

# **ALE**

## **for International Amateur Radio Emergency / Disaster Relief Communications**

**Presented by:**

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**Global Amateur Radio Emergency Communications Conference 2007**



# HFLINK

**is an international resource for:**

- **Coordination of ALE in the Amateur Radio Service**
- **Interoperative HF Communications**
- **Emergency / Disaster Relief HF Communications**



**[HFLINK.COM](http://HFLINK.COM)**



# Is HF emergency communication really viable?

***"For HF emergency communication to be taken seriously, it must be able to make the call or send a message without prior notice, at any time of the day or night."***



# What is ALE?







# **ALE is**

## **Automatic Link Establishment...**

1. A versatile method of connecting radio operators for voice SSB, text, and internet messaging.
2. The *international standard* for initiating and sustaining HF communications.
3. An active HF propagation optimizer.
4. The foundation for non-proprietary interoperative HF communications.



# *A force multiplier for the HF operator.*



Monitor and manage 5 or 10 HF bands  
and Nets simultaneously.





# What Does ALE Do for Ham Radio Emcomm?



- Maintains *Hot Standby Nets* 24 - 7 - 365 on demand.
- Calls up one or multiple stations as needed... without nets or skeds... on the best band.
- Transmits an HF message or bulletin, without a schedule, even when the other radio operator is not listening.
- Interoperates via SSB voice or Text with other organisations and agencies on HF.
- Sends SMS phone texting or email by HF, without an external modem or computer.
- Tracks positions of mobile stations by HF.





# How ALE Works

- Each ham radio ALE station uses the operator's callsign as a digital *address* in the ALE controller.
- When not actively in a QSO with another station, each ALE transceiver constantly scans through channels on every band, listening for its own callsign.
- Each ALE transceiver also listens for other callsigns... and stores the channel, signal quality, and time each station is heard.



**HF propagation is like a wild animal.  
With ALE, you can ride it.**



# ALE Hardware and Software



- Most ALE ham operators use PCALE software ALE program with an HF amateur radio SSB transceiver.
- MULTIPSK software has recently added the basic functions of ALE for calling and messaging.
- MARS members use MARS-ALE.
- Hams also use commercial HF radios with ALE built-in... a computer is not needed with these radios.
- Other ham software programs are now in the process of adding ALE.
- External ALE controllers are also available.





## **PCALE by Charles Brain G4GUO**

- Complete ALE software for amateur radio HF rigs.
- Advanced methods of scanning that enable Ham-Friendly ALE.
- High-speed HF soundcard ARQ built-in.
- Interoperable with ALE Hardware MIL-STD radios.
- Free download for hams at [HFLINK.COM](http://HFLINK.COM)



## **MARS-ALE by Steve Hajducek N2CKH**

- Advanced CAT interface control for ham and commercial HF rigs
- Silent relay scanning for PCALE
- Enables ALE HF Network internet with BBSlink by Alan Barrow KM4BA







[21:48:21]>>[K7EK]SEND 500 GALLONS WATER 1000 MRE TO SHELTER 5

[21:48:46]	[FRQ 14109500]	[MSG SENT]	[K7EK	]			
[21:47:49]	[FRQ 14109500]	[LINKED	]	[K7EK	]		
[21:17:59]	[FRQ 21096000]	[TO ]	[KM4BA	]	[TIS]	[KQ6XA	] SN 09
[21:04:04]	[FRQ 14109500]	[TO ]	[W1PID	]	[TIS]	[KM4BA	] SN 07
[20:12:20]	[FRQ 14109500]	[SND]	[	]	[TWS]	[K7EK	] SN 08
[20:11:17]	[FRQ 10145500]	[SND]	[	]	[TWS]	[K7EK	] SN 03

ADDRESS K7EK

☒ AMD ☐ DTM ☐ DBM ☐ FS1052 ☐ ARO

RESET

SEND DATA

TEXT

SEND 500 GALLONS WATER 1000 HRE TO SHELTER 5

SEND RPT

21:49:32

FRQ 14109500 USB

LINKED

Rx

CAP

# Example of an Icom 756pro ham transceiver with PCALE

## Quiet Relay Scanning and Sounding



MULTIPSK

-141 ALE

Help

TCP/IP

Mdem

Oscillo

Spectrum

Transceiver

Country/Loc

World

QSO

Config

Tune

Program

Beacon

Exit

About

Personal

CPU

Sampling freq.

PC (>=) MHz

Mixer

Level

Over

Panoramic:

Licence

Clocks

16 bits

Identifiers

450

166

66

Input

Output

2 %

PSK

CW

RTTY

0

Call ?

Name

Freq Mhz

Mode

Ur RST

My RST

R

S

Locator ?

QTH

Notes

Opt. ?

Clear

Logbook

Record

KM4BA

141A

599

599

Cluster

L

A

DXKeeper

Cont

F

Modes

RS ID

Video ID

QRGs

RS ID detection

Sound card

Mode

Slave

Master

ARQ FAE

Call

End

Mail

TX: 141A (ALE)

MODE

RX: 141A (ALE)

Aux. functions

Unproto

Answer

PSE

LQA

TX frequency

RX frequency

Fr. difference

My: B?? S??

