



Beacons and Activation Requests

SAR Controllers Workshop 2018

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United States Coast Guard

Office of Search and Rescue





406 MHz Distress Beacons



EPIRB
Emergency
Position
Indicating
Radio
Beacons



ELTs
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

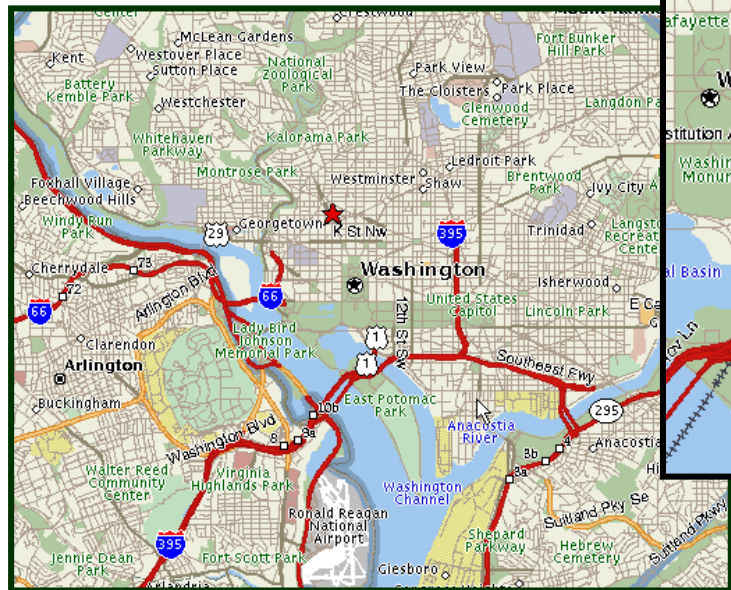


Comparison: 121.5 MHz vs. 406 MHz

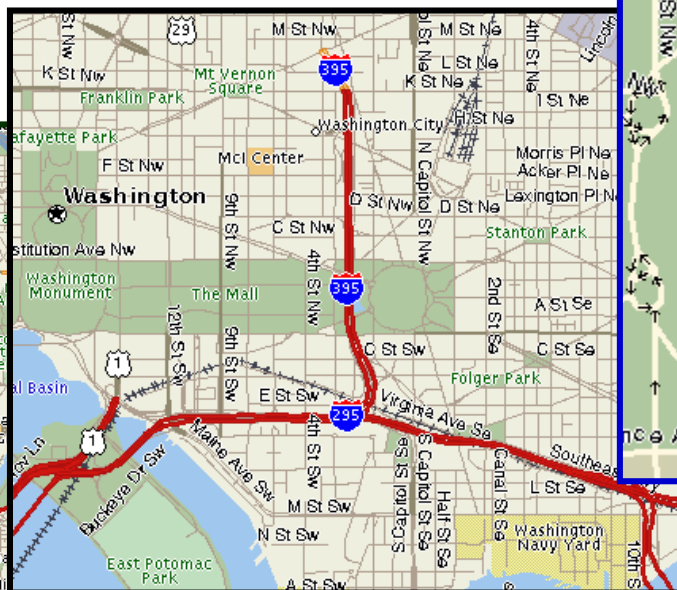
121.5 MHz
**=20 Km search
area radius**

**406 MHz w/GPS
= 100 m**

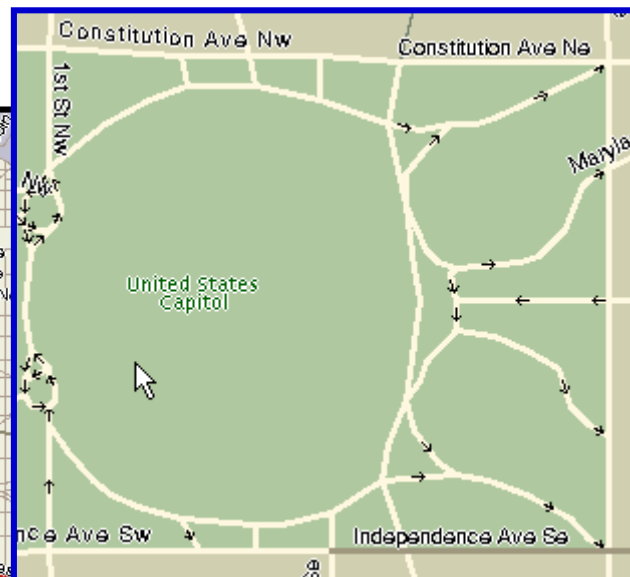
406 MHz – 5km



**Search Time:
12+ hours**



**Search Time:
2 - 3 hours**



**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)





406 MHz Distress Beacon Carriage Regulations

Aircraft

- 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/Military Use



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**

Comic Relief

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 component’s.
- **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

