



ESSENTIAL MARINE COMMUNICATIONS

The Hierarchy of Reliance & Emergency Protocols

THE HIERARCHY OF RELIANCE

Secondary Tool (Mobile):
Powerful for precise location (i-911), but structurally unreliable as a sole lifeline.

SUPPLEMENTARY
CELLULAR
(MOBILE/I-911)

GLOBAL SATELLITE
BACKUP
(EPIRB/PLB)

Global Backup (Sat Beacons):
Guaranteed text-message delivery via space when line-of-sight fails.

Primary Tool (VHF/DSC):
The mandatory first choice for safety and hazard notification.

PRIMARY
LINE-OF-SIGHT
(VHF/DSC)

VHF RADIO (VERY HIGH FREQUENCY)

- **DEFINITION:**
 - The fundamental two-way voice communication radio for ship-to-ship and ship-to-shore contact.
- **SIGNAL ARCHITECTURE:**
 - Operates strictly on line-of-sight transmission.
- **PRIMARY FUNCTION:**
 - Daily navigation traffic, routine hailing, and critical safety broadcasts.

Modern handheld units are compact, energy-efficient, waterproof, and designed to float.



THE MAYDAY BROADCAST DYNAMICS

MOBILE PHONES = POINT-TO-POINT

Unreliable coverage; alerts only one receiver, degrading situational awareness.

