Integration of Personal & Amateur Radio Communications for Community Support: The Peninsula Project

Steve Hansen KB1TCE/WQQB941

Eric Greiner KB1ZUN

Richard Bates WD1O/WQZI552

Agenda

- The Knox Community Emergency Communications program: background, status, plans
- National coordination efforts: National SOS Radio Network, Neighborhood HamWatch, Radio Relay International
- The Peninsula Project
- Applicable 2-way radio services (personal & amateur)
- Skills & skills maintenance
- Roles for non-hams in exercises and for weather spotting
- Current status & plans

Background

- After the November 2014 ice storm, Knox County ARES/RACES-CERT and the Pen Bay Amateur Radio Club established a community support program.
- Community web site for information at http://ballyhac.com with link from the Owl's Head town web site.
- An hourly ham storm net was established.
- Offered services for individuals to communicate with family & friends elsewhere.

Results

- The storm net (top of every hour) has worked out well with many participants from around the county. We have gathered SITREPS and weather info for relay to the Knox EMA and to Gray NWS.
- The EMA has provided SITREPS to the net (e.g. road closures) which are announced on the net.
- Waldo & Lincoln counties are now running similar nets.
- No visible community involvement although it is highly likely we have had people monitoring via their scanners.

Areas to Address

- Need more ham volunteers to improve coverage around the county.
- Outreach to the community was simply “some hams monitor FRS Channel 1.”
- Providing a messaging service is not a big draw given that comms outages in this area tend to be brief and cell services generally have survived. (That doesn’t preclude a major outage in the future. Be prepared.)

Strategy

- Revise the program and pilot test in a limited area (the peninsula south of Rockland).
- Formalize a system of non-ham communications using the personal radio services and linking those to ham operators.
- Involve the community in providing SITREPs and weather information as well as offering relay services for personal messages.
- Communicate priority or emergency messages to the county EMA.

National Level Programs

Related national level programs include:

- National SOS Radio Network (NSRN). Formed after Katrina and includes calling & monitoring procedures for use with FRS radios.
- Neighborhood HamWatch. Closest to our program with scheduled nets, links to town or county EOCs & NGOs, messaging services.
- Both of the programs have been used during various disasters including hurricanes & floods.

Radio Relay International (RRI)

- The two programs lacked a national-level infrastructure and standardized procedures.
- In early 2017 Radio Relay International adopted the programs as part of its National Communications Strategy.
- A local programs committee was formed in July. Membership consists of hams in diverse parts of the country who are committed to emergency communications & formal message handling.

RRI National Communication Strategy

- Information is structured by the radiogram format for accurate, accountable, intermodal messaging.
- Amateur radio clubs publicize, train and manage the plan for their communities.
- Civic groups include neighborhood watch, CERT, scout troops, churches, etc.
- NCERT is the RRI National Communications Emergency Response Team concept.

SIMPLE
SCALABLE
INTEROPERABLE

Global

Regions

Towns

Neighborhoods

Families and Individuals

Radio Clubs

Civic Groups

Multimode HF Nets

NCERT RRI RADIO RELAY INTERNATIONAL

NEIGHBORHOOD HAMWATCH

National SOS℠ Radio Network
www.NationalSOS.com

Information

Amateur Radio Service
Radiotelegraphy, radiotelephony, data
Pactor, AX.25, 802.11

Personal Radio Services
Radiotelephony
FRS, GMRS, CB, MURS

Radio Relay International

RRI NATCOMSTRAT 2017
Approved for General Distribution

www.radio-relay.org/natcomstrat

RRI Local Programs Committee

- C. Matthew Curtin KD8TTE, Ohio Assistant Section Emergency Coordinator
- Kate Hutton K6HTN, Los Angeles Section Traffic Manager (STM)
- Charles Hargrove N2NOV, NYC Amateur Radio Emergency Communications Service (NYC-ARECS)
- Robert Hecht N3AAK, Eastern PA, cw traffic op
- Tom Mills AF4NC, Eastern PA Ass't Section Manager & STM
- Joe Ames W3JY, EPA, RRI Board
- Steve Hansen KB1TCE, Maine Section Emergency Coordinator, Digital Traffic Station

Advisors include:

- Eric Knight KB1EHE, founder NSRN
- Andrew Gausz KG4QC, founder HamWatch

Why this Peninsula?

