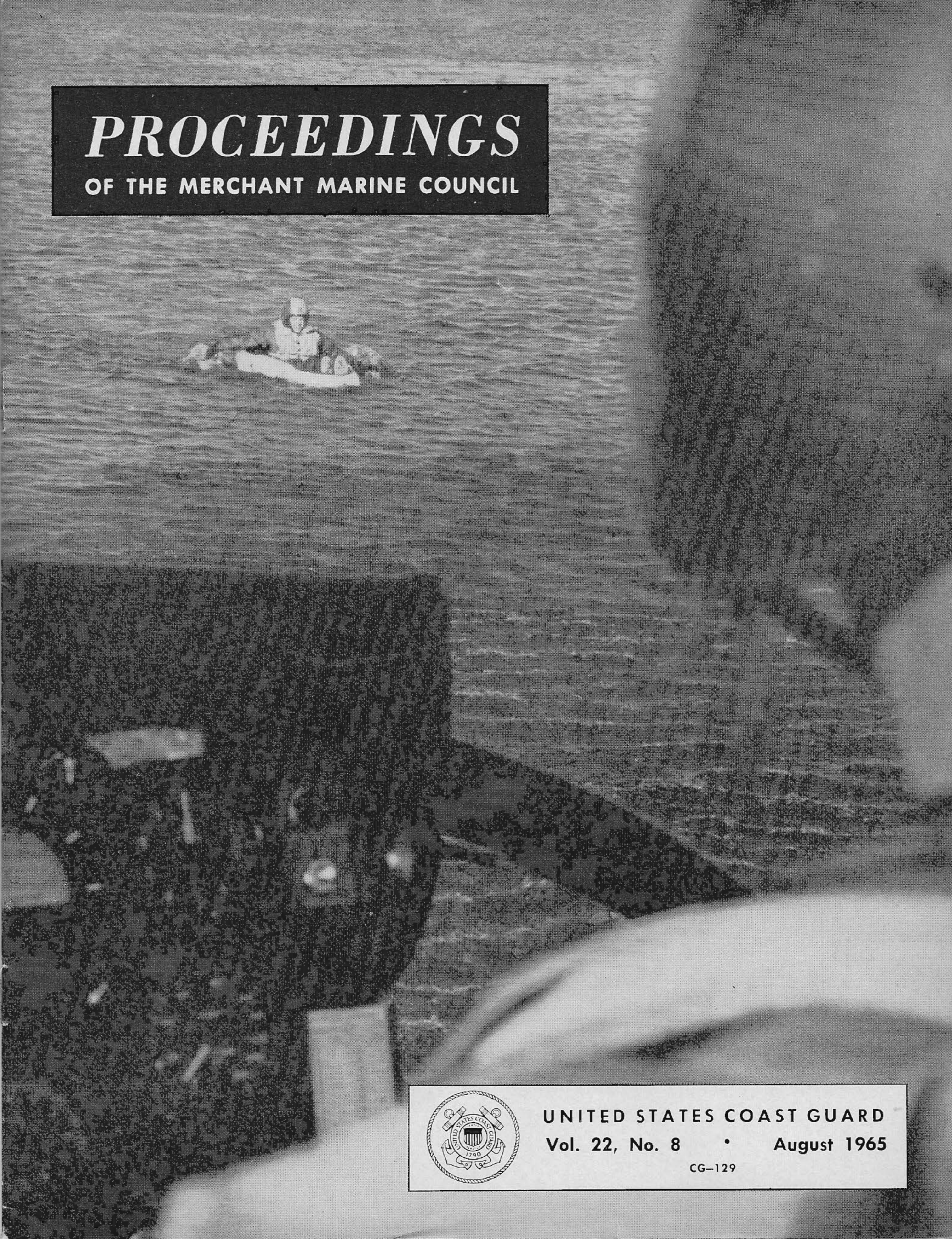
PROCEEDINGS
OF THE MERCHANT MARINE COUNCIL



