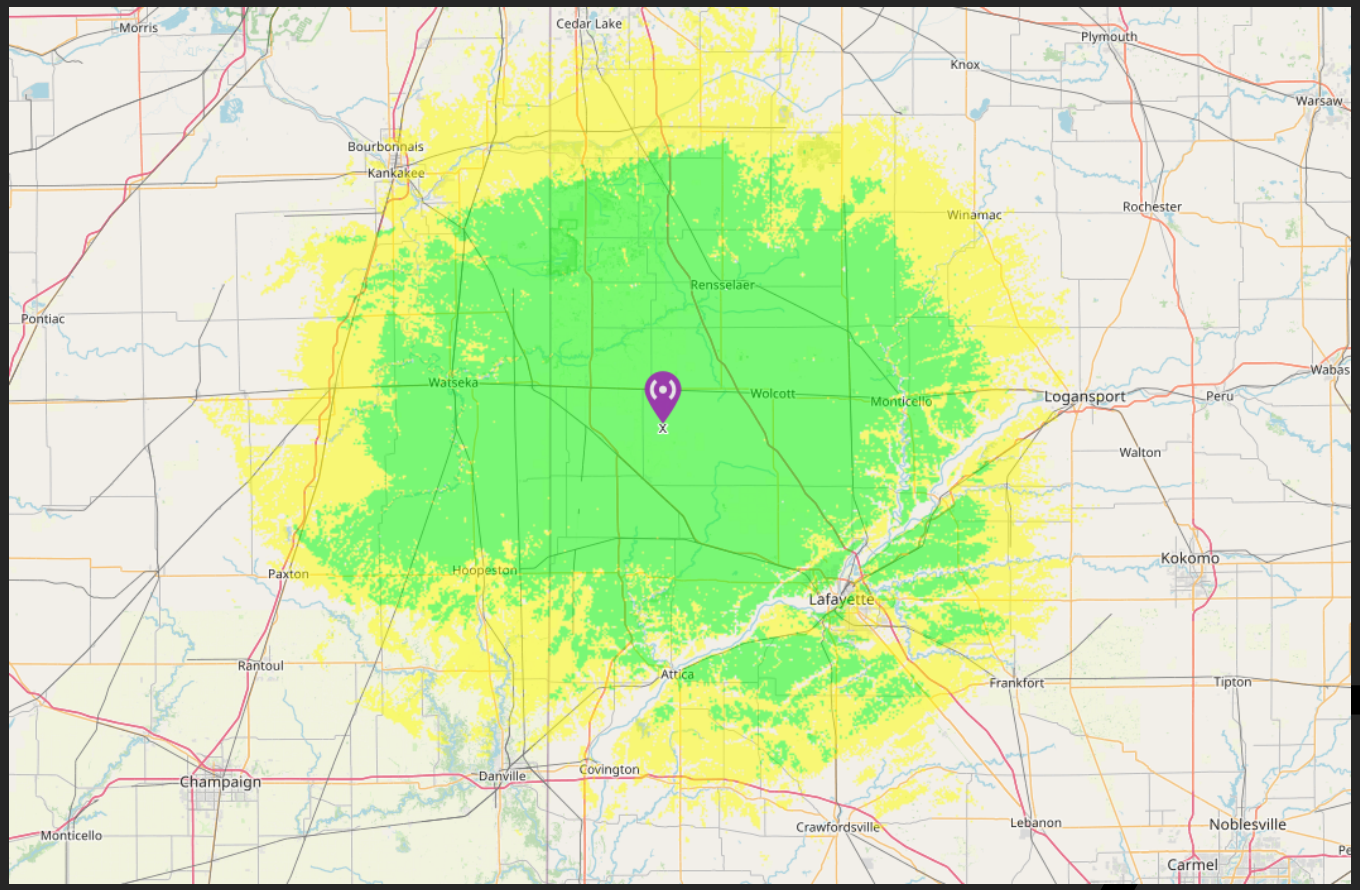

Site used for creating coverage maps: https://www.ve2dbe.com/rmonline_s.asp

