# ARES/Data:
# A PACKET-RADIO DATABASE FOR EMERGENCY COMMUNICATIONS

W. E. Moemer, WN6I
1003 Belder Drive
San Jose, California 95120
WN6I @ WB6ASR

David Palmer, N6KL
248 Omira Drive
San Jose, California 95123
N6KL @ WB6ASR, CIS: 73357,3157

## INTRODUCTION

ARES/Data is a multiple connect, specialized bulletin board system tailored to store and retrieve basic information about people, places, or things during an emergency. The program is a generalized form of the FINDER program (Family Information Database for Emergency Responders), written by David Palmer, N6KL and W. E. Moemer, WN6I[1]. Although ARES/Data allows access to the database via packet radio, the program can also operate stand-alone without the need for packet radio hardware. The actual operating mode is chosen by the system operator when the ARES/Data program is started.

ARES/Data is a system which allows collection and organization of information during a widespread emergency that overloads normal communications channels. The program is designed to be flexible, so that it can be used without change for both small and large disasters to organize information about victims, evacuees, locations, or even ham radio operators. Examples of situations in which ARES/Data could be used are:

- registration of individuals at Red Cross shelters
- patient/victim tracking in a multiple casualty incident
- maintaining staffing information about hams assigned to an emergency
- listings of road closures or damage reports
- logging reports from SKY WARN observers during periods of severe weather

With alternate power sources and their own frequencies, Amateur Radio Emergency Service (ARES) operators can provide the ARES/Data service without tying up critical communications channels or relying on commercial power.

## ARES/Data SYSTEM OVERVIEW

There are three major elements to the ARES/Data system:

- ARES/Data software and database
- Data Concentrators
- Voice operators

The central element of the ARES/Data system is the computer on which the ARES/Data program is running. The ARES/Data program collects and collates current information about people or items in the system, according to the needs of the incident. The program establishes and maintains the actual database on floppy disk or hard disk at this central computer. In general, the operator at the computer keyboard can add new records to the database, delete incorrect records, perform searches for specific information, and generate database summaries. The ARES/Data program will run on any IBM® Personal Computer DOS[2] or IBM-compatible system with at least one floppy disk, although a hard disk increases the allowable size of the database and improves performance.

If remote access is desired, addition of a serial port, TNC, and radio allows the central database computer to become the hub of a packet radio network in which up to eight remotely connected stations can access the information in the ARES/Data database. These packet radio stations, called "Data Concentrators," can update or query the shared database. This data access occurs by exchanging updates or queries in a simple, precise, and well-defined format.

Data Concentrators extend the coverage of the ARES/Data system. They are the input/output ports of the ARES/Data database when remote access is needed. The Data Concentrators can also act as local net controls for any participating voice operators within their range. If voice operators are not needed, the packet operators interact with the public and/or disaster officials directly.

The Voice Operators enter the ARES/Data system when the points of contact with those needing information are numerous and/or spread over a wide area. These amateurs are also the public face of the ARES/Data system. They can be the 'reporters' live at the scene, sending status

updates and requests to the Data Concentrators. They also ensure delivery of responses to the persons making status requests.

Emergency responders, their families, evacuees located at a particular shelter, and responsible agency officials access the ARES/Data system by contacting a participating amateur radio operator.

## DESCRIPTION and O P E R A T I O N of the ARES/Data SYSTEM

### THE ARES/Data PROGRAM

The ARES/Data software was written by W. E. Moemer, WN6I, and David Palmer, N6KL. It may be run in either of two modes: stand-alone with no TNC support and no remote access, or by changing the configuration file, the program will control a TNC that allows multiple remote connections. If TNC support is chosen, the program requires a TNC with WA8DED firmware, because host mode is used for communication between the computer and the TNC. No requirement is placed on the other TNCs connected to the ARES/Data database machine, except that they use AX.25 link-layer protocol. The ARES/Data program is written in Turbo Pascal$^{TM}$ Version 4, and uses Turbo Database Toolbox$^{TM3}$ for management and indexing of its B-plus structured tree. Briefly, ARES/Data may be regarded as a specialized multiple connect BBS with a specific command set tailored to the handling of STATUS INPUT information and SEARCH REQUESTS.

