
S.O.P #: TACTICAL OPERATIONS MANUAL # 36
SUBJECT: OPEN WATER /MARINE OPERATIONS
INCIDENT DIVISION: EMERGENCY OPERATIONS

Objective: To serve as a guide for all Fire Department personnel operating around and in an open water environment during emergency and non-emergency operations.

Section 1: Purpose

This SOP is to be used and followed by all Fire Department members in assisting and developing strategic and tactical decision making while conducting operations around and in an open water environment, which includes emergency medical services, rescue, boat fires at a dock, boat fires open water and non-emergency/recovery operations.

Section 2: Definition

Open water operations include environments where water is not land locked, is tidal in nature, and deep enough to present a life and safety hazard to a person entering or working around the water. These conditions can exist in creeks, rivers, harbors and the Chesapeake Bay. These areas are subject to changing conditions during a tidal anomaly, coastal flooding, heavy rains and dense fog weather patterns. In addition, they may include marshlands, peninsulas, islands, piers, rock jettys, shipping channels and areas of boating and recreation sites not accessible by land apparatus. Flooding shall be defined as waterways overflowing their banks, bulkheads, and inundating coastal roadways, areas of occupancy and communities. Extreme tidal flooding conditions during a hurricane/tropical storm/ nor'easter or other weather conditions may create **swiftwater environment as defined in TAC #23 and shall be managed as such.**

Section 3: Notification and Response

Since open water events are sometimes dictated by weather, the Fire Department will follow four levels of response/action during these types of emergencies.

A. Level 1: (Normal Operations)

This mode is designed for normal day-to-day operations not related to a severe weather event, such as a reported incident in a Tidal area. Should the initial report indicate any aspect of an open water incident, the appropriate response profile shall be alerted and dispatched. (Should the initial report present any aspect of the conditions of a swiftwater incident, the appropriate response profile shall be alerted and dispatched as defined in TAC#23)

B. Level 2: (Heightened Awareness Phase/Pre-Alert)

If Baltimore County is placed under a **Coastal Flood Watch**, or impending or continual weather-related events dictate, Fire Dispatch will notify the Officer in Charge of Marine Emergency Team 21 (Bowleys Quarters), Marine Emergency Team 26 (North Point Edgemere), USAR Station 17 as well as Swiftwater Rescue Team Stations of 35 (Arbutus) and 48 (Kingsville). Operational personnel should take advantage of this notification by advising team members of the potential for possible deployments as well as gathering maps, charts and other pertinent information. They should inspect all water rescue related equipment to ensure it is in a ready state. They should also place water related rescue equipment in more accessible areas. Members, once notified, will remain in communication with Company Commanders to ensure the proper flow of information.

C. Level 3: (Adaptations due to active coastal flooding incidents)

1. If Baltimore County is placed under a **Coastal Flood Warning**, or it is identified that the potential for severe flooding exists or is occurring, the on duty Division Chief, ATR 1, the Officer in Charge of Marine Emergency Team 21 (Bowleys Quarters), Marine emergency Team 26 (North Point Edgemere) USAR Station 17 and the Swiftwater Rescue Team Stations of 35 (Arbutus) and 48 (Kingsville) will communicate and monitor the conditions. The on duty Division Chief shall consider any alterations in open water/swiftwater running assignments based on the need at that time.
2. In addition to swift water strike teams as defined in Tactical #23, the on duty Division Chief may cause to deploy **“Flood Evacuation Boat Groups,”** which will be comprised of a minimum of two marine vessels with 3 person teams from Stations 21 and 26 with the appropriate training and equipment to engage in floodwater evacuation. Swiftwater trained Personnel from 17, 35, or 48 may be utilized to staff, supplement, or replace surface water personnel as necessary. The purpose a Flood Evacuation Boat Group is for the assigned units to become a force multiplier and to be strategically placed/ utilized and respond to incidents as needed in Baltimore County waters.
3. If coastal flooding develops at a known problem area, the station in the affected district should investigate the vulnerable location. The Company Officer on the piece of apparatus will conduct a Windshield Assessment and forward information regarding existing or potential water related problems and the need for road closures to the On Duty DC and the DC of Emergency Management.

CI. Level 4: (Advance Pre-Planning Mode)

If Baltimore County is forecasted for an event of major significance such as a hurricane, tropical storm, or nor'easter that will impact tidal infrastructure and/or inland infrastructure with flooding, the advanced Pre-Planning Mode will be implemented by the BC/DC of Special Operations.

If indicated, the BC/DC of Special Operations, ATR 1, Team leaders from SRT 35, SRT 48, Dive Team 74, MET 21, and MET 26, will develop an Incident Action Plan for anticipated needs. In addition, these resources will work with the Office of Homeland Security and the Emergency Operations Center (E.O.C.) to support overall operations, as needed. Mutual Aid request deployments outside of Baltimore County will be approved by the DC of Special Operations or the on duty DC, who will develop a mutual aid strategy in conjunction with the DC of Emergency Management and the Chief of Department or his/her designee if Baltimore County Fire Department is in the Advanced Pre-Planning Mode. Any requests beyond those consistent with mutual aid agreements MEMAC (Maryland Emergency Management Agency Compact) or EMAC (Emergency Management Agency Compact) must be approved by the Chief of the Department or his/her designee. During such a request, a roster and equipped team will be maintained in Baltimore County during the deployment.

Section 4: Safety**A. Command and Control**

1. To ensure the safety of all personnel, the Incident Command System will be used on all multiple unit response open water incidents regardless of whether they are emergency or non-emergency. If units have arrived and the incident meets the above definition(s) Command will be established. Additional positions to be filled within the command structure for this type of incident shall be as follows:

- a. **Marine Safety Officer**– This position is in addition to the overall safety officer. This position will primarily be concerned with the scene and personnel safety in the hot zone.
- b. **Marine Group Supervisor/Branch Director**– will be responsible for the rescue/recovery/hazard mitigation operations in the Hot and Warm Zone.
- c. **Pier Safety Team**- Anytime personnel/victims are traversing a pier or transferring to or from a docked vessel, a pier safety team shall be deployed and equipped prior to the activity. This team will have communications with the Marine Branch Supervisor and the Incident Commander and will advise of any hazards or other relative information that could have a positive or negative effect on the operation. This team will develop an action plan that includes Talk, Reach, and Throw rescue options in the event of a RIT/Mayday/Person Overboard from bulkhead or pier.

B. Marine Unit Staffing/Accountability

1. To ensure the safety of all personnel, Marine Units, upon calling available on the water or enroute to any marine incident, shall advise dispatch of their number of personnel onboard and EMS staffing level. If at any point in time staffing or number of persons onboard the vessel changes, the new count shall be provided to the dispatcher or incident commander.

Section 5: Rescue/Recovery Operations

A. Strategic Priorities (Strategy)

1. Most often in open water rescue and recovery operations the strategic priorities are the same. They are:
 - a. Locate
 - b. Access
 - c. Stabilize (**BLS before** land, **ALS after** land, unless dispatched as an ALS level medical emergency)
 - d. Transport

Each phase shall be approached as an individual challenge with efforts directed toward making a smooth transition between them. Resources shall be made readily available that is specific to the task.

B. Tactical Considerations

1. The Officer in Charge must fully understand that elements may affect their ability to function safely, the acronym **T.E.M.P.O.** below can help in the decision process.
 - a. **Time** of day, air and water temperature.
 - b. **Energy** of the water and available equipment.
 - c. **Movement** and measurement of the water. (Set and Drift)
 - d. **Personnel** capabilities and plan.
 - e. **Operations** and operational period.
2. Tactics

Rescue and recovery operations for open water emergencies shall begin with low-risk/low-tech options. Obviously these options shall be exhausted before the high-risk/high-tech options are utilized. Three factors that shall be considered include; the time it takes to set up and operate a system, availability and location of resources, and the training and experience of on-scene personnel. The tactics are:

- a. **TALK**- The victim should receive specific instructions and information (Awareness Level)
 - b. **REACH**- Pike Poles, tools, inflated fire hose, and ground ladders.(Awareness Level)
 - c. **THROW**- Throw bags, rope, or flotation.(Awareness Level)
 - d. **ROW**- Boat/Marine Unit operations may consist of paddling the craft, or operating under motor power (Mate II and Motor Vessel Operator (MVO))
 - e. **GO** - Trained and properly equipped personnel shall perform this only after all options have been exhausted.(Mate II/ Surface water Technician Level Provider)
 - f. **HELO**- Request for and use of helicopters shall be jointly agreed upon between the Incident Commander, the Marine Group Supervisor/Branch Director and USAR due to the high-risk option. (Rescuers on hoist- Helicopter Search & Rescue Technician)
3. Piers shall remain limited access with Level II point of entry control. Pier access shall be limited to personnel actively engaged in the operation and the pier safety team. Relief personnel and tool staging areas shall remain on land as not to congest the pier. This team will have communications with the **Marine Group Supervisor/Branch Director** and will advise of any hazards or other relative information that could have a negative effect on the operations.

