



Beacons and Activation Requests

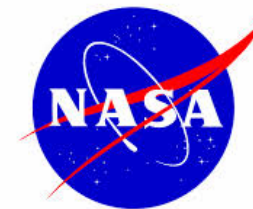
SAR Controllers Workshop 2019

March 5-7, 2019

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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

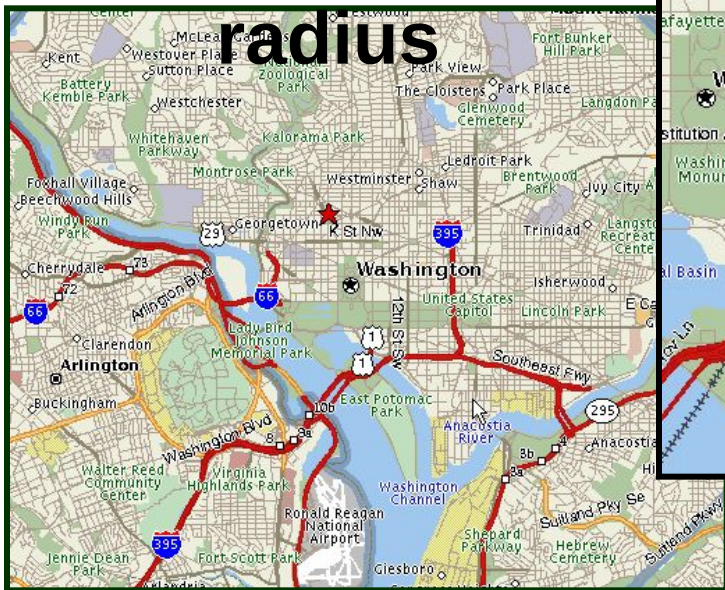
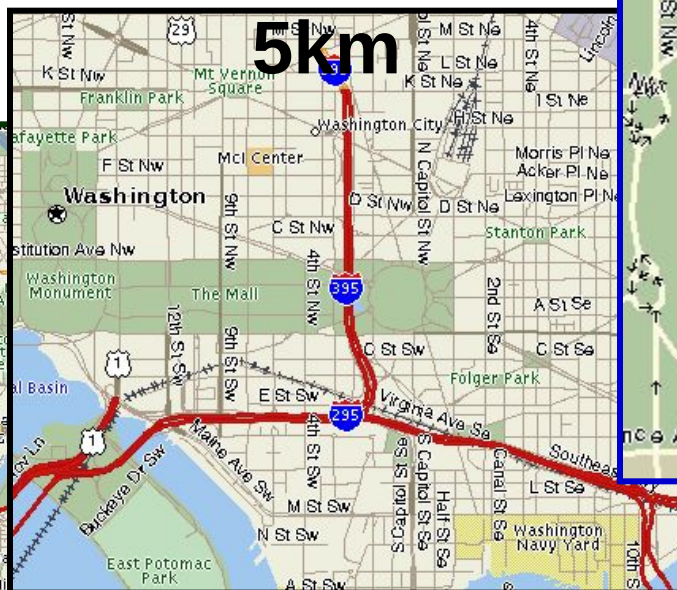
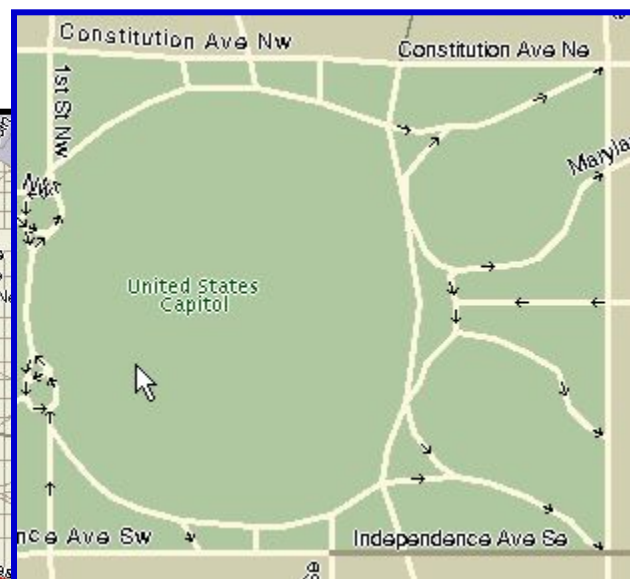


Comparison: 121.5 MHz vs. 406 MHz

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

**121.5 MHz
=20 Km
search area**

**406 MHz –
5km**



**Search Time:
Minimal**

*** in 2017, 65% of
beacons were
built with an
internal GNSS**

**Search
Time:**

**Search
Time: 2 - 3
hours**



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
- If you discover intentional or unintentional interference, contact the USMCC.