UNITED STATES COAST GUARD
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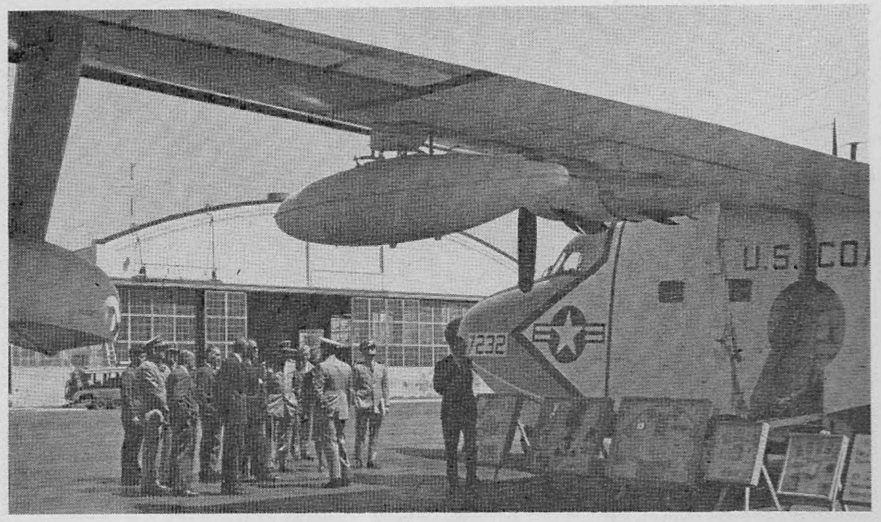
IN THIS ISSUE . . .

The 175th Anniversary of the Coast Guard is commemorated with a summary of past accomplishments and a look at the future of the service, beginning page 171.

Three papers presented by Coast Guard officers to the SAR Seminar in New York are featured, beginning page 175.



Participants and observers at the North Atlantic Search and Rescue Seminar visit a Coast Guard display at Coast Guard Air Station, Floyd Bennett Field, N.Y.

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COVERS

FRONT: Coast Guard Helicopter pilot makes approach on downed flyer in a practice mission.

BACK: Another Coast Guard mission: manning and maintaining 42,000 aids to navigation, some like the Cape St. Elias Light, Alaska, pictured.

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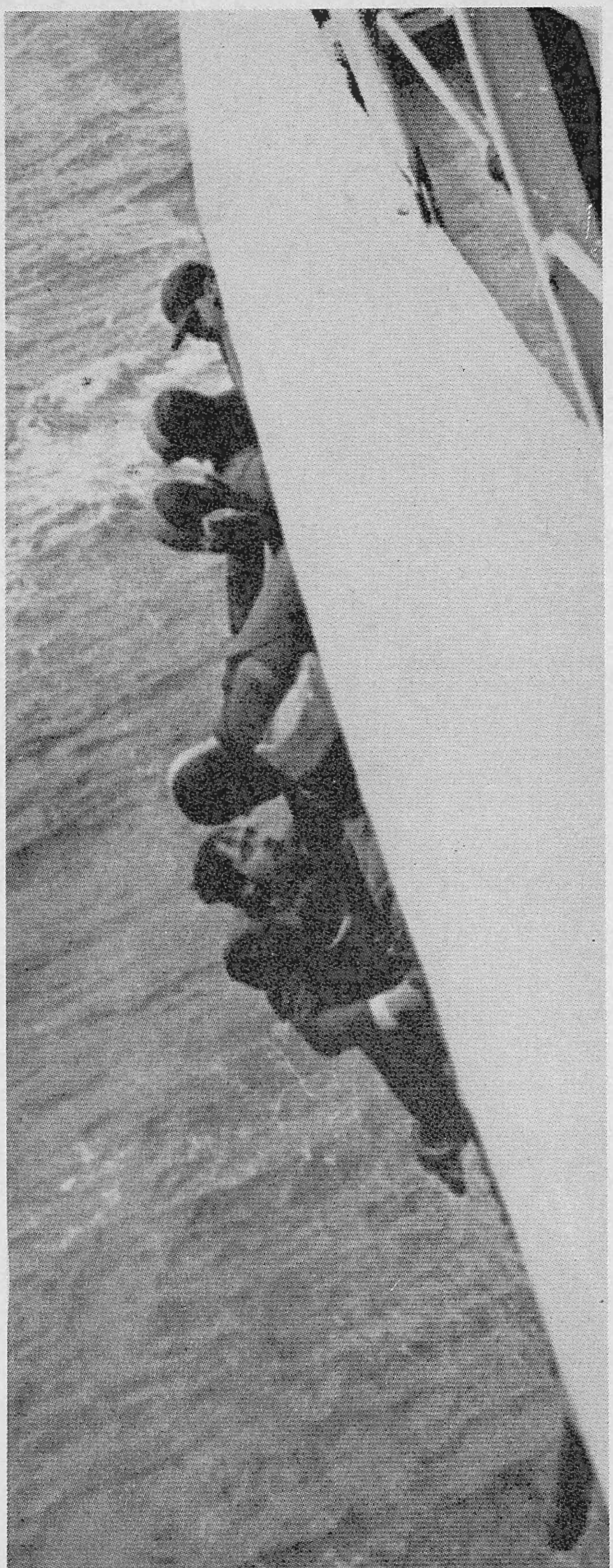
Progress Keynotes Coast Guard's 175th Anniversary

