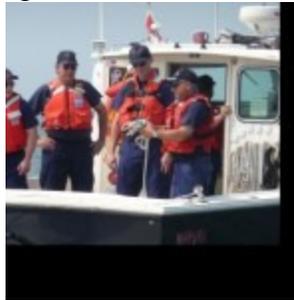


Vincent Pica
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MAYDAY! **We Are Lost & Sinking!**

Search & Rescue (SAR) is the most recognizable and time-honored task of any mariner, especially the United States Coast Guard (USCG). Having saved well over one million lives



since its founding in 1790, the USCG has changed with the times. It embraces risk management, technology, and the latest life-saving techniques in the Command Centers and on the search vessels to spring to action when a *Mayday* cry comes in.

Risk Management

Every search and rescue event has some degree of risk. Some risks are impossible to predict until the situation is at hand. Therefore, each instance requires balancing the risk by applying adequate controls and resources (which may be in short supply for the task at hand). As time is never an ally in an emergency, the USCG Command Center needs information from a boater in distress to advise the SAR Mission Coordinator (SMC). Inquiry will be made as to the nature of the distress (out of fuel is one thing, while sinking or on fire is another), along with:

1. Last known position;
2. A description of the vessel in distress (or a person lost overboard);
3. The number of people on board/involved (so no one gets left behind); and
4. What are the weather/sea conditions at the scene?

The answers determine what tasks the SMC assigns the coxswain and crew of the rescue vessel. The rescue crew then uses the time until it arrives at the scene to assign lookouts (and establish rotations to minimize fatigue and maximize effectiveness) and prepares search patterns and

associated charting. If the vessel or crew in distress is equipped with Electronic Positioning Indicating Radio Beacons (EPIRBs) and/or Personal Locator Beacons (PLBs), the rescue crew coordinates the electronic homing devices onboard with technology at the disposal of the SMC



back at the Command Center, such as the Rescue-21 radio/direction-finding system.

Which steps the USCG takes once they arrive at the scene depends on the details of the situation at hand. Is it a person in the water that is the subject of the SAR mission? Is it a missing vessel, whose last known position was this point on Earth? In either case, how long ago were they here? What “vectors” (wind, current, tides) have been at play since then, and what is expected going forward? As good information narrows the search area, while poor sources expand it, gauging the scene is like a detective case. Who said what? Did he or she actually see it or hear about it over the radio from another boater who thought he saw something? Have weather and tidal data changed from the time of the event to now, or is it consistent with what we see?

Ideally, the rescue crew will drop a radio buoy or other self-locating device overboard to calibrate what actual vectors are at work at the scene (this is called “dropping datum”). Upon arrival, as well as during the course of the SAR exercise, the crew will perform an “aural search”



by quieting down everyone and everything possible while listening for a faint call for help. Lookouts are often posted as far from the engines and radios as possible to assist in the listening part of the SAR.

The next decision made is what kind of search pattern to run. If the missing person or vessel was lost in a river, the boundaries of the search pattern are well defined. The SMC may even post a vessel at the mouth of the river, to prevent the missing person or vessel from passing all the SAR vessels and heading out into the open sea.



If the search area is large, the last known location is approximate, and perhaps debris was found, the search pattern is likely to be a “creeping line” – back and forth across the search area and moving away from the last known position in the direction of the vectors.

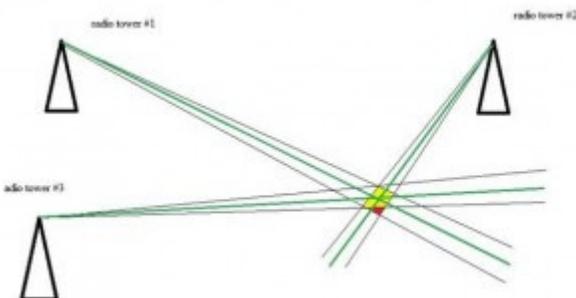
In any event, the last thing that the SMC wants to hear the crew say is “No joy...,” as this means they have done everything that they could and have reached the end of their mission without the joy of finding the missing person or vessel. The SMC will send additional searchers out as long as there is hope, as USCG crews eat, sleep, and breathe safety of life at sea.

If you are interested in being part of USCG Forces, email JoinUSCGAux@aol.com or go to [DSO-HR](#) and we will help you “get in this thing...”



Rescue-21 – The Modern Day Savior

Rescue-21, in addition to being an integral part of the USCG’s 21st century communications system, has a direction finding capability. Even if the distressed vessel doesn’t have an EPIRB or the crew isn’t wearing PLBs, Rescue-21 can point directly at the source of the radio signal. Although there is a 4° error factor (2° on either side of the direct or rhumb line), multiple radio towers can reduce the search area even further.



The green lines indicate the direct or rhumb line from the radio towers to the signal source. With the 2° of error on either side, the red area is eliminated from the search area, thus increasing the odds of the distressed vessel being found.

Search patterns

When the search area is small (a bay, for example) and the crew is aware of the last known position, the search pattern most likely called for is a “vector search,” or “Victor Sierra” in SAR-speak. Moving in pie-like patterns, the coxswain (CXN) will cut back and forth across the point of the “datum’s” location (see “drop datum” in main article), looking for the victim or vessel (see diagram 2.) Somewhat between these two conditions, where the search area is small but the last known position is not so well known, the SAR pattern most likely to be used is the “Expanding Square” pattern, in which the CXN drives in an ever-increasing box or square around the last presumed position (see diagram 3.)

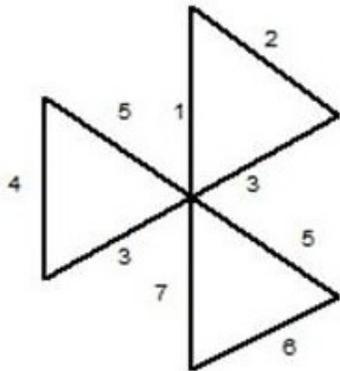


Diagram 2

If you are interested in the math about how small your head may appear while bobbing above the waves from a rescue boat at a distance, click [here](#) and get the math of “size of an object at a distance.” It is a sobering exercise and speaks volumes about the importance of safety of life at sea... suffice it to say this – a human head will appear to be just .03 of an **inch** in size when viewed from 600 feet away (our standard track spacing in a search pattern.)

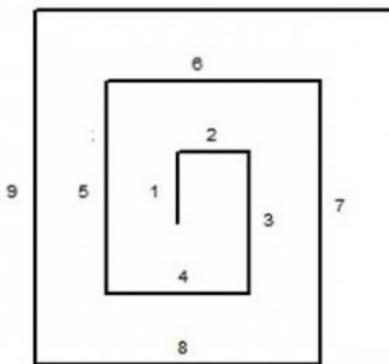


Diagram 3

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