Section 6: Response Order/Responsibilities

A. Incident Command (First Arriving Land Unit)

1. Request an open water rescue assignment.
2. Establish command and command post location
3. Establish Level II accountability and Point of Entry Control
4. Recon from shore/bank
5. Assign additional land units to other geographical locations for additional spotters.
6. Conduct Size-up -Request tide and weather report to include ambient air temperature, wind and incoming disturbances (from dispatch) and water temperature (from marine units)
7. Separate and collect Witness statements if available
8. Establish EMS staging area (may be different than command post)
9. Identify Crew and EMS staffing level of Marine Units
10. Establish Hot, Warm, and Cold zones
11. Assure that all personnel within the Hot and Warm zone are wearing the proper PPE. **This PPE does not include any component of structural firefighting gear/SCBA unless actively engaging in firefighting.**
12. Appropriate PPE shall include approved Type III or Type V Personnel Flotation Devices.
13. Personnel entering the Hot Zone will be equipped with a Type V PFD, a water rescue helmet, and appropriate environmental protection. This level of protection may require personnel to be in a dry suit with hand and foot protection.
14. Personnel are not to tie or otherwise attach themselves, such as with a carabiner, to a fixed rope and make entry into the hot zone. Trained technicians are permitted to do so only when utilizing a Type V PFD with a “Blowout” belt feature.
15. Personnel shall not utilize boats or other watercraft unless trained and equipped to do so in the open water environment.
16. Continually monitor the condition of all personnel, as well as existing and potential environmental conditions during these events, and take appropriate action with regard to staffing.

B. Recon/Rescue Vessel (First arriving Marine Unit)

1. Monitor for victims hazards or debris while underway
2. Conduct size up - 360 entire incident on arrival
3. Are vessel occupants at risk or inconvenienced

-
4. Identify set and drift
 5. Deploy Point Last Seen Marker and Datum
 6. Relay Latitude and Longitude
 7. Identify priority and number of patients
 8. Request Additional Resources.
- C. Hazard Mitigation Vessel (Second Arriving Marine Unit if rescue, first arriving Marine Unit if NO rescue)
1. If not yet assigned by the IC, MVO will assume **Marine Group Supervisor**
 2. Fire Attack - Turnouts and SCBA must be utilized if entering an IDLH
 3. Dewatering Operations
 4. Hazardous Material Containment
- D. Transfer Vessel (FD Boat, Marine Unit, Law Enforcement Vessel, Commercial Tow Vessel,)
1. Conduct Size-up
 2. Identify EMS personnel pick up location
 3. Stage with additional resources until deployed
 4. Identify adequate patient drop off location
 5. Plot course to incident based on lat and long\
 6. PPE: Type III or Type V PFD
 7. Monitor for victims or hazards while underway
 8. Identify maximum capacity
- E. RIT Vessel (FD Boat, Marine Unit, Law Enforcement Vessel, Commercial Tow Vessel, USCG)
1. Conduct Size-up
 2. Stage back enough to see entire incident
 3. PPE: Type III or Type V PFD – **NO TURNOUTS**
 4. Monitor and identify objects that can become a danger to victims and rescuers (debris, trees, vehicles, maritime traffic etc.).
 5. Notify Command of any potential hazardous situation
- F. Dive Unit
1. Conduct Size-up
 2. Identify pick-up location (usually same as EMS)
 3. During incidents of rescue/recovery of victims submerged in the open water environment, the decision to utilize SCUBA/Dive Teams will be determined only after the **Marine Group Supervisor, Marine Safety Officer, and Incident Commander** have determined after a Hazard Assessment that all other options have been exhausted and the conditions and environment are safe to do so.
- G. EMS DO
1. If not already assigned, assume Medical
 2. Consult with EMRC/Facilities
 3. Consider BLS/ALS strike team
 4. Assign Triage, Treatment, Transport
- H. EMS Transport Unit(s)
1. Report to EMS staging area
 2. Prepare to transfer to incident location by vessel
 3. Type III or Type V PFD

Section 7: Special Considerations

- A. **Capture and Control-** At no time should a vessel in distress be free-floating during operations. Capture and control should be a priority and completed early in the operation. Several capture and control methods may be utilized during an operation.
1. Set anchor
 2. Secure vessel to Marine Unit or other vessel not in distress
 3. Secure vessel to anchor point on land or intentionally ground vessel.
- At NO time should a vessels lines be cut from a dock without a secondary control method in place.*
- B. **Vessel Aground-** at no point should a FD vessel attempt to free a vessel that has run aground. If a vessel must be freed to complete an operation it should be done so by a commercial tow vessel.
- C. **Vessel taking on water-** Vessels taking on water with no imminent threat of sinking or personal injury should be referred to a commercial tow vessel. Vessels sinking should only be dewatered enough to keep the vessel afloat. All Vessel occupants should be transferred to a Vessel *not* in distress while the dewatering operation commences
- D. **Boat Fire Open Water-** The two most common components in modern vessel construction is wood and fiberglass/composite material. When actively burning this presents similar to a hydrocarbon fire producing a significant amount of BTU's. Initial fire attack should include a high GPM application of water in a straight stream pattern. As the vessel fills with water, hydrocarbons/fuel will float to the top of the water column. Consider consulting with the HAZMAT Team regarding the application of foam after the initial knock down. Vessels should be dewatered as soon as possible in conjunction with overhaul.
- E. **Boat Fire Docked-** Extinguishment tactics are similar to a boat fire on open water, however docked vessels often have exposures. Exposures are identified as "Exposure Left" (port) or "Exposure Right" (starboard). This is determined from the perspective of the vessel operator at the helm. Shore power may be present in the form of a 50amp 240v power cord. *At NO time should a burning vessel's lines be cut from a dock without a secondary control method in place.* Access to pier or dock should be limited to personnel actively engaged in fire attack and pier safety team only. For extremely long or limited access piers, consider utilizing Marine Units to back feed stand pipes or high-rise packs for fire attack.
- F. **Boat Fire Dry Docked-** Dry docked vessels present a significant safety hazard during and after fire attack. Blocking and/or metal stands designed to support the vessel on land may not support the added weight of water from fire attack or weaken from heat resulting in collapse. Deck scuppers and bilge plugs alone may not evacuate water from the vessel at the rate it is applied. If you must board a vessel consider doing so from the stern and restrict access between vessels, walls or other objects.
- G. **Marine Unit Water Supply-** Marine units can supply large volumes of water at a lower PSI therefore making them a good resource for water supply in waterfront areas/communities with limited land access. Refer to Appendix A for set up procedures and limitations.

Section 8: Search and Rescue/Recovery (Marine Units)

- A. Once aware of a distress, Search and Rescue/Recovery (SAR) units attempt to find out as much information about the incident as possible. Standard response procedures and report formats are very important. Before SAR units are activated, a number of facts about the case must be recorded. These facts fall into two broad categories:
- Initial SAR information
 - Additional SAR information

Initial SAR information is very important for several reasons. One use of SAR mission information by SAR planners is to categorize the case to determine the most appropriate and effective response to provide. SAR

planners use every available piece of information to plan the Coast Guard's response, including determining the type of SRU assigned, when it is dispatched, and what type of equipment is taken to the scene.