The ARES/Data database is simply a collection of records. Each record consists of four main items or "fields" plus a message item. The information in the four main fields can be sorted or searched as required. The rest of this section provides examples and a condensed user manual for the ARES/Data system.

### GENERAL RULES FOR CURRENT INFORMATION INPUT / SEARCH REQUESTS

All basic commands can be entered either at the main ARES/Data keyboard or at any one of the remotely connected packet stations. In addition, the operator at the main ARES/Data keyboard (the "sysop") has an additional set of commands that allow direct communication with the TNC, the printing of a log, backups, and disk report files.

### SYNTAX FOR CURRENT INFORMATION INPUT:

To add a record to the database, the operator simply enters values for the four fields and any message, in order, with separators between the fields. The only valid separator is the comma. Within a field, leading and trailing blanks are ignored, but imbedded blanks ARE significant. If no value is desired for a particular field, that field is just skipped by adding an extra comma. The

database will fill that field with ten blank characters. For example,

```
field1,field2,field3,field4,
    message<cr>
```

(<cr> means carriage return)

### Fields 1 through 4

The four fields are very general. Each can have up to 20 characters, with imbedded blanks. The meaning of each field is defined at the beginning of the event by the ARES officials, depending upon the nature of the event and what type of information needs to be tracked. The sysop can issue a "labels" command that will give specific names to each of the four fields to help the operators remember the purpose of each field.

### Message

MESSAGE is an optional, free-form field that can be up to 80 characters in length. It could contain a message, a phone number, an address, or other information deemed useful for the incident.

### Examples of Data Input

```
85553195,joe,12,sj34<cr>
Johnson,Mary,93445,sj13,home
        2333   Maplenut   St   SJ
        617-555-2368<cr>
```

All of the input information is stored in the database as a record of the status of a particular person, place, or thing at a particular time and date. The time and date are added automatically by the ARES/Data program. Further STATUS INPUT packets for the same person, place, or thing will also be saved in the database. The time and date identifies which information is most recent.

### SYNTAX FOR SEARCH REQUESTS

The search commands instruct the database to look for ALL entries with the same value for field 1, 2, 3, or 4. For example:

| | |
|---|---|
| /1,value<cr> | Searches for "value" in field 1 |
| /2,value<cr> | Searches for "value" in field 2 |
| /3,value<cr> | Searches for "value" in field 3 |
| /4,value<cr> | Searches for "value" in field 4 |

(For convenience in typing, the question mark "?" may be used instead of the diagonal bar "/"--

both are treated identically). A status report listing all information for each match is sent back to the requesting packet station. The first line gives the search value and the field number. At the end of the report, the line

```
ARES/Data Search done at HHMM, nn
hits.
```

is sent, which signifies no more information coming, and that "nn" matches (or hits) were found in the database at time "HHMM".

Value

VALUE must exactly match what was originally typed in for the selected field, with leading and trailing blanks removed, and without regard for case.

Examples of Search Requests

```
/1,5553195<cr>
/2,wlaw<cr>
/3,mercyhosp<cr>
/4,85563<cr>
```

SYNTAX FOR SUMMARY REQUESTS

A Summary command is provided that prints a listing of all the distinct entries in a given field, with the total number of like-named items for each distinct entry. For example, if ARES/Data were being used to maintain a list of evacuees, and field 3 was designated for "shelter location", then the command "$3" would print a list of all distinct shelter names in use, and adjacent to each, the number of records (people) in the database at each shelter would be printed.

```
$1<cr>    Produces a summary on field 1
$2<cr>    Produces a summary on field 2
$3<cr>    Produces a summary on field 3
$4<cr>    Produces a summary on field 4
```

LISTING SPECIFIC ENTRIES (RECORDS) IN THE DATABASE

Each record is automatically assigned a unique record number for identification purposes.

```
l nnnnn<cr>    lists record nnnnn
```

DELETING SPECIFIC ENTRIES (RECORDS) FROM THE DATABASE

```
d nnnnn<cr>    deletes record nnnnn
```

This function is always enabled at the sysop keyboard. Its use by remotely connected packet stations is controlled initially by the configuration file during program startup. Thereafter, the sysop can disable or enable this function as necessary. Be extremely careful in using this command! Always list the record first before deleting to be sure you have the right one.

