

Net Frequencies

1. Introduction

This document defines pre-designated frequencies that may be used by Tippecanoe County, Indiana Amateur Radio Emergency Service® (ARES®) during the operation of training nets, as well as during times of emergency operations.

2. Responsibilities

The Tippecanoe County ARES Planning Committee is responsible for the development and maintenance of this document. (The Tippecanoe County EC and his directly appointed Assistant ECs comprise the Planning Committee.)

Each participant in Tippecanoe County ARES nets is responsible for thoroughly reviewing and following the procedures defined in this document. Each member of Tippecanoe County ARES should consider programming these frequencies into the memory channels of their radios to permit rapid frequency changes during ARES operations.

3. Related Publications

NET 1-1	Net Management (Net Control Station Procedures)
NET 1-2	Net Operations
NET 1-4	Net Formats

4. Definition of Terms

AEC	Assistant Emergency Coordinator
APRS	Automatic Packet Reporting System
D-STAR	Digital Smart Technology for Amateur Radio (digital voice and lo/hi speed data protocol)
EC	Emergency Coordinator
FCC	Federal Communications Commission
LAN	Local Area Network
NBFM	Narrow Band Frequency Modulation
NCS	Net Control Station
Served Agency	A public service agency with which Tippecanoe ARES has established a support agreement through the implementation of a formal Memorandum of Understanding.
UHF	Ultra High Frequency – generally considered from 300 MHz to 3000 MHz. This includes the 440 MHz, 900 MHz, 1.2 GHz, and 2.4 GHz amateur radio bands, as well as the 450 MHz and 700/800 MHz public service bands. It is more commonly considered as referring to the 440 MHz (or 70 cm) band.
VHF	Very High Frequency – generally considered from 30 MHz to 300 MHz. This includes the 6-meter, 2-meter, and 220 MHz amateur radio bands. It is more commonly considered as referring to the 2-meter band.

5. Guidelines

5.1 Frequencies

The following frequencies, as well as those prescribed by an approved operating plan, may be used by Tippecanoe County ARES during training and emergency operations.

Frequency (MHz)	CTCSS / Mode	Alpha Tag	Usage / Notes	Memory Channel
147.135 (+)	88.5/FM	WI9RES	Primary Repeater for ARES / SKYWARN Operations	1
146.760 (-)	88.5/FM	W9YB 2M	Secondary Repeater (backup) for ARES Operations	2
443.775 (+)	88.5/FM	KA9VXS/R	Alternate Repeater for ARES Ops / SKYWARN Link	11 (1)
444.500 (+)	88.5/FM	W9YB 440	Alternate Repeater for ARES Operations	12 (2)
146.520	FM	CALL 2M	National 2M calling frequency	9
446.000	FM	CALL 440	National 70cm calling frequency	19 (9)
145.500	100.0/FM	TAC-A	Primary Tactical 2M FM simplex for ARES Operations	5
146.595	100.0/FM	TAC-B	Tactical 2M FM simplex	6
147.585	100.0/FM	TAC-C	Tactical 2M FM simplex	7
146.415	100.0/FM	TAC-D	Tactical 2M FM simplex	8
445.500	100.0/FM	TAC-1	Primary Tactical 440 FM simplex for ARES Operations	15 (5)
446.200	100.0/FM	TAC-2	Tactical 70cm FM simplex	16 (6)
446.975	100.0/FM	TAC-3	Tactical 70cm FM simplex	17 (7)
445.000	100.0/FM	TAC-4	Tactical 70cm FM simplex	18 (8)
147.420	FM	MA – ARC	ARES / American Red Cross Mutual Aid	
146.490	FM	INARES V	Indiana ARES VHF Simplex	
446.100	FM	INARES U	Indiana ARES UHF Simplex	
144.390	Packet	APRS	National APRS network	
145.010	Packet	PK145010	Packet Network (1200 baud)	
145.050	Packet	PK145050	Tippecanoe County ARES Packet (Primary)	
145.610	Packet	PK145610	Indiana ARES Packet Emergency Frequency (1200 baud)	
145.770	Packet	PK145770	Tippecanoe County ARES Packet (Secondary)	
440.125	Packet	PK440125	UHF Packet Network (Secondary) (1200/9600 baud)	
441.875	Packet	PK441875	UHF Packet Network (Primary) (1200/9600 baud)	
146.730 (-)	D-STAR	W9ARP CG	D-STAR Repeater for local ARES Communications	D02
444.300 (+)	D-STAR	W9ARP BG	D-STAR Repeater for linked ARES Communications	D01
145.670	D-STAR	DV TAC-A	Primary 2M D-STAR simplex	D41
147.480	D-STAR	DV TAC-B	Secondary 2M D-STAR simplex	D42
144.900	D-STAR	DV TAC-C	Tertiary 2M D-STAR simplex	D43
441.000	D-STAR	DV TAC-1	Primary 70cm D-STAR simplex	D44
445.670	D-STAR	DV TAC-2	Secondary 70cm D-STAR simplex	D45
434.000	D-STAR	DV TAC-3	Tertiary 70cm D-STAR simplex	D46
3.910	LSB	INARES80	Indiana ARES Primary HF Net frequency	
7.280	LSB	INARES40	Indiana ARES Backup HF Net frequency	

5.2 Frequency Usage

Actual frequency usage and channel designations will be defined in the appropriate operating plans, or as assigned by the EC, Operations AEC, or Planning AEC, as needed.