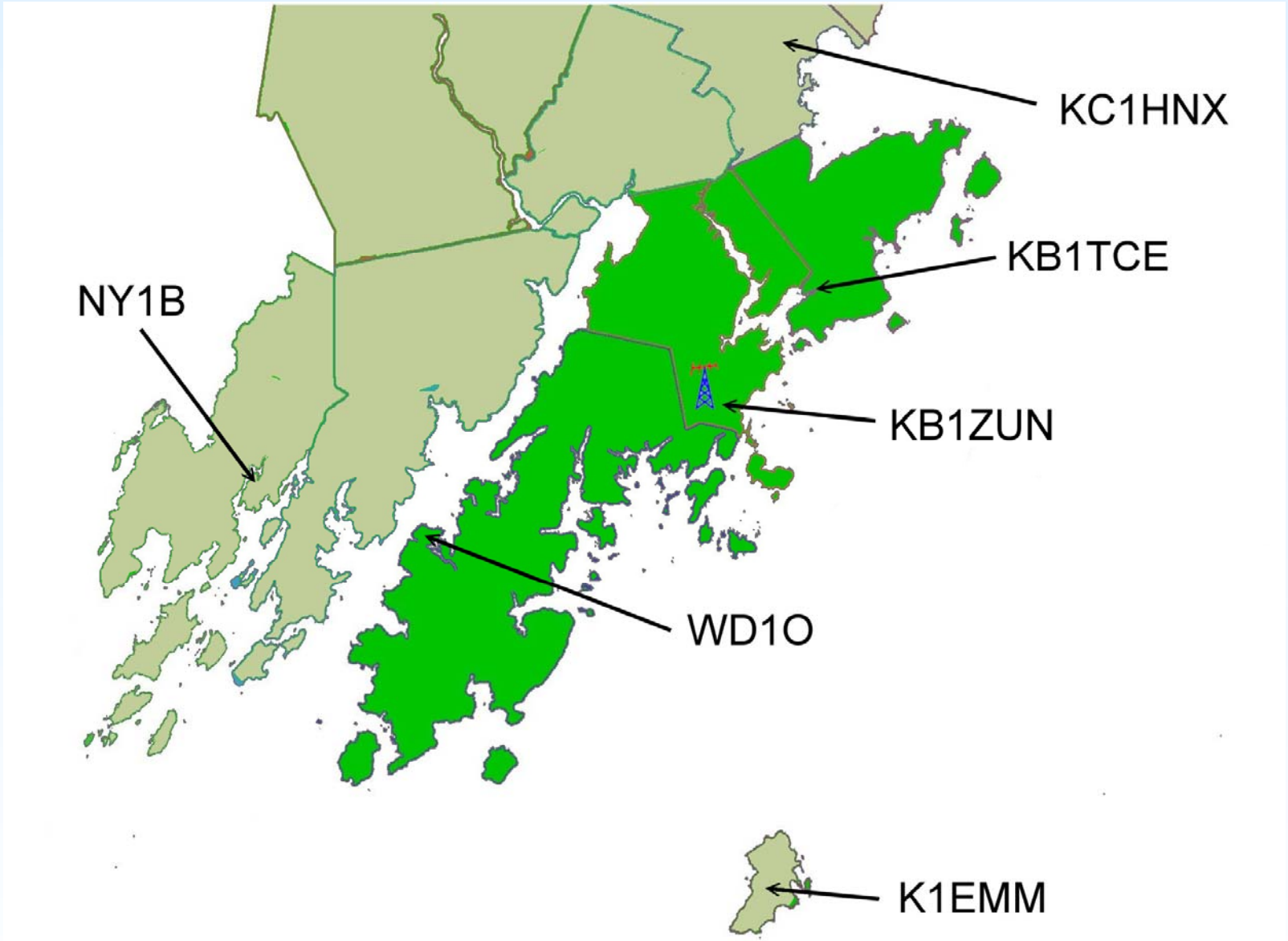
- Base of committed ham volunteers who are familiar with formal message relay procedures.
- Communications here tend to have a variety of issues during storms. Some areas have poor coverage even in normal conditions.

Who's Involved

- KB1TCE/WQQB941 in Owl's Head
  Digital Traffic Station for Maine; FRS & GMRS monitoring; Winlink Target Station; traffic relay.
- WD1O/WQZI552 in Tenants Harbor
  Winlink gateway, Knox County Packet Network; FRS & GMRS monitoring; traffic relay.
- KB1ZUN in Spruce Head
  Host site for the Spruce Head 675 GMRS repeater; FRS & GMRS monitoring; traffic relay.

