Beacons and Activation Requests

SAR Controllers Workshop 2018
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LCDR Erin Boyle
United States Coast Guard
Office of Search and Rescue
406 MHz Distress Beacons

EPIRB
Emergency Position Indicating Radio Beacons

ELT
Emergency Locator Transmitter

PLB
Personal Locator Beacon

SSAS
Ship Security Alert System

* Most have a 121.5 homing signal, but not all SAR assets have Direction Finding capability.

Some countries coding PLBs as ELTs
406 MHz Distress Beacons

- Designed for satellite processing
- Global use
- 5-watt digital signal
- Unique beacon ID
- Rigid specs
- 3-5 km location accuracy
- ~100 meter accuracy with integrated GPS
Comparison:
121.5 MHz vs. 406 MHz

121.5 MHz = 20 Km search area radius

406 MHz = 100 m

Search Time:
- 121.5 MHz: 12+ hours
- 406 MHz: 2 - 3 hours

406 MHz w/GPS

Search Time: Minimal
406.0-406.1 MHz

• The International Telecommunication Union (ITU) manages frequency allocations internationally.

• ITU Radio Regulations state: The use of the band 406-406.1 MHz by the mobile-satellite service is limited to low power satellite emergency position-indicating radio beacons.

• Any emission capable of causing harmful interference to the authorized uses of the frequency band 406-406.1 MHz is prohibited.

• The Federal Communications Commission (FCC) & National Telecommunications & Information Administration (NTIA) manage frequency allocation in the United States.
406 MHz Distress Beacon Carriage Regulations

Ships/Boats

• All vessels 300 tons or greater
• Vessels engaged in transporting 6 or more persons
• All comm fishing vsls (U.S.)
• All vessels in HI waters operating beyond 1 mile of shore (either 406 MHz EPIRB or VHF radio)
Aircraft on international flights must carry an 406 ELT

U.S.: FAA mandates carriage of 121.5 MHz ELT (406 MHz ELT will fulfill requirement)
406 MHz Distress Beacons

United States:
~565,000 beacons in NOAA’s Registration Database

Globally: ~1.9 Mil
U.S. Government possess over 150,000 distress beacons

DoD registration maintained in Joint SARSAT Electronic Tracking System (JSETS)
The Future

• L Band satellite payloads
  – Decreased interference/suspect alerts
• Second Generation Beacons (SGB)
  – Testing this summer
  – L band; all GNSS encoded; no moving beacon issue; greater accuracy
• Emergency Locator Transmitter - Distress Tracking [ELT(DT)]
  – ADT system; all new aircraft by 2021
• Return Link Service
  – Summer/fall 2018
• Moving Beacons – issues - IOC
Overloading the System

• **You can’t!**
  – Also, keep the beacon active until they are safe on a dry land or recovered on another vessel. Remember, crews might still need to DF to the 121.5 signal

• Hurricane Harvey and Irma some significant delays

• RCCs can request the MCC turn off alerts in a specific area
Non-Distress Transmissions

- Cospas-Sarsat discourages Non-Distress transmissions
- Increase the workload for MCCs and RCCs
- Confusion at RCCs: launch on non-distress or miss distress alert
- Can put SAR crews at unnecessary risk
Q: What did the duck say to the comedian?

A: "You quack me up."
U.S. SARSAT Program
Policy on Non-Distress Transmissions

• Applies to transmission of U.S. coded 406 MHz distress beacons type approved by COSPAS SARSAT for.

• self-test transmissions
• test-coded transmissions
• operationally coded transmissions
Beacon Transmission

• **Self-Test Transmission** – an on-air transmission where the frame synch is reversed so that the Cospas-Sarsat space and ground segments do not process the beacon burst.

• **Test Protocol Transmission** – an on-air transmission where the coding of the beacon is modified so that Cospas-Sarsat recognizes it as a test transmission and does not forward it through the operational ground segment.

• **Operational Protocol Transmission** – an on-air transmission where the coding of the beacon corresponds to a distress alert and the resulting alert is treated as if it were an actual distress.
Non-Distress Transmissions

- **Beacon Self-Test** – activation of an emergency beacon according to manufacturer’s instructions to *internally test the beacon unit and assure its operation*.

- **Testing** – activation of an emergency beacon according to manufacturer’s instructions and Federal agency requirements to ensure proper installation of the beacon and its components.

- **Exercise** – a military maneuver or simulated operation involving planning, preparation, and execution that is carried out for the purpose of training and evaluation of SAR response which may involve activation of an emergency beacon exercise the end-to-end capability of the system.