70cm Repeater Coverage Map

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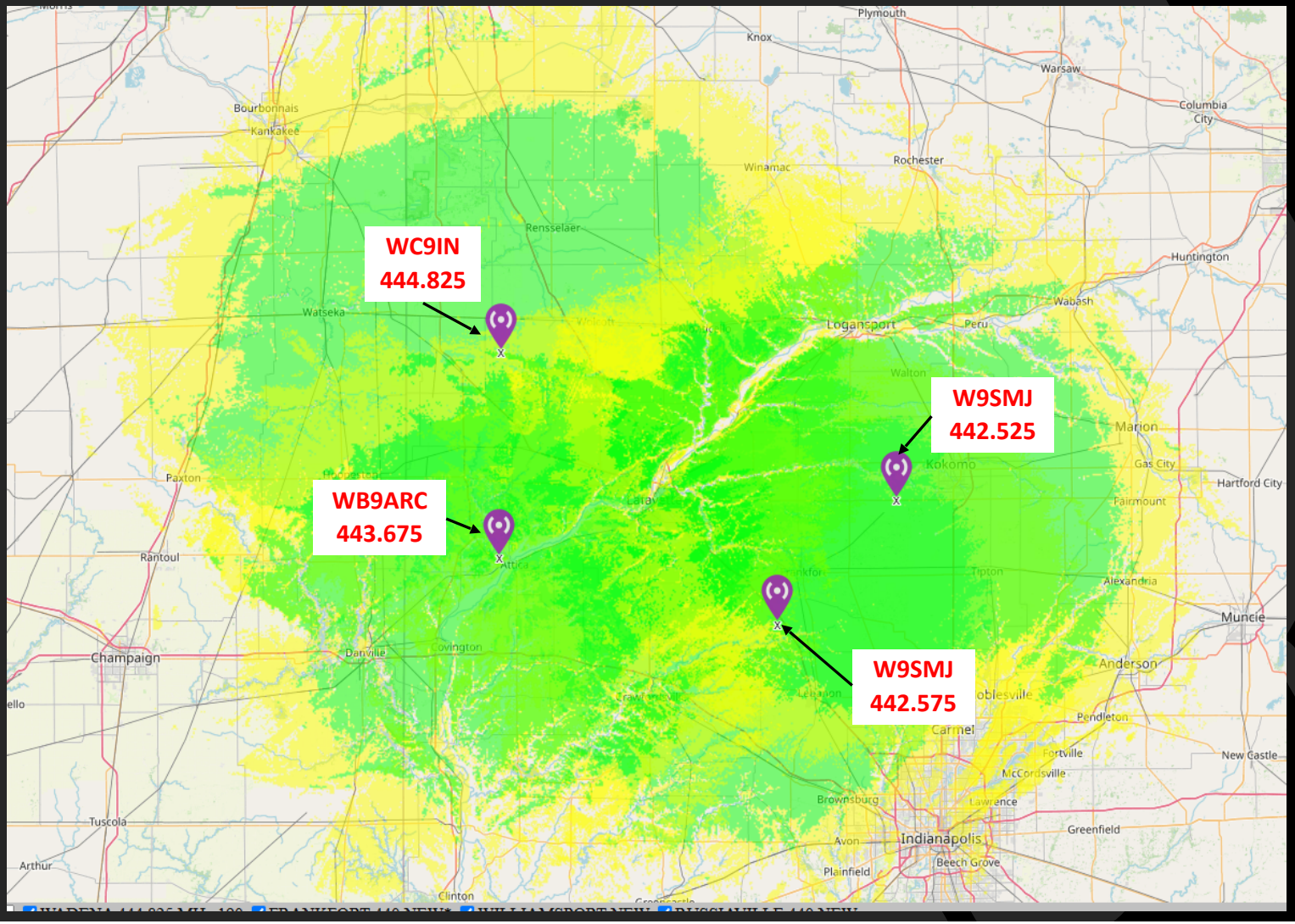