Not on the peninsula but have interest:

K1EMM on Matinicus Island, NY1B in Friendship, KC1HNX/WQYR382 in Rockland


KC1HNX
KB1TCE
NY1B
KB1ZUN
WD1O
K1EMM

Applicable 2-way Radio Services

- Family Radio Service (FRS): UHF
- General Mobile Radio Service (GMRS): UHF
- Multi-Use Radio Service (MURS): VHF
- Amateur Radio (Ham): Allocations throughout the radio spectrum
- CB???: FEMA discourages the use of CB for CERT but may be worth looking into in some locales.

Family Radio Service

- Inexpensive hardware, generally available as “bubble pack” radios that also include some of the GMRS frequencies
- No license required
- Several shared frequencies with GMRS; very important!
- Power currently limited to ½ watt, internal antenna only, cannot be modified
- Best used locally, range is generally <1 mile
- Widely used by hikers, to keep track of the kids, etc.

FRS/GMRS Bubble Pack

- Usually sold in pairs.
- Don’t believe the range claims on the packaging.
- Read the fine print on licensing! Many users are operating illegally.
- Simplex only, not repeater capable.

General Mobile Radio Service

- Requires an individual license. $65/5 years; usable by all family members. No test involved, just fill out the FCC on line form.
- Characteristics similar to FRS in the Bubble Pack configuration but power will be higher on the GMRS channels.
- Dedicated GMRS radios have separable antennas, power levels to 50 watts and can work with repeaters to greatly extend their range.
- Available in hand held and mobile configurations at prices from $55 to $250.

GMRS Radios

- HTs and mobile GMRS radios have been hard to come by until earlier this year (2017).
- Operators frequently used surplus Part 90 public safety radios. These meet the Part 95 technical requirements but are not actually FCC certified for GMRS use.
- Consumer GMRS radios are now available from BTECH, Tera, Powerwerx and Midland.