- **Training** – activation of an emergency beacon according to manufacturer’s instructions to train beacon users on the proper use and operation of a beacon or for Search and Rescue Response personnel to train in the use of direction finding (DF) and/or Homing equipment in locating the beacon or both.
Coordination – Self Test

- Beacon Self-test/ Built-In Test Transmission: No prior coordination necessary. Transmission should be limited to one burst or per manufacturer’s instructions.
Coordination - Testing

- If using an anechoic chamber, no prior coordination necessary.
- If transmitting outside anechoic chamber the test must be coordinated with NOAA prior to activation.
- Should use self-test function and a hand held local test verification unit.
- Operational protocol duration shall not exceed 45 seconds.
Coordination – Operational Exercise

- Operational Exercise: USCG and USAF coordinate with NOAA.
- Test Protocol Coded beacons are preferred; operational protocol can be supported in limited cases.
Coordination - Training

• Training: USCG and USAF coordinate with NOAA.
• Transmission should be limited to the test protocol.
• Operational protocol can be supported in limited cases
• Homing is not on 121.5
Operational Beacon Tests

MCC Coordination Lead Times

• 1-3 Beacons – 48 Hours before first event
• 4-6 beacons – 30 Days before first event
• 7+ beacons – Testing/training not allowed

* Lead time for USCG SARSAT Officer - Leave/TAD

• All MCCs shall be notified of tests using beacons.
Department of Defense

• USAF coordinates DOD, Civil Air Patrol, and State activation requests

• USAF POC: ACC Special Activities Branch

• Email: acc_a3jt.prtraining@us.af.mil
U.S. Coast Guard

- USCG coordinates USCG and USCG Auxiliary activation requests

- USCG POC: Office of Search and Rescue

- Email: HQS-DG-M-406-TESTREQUEST@uscg.mil

- Phone: 202-372-2089
Final Approval

- NOAA coordinates all other activation requests
- NOAA POC: NOAA SARSAT Program
- Email: beacon.test@noaa.gov
- Phone 301-817-4538

- **DO NOT** email the USAF, USCG, and NOAA in one big email
Why We Do It

Beacon is godsend for stranded fisherman

BY BILL DECKER
thedeker@daily-review.com

They're small, bright and fit into the palm.
They are personal locator beacons, powerful enough to put a lost hunter or fisherman instantly in touch with the Coast Guard search and rescue satellite system, complete with GPS coordinates.

Mark Bernuchho sells them at the family business, Control Fire & Safety, 822 Front St. But he said that's not why he contacted The Daily Review with a possible story about the beacons. Instead, he was repaying a good deed.

Bernuchho, normally a vendor for the beacons, turned into a grateful customer Friday during a fishing trip to Point au Fer Island.

When his boat became disabled, his beacon not only guided a Coast Guard helicopter to him, but it helped tell his wife, Brenda, where he was and that he was OK.

"These devices, which are lightweight, compact and easy to use, can instantly summon help and provide rescuers with precise location information," according to the U.S. Coast Guard website.

Bernuchho wasn't having much luck on his solo fishing trip to Point au Fer, almost due south of Morgan City and near the open water of the Gulf of Mexico. He'd caught only one fish and decided to try another spot.

But the engine on his 20-foot aluminum V-hull craft generated nothing more than a clatter. On top of that, there was no (Continued on Page 10)

Mark Bernuchho of Control Fire & Safety in Morgan City holds his Ocean Signal personal locator beacon in his right hand. Bernuchho used the beacon Friday after his boat's engine failed at Point au Fer Island near the Gulf. A Coast Guard helicopter responded and lowered the radio in Bernuchho's left hand to him on a weighted line.
Marc Bernache took this callphone picture of the Coast Guard helicopter that responded to his personal locator beacon Friday at Point au Pech Island. The Coast Guard was unable to arrange a tow back to Morgan City for Bernache's disabled boat.

**Beacon**

(Continued from Page 1 callphone signal)

So, at 1:04 p.m., Bernache activated his personal locator beacon, an Ocean Signal model that sells for $200-$250. He extended the antenna, which looks and works like a carpenter's tape measure. Then he turned on the power.

The beacons are made to send out individualized, registered signals. The National Oceanic and Atmospheric Administration monitors the appropriate frequency.

Before long, a helicopter was on the way from New Orleans, and Brenda Bernache was getting a call from the first she knew that anything was wrong.

Marc Bernache, meanwhile, dialed callphone while he waited for help. He carved a piece of wood to the back of the box in case he had to use it as a flare to help the plane find him. He gathered anything that might get blown around by the returning current and put it in the well of the boat.

And, he waited.

"I don't want this operation to go late tonight," Bernache told The Times.

He needn't have worried. The helicopter arrived at 1:44 p.m., 50 minutes after he powered up the beacon.

"The pilot didn't see us at first. They've got a heavy device on this helicopter that doesn't show up too far away," Bernache said. "As it got stronger in wind, they finally saw us.

"We started going back toward shore when they came back toward us again. That's when I heard my orange smoke."
Contact Information

LCDR Erin Boyle
United States Coast Guard
Office of Search and Rescue
Erin.M.Boyle@uscg.mil
(W) 202-372-2089
(W.Cell) 202-286-2696

* I might be TAD and in another time zone