- B. Before a search and rescue/recovery (SAR) can begin, careful planning is needed to accurately determine area where the survivors/victims are or will be located when vessels arrives on scene. Good SAR planning significantly increases the probability of successfully locating and rescuing those in distress. Planning the search involves calculating datum and then outlining the boundaries of the search area. Most search planning would be done by USCG Command or **Marine Group Supervisor** and results in a search action plan. The search and rescue unit(s) (SRU's) then conduct SAR operations based on the search action plan. Search planning also includes risk management to determine what response, if any, is appropriate and which resources are the right ones to participate. The following shall be procedure in the absence of USCG Command:
1. Determine rescue or recovery mode and available resources.
 - a. During rescue mode, all Fire Department resources assigned to the incident will remain "on location" until a victim is located, or it is determined that a specific resource will not be needed.
 - b. During recovery mode all Fire Department resources not actively engaged in the incident or supporting the search mission may be returned to service at the discretion on the Incident Commander and called back if the need arises.
 2. Determine **Datum**, the most probable location of the distressed vessel, victim or incident corrected for drift over a given period. Depending on the information available and its accuracy, datum may be a point, a line, or an area. As the mission develops, datum must be corrected to account for wind and current. Datum is established by the Marine Group Supervisor or USCG Command.
 - a. **Datum point** - A point at the center of the area where it is estimated that the search object is most likely located.
 - b. **Datum line** - If you cannot pinpoint the location of a distressed boat, you may be able to determine its intended trackline or a line of bearing. The **datum line** is the intended trackline or line of bearing plotted on the chart. Without more information, it is assumed that the distressed vessel may be anywhere along the length of the plot. The line could also be a direction finding line of position.
 - c. **Datum area** - When you cannot determine either the exact position of the distress or a datum line, a **datum area** is developed based on many factors, but including as a minimum:
 1. Fuel endurance of the vessel in distress
 2. Vessel's maximum cruising range
 3. Wind and currents which affect the search object
 4. Operator's intentions
 - d. As time progresses, datum must be corrected to compensate for the effects of wind and current. Some of the many natural forces which affect a search object are wind, current, depth, and weather conditions.
 3. Identify search area (area most likely to contain the distressed). The amount of error inherent in drift calculations and navigational capabilities of both the distressed and the Search Units are used to calculate a search **radius**. When response times are short, the **Marine Group Supervisor** may use a standard radius, adjusted for physical surroundings. Where a search can begin in less than six hours, a one nautical mile radius per elapsed hour shall be considered.

-
4. Once a search area has been determined, a systematic search for the object must be planned. Common search patterns are defined in "Appendix C". Consider the following to determine which search pattern to use:
- a. Weather conditions
 - b. Size of search area
 - c. Size of search object
 - d. Number of search units involved
 - e. Search area location
 - f. Time limitations
5. Search area coverage considers the area to be searched and the SRUs available to search. Once the search area has been determined and the search patterns selected, the next step is to have SRUs conduct the search. Based on the sweep width, an SRU will be assigned its own part of the overall areas to search. Essentially, your vessel/unit will start at an assigned commence search point (CSP), steer the track (search leg), and search (sweep down) on both sides of the vessel.
- a. **Sweep width** is a distance measured on both sides of an SRU. A sweep width of one mile means 1/2 mile to starboard and 1/2 mile to port for a total "width" of one mile. Sweep width is determined by:
 - Search object type, size and construction
 - Environmental conditions
 - Sensor (e.g., visual or radar)
 - b. **Track spacing** is the distance between adjacent parallel legs within a search area. These tracks may be conducted simultaneously by multiple units separated by fixed intervals, or they may be the result of successive sweeps conducted by a single SRU. Most of the search patterns described in this chapter consist of equally spaced, parallel search legs (tracks). The distance between adjacent search legs is called the track spacing (S). The best track spacing is a distance which permits maximum expectation of search object detection in the shortest period of time.
 - c. The **commence search point** is a charted point normally specified by the **Marine Group Supervisor** for an SRU to begin its search pattern.
6. Before beginning a search, a SRU must collect all available facts about the mission. The **Marine Group Supervisor** should provide most of this information as the search action plan. Answers to the following questions will help determine if you have done everything you need to do before getting underway:
- a. What is the mission of this search and what equipment do the personnel aboard have?
 - b. How many people are involved?
 - c. What is the assigned search area?
 - d. What are the circumstances of their distress?
 - e. What search pattern will be used?
 - f. What is the desired search speed?
 - g. What special equipment is required?
 - h. What radio frequencies will you use?
 - i. Are other units assigned? If so:
 - 1) What kind?
 - 2) What are their search areas?
 - 3) What are their search speeds?
 - 4) What search patterns will they employ?
 - 5) What radio frequencies will they use?

7. SRU Crew members must be briefed before getting underway. Make sure all crew members:
 - a. Understand the mission
 - b. Know what they are looking for
 - c. Know where the search will be conducted
 - d. Understand how the search will be conducted

Section 9: Man Overboard, Person in Water (Marine Units)

Even the best of swimmers can become disoriented when unexpectedly falling into the water. Immediate action is of primary importance when a person falls overboard. Every second counts, particularly in heavy or cold weather. This section addresses man overboard and person in water (PIW) recovery procedures, as well as water survival skills. Lives depend on every crew member performing these procedures competently and effectively.

- A. Crew Recovery - All crew members must be prepared when someone falls overboard. Rehearsing how to react is vital to a successful and safe recovery of the individual. Assume the person who is in the water is suffering from shock, may be unconscious, and possibly injured. The information here is only a general guideline, as each boat and situation presents problems beyond the scope of this publication. A professional understands and rehearses each possibility remembering that the key to a successful rescue is preparation, practice, and alertness.
 1. The action taken in the first few seconds after a crew member falls overboard decides the success of the recovery. An alert crew member can do much to save the life of someone who might otherwise drown. First actions should be swift and certain. If a person fell over the side, the first crew member to realize someone had fallen overboard should follow these procedures:
 - a. Spread the alarm in a loud voice by repeatedly calling out, "MAN OVERBOARD, PORT SIDE (or STARBOARD)"
 - b. Throw a ring buoy with strobe light (or anything that floats) over the side towards the person in the water.
 - c. Maintain sight of, and continuously point (open handed), to the individual in the water while carefully moving to a position where you can be seen by the operator. Give clear, loud verbal directions to the operator.
 2. The Vessel Operator shall then push the memory button (MOB) on the Loran-C or GPS receiver (if so equipped) to mark the exact position (datum) of the distress. Use all possible means to identify the position (dead reckoning, visual landmarks, radar, etc.). Note the location on the chart so that the boat can return to the vicinity of the person in the water. Where the correct equipment is available, a more precise position locked into the navigation receiver will be invaluable in determining datum.
 3. At the same time the position is being recorded, turn the boat in the direction the individual fell overboard (port or starboard) and simultaneously sound the danger signal (5 or more short blasts on the boat's whistle or horn)
 4. Throw a ring buoy with strobe light (or anything that floats) over the side towards the person in the water. It does not matter if the person is visible at this time or not. The person in the water may see the flotation device and be able to get to it. Additionally, the ring buoy or any floating object thrown over the side (if a ring buoy is not available) serves as a reference point (datum) marking the general location of the incident and for maneuvering the boat during the search. Do not throw the floatable object(s) at the person overboard. It could cause further injury if it hits the individual. Throw the object so that it or its line can drift down to the person while avoiding fouling the line in the propeller.

5. Once a device is thrown, the vessel operator will assign duties to each crew member.
 - a. If weather conditions permit, a POINTER will be positioned on or near the bow of the boat.
 - b. A recovery/pick-up crew member will be assigned to prepare a heaving line to be used in retrieving the person from the water.
 - c. A **surface swimmer** if available will be made ready as needed, as well as another crew member on the tending line to the surface swimmer's PFD blowout harness whenever the swimmer is in the water.
6. When the vessel operator is ready to commence the recovery approach, he must brief the crew on how the recovery will be made and whether it will be accomplished on the port or starboard side. The approach will be influenced by
 - a. Wind
 - b. Sea surf conditions
 - c. Maneuverability of the vessel
 - d. Maneuvering space restriction
7. If the person overboard has not been located and immediately recovered and assistance of other boats is needed, transmit the emergency call signal Pan (pronounced PAHN) three times on channel 16 or 2182 kHz. Follow this with the boat's identification, position, and a brief description of the situation. Do not use "mayday." A boat uses a mayday call only when threatened by grave and imminent danger. After returning to datum and completing a quick scan of the area, if the PIW is not found, drop a datum marker and commence an initial search pattern. Continue the search until otherwise directed by the Incident Commander.
8. When circumstances and time permits, the vessel operator must notify the incident commander of the man overboard situation. This should be done as soon as possible after the occurrence.
9. Requests for additional assistance may be made to the incident commander by radio. Also, any vessel near the scene may be requested by the vessel operator to assist as needed.
10. The vessel operator must select an approach that is suitable for the existing conditions. There are two basic approaches:
 - a. A leeward approach (against the wind and current)
 - b. A windward approach (with the wind and current)
11. Perform the leeward approach with the bow facing into the greatest force of oncoming resistance at the time of pickup. This may be the wind, current, seas, or any combination of the three. There are times when the wind and current are from different directions. Select the heading which will best ease the approach. The operator must also balance the effect of any swell that might be present. The approach must be made rapidly but as the vessel nears the person the operator must slow the vessel and reduce wakes enough to where a short burst backing down stops headway. The person in the water should be next to the recovery area on the vessel and the vessel should be dead in the water (placing engines in neutral and shut off when sea conditions permit. When the person overboard is alongside, have a crew member make the recovery. Make all pick-ups into the prevailing weather and sea conditions. Take care not to overrun the person overboard or to have so much headway on that the boat drifts beyond the person overboard. If the person in the water does drift aft of the boat, **do not back down to effect the recovery** as the propeller could injure the person.