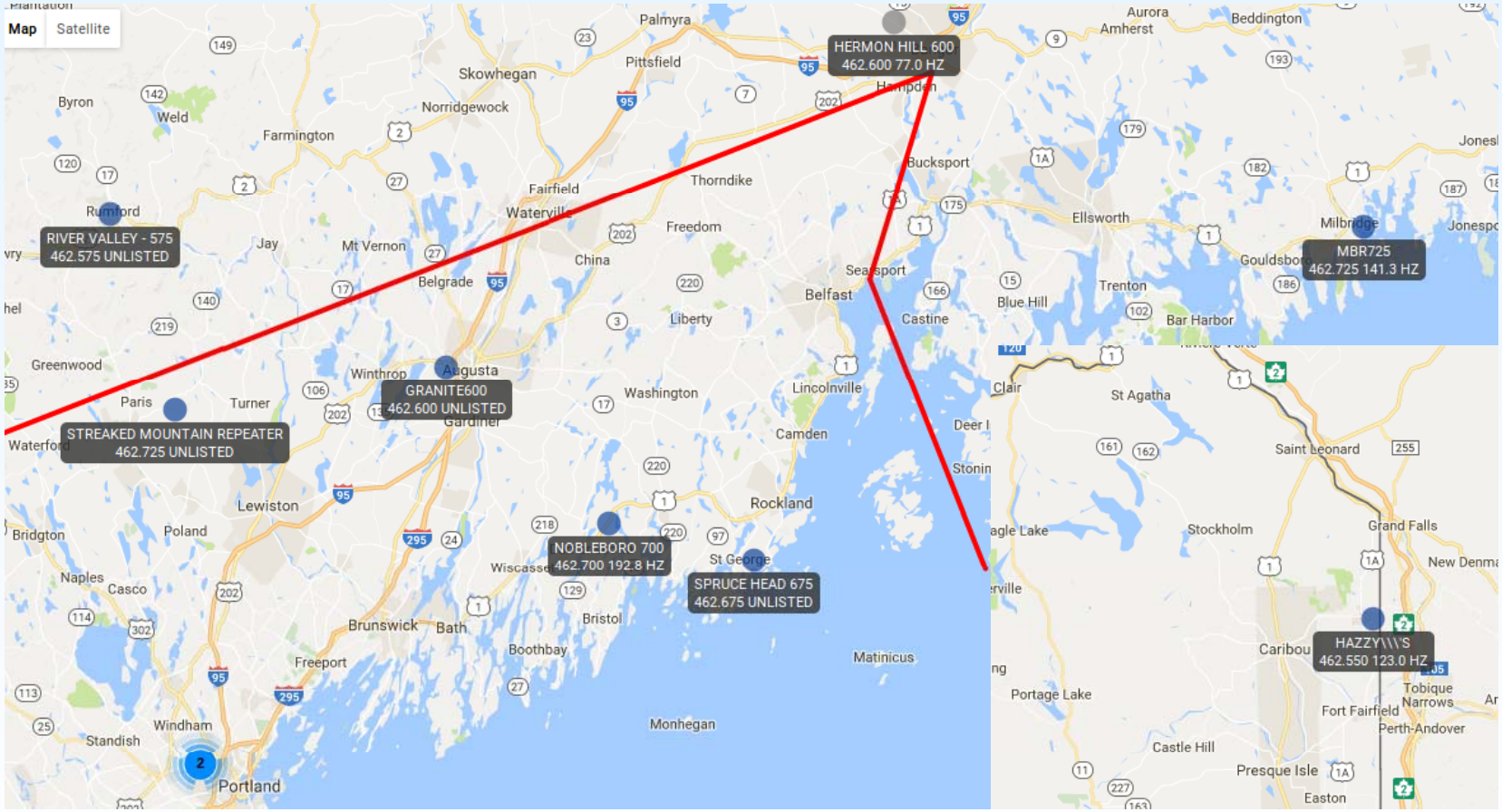
Midland 40 watt
Mobile GMRS radio

GMRS Repeaters

- Many are operated by hams.
- Frequently affiliated with emergency groups e.g. REACT, VOAD, neighborhood watch groups, etc.
- Access is generally restricted i.e. permission required or by membership in a community group.
- Bubble pack radios are not repeater capable.

GMRS Repeaters in Maine

Nearby:
Nobleboro 700, Lincoln County EMA, Mac McFetridge N1VVH/WPUK253
Granite 600, Hallowell, Rick Sieberg, N1QFY/WQTL959/Army MARS



Source: mygmrs.com

Multi-Use Radio Service

- 5 channels in the VHF range (151-155 MHz).
- No license. May be used for business, pleasure, CERT.
- 2 watts maximum, separable antennas ok if not > 60 ft above terrain or > 20 ft. above a structure (whichever is greater). Can achieve ranges well in excess of 5 miles over typical terrain.
- Voice and data!
- Repeaters are not allowed.
- Commonly used in industry for telemetry or as wireless intercoms. Finding more use in recreational activities.
- Consumer radios are in the $75 to $110 range. Tera now makes a GMRS/MURS handheld radio.
- MURS uses odd channel bandwidths (11.25 & 20.0 kHz): only certified MURS radios are technically compliant.

