SAINT LOUIS COUNTY ARES®
DIGITAL OPERATIONS MANUAL
PACKET RADIO SUPPLEMENT

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BACKGROUND

It is the intention of this plan to provide guidelines for training and usage of amateur radio volunteer communicators. The Saint Louis County ARES® organization recognizes the role of the Radio Amateur to government agencies as auxiliary communications links during times of emergency. It is also the intention of this plan to provide for adequate training and preparation of Saint Louis County ARES® operators to assist with the needs of the Saint Louis County ARES® Emergency Coordinator.

The Assistant Emergency Coordinator – Digital Operations shall establish the training and operational standards for new Saint Louis County ARES® volunteers and ensures that all new Saint Louis County ARES® digital operators are provided with the tools and training for digital communications to support the needs of the Saint Louis County ARES® Emergency Coordinator. The Digital Coordinator shall ensure that all digital operators within Saint Louis County have adequate training available and regular exercises so that the Saint Louis County area as a whole maintains a high degree of readiness.

OBJECTIVE

The Objectives below reflect the same Objectives that are defined in the Missouri Section ARES® Emergency Operations Plan – Digital Addendum located online at: http://ares-mo.org/plans.
- To provide an advanced high speed digital packet network for emergency service communications
- To provide training as required
- To use standard hardware, firmware, and software configuration(s)
- To be easy to set up and expand
- To be upgradeable for future technologies
- To be able to be built with available "off the shelf" equipment

PURPOSE

To provide guidelines and suggestions for amateur radio operators using digital communications, and to assist with routine and emergency communications links to served agencies and affiliated organizations. These include, but are not limited to; the State of Missouri Emergency Management Agency (SEMA), American Red Cross, Salvation Army, National Weather Service, other public service and disaster relief organizations, and affected areas of the Saint Louis County area during ARES® activation.

ORGANIZATION

An updated and more detailed list can always be found at http://www.stlares.org.

SAINT LOUIS COUNTRY ARES® DIGITAL OPERATIONS TEAM MEMBERS

- ASSISTANT EMERGENCY COORDINATOR – DIGITAL OPERATIONS
  - Peter B. Brisbine, NØMTH
  - n0mth.pb@gmail.com
- ASSISTANT DIGITAL OPERATIONS
  - TBD
  - TBD

TRAINING

It is the goal of the Digital Coordinator to provide routine training on a minimum quarterly basis depending on the needs defined by the Emergency Coordinator. Because of the different types of hardware and software available for digital communications, training will be kept to basic configuration, routine & emergency procedures, and digital operations within the Saint Louis County ARES® digital network.

STANDARDIZATION

Because of the variety of hardware and software available for digital communications, it is in the best interests to standardize hardware and software used within Saint Louis County ARES® in order to ensure the most efficient implementation, operations, and ongoing support.

HARDWARE

Hardware requirements are unique in that not only can hardware needs be met with standalone Terminal Node Controllers (TNCs), they can also be software emulated. For hardware, the minimum is required to function within the digital network:

- AX.25 compatible TNC with KISS mode
- Examples of these include and are not limited to:
  - Kantronics
  - MFJ
  - AEA

SOFTWARE EMULATION OF HARDWARE

Because many hardware functions can be emulated using Sound Card interfaces with additional software, it is necessary to standardize on the following:

- Any of the West Mountain Radio RIGblaster® hardware
- Any of the Tigertronics SignaLink™ hardware

SOFTWARE

Unique software is required for the different modes that are used by Saint Louis County ARES®. See the "DIGITAL MODES" section for more information about mode specific software.

SUPPORT

Because of the variety of hardware, software, and software emulation that can be used, support by the Digital Coordinator is provided on a 'best effort' basis in order to comply with the Objectives in this manual.

DIGITAL MODES

The following digital modes are the standard modes used within the Saint Louis County ARES® as directed by the Emergency Coordinator.

- APRS – Automatic Packet Reporting System
- MEPN – Missouri Emergency Packet Network
- NBEMS – Narrow Band Emergency Messaging System
- Packet
- WinDRM
- Winlink 2000

Recommended hardware, software and configuration information is found in the following pages broken down by the approved modes for Saint Louis County ARES®.

PACKET RADIO

Packet radio is a form of packet switching technology used to transmit digital data via radio or wireless communications links. It uses the same concepts of data transmission via Datagram that are fundamental to communications via the Internet, as opposed to the older techniques used by dedicated or switched circuits.[i]

- HARDWARE REQUIREMENTS
    - Laptop or Desktop PC
    - Tranceiver
    - Dedicated Terminal Node Controller (TNC) or Sound Card Interface such as a West Mountain Radio RigBlaster or Signalink interface with appropriate cabling to interface with your transceiver.