FRM:

Sounding (TW)

Scan

Call

1625.0 Hz

1625.0 Hz

0.0 Hz

His: B?? S??

AFC

Options

Answer to FRM

Stop

End

HFL

Auxiliary functions for the 141A mode (AMD and ARQ FAE messages and answer to op...

This panel opens with the button "Aux. functions" on the RX/TX screen.

Help

Management of calls

Add this call to the list:

KQ6XA

See the file

Lists up-to-date

Addressee:

KM4BA

AMD message to send:

SEND 500 GALLONS WATER 1000 MRE TO SHELTER 5

Send

End in THIS...

IS

WAS

Open nets on which you want an automatic answer:

QRZ

HFL

Mail (RX/TX)

APRS position transmission in FAE mode

APRS RX authorized

APRS TX authorized

APRS window

0 %

Authorized

Send

Reset link or connection attempt

ARQ FAE message to send:

SEND 500 GALLONS WATER 1000 MRE TO SHELTER 5

MULTIPSK by Patrick F6CTE

# Mobat Micom ALE Transceivers





# Harris ALE Transceivers



**LCD display  
shows  
messages  
and calls**



**Use keypad  
to send text  
similar to  
cell mobile  
phone**



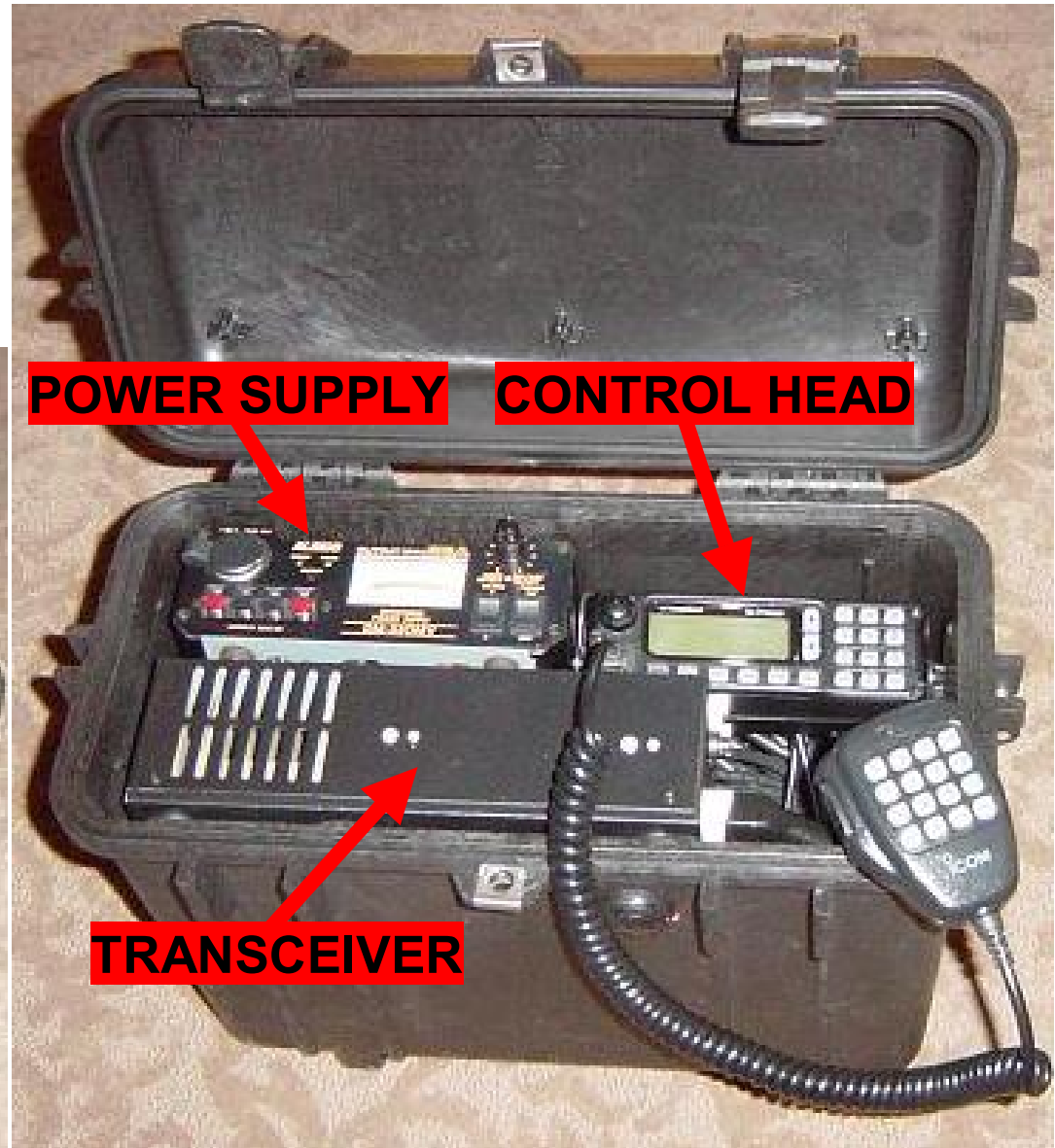


## Icom IC-F7000 ALE mobile

Fly-Away 125 Watt  
Portable ALE HF  
Station Package in  
Waterproof Case



**PELICAN  
FLIP TOP  
CASE 1430**



**POWER SUPPLY**

**CONTROL HEAD**

**TRANSCEIVER**



# International Amateur Radio Emergency / Disaster Relief ALE Channels

1845.0 Global	14346.0 Global
3791.0 Global	18117.5 Global
5403.5 Regional	21437.5 Global
7065.0 Regional	24932.0 Global
7185.5 Global	28312.5 Global
10145.5 Global	kHz USB

All ALE Channels are Upper Sideband standard.  
 Channels are frequency-coordinated with  
 all IARU Regions (R1, R2, R3) for Global use.