I-65 Coverage:
Frankfort – Marion County north line to MM 180

Fowler – MM 176 to Lake County South line

I-74 Coverage:
Williamsport – Danville, IL to IN-32

Frankfort – US-41 to Brownsburg, IN

2m Repeater Coverage Map

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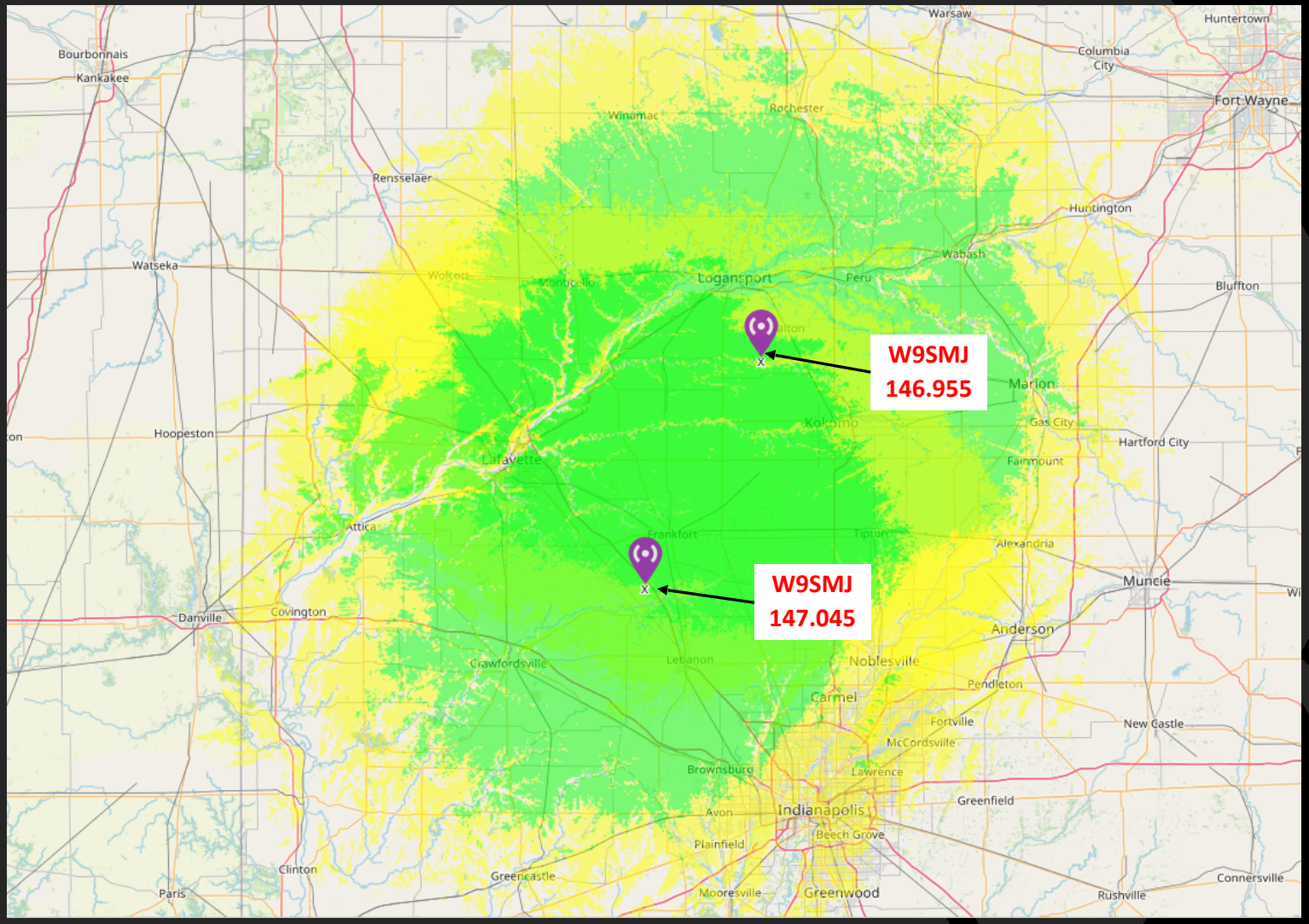