So much more eloquently than any words alone could ever convey, the lifesaving hands of the coastguardsmen at right, extended to a survivor of the Ambassador casualty, epitomizes the humanitarian mission of this armed service that celebrates its 175th anniversary this month.



THE U.S. COAST GUARD is well on its way towards a completely modernized establishment by the mid-1970's.

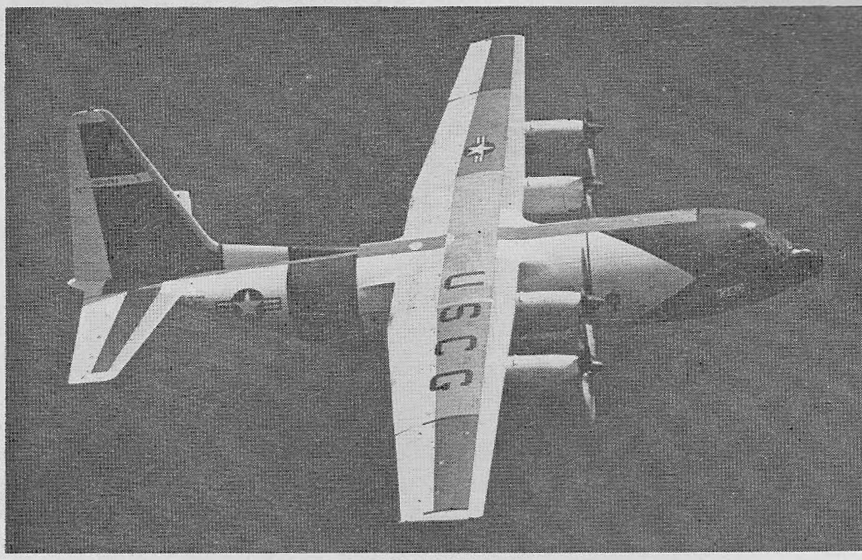
Boldness and imagination spark the Coast Guard's far-reaching plan to streamline this historic Service which has behind it a century and three quarters of service as an Armed Force and chief U.S. maritime safety agency. The objective of Coast Guard planners is to provide the Nation with a Service which will be fully responsive to the increasingly complex needs of our times.