## **Why Upper Sideband?**

- **All ALE for Amateur Radio is USB, including channels below 10MHz.**
- **USB conforms to International Standards for ALE.**
- **USB enables interoperability with other services.**





# ALE Pilot Channels

HF Network, Text Messaging, and Sounding

Frequency kHz USB	IARU Region
1806.0	2,3
1840.5	1
3596.0	2,3
3617.0	1
3626.0	3
7040.5	1,3
7102.0	2
7185.5	3
10145.5	1,2,3

Frequency kHz USB	IARU Region
14109.0	1,2,3
18106.0	2,3
18117.5	1
21096.0	2
21116.0	1
24926.0	1,2,3
28146.0	2,3
28312.5	1
kHz	

Coordinated with IARU Regions' Automatic Data Sub-Bands.



# **Info About the ALE Channels**

- **ALE channels are frequency coordinated with IARU Region bandplans, and comply with rules for the various countries of operation.**
- **At least one ALE voice SSB channel on each HF band is available in every IARU Region throughout the world.**
- **An ALE data channel on each HF band is used for *Sounding* Station Identification transmissions and HF Network text/data.**
- **The HF spectrum is a shared resource, so there is no guarantee of a clear channel... if one ALE channel is busy, an alternate QSY channel is selected by ALE.**
- **Ham-Friendly ALE techniques for sounding and channel scanning were specially developed by hams to avoid interference, and make ALE compatible with ham radio.**