MURS Radios

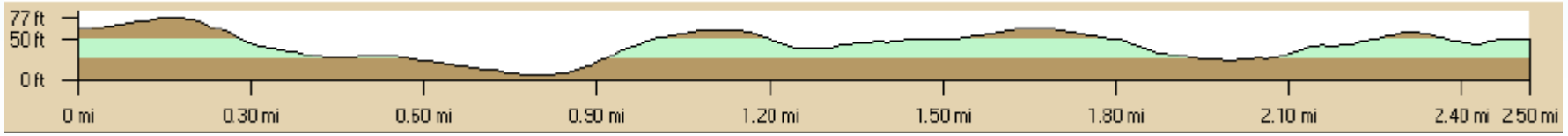
Dakota Alert
Base Station

Tera TR-505
GMRS/MURS HT

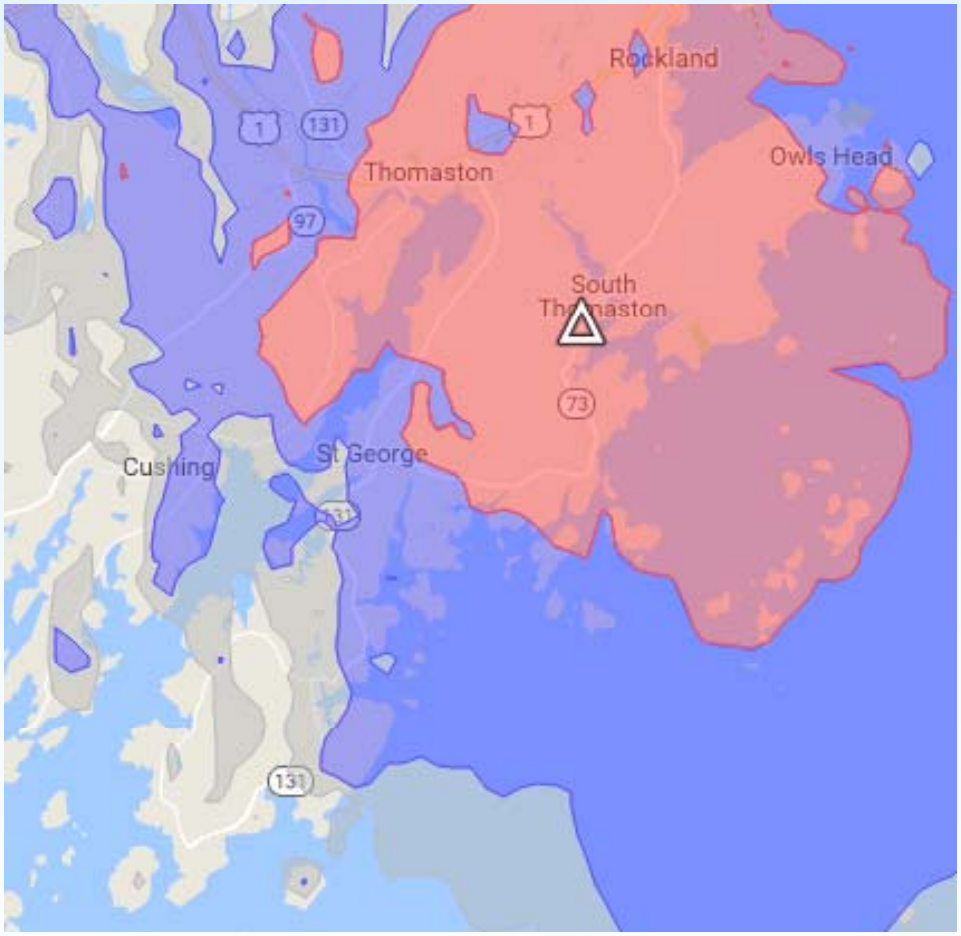
GoTenna: MURS transceiver for smartphones

MURS for Warming Shelter

- Tests show MURS ideal for communications between the So. Thomaston EOC and the Spruce Head warming shelter with slightly elevated simple antennas. Extremely simple radio, no license.
- Below: Arrow j-pole, stock antenna (some noise), Ed Fong roll-up j-pole (at EOC)



So. Thomaston EOC Coverage



New FCC Rules

- Approx. mid-August phase in starts.
- FRS goes from ½ to 2 watts maximum.
- Phase out of combined FRS/GMRS radios. Any bubble pack radio that exceeds 2 watts on any frequency will only be able to be operated legally by a user with a GMRS license.
- Brief data bursts ok on GMRS and FRS (1 second max every 30 seconds) for texting and positional information (e.g. Garmin devices).

FRS/GMRS Shared Channels

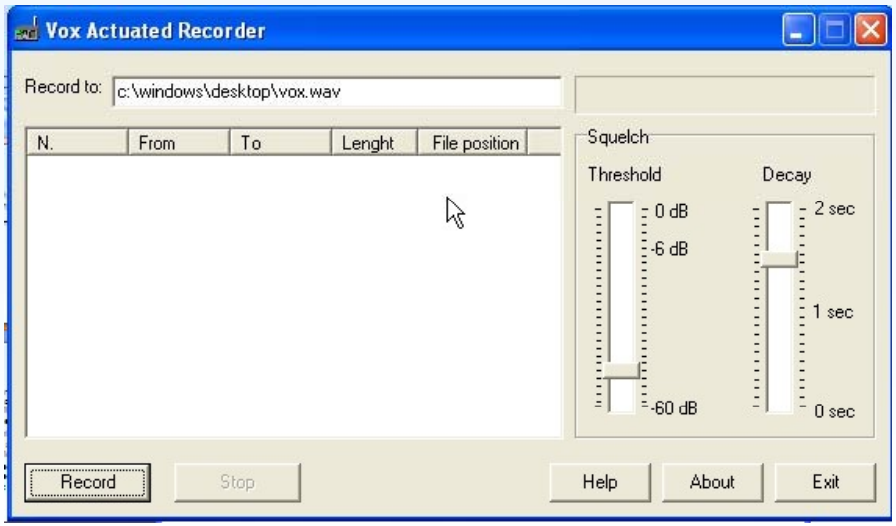
Channels	Function	FRS Power	GMRS Power
Existing Rules			
1-7	Shared simplex	½ watt	5 watts
15-22	GMRS simplex; repeater output	Not permitted	50 watts
New Rules			
1-7	Shared simplex	2 watts	5 watts
15-22	FRS/GMRS simplex; repeater output	2 watts	50 watts