-
12. Perform the windward approach with the wind coming from behind the vessel. Use the windward approach when the person overboard is in a confined space or a leeward approach is impossible.
 13. There may be instances when stopping the boat and allowing the person overboard to swim back to the boat, or at least to reach the tethered floating object is the most appropriate action. Especially if the boat can be stopped quickly after the person falls overboard.

Section 10: Hazardous Material

- A. All Open Water emergencies can pose potential exposures to civilian and fire department personnel from contaminants in the water. Typical contaminants include, but are not limited to bacteria, fecal matter, parasites, pesticides, and hydrocarbons. During an open water emergency, the **Marine Group Supervisor/Branch Director** and the **Incident Commander** must assure that any exposed personnel and equipment will be **decontaminated if necessary**. Information should be obtained as needed from Hazmat 114 and the Infection Control Officer to develop the appropriate care and record keeping for any exposure.

Section 11: Demobilization

- A. Once the rescue/recovery/suppression is complete, the Marine Group Supervisor/Branch Director and the Marine Safety Officer shall confer with the Incident Commander as to an appropriate demobilization plan.
 1. Assure that all information gathered from the incident has been properly documented, and all forms completed and turned into the Incident Commander.
 2. Follow up and information pass on to appropriate agency ie. USCG, MDE, MNRP County Police, Tow company.
 3. A complete inventory of all equipment that has been used is accounted for any items lost or damaged documented.
 4. Assure that initial steps are underway for the proper decontamination for all personnel and equipment if warranted.

Definitions

Awareness Level - A provider that has received formal training in open water, swiftwater or surface water and is able to identify hazards.

Cold Zone - Outside the Warm Zone; this is where non-trained and non-equipped civilians must be located

Datum - The most probable location of the distressed vessel, victim or incident corrected for drift over a given period. Depending on the information available and its accuracy, datum may be a point, a line, or an area. As the mission develops, datum must be corrected to account for wind and current. Datum is established by the Marine Group Supervisor or USCG.

Drift - The speed the current is carrying and object or incident (Usually in knots or nautical mph)

Hot Zone - Defined as the water or vessel in distress; Mate/Surfacewater trained rescuers only

Marine Branch Supervisor - A supervisory position responsible for the rescue/recovery/hazard mitigation operations in the Hot and Warm Zone.

Marine Group - A grouping of two or more marine vessels strategically deployed

Marine Safety Officer - This position is in addition to the overall safety officer. This position shall be a minimum Mate I level provider, and primarily be concerned with the scene and personnel safety in the hot zone.

Mate I - This is a provider who has received a certification from the Maryland Voluntary Fire Certification System and/or who identifies maritime hazards, uses maritime equipment, and applies navigational, boating and seamanship skills outlined by MCMERG, the USCG and specified in the International Maritime Organization 1972 Inland Water COLREGS

Mate II - This is a provider who has received a certification from the Maryland Voluntary Fire Certification System and/or who identifies maritime hazards, uses maritime equipment, and performs rescue boat operation, from vessel and surface water extractions, boating and seamanship skills, developed and outlined by MCMERG, the USCG and specified in the International Maritime Organization 1972 Inland Water COLREGS

MAYDAY - Mayday is the maritime emergency call signal a vessel uses only when threatened by grave and imminent danger.

Mid Chesapeake Maritime Emergency Response Group (MCMERG) - Group of professional organizations (including fire department, law enforcement, maritime organizations, and the United States Coast Guard) responsible for producing maritime emergency response procedure, regulation, and provider certification standards for the Chesapeake Bay region.

Motor Vessel Operator - This is a provider who has received a certification from the Maryland Voluntary Fire Certification System and/or who identifies maritime hazards, uses maritime equipment, marine vessel operation, marine pump operations, from vessel surface water extractions, boating and seamanship skills, developed and outlined by MCMERG, the USCG and specified in the International Maritime Organization 1972 Inland Water COLREGS

Navigator - Marine unit crew member responsible for charting, plotting, and data collection. In addition, the navigator shall maintain VHF radio transmissions.

On-scene weather - Weather and sea conditions at the incident location. (may vary from weather conditions at the command post)

PAN PAN - Pan (pronounced PAHN) is the maritime emergency call signal when the assistance of other boats is needed.

Pier Safety Team - Anytime personnel/victims are traversing a pier or transferring to or from a docked vessel, a pier safety team shall be deployed and equipped prior to the activity. This team will consist of a minimum of three awareness providers, have communications with the Marine Branch Supervisor and the Incident Commander and will advise of any hazards or other relative information that could have a positive or negative effect on the operation. This team will develop an action plan that includes Talk, Reach, and Throw rescue options in the event of a RIT/Mayday/Person Overboard from bulkhead or pier.

Point Last Seen - Suspected, Witnessed, or identified initial location of an object, person or incident

Port - Referring to the left side of the vessel from the operator's perspective

Set - The direction the current is moving an object, person or incident (Usually in degrees)

Starboard - Referring to the right side of the vessel from the operator's perspective

Surface Swimmer - This is a provider who has received a certification from the Professional Qualifications Board in Surface Water or Swiftwater Rescue and/or MATE II Certification who identifies hazards, uses equipment, and applies advanced techniques specified in the NFPA1006/1670 standards.

Vessel - A mobile conveyance on the water required to have USCG regulated safety equipment. This includes all powered boats regardless of overall length and non-powered boats larger than a canoe or kayak.

VHF - VHF radio refers to the **radio** frequency range between 156 and 174 MHz, inclusive. The "**VHF**" signifies the very high frequency of the range. In the official language of the International Telecommunication Union the band is called the **VHF** maritime mobile band.

Warm Zone - Generally, within 10 feet of the water, aboard marine rescue vessels, piers, bulkheads set

Appendix

- Appendix A: Incident Information Data Collection
(911 Center, Marine Emergency Team, Marine Unit)
- Appendix B: Marine Emergency Team 21
Immediate Incident Data Collection Work Sheet
- Appendix C: Marine Unit Water Supply plan
- Appendix D: Search Patterns
- Appendix E: Agencies
- Appendix F: Open Water Incident Tactical Card

Appendix A: Incident Information Data Collection (911 Center, Marine Emergency Team, Marine Unit)**A. Data Collecting and recording**

1. Initial notification that an emergency exists may come from many sources, including:
 - a. 911 call from vessel
 - b. relatives may report that a family member is overdue
 - c. "MAYDAY" or "PAN PAN" by **VHF** radio
 - d. Witness to the distress
2. If the caller/hailer seems excited:
 - a. Calm the individual down enough to collect accurate, essential information.
 - b. Be courteous and show concern for the caller and their situation.
 - c. Be confident and professional, but not overbearing.
 - d. Speaking calmly will help ease people's concerns and assure them that the situation is well in hand.
 - e. Be prepared to write down information (have checklist and pen within reach).

B. Communication with the source

1. It is important to maintain communication with reporting sources, regardless of who they are or how the call was made. Also, keep callers advised of what actions are being taken to resolve the situation they reported.
2. Most distress calls by radio come in on Channel 16, 156.8 MHz. This channel is the maritime VHF-FM international distress and calling frequency. To keep it open for other distresses, the caller is usually asked to move (shift) to a working channel, if possible. Since shifting could result in losing communications with your reporting source, the caller is asked to shift back to channel 16 if no reply is heard on the working channel within one minute. Monitoring Marine Units shall also shift to the requested channel as well. The transmission will likely be as follows

Example: "Vessel in distress, this is Baltimore County Fire. Shift and answer channel 22 alpha. If no reply is heard on that channel within one minute, shift back to this frequency, channel 16, over."