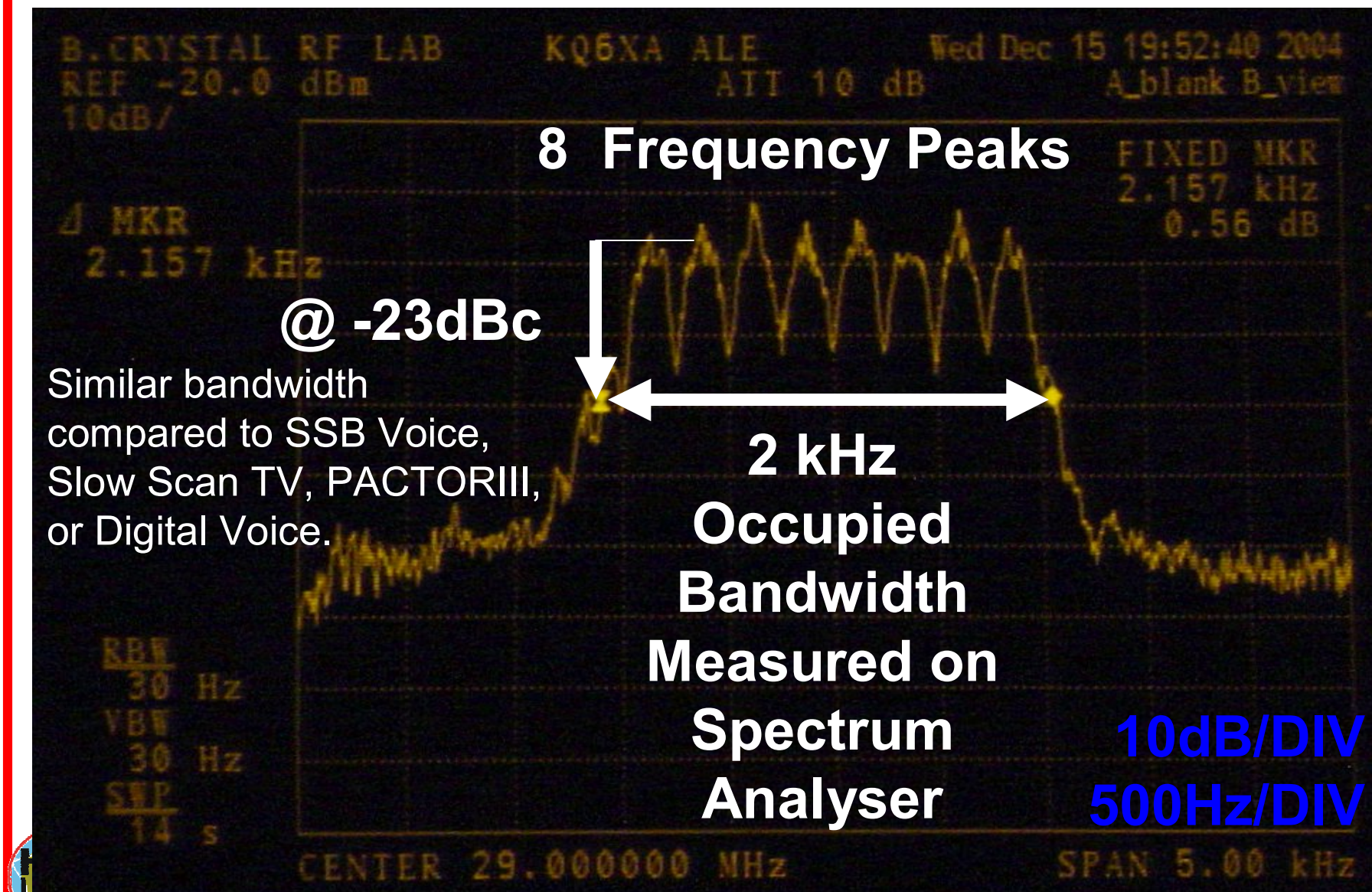


# ALE Signal

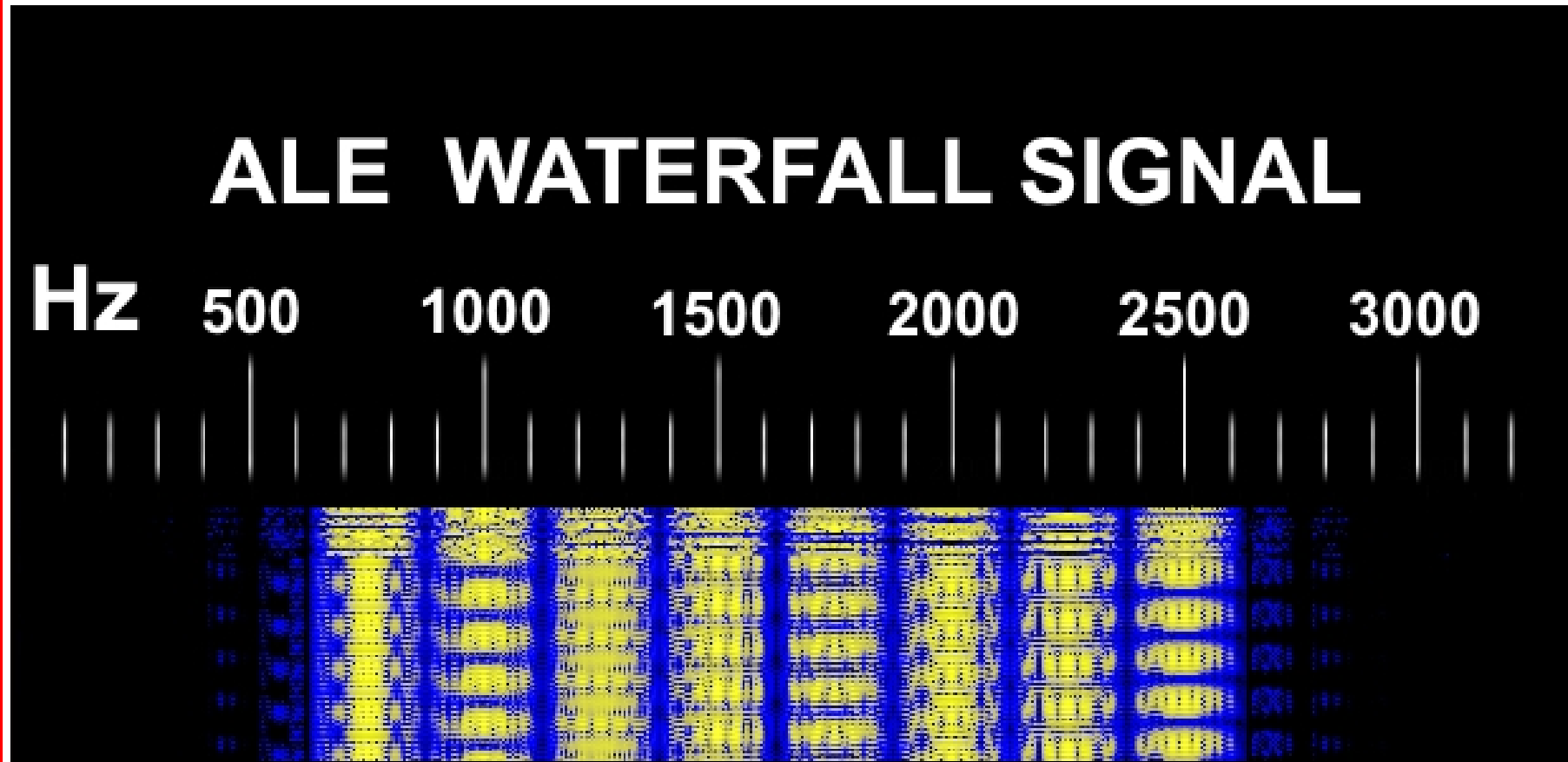
<b>Based on standard</b>	<b>FED-1045 or MIL-STD 188-141</b>
<b>Occupied Bandwidth</b>	<b>2kHz</b>
<b>Emission Type</b>	<b>8FSK - single tone shifted between 8 frequencies</b>
<b>Audio Shift Frequencies</b>	<b>750Hz to 2500Hz at 250Hz spacing</b>
<b>Symbol Rate (baud)</b>	<b>125 Symbols Per Second</b>
<b>Speed (raw bit rate)</b>	<b>Basic 375 Bits Per Second.</b> (Up to 4800 BPS with the 8PSK fast ARQ data formats associated with ALE)
<b>Decode sensitivity</b>	<b>- 4dB SNR</b>
<b>Compatible with</b>	<b>Amateur SSB Transceivers with no special ALC requirements</b>