Target: A Modernized Coast Guard Establishment

Modernization of the Coast Guard's surface fleet is moving ahead at a brisk tempo. The goal over the next decade is the construction of 36 high endurance cutters, 378 feet in length. They will be the Coast Guard's largest and most versatile ships. Two are being built and the first, the *Hamilton,* is scheduled for delivery in September 1966. Two others are expected to join the fleet in 1968.

Most striking advance in fleet modernization has been in the medium endurance, 210-foot cutter class. Three of the new vessels, *Diligence, Reliance,* and *Vigilant,* are already in operation, and a fourth, *Active,* will join the fleet in the fall of 1965. It is anticipated that a total of 29 will enter the fleet in the next 10 years. Designed to carry the amphibious HH52A helicopter, they will add new scope and efficiency to Coast Guard operations. Two of the cutters took part in the successful retrieval of the project GEMINI III space capsule and its astronauts after their return to earth near Grand Turk Island, Bahamas.

The Coast Guard's air arm is being strengthened by the acquisition of additional HH52A helicopters. These aircraft have already proved themselves exceptionally well suited to Coast Guard requirements.



The "Hercules" C130 long range search and rescue aircraft

Coming in for its share of scrutiny is the shore establishment. Special effort will be made in years ahead to provide additional housing for personnel. In recent months, steps have been taken to consolidate most of the Coast Guard's New York City facilities on Governor's Island (formerly U.S. Army Fort Jay).

Oceanography, Science of the Sea

For the Coast Guard, the decade ahead promises to be one of the most fruitful in its nearly a century of experience in marine research. As part of its stepped up program, the Coast Guard is equipping its ocean station vessels in the Atlantic and Pacific with the most modern instrumentation. The new equipment will enable the vessels to carry on continuous marine observations.

This year's International Ice Patrol, a Coast Guard responsibility since 1915, will make important new contributions to our knowledge of northern waters. Although the Patrol's primary mission is to protect shipping in the North Atlantic against floating icebergs and other hazards, it is also carrying out major marine research. In 1965, Coast Guard scientists will conduct marine studies from Greenland to Iceland, and from Iceland to the Orkney Islands. They will study the interchange between the Norwegian Sea, the Atlantic Ocean and the Denmark Strait. During the post-season cruise of the oceanographic ship, *Evergreen,* an effort will be made to determine the origin of the Labrador Current which carries icebergs calved off Greenland into North Atlantic shipping lanes.

Cuban Patrol

Since 1959, when the Patrol was established shortly after the Castro takeover in Cuba, it has kept a watchful eye on the situation in this troubled part of the world. Ships and aircraft of the Patrol scour the waters of the Straits of Florida on the alert for refugees and for possible sneak attacks by anti-Castro elements on Cuba. The Patrol has picked up more than 8,000 refugees since its inception. Its work constitutes a major contribution towards the maintenance of stability in the Caribbean.

Search and Rescue

Modern search and rescue is a complex function, involving the closest cooperation between Coast Guard air, sea and shore units. Most current means for attaining this coordination is the Automated Merchant Vessel Reporting program (AMVER) established in 1958. Nerve center for AMVER is the Coast Guard's Rescue Coordination Center in New York City. The program has proved so successful that it will soon be extended to the Pacific. Under AMVER procedure, vessels voluntarily report their positions periodically to the Coast Guard at New York. These data are processed by an electronic computer and provide the most current information for Coast Guard rescue coordination centers. Thousands of foreign and U.S. vessels are taking part in the program and the number is growing steadily.

What could be the first step towards a global search and rescue system was taken in New York City in May, 1965. At that time, the Coast Guard's Eastern Area Commander invited operating personnel of countries of the North Atlantic basin to study means of speeding the exchange of information and coordinating data on overdue aircraft and ships.

Law Enforcement

Enforcement of international treaties to preserve valuable marine resources in North American waters is a traditional Coast Guard function.