"Baltimore County Fire, this is the vessel, shifting to channel 22, out."

3. If calls come in by telephone, immediately take down the name and number of the person calling. In the event you are disconnected, you will be able to return the call and obtain the needed information. Also try to identify how you may be able to try to communicate with the person or vessel that is reported to be in distress. Cellular telephone numbers, types of radio equipment and frequencies used may help establish communications with the distressed vessel or person.
4. Once stable and repeatable communications are established, the most vital information to immediately record is:
 - a. Location
 - b. Number of people on board (POB)
 - c. Nature of distress
 - d. Name, radio call sign of distressed craft
 - e. Description of the craft

See Appendix A- Data Collection Worksheet

Response activity can be started once these items are known. Also, realize that this may be the only contact made with the distressed craft or reporting source (e.g., the radio broke, power was lost, or the boat capsized).

5. The identity of the distressed vessel should be established:
 - a. Vessel name
 - b. Vessel numbers
 - c. Vessel type
 - d. Vessel call sign
 - e. Name of person calling
 - f. Number of people on board (POB)
 - g. Condition of all POB

When direct communications with the vessel in distress are not available, that is to say the information about the distressed vessel is being relayed, gather and record the same information about the relaying source.

6. The nature of the emergency must be clearly and completely understood in order for responding units to be prepared to assist. The emergency may be any one of the following, or it may include many of these examples, or it may be some other type of emergency:
 - a. Aground
 - b. Sinking
 - c. Collision
 - d. Fire
 - e. Disabled
 - f. Overdue
 - g. Medical
7. The location of the emergency and persons on board must be clearly established in the most detailed terms possible. This should include any or all of the following, plus all additional information received.
 - a. Position (latitude and longitude) of the incident
 - b. Bearing and distance from the incident to any points of land or landmarks known or observed
 - c. Last known position of the incident or distressed vessel
 - d. Number of people on board (POB)
 - e. Condition of all POB
 - f. Survival equipment
 - g. Friends/Relatives
8. After the nature of the incident has been completely established, additional information about the location should be gathered. This additional information is needed when determining "**datum**," the position where the incident occurred or where the search will begin:
 - a. Vessel's course and speed
 - b. Date and time of the last known position
 - c. Length of the time that the vessel has been drifting/disabled/aground

C. Additional Information

1. Besides recording the **SAR** information described above, certain additional information is extremely valuable. Information in this category includes:
 - a. Medical data
 - b. On-scene weather data
 - c. Overdue data
2. If medical assistance is required, collect and record as much of the following additional information as possible:
 - a. Patient's name, nationality, age, and sex
 - b. Patient's symptoms and vital signs
 - c. All medication given to patient
3. Additional weather information can be useful. The weather on scene may differ from the weather at your location. **On-scene weather** information is important in determining:
 - a. Type of vessel best suited to respond
 - b. Datum (the probable location of the distressed vessel)
 - c. Location of where to deploy resources

D. Overdue Vessels

1. Some reports received will involve people or vessels that are **overdue** at some location, but no distress will be evident at that time. Information collected at the time of the initial report may prove invaluable later if a search planning effort is begun.
2. Gathering the following type of data will avoid possible delays if the person or vessel does not arrive at the destination and further action is required. Sometimes it becomes difficult to reestablish contact with the reporting source to gather additional information when that information is needed. Data collection includes:
 - a. Period of time the vessel has been overdue
 - b. Vessel's departure point and destination (float plan)
 - c. Places the vessel planned to stop during transit
 - d. Navigation equipment aboard the vessel
 - e. Survival equipment aboard the vessel
 - f. Number of people aboard the vessel as well as their names, ages, sex, and general health
 - g. Personal habits of the people aboard the vessel (e.g., dependability, reliability, etc.)
 - h. License plate number and description of the towing vehicle and trailer, if the boat was trailered to the departure point
 - i. Communications equipment on board including radio frequencies monitored
 - j. Additional points of contact
 - k. Pending commitments (work, appointments, etc.)

Marine Emergency Team 21 Immediate Incident Data Collection Work Sheet

General Distress Information

Vessel exact position (GPS) _____
in degrees of latitude and longitude

Geographical reference _____
an estimated distance and direction to an easily identified landmark or aid to navigation.

Vessel description _____
Type (power, sail), design (cabin cruiser, sloop), length, color and other distinctive features.

Number of persons on board and available PFD's _____
Include age and special considerations (physical disability, medical conditions, etc)

Nature of the distress _____
Sinking, taking on water, medical emergency, personal injury, fire, person overboard, etc.
-If boat is in danger of sinking or collision, estimated time until it occurs.

What kind of equipment do you need to control the situation _____
Medical support, fire extinguishment, towing, pumps, etc.

Additional information needed for overdue vessels

Starting point _____

Destination _____

Planned Activities _____

Operators Experience Level _____

Immediate Instruction for vessel occupants

- 1) All occupants should don a PFD if available
- 2) Isolated all occupants from the immediate hazard
- 3) Make VHF distress call and monitor channel 16 for a response
- 4) Use visual and audible emergency signaling devices in five minute intervals and when in line of sight of a rescue vessel
- 5) Do not abandon vessel unless absolutely necessary

Notes:

Baltimore County Fire Department

Marine Unit Water Supply Plan



STRUCTURE ON FIRE



Attack Pumper



Attack Pumper



Relay Pumper



Relay Pumper

1100 GPM
@ 50 PSI
200' max

750 GPM
@ 50 PSI
400' max

4"

As Pier line is lengthened,
Max. GPM is reduced

4"