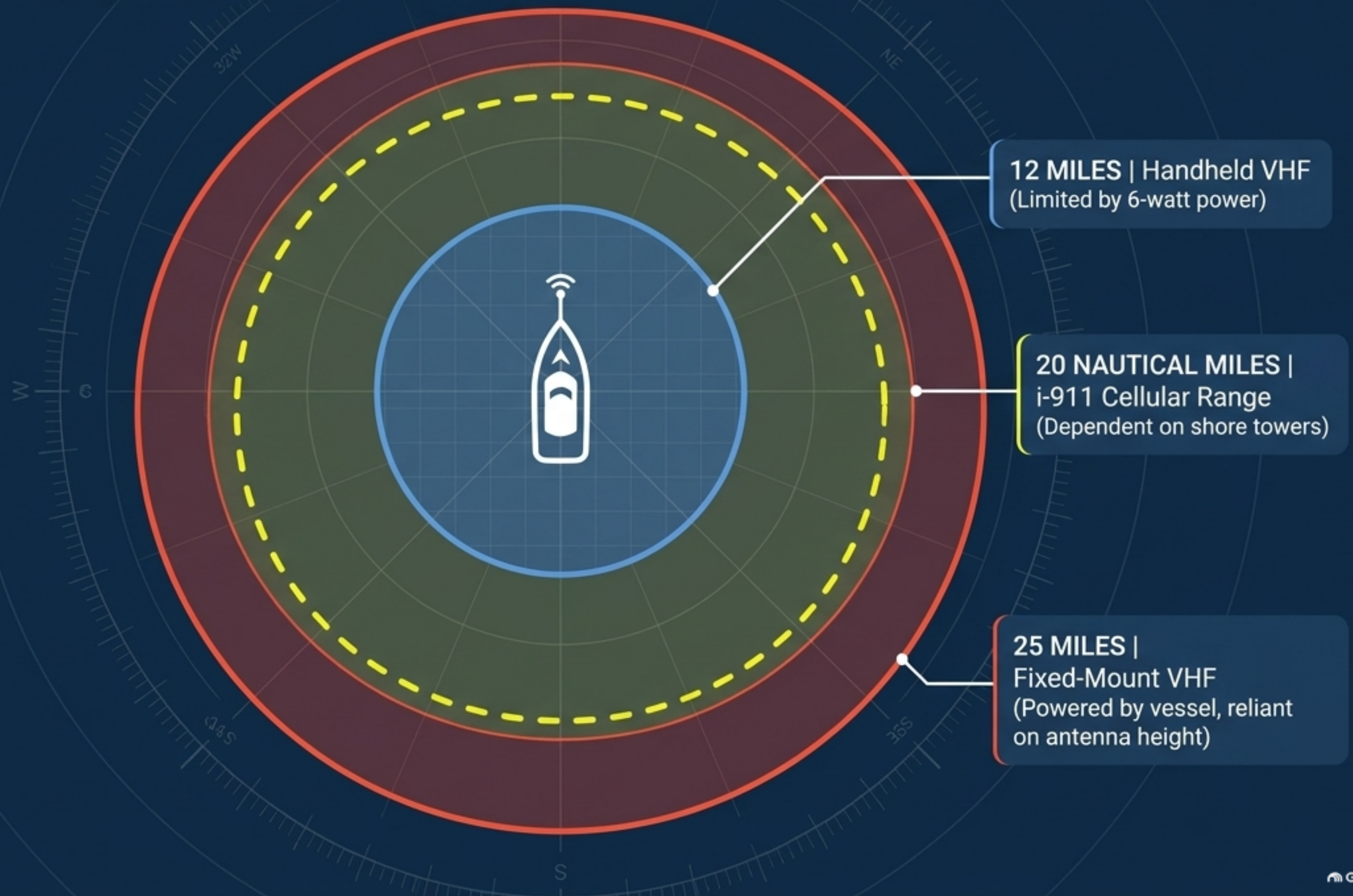


VHF RADIOS = POINT-TO-MULTI-POINT

Instantly and simultaneously alerts all nearby vessels and agencies.



OPERATING RANGE CAPABILITIES



VHF Channel 16

International Distress, Safety & Hailing Frequency (156.8 MHz)



Mandatory Monitoring: Power-driven vessels 20 meters or longer must continuously monitor Channel 16 while underway.

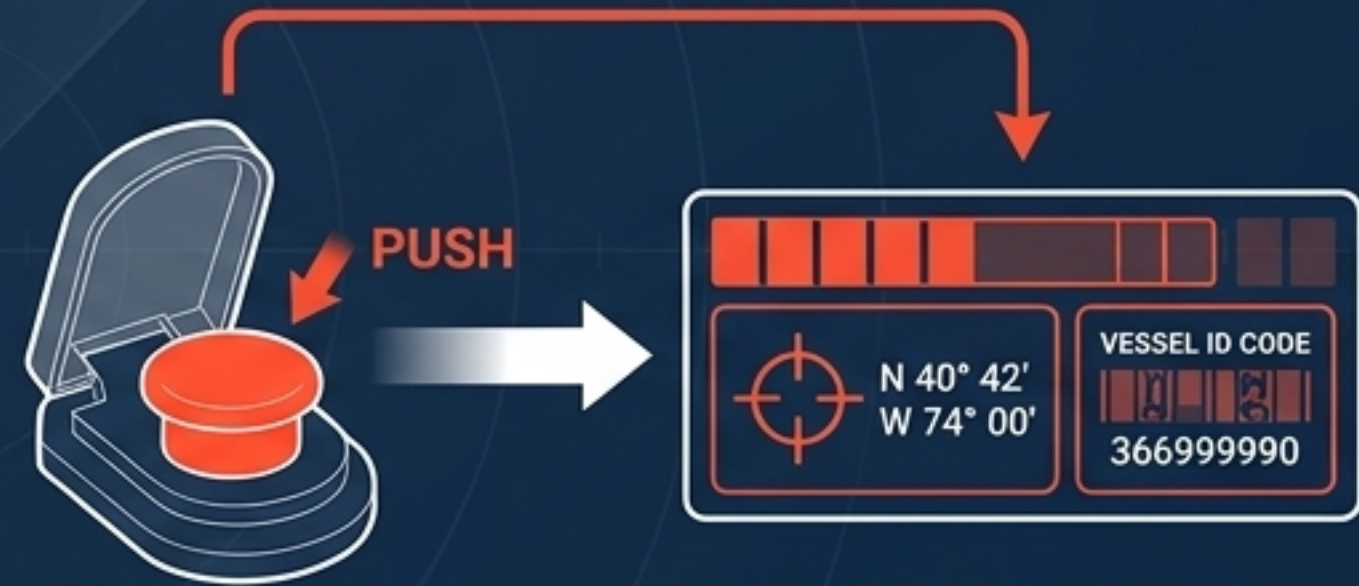
Strongly Encouraged: All boaters are advised to monitor this channel to maintain situational awareness.

Strict Usage: Reserved exclusively for emergency distress calls, immediate Coast Guard access, and initial vessel hailing.

Digital Selective Calling (DSC)

DIGITAL MAYDAY

- **Definition:** Electronic automation integrated directly into modern VHF radios.
- **The Digital Mayday:** At the push of a distress distress button, transmits a digital alert containing exact latitude and longitude and vessel-specific identification.
- **Continuous Scanning:** Most models automatically scan every U.S., international, weather, and emergency channel to ensure incoming alerts are never missed.



Global Satellite Beacons (EPIRBs & PLBs)



Activation: Device activates (manually or automatically) far beyond VHF line-of-sight.



Satellite Relay: Relays coded text messages through a free-to-use multinational satellite system.