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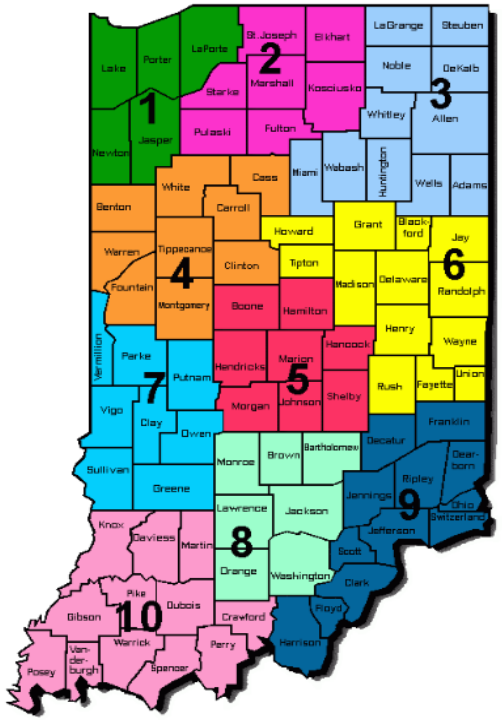
Indiana ARES District Map

By AK9R, 1 September, 2023



Indiana ARES districts correspond to Indiana Department of Homeland Security districts.

Our linked repeaters cover about 85-90% of Indiana ARES/IDHS District 4 from a mobile.

With a solid base station, there is 100% coverage.

The system is open for any type of ARES related use.

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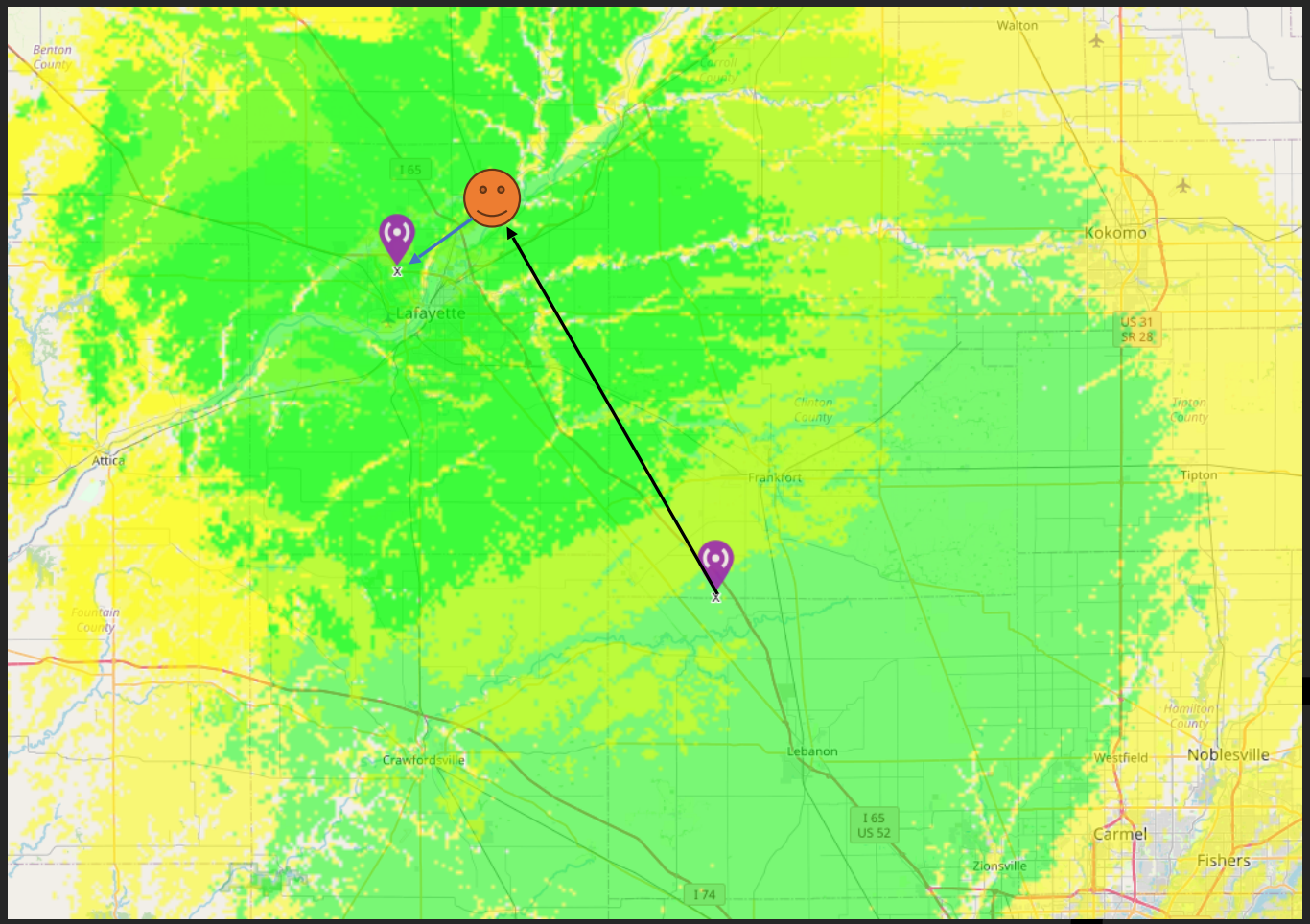
How does a Remote Receive Site Work?