# ALE Signal RF Spectrum



# ALE Signal on a Computer Waterfall Audio Display





# Starting an ALE QSO



1. The radio operator enters the desired callsign into the ALE controller, just like dialing a phone number.
2. The ALE controller starts calling on the bands the desired station was heard previously with good quality.
3. The ALE controller transmits a short *selective calling* burst containing the callsigns.
4. When the desired station responds, a Link is thus Established and the QSO can begin using any mode, such as SSB Voice or Text Messaging.





# **Receiving an ALE Call**

- 1. When your scanning transceiver's ALE controller detects the first few characters of its callsign, it stops scanning and stays on that channel.**
- 2. If it decodes your callsign, it responds to the caller with a *handshake* to confirm the link is established.**
- 3. Your transceiver, muted up until now, turns on its speaker, or the controller beeps to alert you.**
- 4. Your ALE controller display indicates the callsign of the station calling you.**
- 5. You may start a regular QSO in any mode you like.**
- 6. At the conclusion of the QSO, you clear the link, and each operator returns their transceiver to scanning.**





# LINKING WITH ALE



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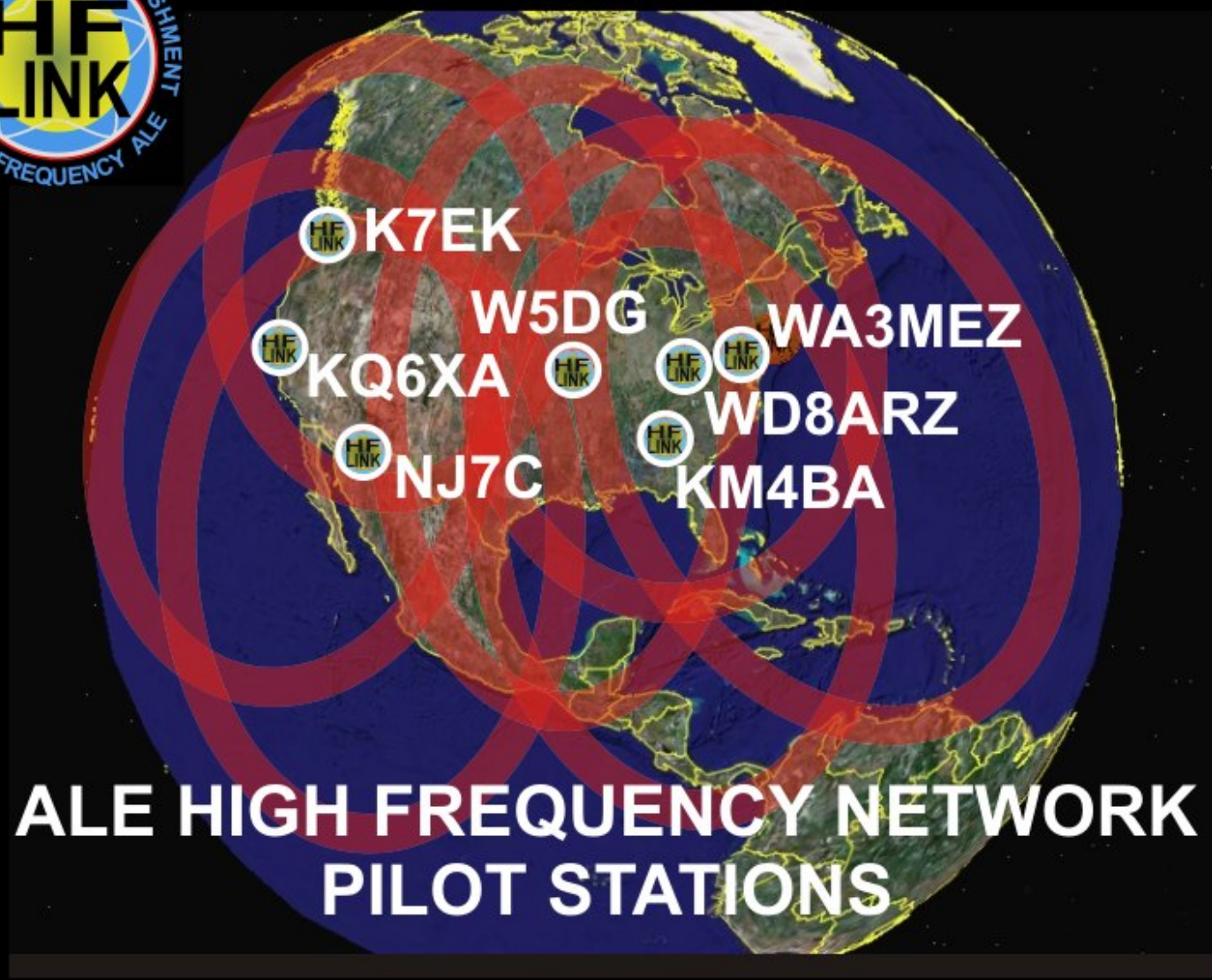