Rescue Coordination: Delivers the automated distress message to the nearest command center, ensuring delivery regardless of global location.

Dual-Frequency Distress Anatomy

121.5 MHz Homing Signal |
The localized ping. Used by local search and rescue units to pinpoint the exact physical location of the beacon in the water.



406 MHz Distress Signal |
The global alert sent to space. Delivers the coded message to the rescue coordination center.



Satellite Beacon Diagnostic Table



Emergency Position Indicating Radio Beacon

Tied to a **specific Boat**

Automatic (via submersion) or **Manual**

Minimum **48 Hours**



Antenna Floats in water



Vessel Sinking



Personal Locator Beacon

Tied to an **individual Person**

Manual only (3-step process)

Minimum **24 Hours**



Does NOT float



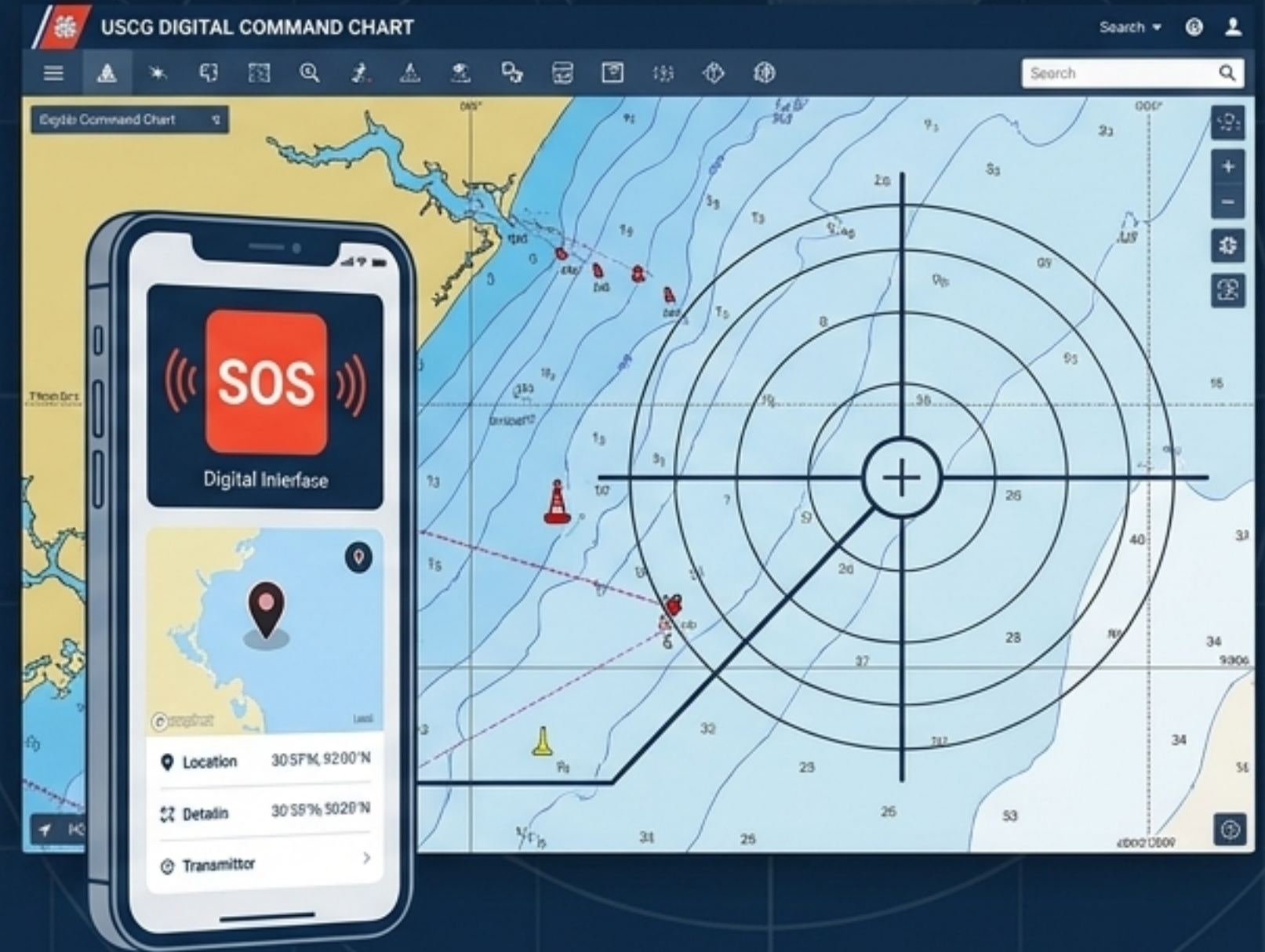
Falling Overboard (Man-Overboard)