Tactical CTCSS tones are 100.0 Hz (primary), 156.7 Hz (secondary) and 167.9 Hz (tertiary), and will be assigned as needed. If other frequencies or signaling requirements are needed for specific functions, they will be announced and coordinated at the time required, if not included in the specific operating plans.

Very limited use will be made of the national 2-meter calling frequency (146.520 MHz) by Tippecanoe County ARES, and then only under certain circumstances. As time, attention, and equipment resources allow during a net, it should be monitored for transient operators by ARES personnel, who can respond to calls and provide information on the frequency(s) to be used.

5.3 Repeater Recovery

With the heavy dependency on repeaters for broad geographic coverage in the VHF and UHF bands, consideration must be given to the possibility that a repeater may fail or become unusable for a variety of reasons. The following procedure is to be used in the event a repeater becomes inoperable:

- A. The NCS will begin operating in simplex mode on the output frequency of the used repeater. That is the frequency being listened to by the members of the particular net.
- B. The NCS should request a station with the best elevation/coverage to assume net control responsibilities. This will provide maximum coverage to all other members of the net. If the new NCS does not have a roster of stations involved in the net, the net roster (by tactical call signs, if used) will be provided to the new NCS by the NCS relinquishing net control responsibilities.
- C. The new NCS will attempt to contact each station in the net. If problems exist in contacting every station, stations located in positions that may be able to relay will be asked to determine if they can contact the station(s) that cannot communicate directly with the NCS. This process will continue until all stations are accounted for. (NOTE: Any priority traffic that is presented must be handled if at all possible and takes precedence.)
- D. If the designated backup repeater, or another alternate repeater, is available, the original NCS should move to the backup repeater after transferring control of the original repeater's output frequency to the new NCS. The NCS operating in simplex mode on the original repeater frequency will begin moving stations one at a time to the backup or alternate frequency, beginning with the ones that must have a relay to contact the NCS. This will verify transition of all stations to the backup or alternate repeater, and do so in a controlled fashion.

5.3.1 Special Considerations to Repeater Recovery

5.3.1.1 Stations Out of Simplex Range

Participants that may not be able to hear instructions from the NCS, or its relays, should periodically monitor any alternate repeater frequency(s) that may be designated in the applicable operating plan to determine if the net has moved. If not successful, the net participant should attempt to contact someone on any working repeaters within range, or on 146.520 MHz, the 2-meter calling frequency. Other amateurs may be able to make contact with the station, and provide information on the frequency(s) to be used.

5.3.1.2 Repeater Unusable, but still Transmitting

Should a situation occur that renders the repeater unusable, yet it is still transmitting (due to either deliberate or unintentional interference, technical problems, stuck mic, etc.), the repeater's output frequency may not be able to be used for simplex operation, even for a temporary operation such as an orderly movement of participants to an alternate repeater. In this case, the NCS should immediately move to the designated backup repeater and continue net operations there. The NCS should attempt to contact each station in the net once the move to the backup or alternate repeater has occurred.

5.3.1.3 Widespread Repeater Failure

Should none of the local 2-meter or 440 FM repeaters be operational (not transmitting), the NCS will begin operating in simplex mode on the output frequency of the primary repeater. That is assumed to be the frequency being listened to by TCARES members and other local amateurs. Simultaneously, another NCS should attempt to contact ARES members on the "fail-safe" simplex frequency of 146.520 MHz, and move them to the simplex net on the primary repeater output frequency.

The NCS may continue to conduct simplex net operations on the primary repeater output frequency, or move the net to a designated Tactical simplex frequency. If the net moves to a designated Tactical simplex frequency, details should be announced multiple times on both the primary repeater output frequency and 146.520 MHz before and after moving.

In addition to the new net frequency, a number of stations should continue to monitor 146.520 MHz (and the primary repeater output frequency, if applicable), ready to respond to any calls for information. As long as all repeaters continue to remain out of service, an announcement should be made on 146.520 MHz (and the primary repeater output frequency, if applicable) at regular intervals, informing stations of the frequency(s) being used for ARES net operations.