- SOFTWARE REQUIREMENTS
    - If you are using a dedicated TNC, it should have come with terminal emulation software to communicate with it. If not, you will need to use software such as HyperTerminal (Windows XP) or PuTTY.
    - If you are using a Sound Card Interface, you will need to follow the manufacturer's instructions.

PACKET NETWORK

WHAT IS MEPN?

Specific information on Missouri Emergency Packet Network can be obtained by visiting the MERS website: http://www.mersweb.org/userInfo.htm

WHO IS MERS, INC?

Specific information on the Missouri Emergency Radio Service, Inc. can be obtained by visiting the MERS website: http://www.mersweb.org

K0DO/MSTL NODE

The MSTL node is supported by MERS, Inc. as part of the MEPN network. This node is used by Saint Louis County ARES® as our primary digipeater resource in the Saint Louis area. It provides a link for local packet operators to other nodes on the MEPN across the state. It operates at 100 watts up 220' on the tower. This gives excellent coverage to Saint Louis County, Saint Louis City, St. Charles County, and Jefferson County.

PACKET RADIO PRIMARY LAN *(Everyday & Emergency Use)*

Because of the coverage of the MSTL node, Saint Louis County ARES® packet operations are on the following frequency:

MODE/METHOD	PRIMARY	SECONDARY
PACKET-1200	145.070MHz	Non-defined

SECONDARY LAN *(Development, Testing, Learning, Experimenting)*

The SECONDARY LAN is used for Saint Louis County ARES® development, testing, learning and experimenting with new modes, hardware, and software configurations. Fine tuning, and such can take place here before moving a node or system into the PRIMARY LAN. This way misconfigurations will not affect the PRIMARY LAN or cause problems with its operations. Remember that full implementation of network support in the SECONDARY LAN may not be there to successfully test. In that case, it's best to contact someone willing to assist in testing and continue testing here before working with the PRIMARY LAN.

MODE/METHOD	PRIMARY	SECONDARY
PACKET-1200	145.050MHz	145.010MHz

N0ARS/N0ARS-1 STATION INFO

The Saint Louis County ARES® packet station is routinely monitored by Peter Brisbine, N0MTH. It is running on a Kantronics KPC-3 v5.1 TNC. As such, the mailbox commands are the standard Kantronics command set.

USAGE

The following instructions will help you to make a connection to the Saint Louis County ARES® packet station N0ARS/N0ARS-1. Not only will this station provide support as directed by the Emergency Coordinator, it will also serve as a training and educational tool for new and seasoned packet mode operators to test their equipment. It is highly encouraged and welcomed that everyone use the station if they have packet capabilities.

CONNECTING TO N0ARS (Keyboard to keyboard)

If there is a local operator at the N0ARS station that is able to reply, you will be able to have a keyboard-to-keyboard "chat" with them. In packet, this is known as CONVERSE/CONV mode. This mode operates similar to other digital modes except that as you type your responses, it is not continuously sending each character out as you type them like PSK or RTTY. It sends characters out in packets of text instead.

If you want to practice this mode, coordination with the control operator of N0ARS is recommended first. Send an email to the Saint Louis County ARES® Digital Coordinator to setup a QSO time.

CONNECTING TO N0ARS-1 (Mailbox)

Assuming you have a correctly configured packet radio station that is operating on 145.070MHz, the steps below will assist you in making a successful connection to the N0ARS-1 mailbox. The mailbox can be used for the following; to store BULLETIN messages to other mailbox users, send PRIVATE messages to other mailbox users, practice sending NTS formatted messages, as well as allow you to obtain participation credit for packet radio.

NOTE: If you are located in Zone 3 of the county, you can also try making a direct connection to N0ARS-1 without digipeating thru MSTL by starting at Step 2 below.

1. Connect to MSTL
   a. Issued the command: **C MSTL**
   b. Wait for MSTL to reply with `*** CONNECTED TO MSTL`

2. Connect to N0ARS-1
   a. Issue the command: **C N0ARS-1**
   b. Wait for N0ARS-1 to reply with `*** CONNECTED TO N0ARS-1`

```
cmd:c n0ars-1
cmd:*** CONNECTED to N0ARS-1 [10/06/13 00:21:52]
[KPC3-5.1-HM$]
19482 BYTES AVAILABLE
THERE ARE 2 MESSAGES NUMBERED 13-17
Welcome to the N0ARS Packet Station. Please read the bulletin message.
ENTER COMMAND:  B,J,K,L,R,S, or Help >
```

3. After successfully connecting to N0ARS-1, you should then **LIST BULLETIN** messages available to be read by issuing the **LB** command.

```
ENTER COMMAND:  B,J,K,L,R,S, or Help >
LB
MSG#  ST SIZE  TO      FROM   DATE               SUBJECT
13    B  332   ALL     N0ARS  10/03/13 14:10:54  INSTRUCTIONS
ENTER COMMAND:  B,J,K,L,R,S, or Help >
```