Supplementary Cellular: The i-911 System

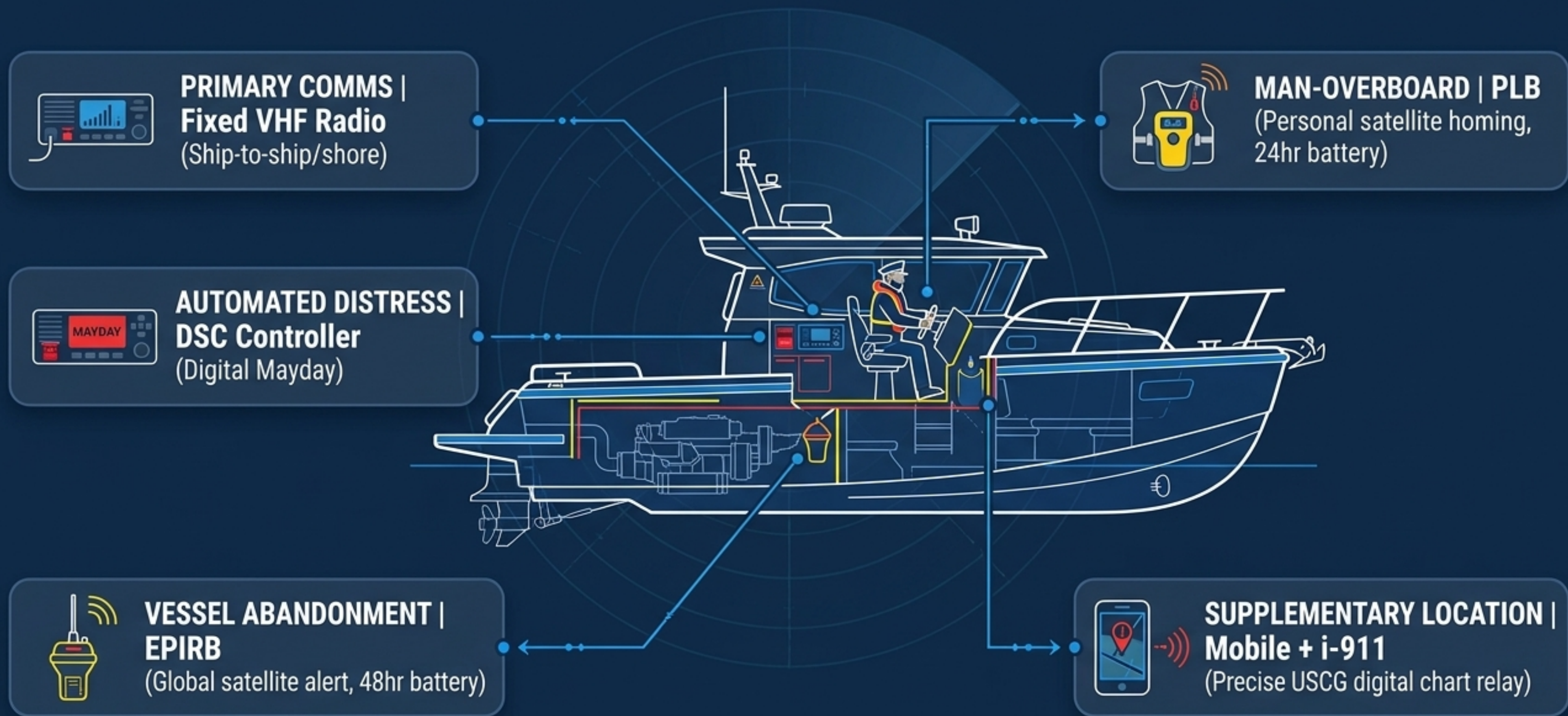
The Technology: Approved by the USCG in Spring 2020. Pairs consumer smartphone internal GPS with a web-based interface.

The Capability: Locates distressed mariners on a digital chart with accuracy often less than 10 feet, up to 20 nautical miles offshore.

Crucial Warning: i-911 relies on point-to-point cellular service. It is a powerful secondary tool, but must never replace your VHF-DSC radio.



The Marine Communications Ecosystem



Protocol Verification Check



Which global beacon is registered to an individual rather than a vessel, and does not float?

Personal Locator Beacon (PLB)



What is the minimum required operational transmission time for an EPIRB?

48 Hours



What frequency must power-driven vessels of 20 meters or more strictly monitor?

**VHF Channel 16
(156.8 MHz)**