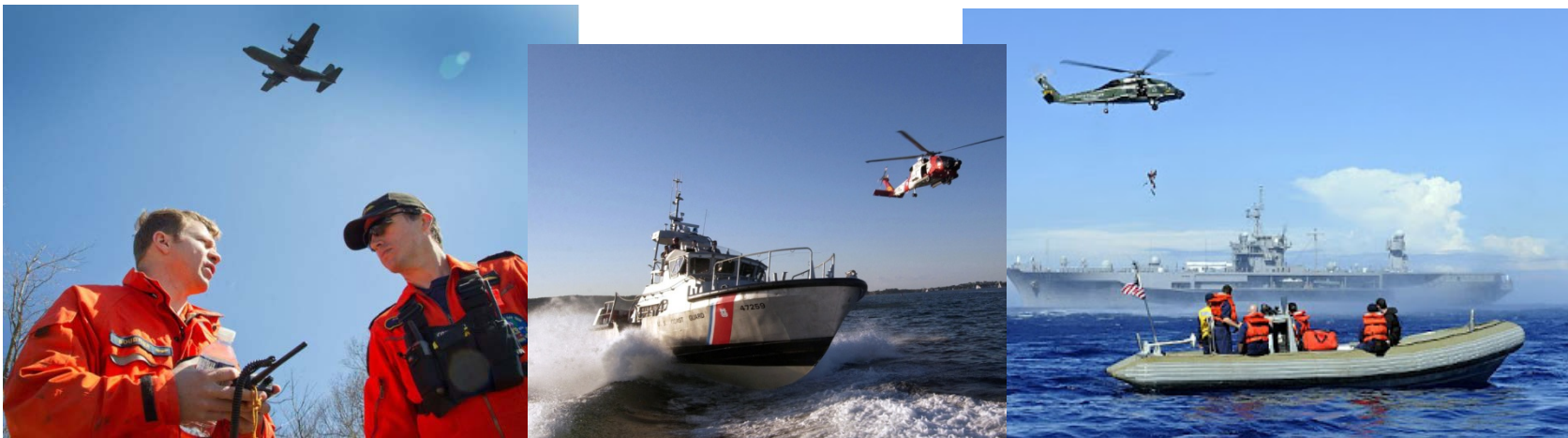
- If using an anechoic chamber, no prior coordination necessary.
- If transmitting outside anechoic chamber the test must be coordinated with NOAA prior to activation.
- Should use self-test function and a hand held local test verification unit
- Operational protocol duration shall not exceed 45 seconds.





Coordination – Operational Exercise

- Operational Exercise: USCGC 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 Dicker

bdicker@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 coordination.

Mark Bernucho 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.

Bernucho, 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.

Bernucho 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 Bernucho of Control Fire & Safety in Morgan City holds his Ocean Signal personal locator beacon in his right hand. Bernucho 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 Bernucho's left hand to him on a weighted line.



Mark Bernuche took this cellphone picture of the Coast Guard helicopter that responded to his personal locator beacon Friday at Point au Fer Island. The Coast Guard was able to arrange a tow back to Morgan City for Bernuche's disabled boat.

Beacon

(Continued from Page 1)
cellphone signal.

So, at 1:04 p.m., Bernuche activated his personal locator beacon, an Ocean Signal model that sells for \$200-\$300. He extended the antennas, which look and work like a carpenter's tape measure. Then he turned on the power.

The beacons are made to send out individualized, radio-coded signals. The National Oceanic and Atmospheric Administration monitors the appropriate frequencies.

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

Mark Bernuche, meanwhile, shot cellphone video as he waited for help. He moved gasoline cans to the back of the boat in case he had to set off a flare from the front. He gathered anything that might get blown around by helicopter rotors and put it in the well of the boat. And, he waited.

"I don't want this operation to go into nighttime," Bernuche said on the tape.

He needn't have worried. The helicopter arrived at 1:30 p.m., 36 minutes after he powered up the beacon.

The pilot didn't see him at first.

"They've got a hunting device on that helicopter that homes in on that frequency," Bernuche said. "As it gets stronger in weaker, that's how they know where you are."

"They started going back and away from me, and when they came back toward me again, that's when I let out my orange smoke."

The orange smoke flares are part of Bernuche's rescue equipment.

"I asked him later how he found me," Bernuche said, "and he said, 'I saw your orange smoke.'"

Using hand signals, Bernuche let the copter crew know that he was OK physically. As for the engine, he painted to it and made a cutting-the-throat gesture. The crew lowered a radio to Bernuche on a weighted line. Before long, Jeff Fontenot of Morgan City was on his way to Bernuche's location for the 60-minute tow back to town.

The beacon saved Bernuche some inconvenience and his family some worry. In other cases, the results have been more dramatic.

Cuampdon reported that over the weekend, 6 boat-loads swamped a small boat in which four men were fishing 21 miles west of the South Pacific island of Palmyra. While his friends found empty gasoline cans to use for flotation, one of the men dove down to grab a personal locator beacon from the boat and activated it. They were rescued after four hours.

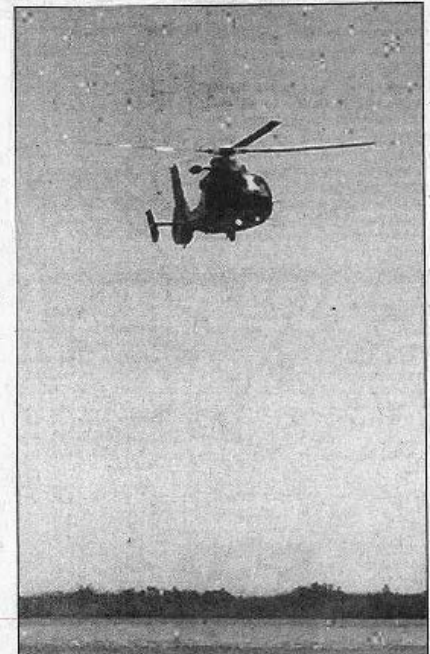
Bernuche said that after his adventure with the beacon, "I asked the Coast Guard if there was anything I could do. And they said, 'Spread the word.'"

Around Town

Happy 18th birthday Du'Angelo Johnson, love always, Mum and siblings. Happy birthday Monique Bate'iff, have a great day, we love you, family and friends.

@daily-review.com

Get You One Pronto!!!



Thanks for the prompt action & professionalism with my May 1, 2015 Rescued!

I really appreciate the hard work you guys do. You said 'spread the word' so I have included a copy of the newspaper article I was featured in.

THANK YOU!!!

I just wanted to let you know how much I appreciate everything you've done. It really meant a lot.

Mark Bernuche



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* I might be TAD and in
another time zone