CONFERENCE BRIDGE (Roundtable)

This feature allows any connected station to send messages to other connected stations or to the sysop. The conference bridge illustrates how the ARES/Data system operates as a hub-oriented network, with all transactions passing through the central database station.

Users command:

The users command in the form "users<cr>" or "u<cr>" returns a list of the callsigns of currently logged-on packet stations. The response is of the form:

```
At WN6I-1:   N6KL   W6BB-3   KJ6K
```

Tell command

The Tell command allows connected packet stations to use ARES/Data as a conference bridge, or roundtable. The general format is:

```
tell callsign message<cr> or:
t callsign message<cr>
```

For example:

```
tell  w6bb-3  We   have   lots   of
people here at SJ12<cr>
```

The message "We have lots of people here at SJ12" is sent to the connected station W6BB-3 prefaced by a time stamp and the call of the station originating the tell command. In this case, if the tell command was sent by KJ6K, W6BB-3 sees:

```
1230  KJ6K>  We   have   lots   of
people here at SJ1.2
```

The special callsign "*" or "all" is used to send a message to all connected stations. The special callsign "sysop" sends the message to the sysop at the ARES/Data database station. It is not necessary to enter the entire callsign--just the suffix or some other substring will do. In this case, the message is sent to any connected station whose callsign contains this substring. This feature can be used to create multiple roundtables. For example, packet stations located at, say, hospitals, could adopt sub-station identifiers (SSIDs) of "-1", while those located at shelters could use SSIDs of "-2". This way, broadcast messages of interest to one group can be easily sent without disrupting the o t h e r groups. For example:

```
tell  -1  Mercy  Hospital  has  12
beds available.<cr>
```

This message would be sent to all stations that were part of the hospital net.

## EXAMPLES OF HOW TO USE ARES/Data IN SPECIFIC DISASTER SCENARIOS

● In an evacuation of residents in a local area, the Red Cross often maintains health and welfare status information about evacuees. In this case, the four fields and the comment field might be defined to be:

Last Name - First Name, Shelter, Number in Family, Last phone, Next of kin

● In a multiple-casualty event where victim transportation needs to be tracked:

Name, Sex/Age, Ambulance#, Hospital, Injuries

● In a ham radio staffing situation:

Call, Name, Location, Shift, phone number for cancellation

● In a disaster situation where damage assessment and damage reports are needed:

Coded type of damage, Location, Number of injuries, Callsign, comment

There are many more possibilities, of course. This is why the exact definitions of the various fields are not defined in advance. In any given situation, more information than will fit into four fields and a comment field might be needed. However, on today's 1200 baud packet radio networks, not much more information per record can be accommodated without restricting the total number of records that can be handled in a reasonable time.

## HOW TO OBTAIN YOUR COPY OF THE ARES/Data PROGRAM

The ARES/Data program, a relative of and successor to the FINDER program, is in the public domain. The current version is 0.1, which operates as described in this paper. A copy of the program along with the documentation is available for non-commercial, non-profit use from WN6I or N6KL by sending us a blank, formatted 5 1/4" (360 kB) or 3 1/2" (720 kB) floppy in a mailer with return postage stamps. The cost to you is the cost of the diskette and postage. No other compensation can or will be accepted - please do not send money. We have included a configuration file facility so that you can tailor many parameters to your specific system.

## FUTURE DIRECTIONS

The ARES/Data program is continuously being updated to add additional function and flexibility. For example, multiple TNC operation at the main database is being added to the program to allow more data concentrators on multiple frequencies. In addition, support for the Advanced Electronic Applications' PK-232, PK-87, and PK-88 TNCs as the main database TNC is planned. We encourage your comments and suggestions, and will strive to incorporate them in future releases.

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1    *See FINDER: The Family Information Database for Emergency Responders,* Proceedings of the Sixth ARRL Computer Networking Conference, 1987,pp. 134-141, by W. E. Moerner, Sharon Moerner, and David Palmer.

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