# Global ALE HF Network (HFN)



- 24-7 Network of ALE stations with HF internet connectivity
- ALE-SMS phone texting and HF email text messaging
- Sounding every hour on the Pilot Channels 3.5MHz - 28MHz
- Phase 1 : Covers North America with a 7 station constellation
- Phase 2 : Expand Network worldwide with *soundcard* HF text email

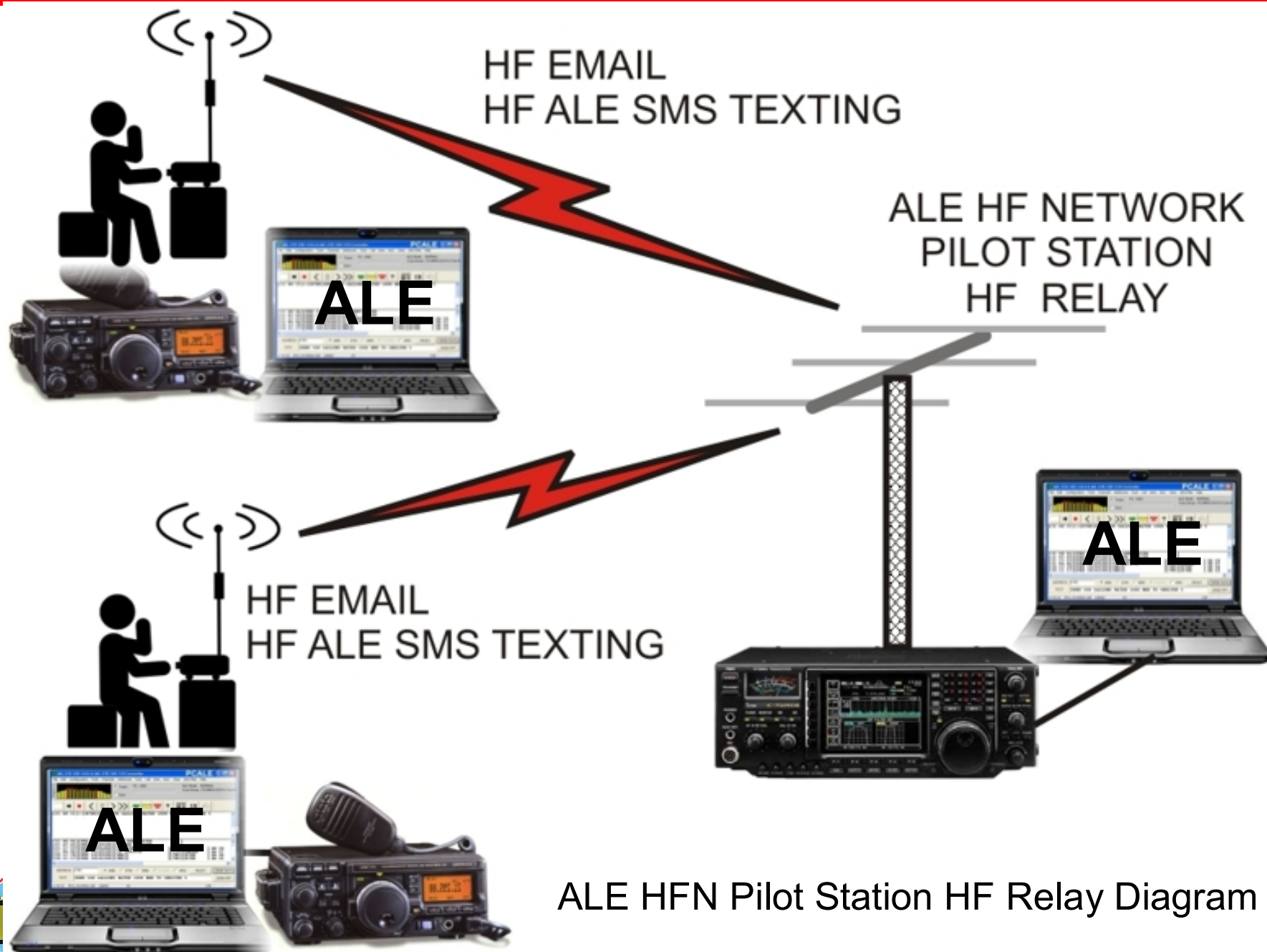




# ALE HIGH FREQUENCY NETWORK PILOT STATIONS

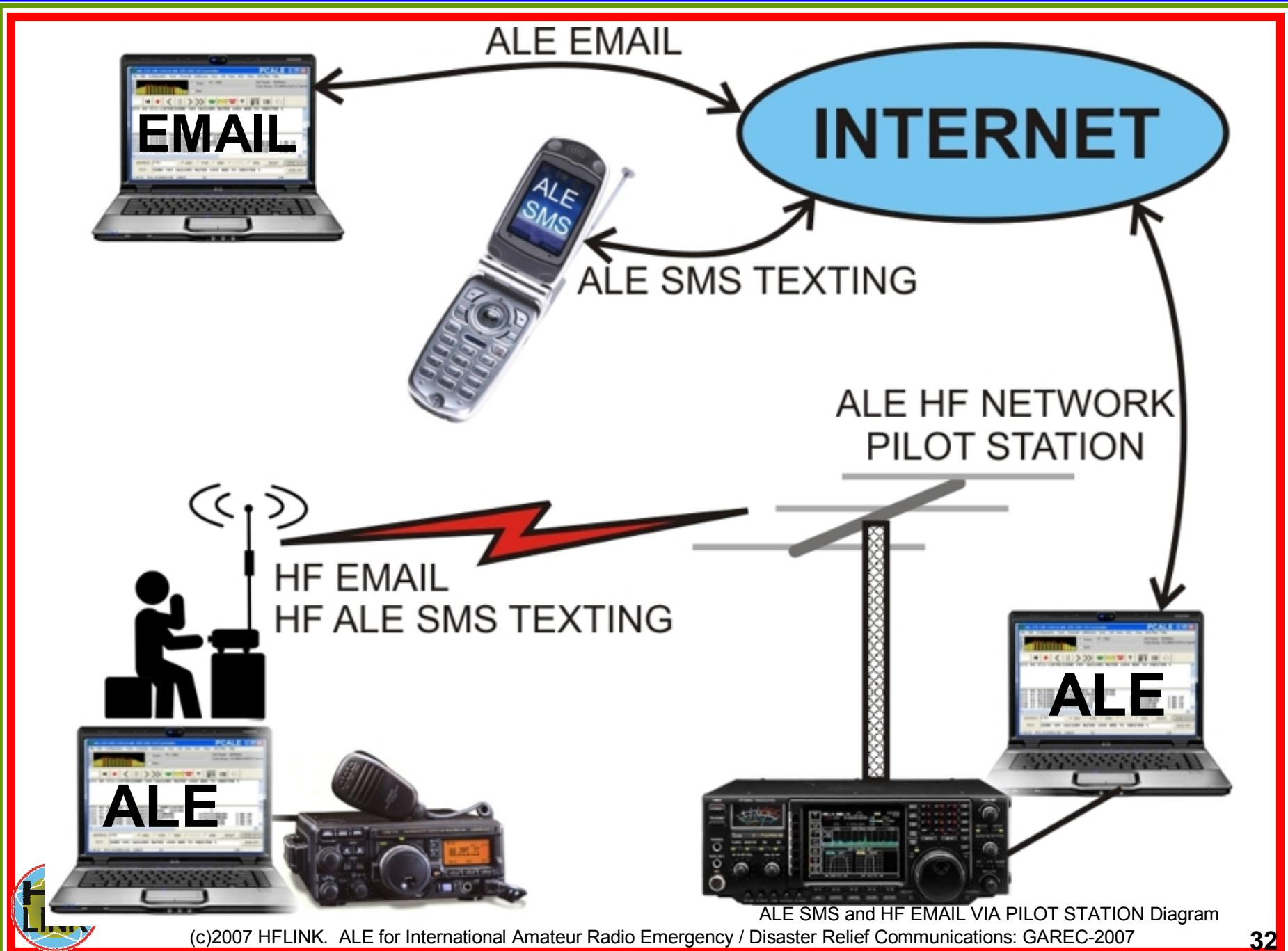
ALE HFN Pilot Station Map, Phase 1





ALE HFN Pilot Station HF Relay Diagram





ALE SMS and HF EMAIL VIA PILOT STATION Diagram



# ALE – SMS

**What is ALE - SMS?**

**A short phone-text or email message sent through an ALE HF Network Station.**





## SENDING AN SMS MESSAGE BY FRONT PANEL KEYPAD OF AN ALE HF TRANSCEIVER





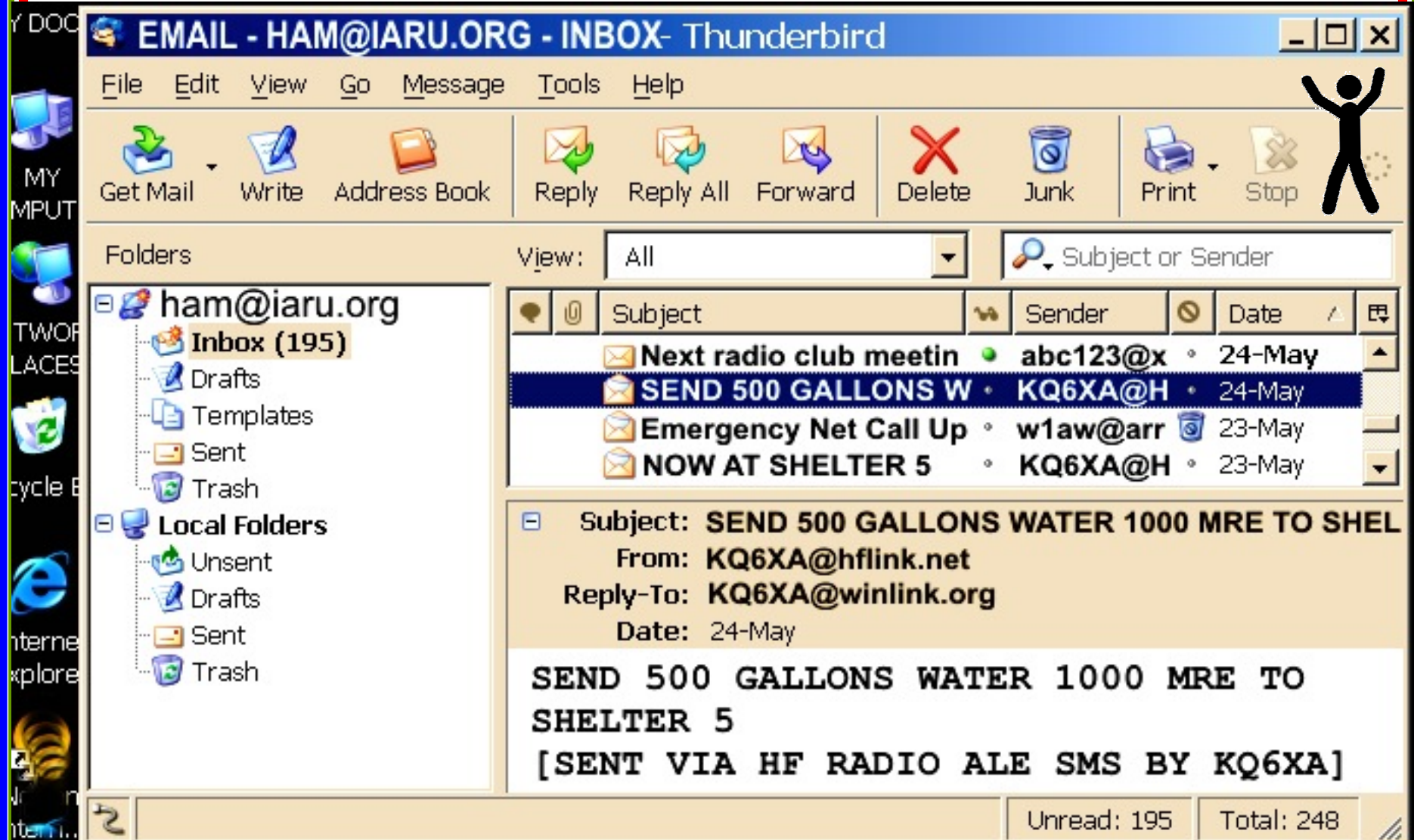