References:

http://transition.fcc.gov/Daily_Releases/Daily_Business/2017/db0427/DOC-344617A1.pdf
https://wiki.radioreference.com/index.php/FRS/GMRS_combined_channel_chart

Monitoring

- Scheduled Nets, perhaps hourly amateur and GMRS on the half hour.
- Can use scanner recording software, e.g. VOXRecorder for unattended monitoring.



The Amateur Radio Service

- Extremely flexible in terms of frequencies and modes (voice, text, data, photos, documents, e-mail, video).
- Extensive VHF & UHF repeater systems.
- RRI and NTS all-RF multi-mode networks for radiogram format messages.
- Winlink radio-email system.
- Licensed service, test required for each of 3 levels.
- Not for business use.

Radio Skills for Emergency Communications

- Achieve effective communications through proper radio operation, tactical call signs, pro-words, phonetic alphabet, and basic protocols.
- Formatting, transmitting and delivery skills for formal messages.
- Net control function.
- Working understanding of NIMS; how to interface with civil agencies.

Home Stations

- Properly equipped home stations can provide an invaluable service in times of emergency.
  - Away from the noise (acoustic and RF) of the EOC
  - Relay functions to traffic nets or Winlink
  - Scattered throughout the communities; ideal for NSRN and HamWatch type activities
  - Perfect for hams who are less mobile

Skills Maintenance

- Keep up with the changes in the tools you use: NBEMS, Winlink, traffic systems, SARTrack.
- Participate in community events where comms support is required: Lobster Ride, MS Walk, Islesboro Swim, etc.
- Participate in formal exercises: Quarterly Knox exercises, Maine Fire & Ice, annual ARRL SET, International Radiogram SET, etc.
- Participate in SKYWARN as weather spotters.

For Non-Hams

- Add roles for non-hams in our exercises. Equip them with FRS or MURS radios if they don't have them. Examples:
  - Provide weather information
  - Provide a SITREP
  - Initiate a formal message to a friend or family member out of state
- Train in the use of proper radio communications protocols and message formatting.
- Promote the use of GMRS.
- Encourage them to get their ham ticket.

