U.S. Coast Guard (USCG)
Communications and Search and Rescue (SAR)

CAPT Kevin C. Kiefer
United States Coast Guard
Commander, Sector Baltimore
Agenda

- Boating Safety
- USCG Resources
- Mariner Resources
- Real-Life Case
Boating Safety

USCG Data

Every 2-1/2 Hours
Someone is injured or killed in a boating accident.

Chance of Drowning
In a Boating Accident

- With Life Jacket: 66
- Without Life Jacket: 1 in 11

U.S. Boat Owners
Who Say They...

- 42.60% Have Ever Taken a Boating Safety Course
- 63.40% are "Very Experienced"

Boating Accidents
Attributable to Operator Error, Poor Judgement, or Inexperience

- 56.9%
- 63.4%

Source: http://www.uscgboating.org/
SCG Rescue Coordination Centers (RCCs)

- Boston
- Norfolk
- Miami
- New Orleans
- Cleveland
- Alameda
- Seattle
- Honolulu
- Nueva
USCG Sectors – 37
USCG Sector Command Center

- 24x7 Watchstanders
  - Command Duty Officer
  - Operations Unit
  - Situation Unit
  - Communications Unit

- Highly Trained Personnel
  - Officer, Enlisted & Civilian
  - National Search & Rescue School
    - Maritime Search Planning Course
    - Search Coordination & Execution
    - Search & Rescue Supervisor Course
USCG Boat Stations

Sector Baltimore
- Station Curtis Bay
- Station Stillpond
- Station Annapolis
- Station Oxford
- Station St. Inigoes
- Station Crisfield
- Station Ocean City
- Station Washington, D.C.
Minimizes time between call for help & rescue.

Enables USCG to execute SAR mission with greater agility and efficiency.

Direction-finding capability uses tower stem to generate lines of bearing to source VHF radio transmissions.

Extends coverage to 20 NM from coastline, even further.
Rescue 21 - how it works...

Rescue 21 direction finding equipment uses determine latitude and longitude
Remote Fixed Facilities (10 total):
- Alexandria
- Chincoteague
- Farnham
- Berlin
- Greenbury Point
- King George
- Leonardtown
- Merrick
- Northeast
- Riverton
SAR Communications

BIG 4

- 1) Nature of Emergency/Distress
- 2) Location (lat/long or geographic)
- 3) Number of Persons Onboard
- 4) Description/Name of Vessel
SAR Tools—

SAR Optimal Planning System (SAROPS)

• Software used by USCG for maritime search planning

• Monte Carlo based system uses thousands of simulated particles generated by user inputs to create search areas

• Ability to handle multiple scenarios, search object types & account for affects of previous searches

• Uses Environmental Data Server (EDS) real-time gridded environmental products (e.g. winds & currents) to project drift of survivors & craft

• Search Rescue Unit (SRU) allocation is automated in SAROPS by maximizing Probability of Success

• Each SRU gets a recommended search pattern that accounts for relative motion between SRU & drifting particles

• Generates search pattern summaries & search effectiveness reports
SAR Tools— SAROPS

Typical Outputs
F– Digital Selective Calling (DSC) Radios

- Paging system that uses digital data signals to automate transmission & reception of calls on VHF CH–70
- DSC message automatically indicates identity of calling station & priority or purpose of call
- Every DSC radio has a unique number (just like a phone)
- DSC is used by ship & coast stations for sending & relaying distress alerts & for other urgency, safety & routine traffic
- DSC also offers ability to send/receive GPS positions
VHF– DSC Radios

- VHF radio must be registered for a Maritime Mobile Service Identity (MMSI) number

- Encouraged to connect DSC radio to your vessel’s Global Positioning System (GPS)

- DSC radio should be tested by:
  - DO NOT PRESS THE DISTRESS BUTTON
  - Use a working channel (not channel 16)
  - Determine MMSI number of friend or shore station
  - Call friend or shore station by dialing MMSI number
Advantages of VHF– DSC Radios

- Equipment is relatively inexpensive
- Easy to use & install
- Activation of a single button automatically sends a distress signal to DSC–equipped ships, boats & shore stations
  - Call includes:
    - Your identity
    - Your position (if GPS is connected)
    - Nature of distress
  - Call automatically repeated until acknowledged
- Useful if need to abandon vessel quickly
  - Push red distress button & go
- Automates the radio calling process
  - If someone wants to talk to you, they simply dial your DSC number
USCG VHF–DSC Response

- USCG will acknowledge distress alert or distress relay
- Determine if comms can be established with vessel
- Determine vessel position (if known)
- If comms cannot be established, query MMSI database to determine vessel identity & other means of contacting vessel (i.e. Inmarsat)
- If comms cannot be established & position is provided, dispatch resources to investigate
- If comms cannot be established & position is unknown
  - Continue to investigate for more info
Emergency Position Indicating Radio Beacon (EPIRB) & Personal Locator Beacon (PLB)

- 92% of alerts received from 406 MHz beacons are false
- 406 MHz beacons are required to be registered with NOAA
- Beacon owners should prevent mishandling of EPIRBs & PLBs by inexperienced persons to avoid possible damage or transmitting a false alert
- EPIRB & PLB self-tests should only be conducted according to manufacturer instructions
- When disposing of beacon or taking it out of regular use (i.e. putting in storage), ensure battery is disconnected/removed & update registration data
USCG–EPIRB/PLB Response

Response initially coordinated at the Rescue Coordination Center (RCC–District) level – may shift to USCG Sector

USCG response to 406 MHz beacon alert is identical to a MAYDAY broadcast response

- Determine if registered or if location was identified
- Urgent Marine Info Broadcasts (UMIB) used to determine distress position & maximize use of other resources
- When only general position info is available, boat/aircraft may be launched to direction find on 406 MHz beacon signal
- For incidents with no position info other than a vessel’s homeport, the USCG may issue a UMIB in the vessel’s homeport
Other Alternatives...

Satellite Emergency Notification Devices (SENDs)

- Example – SPOT Device

SAR (radar) Transponder (SART)

- For locating survival craft
Disabled Vessel

900 NM East of Cape Henry, VA

persons onboard

departed NY en route BVI

engine casualty

lost rudder

food & water onboard

crew fatigued
Disabled Vessel

Equipment Onboard

- 4 Lifejackets
- 2 Iridium Phones
- 406 MHz EPIRB
- SPOT Device
- VHF-FM Radio

Challenges

- Weather
- Distance Offshore
  - Helicopter Operations
  - Helicopter Fuel
- Communications
  - C-130 Cover Aircraft
  - Iridium Phones
Offshore Sailing – Safety Recommendations

- Make sure proper maintenance & repair of critical mechanical systems to reduce possibility of failure
- Know operational limitations of your systems
- Keep adequate tools, hardware & spare parts on board
- Inspect all steering gear components & engine systems prior to departing
- Keep a flooding & damage control kit onboard
- Contemplate & envision ways to fabricate a temporary emergency rudder
- Make sure EPIRBs & PLBs are registered, operational & available
- Make sure VHF radio is operational (& registered if DSC equipped)
- File a float plan with someone ashore before departing
Offshore Sailing – You Must Be Prepared!

Offshore sailing requires special knowledge, skills & abilities

Vessel equipment must be thoroughly checked before getting underway & periodically while at sea

Preparation is key to minimizing misfortune
Be Safe!

CAPT Kevin C. Kiefer
United States Coast Guard
Commander, Sector Baltimore