NOTE: Long-duration nets on the calling frequency of 146.520 MHz must NOT be allowed to take place. The NCS should quickly establish communications with a few net participants and immediately move them to the main net frequency. 146.520 MHz must be kept relatively clear, particularly during times of disaster, to allow for emergency and priority calls to be made, monitored, and responded to. Its primary ARES use should be for responding to questions about the net, and directing stations to the appropriate frequency(s). ARES personnel should monitor 146.520 MHz, whenever practical, during any ARES operation.

Remember – The NCS is always in charge of the net for which he or she is responsible, including the move to an alternate frequency. All members of the net are to follow the NCS’s instructions.

5.4 FM Cross-band Repeater Frequencies

Based on standards established by the ARRL and the Indiana Repeater Council, Inc., the following frequencies are authorized for use in temporary cross-band repeater operation, as might be found in a mobile being used to cross-band a low power 70cm radio to a 2M frequency. Care should be taken to avoid interference to and from others using a similar capability located nearby.

445.7375	445.7625	445.7750	445.7875
445.8125	445.8250	445.8375	445.8500
445.8625	445.8750	445.8875	445.9000

In addition, the following VHF simplex frequencies may be used when cross-band operation is needed to access a particular UHF frequency:

144.450	145.540	145.580	145.640
146.445	146.565	147.450	147.540

The use of frequencies for cross-band repeater operation should be coordinated through the EC, Operations AEC, or Planning AEC. They may, at their discretion, assign temporary use of designated tactical frequencies for cross-band repeaters during ARES activities, rather than the choices listed in this sub-section. Also, be sure to reference any applicable operating plan for pertinent frequency assignments.

5.5 Suggested Memory Channel Programming

A list of memory channel contents has been developed for optional implementation by Tippecanoe County ARES members when programming their transceivers. While not a requirement, the suggested common memory channel scheme will facilitate a certain degree of familiarity when ARES personnel find themselves using a transceiver model that they may not be used to operating. Tippecanoe County ARES encourages its members to consider utilizing this programming scheme in their radios. In addition, a printed list of all frequencies and tones that are programmed into each transceiver should be kept with the radio for quick reference.

Only the primary and backup repeaters, calling frequencies, and tactical simplex channels are included in this suggested memory channel scheme. Users may program the non-designated memory channels with whatever contents they choose.

Memory Channel # (Dual-band radios with shared memory channels)	Channel Contents	Memory Channel # (2M only radios)	Memory Channel # (440 only radios, or dual-band non-shared memories)
1	WI9RES	1	
2	W9YB 2M	2	
5	TAC-A	5	
6	TAC-B	6	
7	TAC-C	7	
8	TAC-D	8	
9	CALL 2M	9	
11	KA9VXS/R		1
12	W9YB 440		2
15	TAC-1		5
16	TAC-2		6
17	TAC-3		7
18	TAC-4		8
19	CALL 440		9

Consult section 5.1 (Frequencies) of this document for the specific frequencies and tones of the referenced channel contents.

Those with D-STAR capable transceivers should contact the Operations AEC for suggested memory channel programming for specific D-STAR frequencies.

6. Release Information

The Tippecanoe County ARES Planning Committee is responsible for the development and maintenance of this document.

The date of publication for this document is 08 APR 2010.

Change log:

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| 08 APR 2010 | Section 5.5, "Suggested Memory Channel Programming", was added. Changes to frequencies in Section 5.4, "FM Cross-band Repeater Frequencies". In section 5.1, "Frequencies", changed UHF packet frequencies, added a Memory Channel column, and updated some of the notes. |
| 03 JAN 2010 | In section 5.1, "Frequencies", tactical simplex frequencies were added. Removed a VHF simplex frequency in section 5.4, "FM Cross-band Repeater Frequencies". Removed a reference to a document in section 3, "Related Publications". Removed section 5.5. |
| 12 NOV 2009 | In section 5.1, "Frequencies", some tactical simplex frequencies were changed. Packet frequencies were changed and added. Changed usage/notes of various frequencies. Significant changes to section 5.3.1.3, "Widespread Repeater Failure". |
| 18 JUN 2009 | In section 5.1, "Frequencies", changed one VHF packet frequency and added two UHF packet frequencies. Changed usage/notes of various frequencies. |
| 11 NOV 2008 | In section 5.1, "Frequencies", added Packet frequencies, renamed Packet channel designators, and clarified usage of Packet frequencies. |
| 01 SEP 2008 | In section 5.1, "Frequencies", changed the frequency for channel "DV TAC-B". Added nationwide ARES mutual aid frequency (147.420 MHz) for American Red Cross. Removed two frequencies from section 5.4 to help avoid potential co-channel interference. |
| 31 AUG 2008 | In section 5.1, "Frequencies", changed the channel designators for the two local D-STAR repeaters to indicate RPT2 gateway programming. Changed minor wording in section 5.4, "FM Cross-band Repeater Frequencies", to clarify use of cross-band repeater operation. Added section 5.5, "Frequency Lists and Charts". |