A 311-foot cutter

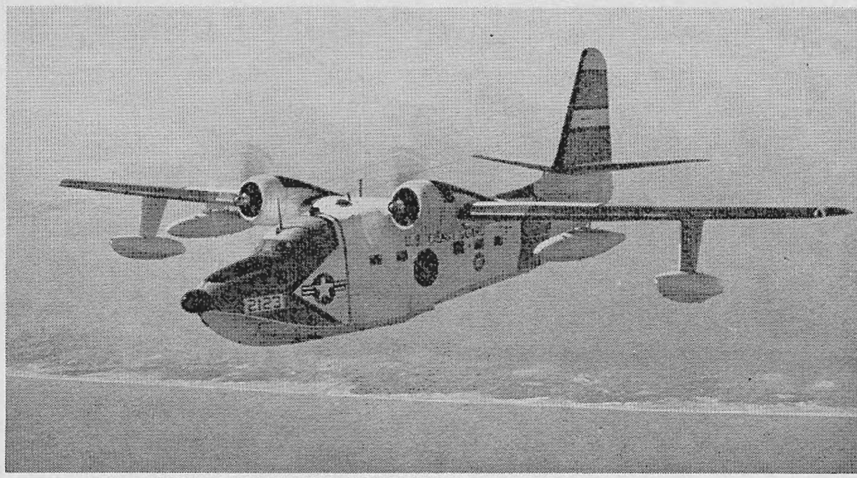
A 255-foot Lakes class cutter

In May, 1965, three Coast Guard officers boarded the Soviet tug *Stremitelniy* at Halifax to undertake a first hand observation of Soviet law enforcement techniques in the Grand Banks area. Later in the month, three Russian officers boarded the Coast Guard cutter *Acushnet* for a similar period of observation. Following the observation, they were taken on a tour of the Bureau of Commercial Fisheries and of Coast Guard law enforcement units in the vicinity of Boston, Mass. These activities were conducted pursuant to the International Convention for Northwest Atlantic Fisheries (ICNAF).

Maritime safety is a basic Coast Guard responsibility. This function now absorbs about 20 percent of Coast Guard officer personnel. Its objective is to prevent disasters at sea from making the headlines. It includes an intensive merchant vessel inspection program, extending from the blueprint stage through the construction and operation of the vessel. Periodic reinspections are made to assure continued compliance with U.S. safety standards, the highest in the world.

Shipment of industrial chemicals by water has risen sharply in recent years, creating new hazards for operating personnel and for communities along routes of shipment. To prevent catastrophes, the Coast Guard maintains a nucleus of technically trained personnel who are constantly in touch with the situation.

Water pollution is another area in which Coast Guard activity is likely to grow in coming years. The problem is of increasing concern to local, State and Federal authorities. As a remedial measure the Coast Guard is planning to install shipboard disposal systems on its entire fleet. Here as in other fields, the Coast Guard must keep abreast of technological developments if it is to maintain U.S. leadership in marine safety.



The "Albatross" amphibious SAR aircraft

Aids to Navigation

Maintenance of a network of more than 42,000 navigation aids of all types poses an urgent problem for the Coast Guard's limited personnel. To help simplify the maintenance problem, the Coast Guard is experimenting with the adaptation of atomic energy to some of its aids. Most notable are the atomic buoy in Baltimore Harbor and the atom-powered lighthouse in Chesapeake Bay, Md.

Loran (Long Range Aid to Navigation) is a valuable navigation aid with which the Coast Guard has been prominently associated since World War II. Loran installations extend from the equator to above the Arctic circle, from the Black Sea to the South China Sea, and throughout the western hemisphere. This very reliable aid has important peacetime and military uses. In recent years, the Coast Guard has undertaken the development of the more advanced Loran–C. Altogether, 25 Loran–C stations have been constructed and a 26th is now being built.