1100 GPM 750 GPM
@ 50 PSI @ 50 PSI
200' max 400' max

Bulkhead / Shoreline

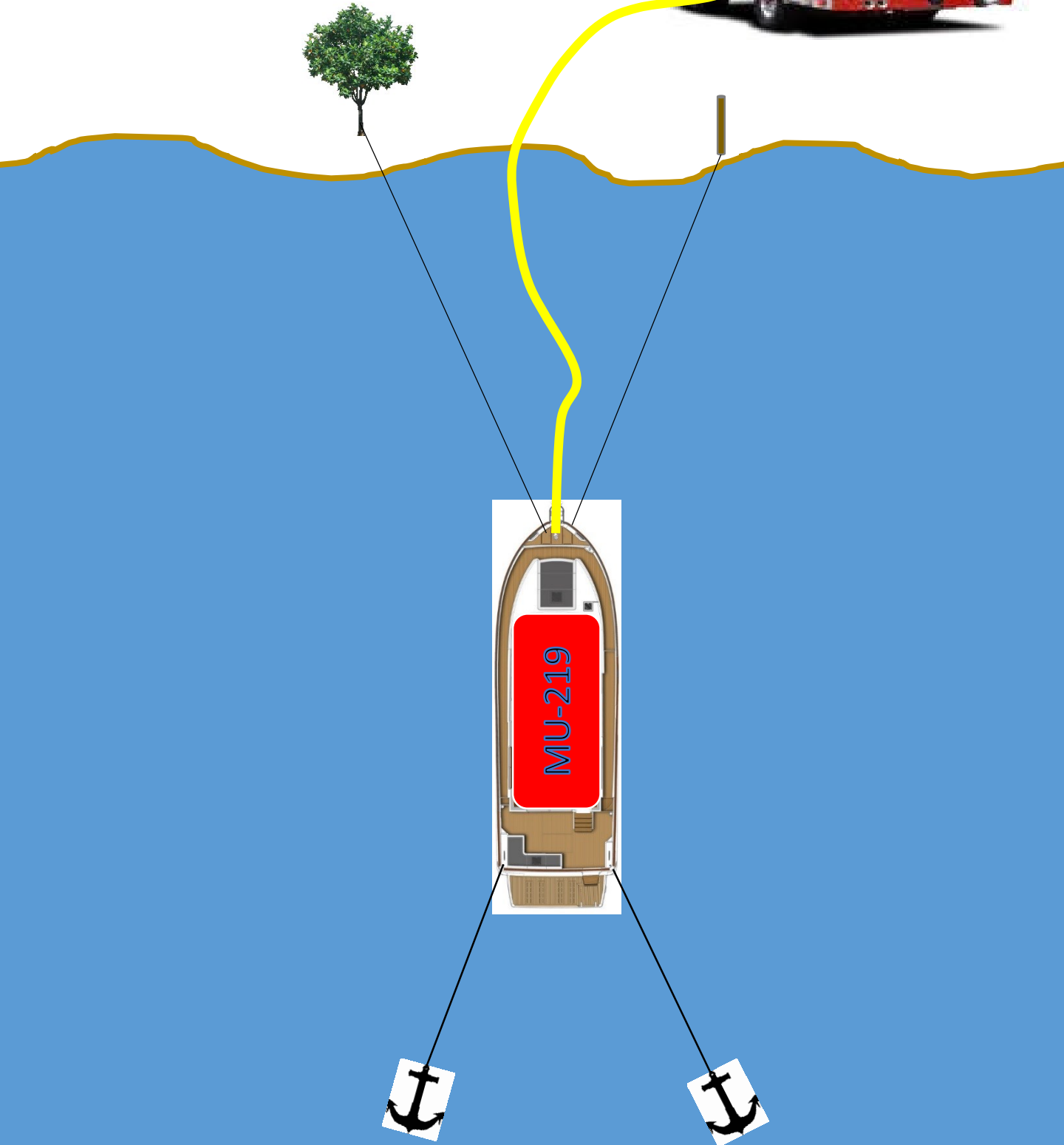
Bulkhead / Shoreline

Extend 4"
with Siamese
To minimum
depth on pier



Need 24" depth to pump

**Method for Marine Unit Water Supply
When there is no pier, bulkhead or
Shallow water is present**



Appendix D Search Patterns

Once a search area has been determined, a systematic search for the object must be planned. Consider the following to determine which search pattern to use:

- Weather conditions
- Size of search area
- Size of search object
- Number of search units involved
- Search area location
- Time limitations

Search patterns are designated by letters. The first letter indicates the general pattern group:

- T = Trackline
- C = Creeping line
- P = Parallel
- V = Sector
- S = Square

The second letter indicates the number of search units:

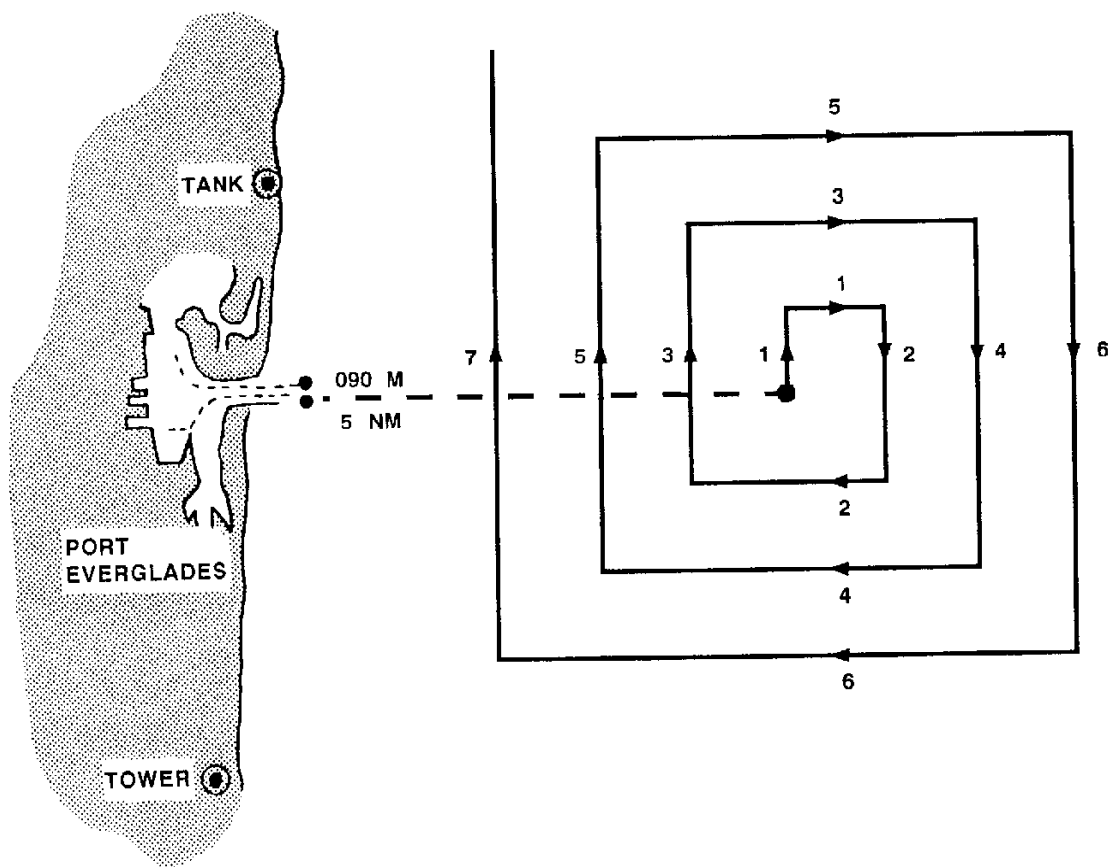
- S = Single-unit search
- M = Multiunit search

The third letter indicates specialized SRU patterns or instructions, for example:

- R = Return
- N = Non-return

Appendix D
Search Patterns

Square Single-unit (SS)- In the **SS pattern** for boats, the first leg is normally in the direction of the search object's drift and all turns are made 90° to starboard). The **square search pattern** is used when the last known position of a search object has a high degree of accuracy, the search area is small, and a concentrated search is desirable.



Appendix D
Search Patterns

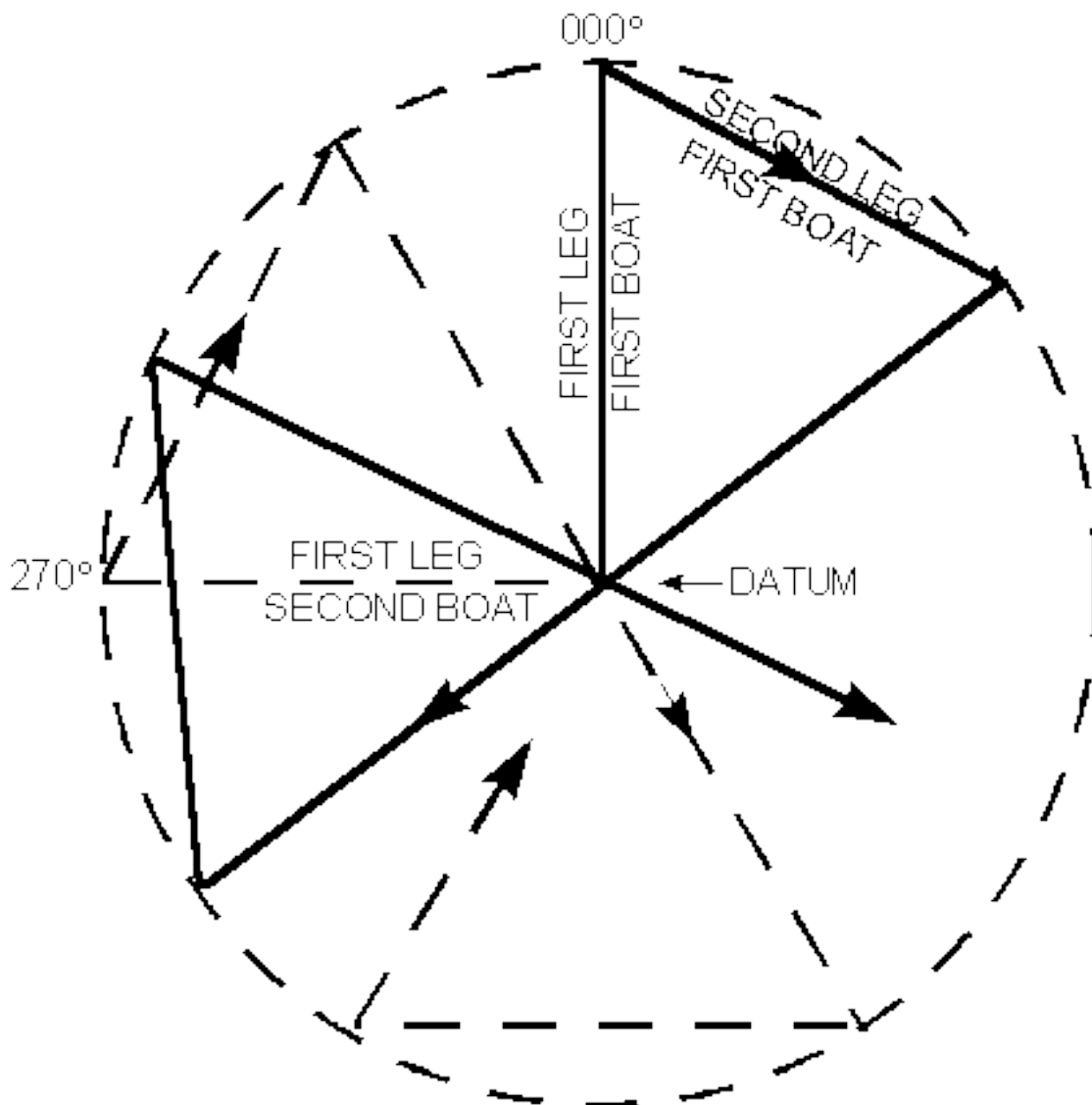
Sector search patterns are used when datum is established with a high degree of confidence but the search object is difficult to detect, such as a person in the water. The search unit passes through datum several times, each time increasing the chances of finding the search object. The pattern resembles the spokes of a wheel with the center of the wheel at datum. **Datum should be marked by the first SRU on scene with a Data Marker Buoy (DMB) or other floating object.** By marking the center of the search pattern, the coxswain has a navigation check each time the boat passes near the center of the search area (datum). This pattern consists of nine legs. There are two types of sector search patterns.

