



COMPARISON OF THE 406 MHz AND 121.5 MHz DISTRESS BEACONS

The following table compares 406 MHz and 121.5 MHz beacons in these critical areas:

406 MHz Beacons

Coverage:

- o Global

False Alerts:

- o **All alerts come from beacons.** Satellite beacon transmissions are digital, coded signals. **Satellites process only encoded data, other signals are rejected.**
- o About 1 in 12 alerts are actual distress.
- o **Beacon-unique coding/registration allow rapid incident corroboration. Registration mandatory since 1994. 90% beacons registered. About 70% of false alerts are resolved by a phone or radio call to registration POCs prior to launching SAR assets.**

Alerting:

- o **First alert warrants launch of SAR assets. Earlier launches puts assets on scene sooner--Average 3 hrs saved in maritime, 6 hrs in inland.**
- o Average initial detection/alerting by orbiting satellites is about 45 minutes.
- o Average subsequent satellite passes every 60 minutes.
- o **Vessel/aircraft ID, point of contact information provided with alerts allows rapid verification or stand-down.**
- o Allows false alert follow -up to continuously improve system integrity/reliability.
- o **Near instantaneous detection by geostationary satellites. System provides world-wide coverage.**

Position Information:

- o **1-3 nm (2-5 km) accuracy** on average. Position calculated by Doppler shift analysis.
- o **Less than 100 yard accuracy with GPS-equipped beacons. GPS position processed with initial alert. Major beacon enhancement.**

Locating the Target:

- o **Superior alert (non-GPS) position accuracy limits initial search area to about 25 sq. nm (65 sq. km).**
- o **GPS-equipped beacons reduce search area to a significantly smaller area.**
- o 121.5 MHz homing signal facilitates target location by radio detection finder equipped search units.

Power Output:

- o **5.0 Watts** (Strong power output)

Cost:

- o Average cost is \$1000 (GPS-equipped EPIRB)
- o Average cost is \$500 (Personal Locator Beacon)
- o Average cost is \$1500.00 - \$3000.00 (ELT)

121.5 MHz Beacons

- o **Ground station dependent;** ground stations have an effective radius of about 1800 nm (2300 km). Both ground station and beacon must be in satellite footprint. Current coverage is about two-thirds of the world.

- o **Only about 1 in 5 alerts come from beacons. Satellites cannot discern beacon signals from many non-beacon sources. Beacons transmit anonymously with no unique identifier. Non-beacon interferers have included ATM machines, pizza ovens, and stadium scoreboards!**

- o **Fewer than 2 in 1000 alerts and 2 in 100 composite alerts are actual distress.**

- o **Since 121.5 MHz beacons transmit anonymously, the only way to ascertain the situation is to dispatch resources to investigate -- a costly disadvantage.**

- o **High false alert rate makes first-alert launch unfeasible.** Absent independent distress information means RCCs must wait for additional alert information.

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- o **Alerts are anonymous. 121.5 MHz analog technology not capable of transmitting data.**

- o No false alert follow -up capability.

- o **No GEO detection capability = no instantaneous detection.**

- o **12-15 nm (15-25 km) accuracy** on average. Position calculated by Doppler shift analysis.

- o **No GPS capability.**

- o **Initial position uncertainty result in 500 sq. nm (800 sq. km) search area on average.**

- o **No GPS capability.**

- o Same as 406 MHz.

- o **0.1 Watt** (Weaker power output) – Hard for satellites to detect

- o Average cost is \$200.00 - \$400.00 (EPIRB)
- o Average cost is \$600.00 - \$1200.00 (ELT)
- o **121.5 MHz beacons are being phased out**