COMPARISON OF THE 406 MHz AND 121.5 MHz DISTRESS BEACONS

Presented to CAP National Board, Feb 2000. NOAA briefed on discontinuing satellite monitoring of the 121.5 MHz distress signal in 2006. NOAA seeks CAP assistance in getting out the message about the advantages of the 406 system and to notify users about the future phase-out of satellite monitoring of the 121.5 MHz distress signal.

406 MHz Beacons	121.5 MHz Beacons
Coverage: • Global	• Ground station dependent; ground stations nave an effective radius of about 1800 nm (2300 km). Both ground station and beacon must be in satellite footprint. Current coverage is about one -third of the world.
Reliability - False Alerts: • All alerts come from beacons. Satellite beacon transmissions are digital, coded signals. Satellites process only encoded data, other signals are rejected. • About 1 in 10 alerts are actual distress. • Beacon-unique coding/registration allow rapid incident corroboration. Registration mandatory 9/13/94. 90% beacons are registered. About 70% of false alerts are resolved by a phone or radio call to registration POCs prior to launching SAR assets.	• Only about 1 in 5 alerts come from beacons. Satellites cannot discern beacon signals from many non-beacon sources. Beacons transmit anonymously. • Fewer than 2 in 1000 alerts and 2 in 100 composite alerts are actual distress. • Since 121.5 MHz beacons transmit anonymously, the only way to ascertain the situation is to dispatch resources to investigate - a costly disadvantage.
Alerting: • First alert confidence sufficient to warrant launch of SAR assets. Earlier launches put assets on scene earlier - Average 2.5 hrs saved in maritime, 6 hrs in inland. • Average initial detection/alerting by orbiting satellites is about 45 minutes - worst case 60 minutes. • Average subsequent satellite passes every 60 minutes. • Vessel/acft ID, point of contact information provided with alerts allows rapid corroboration or stand-down. • Allows false alert follow-up to continuously improve system integrity/reliability. • Near instantaneous detection by geostationary satellites. System provides worldwide coverage.	• High false alert rate makes first-alert launch unfeasible. Absent independent distress corroboration, RCCs must wait for additional alert information. • Same as 406 MHz. • Same as 406 MHz. • Alerts are anonymous. 121.5 MHz analog technology not capable of transmitting data. • No capability. • No capability.
Position Information: • 1-3 nm (2-5 km) accuracy on average. Position calculated by doppler shift analysis. • 100 yard accuracy with GPS equipped beacon. GPS position processed with initial alert. System infrastructure now available.	• 12-16 nm (15-20 km) accuracy on average. Position calculated by doppler shift analysis. • No capability.
Locating the Target: • Superior alert (non-GPS) position accuracy limits initial search area to about 12.5 sq. nm (20 sq. km). • GPS-equipped beacons reduce search area to a negligible area. • 121.5 MHz homing signal facilitates target location by radio detection finder equipped search units.	• Initial position uncertainty result in 450 sq. nm (700 sq. km) search area on average. • No GPS capability. • Same as 406 MHz
Power Output: • 5.0 Watts	• 0.1 Watt
Cost: • Average cost is $750.00 - $1200.00 (EPIRB) • Average cost is $1800.00 (GPS equipped EPRIB) • Average cost is $2200.00 - $3500.00 (ELT)	• Average cost is $200.00 - $500.00 (EPRIB) • Average cost is $600.00 - $1500.00 (ELT)

Source: USCG