Non-Hams and SKYWARN

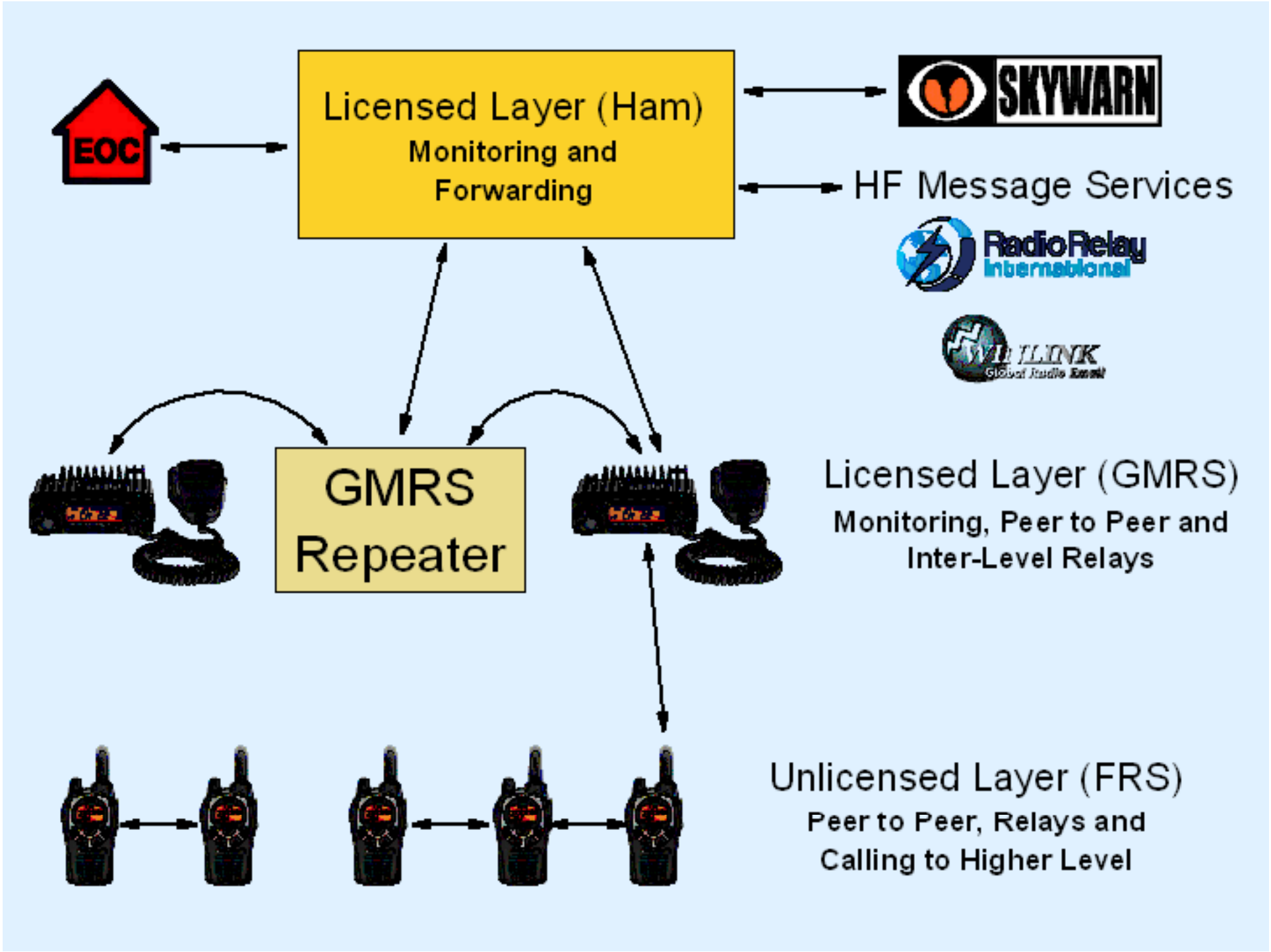
- Any resident can register with Gray NWS and become a weather spotter. The NWS has regular training sessions around the state as well as written training & reference materials.
- Weather spotters provide a valuable service for reporting various meteorological events that are difficult or impossible to measure remotely. Examples include snowfall amounts, hail, localized high winds, weather induced damage, flooding, ice, etc.
- If conventional communications are impaired, hams will report conditions via radio.
- For the non-ham, the type of program we are proposing would enable them to submit reports by a Personal Radio Service radio to a ham who can then relay the information.

Weather Spotters in Our Area
(per Gray NWS)

- Owl's Head: 6 (at least 3 are hams)
- So. Thomaston: 5
- Spruce Head: 1 (probably a non-ham)
- Tenants Harbor: 1 (probably a non-ham)
- St. George: 0
- Port Clyde: 1 (probably a non-ham)
- Friendship: 1 (ham)

Gray NWS can do another spotter session this fall (if we request quickly).

- Get more ARES/RACES-CERT and club members involved as spotters.
- Provide summary of this program during the session.


EOC
Licensed Layer (Ham)
Monitoring and
Forwarding
SKYWARN
HF Message Services
Radio Relay
International
WB LINK
Global Radio Email
GMRS
Repeater
Licensed Layer (GMRS)
Monitoring, Peer to Peer and
Inter-Level Relays
Unlicensed Layer (FRS)
Peer to Peer, Relays and
Calling to Higher Level

Current Status and Plans

- Assemble & install the GMRS repeater for coverage on the peninsula.
- Continue gathering coverage information (FRS, GMRS and MURS).
- Determine PRS protocols: calling channels & procedures, PL tones, etc.
- Engage selected community members for feedback.
- Build non-hams into our exercises.
- Expand & integrate SKYWARN.
- Update website and brochure before winter.