Sector Single-unit (VS). The **VS pattern** is used by a single boat. The first leg begins in the same direction that the search object is drifting toward. All legs and crosslegs of this pattern are of equal length. After running the first leg, your first turn will be 120° to starboard to begin the first crossleg. All subsequent turns will be 120° to starboard to a course determined by adding 120° to your previous course (See Figure 15-10). Notice that after completing the first leg and crossleg, the second and third

Appendix D
Search Patterns

legs of the pattern are completed in sequence without turning between.

Sector Multiunit (VM). The **VM pattern** is used when a second boat is available. The second boat starts at the same datum, but begins the first leg on a course 90° to the left of the first boat. The search is then the same as a VS pattern. The second boat should start the search at a slower speed than the first boat, if both boats start at the same time. When the first boat is one leg ahead of the second boat, the second boat accelerates to search speed. This slow start by the second boat will keep both boats from arriving at the center of the search pattern at the same time

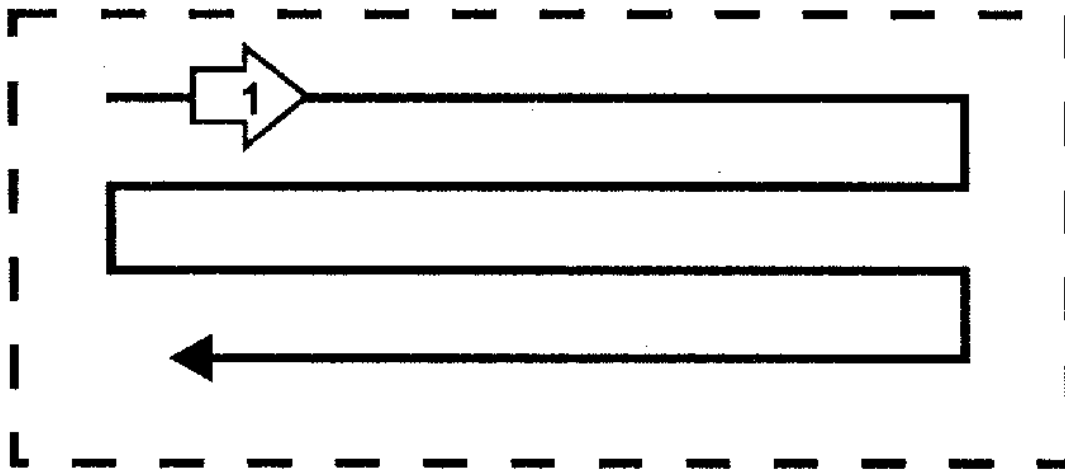


Appendix D
Search Patterns

Parallel track patterns are used when there is an equal probability that the search object could be anywhere in the search area. It is a good pattern to use when the approximate location of the search object is known and **uniform coverage is desired**. Parallel track patterns are the simplest of the search patterns. You steer straight courses on all legs. Each leg is one track spacing from the other. The legs are parallel to the long side or major axis of the search area. There are two types of parallel track patterns.

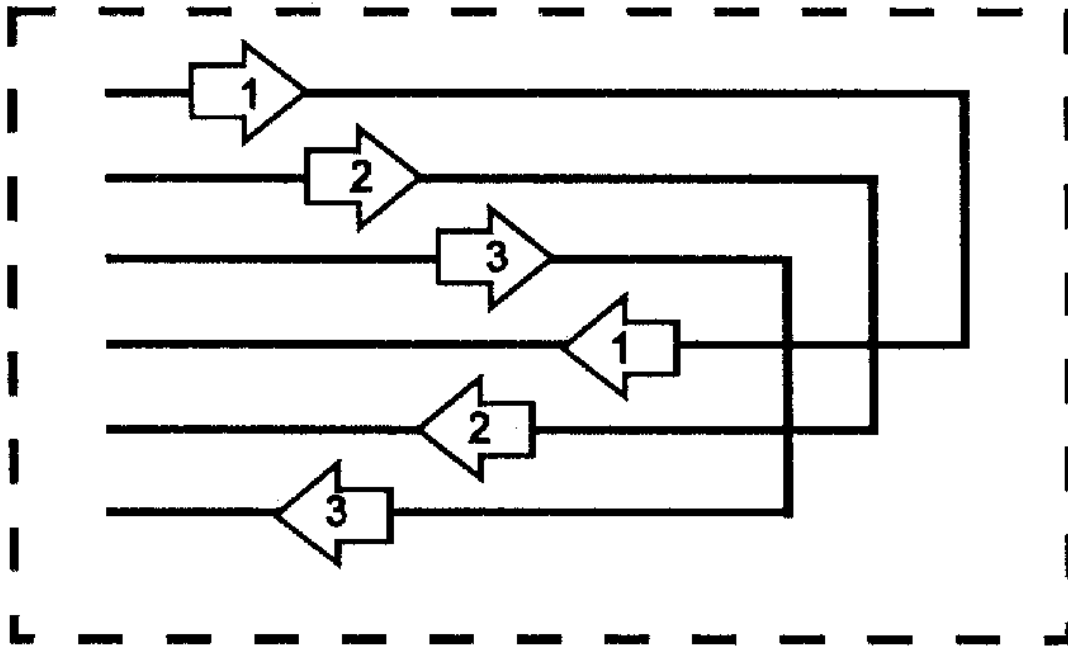
The Commence Search Point (CSP) for parallel patterns is located at a point 1/2 of the distance selected as the search track spacing inside a corner of the search area. The first and last search legs then run 1/2 track spacing inside the search area boundaries. This prevents excessive duplicate coverage, eliminates the possibility of leaving an unsearched track at the search area boundary, and gives SRUs in adjacent search areas a margin of safety.