4. Then you'll want to **READ** the BULLETIN with the subject of **"Instructions"**
   a. Issue the command: **R 13**

```
ENTER COMMAND:  B,J,K,L,R,S, or Help >
r 13
MSG#13 10/03/13 14:10:54 FROM N0ARS TO ALL
SUBJECT: INSTRUCTIONS
PATH: N0ARS
Welcome to the N0ARS Packet Station located in Mehlville, MO EM48. Please create
 a message addressed to N0ARS with your name, location, status of any traffic to
 check into the St Louis County ARES Packet Station, and the answer to the quest
ion below.

QUESTION: Have you tried APRS (Automatic Packet Reporting System)?

ENTER COMMAND:  B,J,K,L,R,S, or Help >
```

NOTE: The MSG# will not always be the same from week to week. Which is why each time you make a new connection to N0ARS-1, you will want to issue the LB command to check for new BULLETINS.

5. After reading the **"Instructions"** BULLETIN and receiving the "Question of the Week", you're ready to create a message reply.
   a. At the **>** prompt, issue the command: **sp n0ars**
   b. At the **SUBJECT:** prompt, issue the command: **Answer to QOTW**
   c. At the **ENTER MESSAGE 19--END WITH CTRL-Z OR /EX ON A SINGLE LINE** prompt, you're ready to type your reply.
   d. Once you've completed your reply with your name, location, status of any traffic, and the answer to the question of the week, enter in **/EX** on a new blank line and **press the [ENTER] key**.
   e. If you've issued the end of message command /EX correctly, you should then see the following response: **MESSAGE SAVED**

```
ENTER COMMAND:  B,J,K,L,R,S, or Help >
sp n0ars
19457 BYTES AVAILABLE
SUBJECT: Answer to QOTW

ENTER MESSAGE 21--END WITH CTRL-Z OR /EX ON A SINGLE LINE
Peter, Mehlville, No Traffic, Yes.
/ex
MESSAGE SAVED
ENTER COMMAND:  B,J,K,L,R,S, or Help >
```

6. If you are done creating, reading, and deleting your messages, you can simply tell the mailbox "bye".
    a. Issue the following command: **B**
    b. Wait for N0ARS-1 to reply with: ***** DISCONNECTED**

```
ENTER COMMAND:  B,J,K,L,R,S, or Help >
bye
*** DISCONNECTED [10/06/13 00:32:31]
cmd:
```

At this point, you will be back to the MSTL node to complete any other additional tasks you would like from MSTL. If you are done with MSTL, make sure you disconnect from it correctly by issuing the QUIT command.

If at any time you get lost or are unfamiliar with the Kantronics Mailbox commands, you can ask for help.
1. Issue the following command: **help**
2. The mailbox will respond with the following:

```
B(ye)          PBBS WILL DISCONNECT
E(dit) n [BPTYNFH] [>tocall] [<fromcall] [@BBS] "old" "new"
J(heard)       CALLSIGNS WITH DAYSTAMP
J S(hort)      HEARD CALLSIGNS ONLY
J L(ong)       CALLSIGNS WITH DAYSTAMP AND VIAS
L [x [y]] [;] LIST MESSAGES x THRU y YOU CAN READ
L <|> call     LIST MESSAGES FROM OR TO CALL
LB             LIST BULLETINS
LC [cat]       LIST CATEGORIES
LL n           LIST LAST n MESSAGES
LM(ine)        LIST UNREAD MESSAGES ADDRESSED TO YOU
LO [+|-]       LISTING ORDER
LT             LIST TRAFFIC
K(ill) n       DELETE MESSAGE NUMBER n
KM(ine)        DELETE ALL READ MESSAGES ADDRESSED TO YOU
R(ead) n       DISPLAY MESSAGE NUMBER n
RH n           DISPLAY MESSAGE n WITH HEADERS
RM(ine)        READ ALL MESSAGES ADDRESSED TO YOU
S(end) call    SEND MESSAGE TO callsign
S[B|P|T] call SEND BULLETIN, PRIVATE, or TRAFFIC
ENTER COMMAND:  B,J,K,L,R,S, or Help >
```

RESOURCES

General Packet Information: http://www.tapr.org/pr_intro.html
MERS/MEPN: http://www.mersweb.org
Kantronics KPC-3/3+ TNC: http://www.kantronics.com/products/kpc3.html

REFERENCES

i "Packet Radio." *Wikipedia*. Wikimedia Foundation, 28 Sept. 2013. Web. 05 Oct. 2013.