# ALE – SMS TEXT MESSAGE

- Message is received via internet or cell phone system by any Mobile Cell Phone, Blackberry or PDA



# ALE - SMS TEXT MESSAGE

- Message received via internet on any computer's Email





## ALE in the Katrina disaster relief

Mobile tracking

Station status

In route messaging



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# **The International Amateur Radio ALE HF Network is an Open Network**

- All organizations and individual operators are invited to use the ALE network and ALE channels at any time.
- Use it as an interoperative, common *Net of Nets*.
- Share the ALE common channels for calling each other, or calling up your own net with your net's unique ALE netcall.
- Make your contact on frequency as needed, or QSY to your normal net frequency.



# Proposed ALE Net Calls

ALE netcalls are 3 Letters

HAM = Ham radio emergency stations

RED = Red Cross

SAT = SATERN

ARR = ARRL

ARE = ARES

RAY = Raynet

RAC = Radio Amateurs of Canada

IAR = IARU

RCS = RACES

SBD = SBDR

SAL = Salvation Army

Other examples:

CAA = California ARES

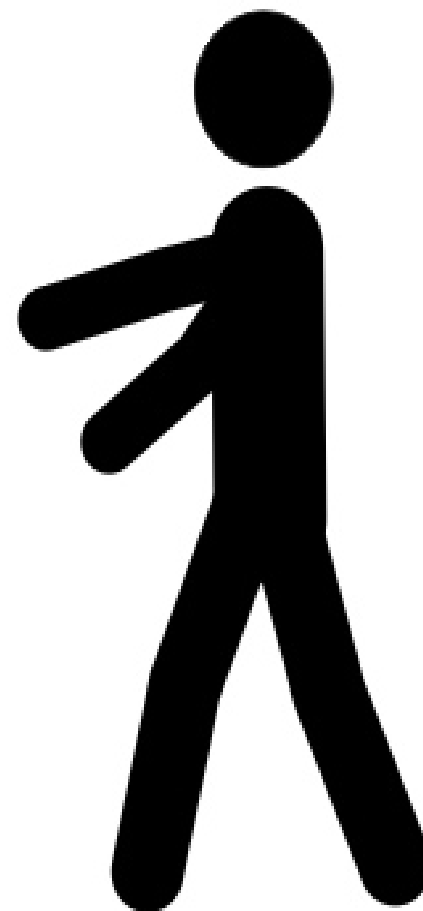
ALA = Alabama ARES

MCA = Monroe County ARES





# Questions      Answers





# **ALE for International Amateur Radio Emergency / Disaster Relief Communications**

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**More information:**

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