When using a remote receive site, the user transmits into the receive site but will receive their audio back from the actual repeater site. (Notice the arrows the audio path travels)

Users can expect to hear the last word said when they unkey come back to them. Is this due to internet latency.

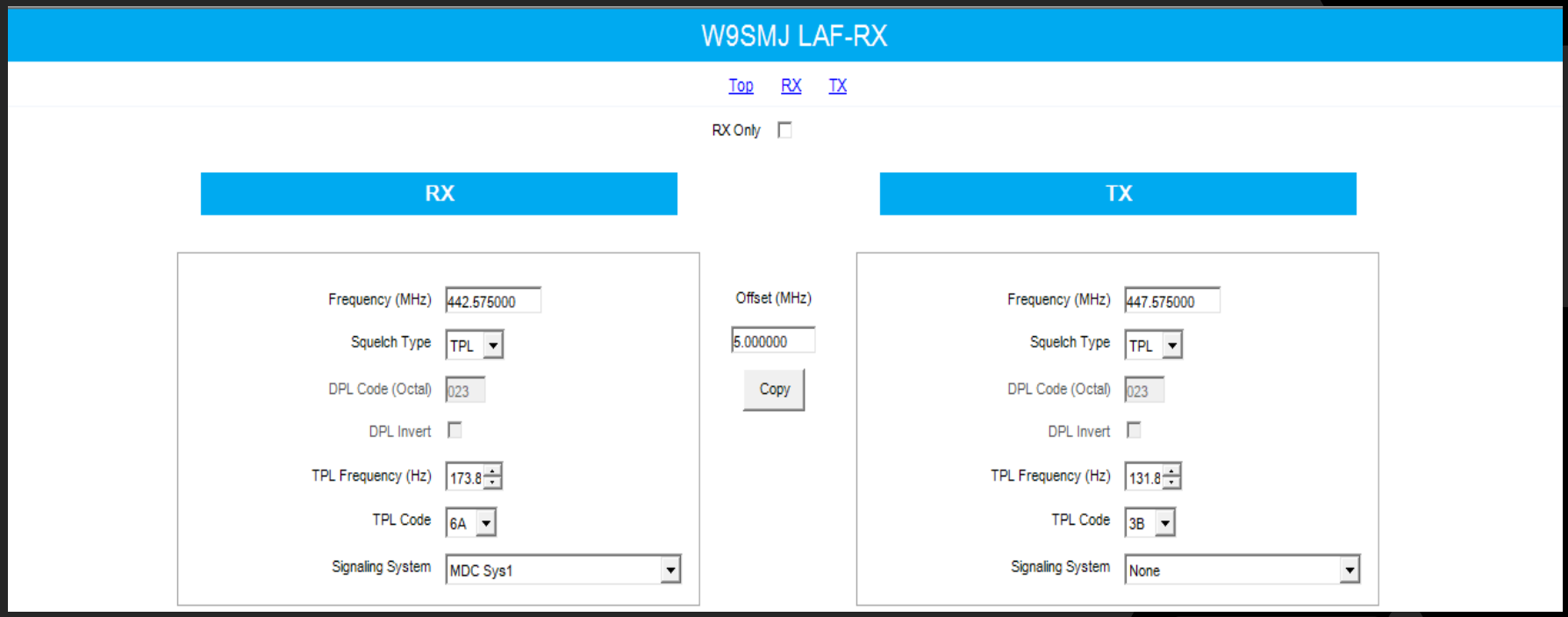
Programming Example: Taken from Yaesu FTM-500/RT Systems