406 MHz Distress Beacon Carriage Regulations

Ships/Boat

- 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



406 MHz Distress Beacon Carriage Regulations



Ships/Boat

- **Some U.S. state programs offer discounts for registration with proof of EPIRB or PLB**



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)
 - Phase out



406 MHz Distress Beacons

United States:

~605,000 beacons in NOAA's Registration Database

Globally: ~2.0 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)**





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
 - USCG will support you; San Juan complaint letter

Comic Relief

- https://www.youtube.com/watch?v=yR0lWIC_H3rY





Non-Distress Transmissions

- Cospas-Sarsat is trying to education the public on Non-Distress transmissions
 - Kudos to District 7 and their Miami Boat Show outreach
 - District 5 SARSAT video
- Increases the workload for MCCs and RCCs
- Confusion at RCCs: launch on non-distress or miss distress alert
- Can put SAR crews at unnecessary risk
- Canadian self-test program



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.
- **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.
- **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.



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.
- 121.5 MHz will be broadcasted





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





Coordination - Training

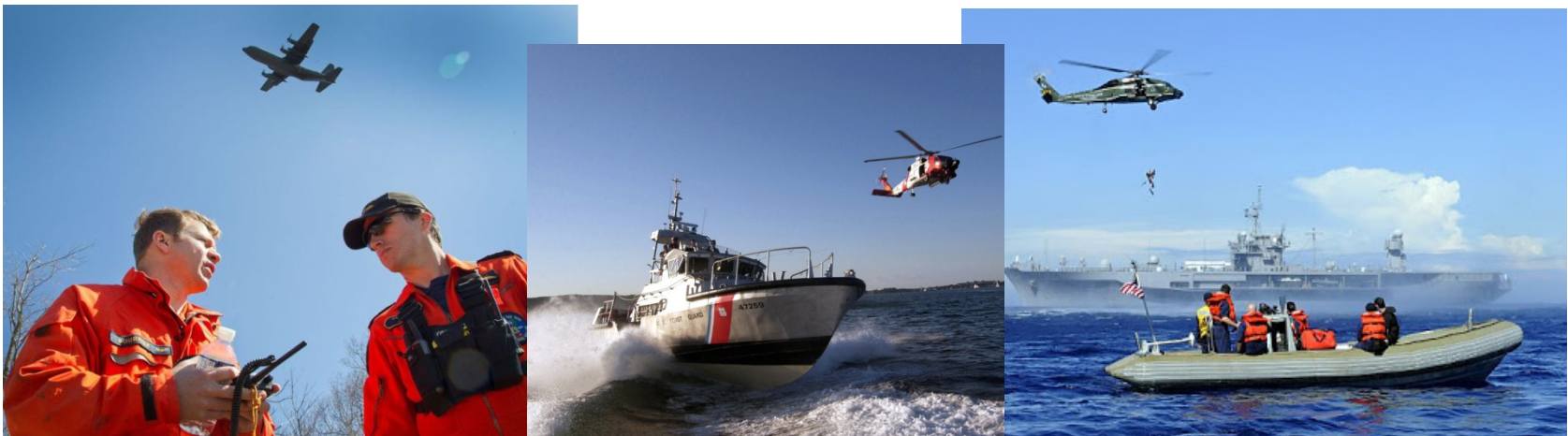
- Training: USCG and USAF coordinate with NOAA.
- Transmission should be limited to the test protocol.
 - Homing is not on 121.5 MHz (different frequency)
- Operational protocol can be supported in limited cases





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.





Operational Beacon Tests

MCC Coordination Lead Times

- 1-3 Beacons – 72 Hours before first event
- 4-6 beacons – 30 Days before first event
- 7+ beacons – Testing/training not allowed

- 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: **AFRCC.Console@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



Contact Information

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* I might be TDY and in
another time zone