Parallel Track Single-unit (PS). The **PS pattern** is conducted by a single SRU. The legs of the search are run parallel to the long side (Major Axis) of the search area



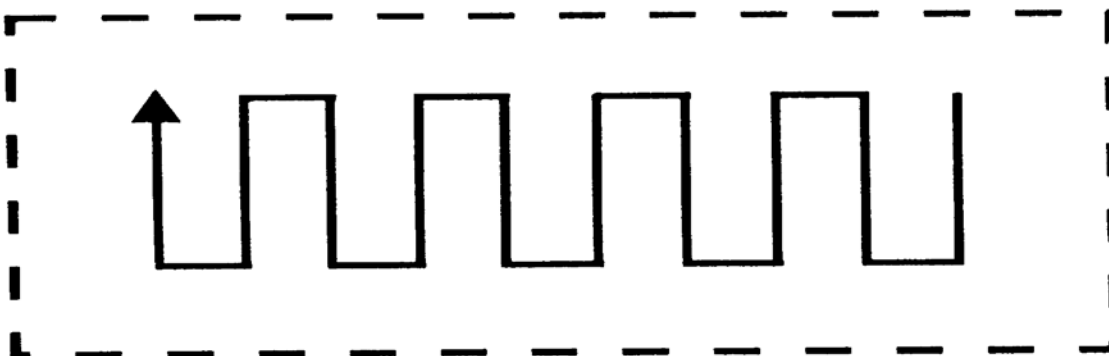
Appendix D
Search Patterns

Parallel Track Multiunit (PM). The **Multiunit (PM)** pattern is used under the same circumstances as the (PS) but with more than one SRU (See Figure 15-15). The SRUs are separated by a single track spacing. They search parallel to the long side of the search area. After completing the first search leg, they move over a distance equal to the track spacing times the number of SRUs, and then search back on the reciprocal



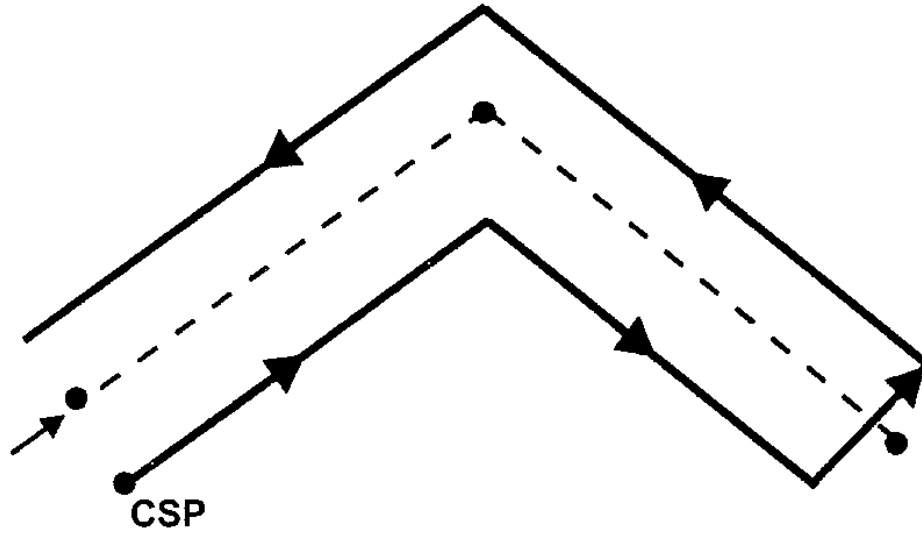
heading of the first leg.

The Creeping Line **CS pattern** is used when the probable location of the search object has been determined to be **more likely at one end of the search area** than at the other end. Creeping line search patterns are the same as parallel patterns with the exception that the legs are run parallel to the short side (minor axis) of the search area. This pattern's CSP and search legs are also located 1/2 track spacing inside the search area



Appendix D
Search Patterns

The **Trackline Single-unit Return (TSR)** pattern is used to search when the only



information available on the missing vessel is the intended track of the search object.

Appendix E
Agencies

United States Coast Guard
Sector Maryland
National Capital Region
Command Center Emailed > secmdncr@uscg.gov
Primary: 410-576-2693
Emergency: 410-576-2693
Fax: 410-576-2575

Baltimore County Police Department
Marine Unit
Primary: 410-887-0279 PCT X-0220
Fax: 410-574-5196

Aviation Unit
Primary: 410-887-3491
Fax: 410-887-3479

Maryland State Police
Aviation Command
Primary: 410-238-5800
Fax: 410-238-5809

Maryland Natural Resources Police
Primary: 800-628-9944
Emergency: 410-260-8888

US Department of Defense
Aberdeen Proving Ground Police
Primary: 410-306-0564

Maryland Department Transportation Authority Police
Francis Scott Key Bridge
Primary: 410-537-7600

Port of Baltimore
Primary: 410-633-1130

Maryland Department of Environment
Emergency Response
Primary: 866-633-4686

OPEN WATER INCIDENT TACTICAL CARD

Vessel in Distress / PIW Information: Description (Markings and vessel type/color), LAT/LONG, # on board, medical issues, point last seen, departure and arrival point, tow trailer license, etc:

<input checked="" type="checkbox"/>	Arrival Sequence	UNIT NUMBER	INITIAL TACTICAL GUIDELINES
	1st arriving piece of LAND Apparatus		<input type="checkbox"/> Establish COMMAND and Command Post <input type="checkbox"/> PPE: Type III or Type V PFD – <u>NO TURNOUTS unless active firefighting</u> <input type="checkbox"/> Conduct Size-up -Request tide and weather report to include ambient air temperature, wind and incoming disturbances (from dispatch) and water temperature (from marine units) <input type="checkbox"/> Witness statements if available <input type="checkbox"/> Rescue or Recovery? <input type="checkbox"/> Establish Hot , Warm , and Cold Zones <input type="checkbox"/> Level II accountability & Pier Safety Team <input type="checkbox"/> Establish EMS / DIVE staging area and pick-up point (may be different than command post) <input type="checkbox"/> Assign additional land units to other geographical locations for additional spotters.
	RECON/Rescue Vessel (First Arriving Marine Unit)	Marine Unit # # Crew # Capacity ALS or BLS	<input type="checkbox"/> Monitor for victims or hazards while underway <input type="checkbox"/> Conduct size up - 360 entire incident on arrival <input type="checkbox"/> Are vessel occupants at risk or inconvenienced <input type="checkbox"/> Identify set and drift <input type="checkbox"/> Deploy Point Last Seen Marker and Datum <input type="checkbox"/> Relay Lat and Long <input type="checkbox"/> Identify priority and number of patients <input type="checkbox"/> Request additional resources.
	Hazard Mitigation Vessel (Second arriving Marine Unit if rescue, first arriving Marine Unit if no rescue)	Marine Unit # # Crew # Capacity ALS or BLS	<input type="checkbox"/> Monitor for hazards underway <input type="checkbox"/> Assume Marine Group Supervisor / Branch Director <input type="checkbox"/> Capture and Control <input type="checkbox"/> Fire attack <input type="checkbox"/> De-watering <input type="checkbox"/> Hazardous material containment
	Transfer Vessel (FD Boat, Tow Vessel, County Police, MNRP, USCG)	Marine Unit # # Crew # Capacity ALS or BLS	<input type="checkbox"/> Conduct size-up <input type="checkbox"/> Identify EMS personnel pick up location <input type="checkbox"/> Identify adequate patient drop off location <input type="checkbox"/> Plot course to incident based on lat. and long. <input type="checkbox"/> PPE: Type III or Type V PFD <input type="checkbox"/> Monitor for victims or hazards while underway <input type="checkbox"/> Identify maximum capacity

	RIT Vessel (FD Boat, County Police, MNRP, USCG)	Marine Unit # # Crew # Capacity ALS or BLS	<input type="checkbox"/> Conduct size-up <input type="checkbox"/> Stage back enough to see entire incident <input type="checkbox"/> PPE: Type III or Type V PFD – <u>NO</u> <u>TURNOUTS</u> <input type="checkbox"/> Monitor and identify objects that can become a danger to victims and rescuers (debris, trees, vehicles, etc). <input type="checkbox"/> Notify Command of any potential hazardous situation
	Pier Safety Team	Unit #	<input type="checkbox"/> At least 3 personnel <input type="checkbox"/> PPE: Type III or Type V PFD <input type="checkbox"/> Conduct size-up <input type="checkbox"/> Consider talk / reach / throw strategies <input type="checkbox"/> Communicate obvious hazards to IC

Tempo: **T**ime of day and water temperature, **E**merging weather patterns, **M**ovement and measurement of the water, **P**ersonnel capabilities and plan, **O**perations and operational period.

GENERAL SAFETY ITEMS and DEFINITIONS	
Hot Zone	Defined as the water or vessel in distress; Mate / Specialist level trained rescuers only
Warm Zone	Generally, within 10 feet of the water, aboard rescue/marine unit vessels – Awareness level rescuers only
Cold Zone	Outside the Warm Zone; this is where non-trained and non-equipped civilians must be located
Set	The direction the current is moving an object or incident (Usually in degrees)
Drift	The speed the current is carrying and object or incident (Usually in knots or nautical mph)
Datum	Floating marker for identifying set and drift
Point Last Seen	Static marker to identify initial location of incident

Aviation for Search
Request for helicopters shall be jointly agreed upon between the Incident Commander and the RECON Vessel

**Possible IMS Structure
Open Water Incidents**