4	444.82500	449.82500	5.00 MHz	Plus	FM	☑	WC-IND Fowler	T Sql	173.8 Hz
5	444.82500	447.57500	2.75 MHz	Plus	FM	☑	WC-IND Laf-RX	Tone	131.8 Hz
6	442.57500	447.57500	5.00 MHz	Plus	FM	☑	W9SMJ Frankfort	T Sql	173.8 Hz
7	442.57500	447.57500	5.00 MHz	Plus	FM	☑	W9SMJ Laf-RX	Tone	131.8 Hz
8	442.52500	447.52500	5.00 MHz	Plus	FM	☑	W9SMJ Russiavill	T Sql	131.8 Hz
9	443.67500	448.67500	5.00 MHz	Plus	FM	☑	WB9ARC Williamsp	T Sql	88.5 Hz
10	147.04500	147.64500	600 kHz	Plus	FM	☑	W9SMJ Frankfort	T Sql	173.8 Hz
11	146.95500	146.35500	600 kHz	Minus	FM	☑	W9SMJ Galveston	T Sql	131.8 Hz

Some Part 97 radios do not allow split CTCSS/PL tones.
For example, the W9SMJ Frankfort repeater has a transmit and receive tone of 173.8 but when using the Remote Receive in West Lafayette, it has a tone of 131.8 to activate it. In the above example, I had to set up using TONE 131.8 Which leaves the receive side of the radio listening to the repeater on CSQ.

I also made a “Hybrid channel” for the Remote receive site in West Lafayette that would still transmit to the receive site But then listen to the Fowler repeater instead. This is accomplished by changing the offset to 2.75MHz. This is handy if The user is still close to the Receive site in West Lafayette but can hear the Fowler repeater better than the Frankfort.

Programming Example: Motorola XPR5550e for the Remote Receive Site



Commercial radios will allow manual frequency entry and squelch type to fit the user's needs.

Upcoming Plans:

- Starting a structured net sometime in March
- Looking at streaming ARRL Audio News once a week (Trialed on Feb 10th)
- We have the option to connect to other hubs for nets. www.allstarnets.org has a list of open nets that are open for connection.
- Improved internet connections for Fowler and Williamsport. Currently both run on cellular modems.
- Looking into 5GHz or 60GHz point to point dishes.
- Adding Skywarn Plus weather alerts to broadcast specific alerts to certain repeaters
- Looking at GPS units later this year for voted receive between Frankfort and the remote receive site
- We do not have any plans at the moment to add any additional repeaters. Our focus was mainly for West Central Indiana.

West Lafayette GMRS Programming Party

WEST LAFAYETTE GMRS

Sunday February 23rd
2 PM to 5 PM
Lafayette Police Dept. Training Center
1301 South St
Lafayette, IN 47904

Big thank you to TARA and LPD for letting us use this space.
Bring a radio, bring a laptop, or bring both!

Open to GMRS and Amateur Radio operators

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For any additional information, please go to our website at www.wc9in.com

Repeaterbook links, our Facebook page, and the link to our status page can be found there.

Any additional questions, please e-mail me at k9nmt@yahoo.com

Thank you and we hope you enjoy!