Most recent entry into the Loran picture is the very advanced Loran–D. Designed primarily for overland use, it can also be employed by vessels and aircraft. Weighing approximately 30 pounds, the highly miniaturized portable Loran–D receiver, can be used on military vehicles at speeds ranging from zero to 2,000 miles an hour. Specifications call for a Loran–D installation capable of locating a given point with repeatable accuracy of 60 feet at 250 miles and to no more than 600 feet at 500 miles. Tests on the new receivers will begin in December and will extend over 6 months.

A Busy Future

For the Coast Guard, the decade ahead will be one of the busiest and most exciting in its 175-year history. They will be years of growth and development. As always, the Coast Guard will dedicate all of its resources towards providing the American people with the most effective maritime safety service in the world.

A 327-foot Secretary class cutter

A new 210-foot cutter

North Atlantic Lifesavers Meet

SEARCH AND RESCUE SEMINAR

Representatives of the Maritime nations of the Atlantic Basin have met at Coast Guard invitation to exchange ideas on latest SAR methods looking toward improving multination SAR capabilities in the North Atlantic.

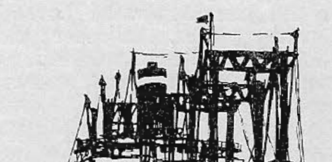
A REPRESENTATIVE of the United Kingdom appears to have summed up the mission, and at the same time, beautifully caught the tone of the North Atlantic Search and Rescue Seminar when he said during the course of a prepared delivery, "It is appreciated that the seminar is to be discoursive rather than policy forming." And it was just that. At the invitation of the Commander Eastern Area, U.S. Coast Guard, representatives of nations bordering on the North Atlantic Ocean gathered and participated in an extensive 3-day exchange of search and rescue views and ideas. The attending nations included Canada, the Federal Republic of Germany, France, Iceland, Norway, Spain, Sweden, the United Kingdom, and the United States.

Professional papers reflecting the most recent expert thought on the several problems of multinational search and rescue cooperation were presented. Discussed were such problems as: How should organization of search and rescue facilities be ordered so as to maximize SAR successes; how might the SAR tool of communications be improved to better serve the rescue mission; what type of homing beacon do we develop to hasten the locating of a downed flyer or a lost-ship survivor? These problems, and many others were aired by the blue ribbon group representing maritime interests, both government and private, from the Atlantic basin.

It is widely hoped that this seminar will be but a precursor to a long line of such idea-pooling-meetings from which a feeling of identification with a mutually interesting problem will quickly result in life and property saving breakthroughs.

Hosting the seminar was the Commander of the Eastern Area, Rear Admiral Irvin J. Stephens, USCG, the Atlantic Maritime Search and Rescue Coordinator. Admiral Stephens convened the seminar May 12, 1965, at the U.S. mission to the United Nations.

The Coast Guard opened the con-



clave with a presentation on search and rescue problems. Other presentations on opening day included a paper on "Search and Rescue Organization" by the Board of Trade of the United Kingdom; "Communications in Search and Rescue" by the Coast Guard; and "Coordination of efforts among operating forces of the various North Atlantic Nations" by the Royal Canadian Air Force.

"New Developments in Search and Rescue Equipment, Procedures, and Operations," a presentation by the U.S. Coast Guard, opened the second session followed by the Navigation and General Safety Section of the Inter-Governmental Maritime Consultative Organization's presentation of "Dissemination of Information." "Automated Merchant Vessel Report System (AMVER)" was also discussed together with another Coast Guard paper on "Planning and Doctrine in International Search and Rescue and Feasibility of a North Atlantic Search and Rescue Plan."

On the final day of the meet participants and observers at the seminar had the opportunity to make one of three separate field trips: a demonstration of airborne search and rescue equipment at the U.S. Coast Guard Air Station, Brooklyn, N.Y.; joint operations with the Coast Guard's amphibious "Sea Guard" helicopter and the Coast Guard Cutters *Rockaway* and *Vigilant;* or a tour through the New York Rescue and Automated Vessel Report System Center in the Custom House, New York.

It is with particular appreciation to the Commander, Eastern Area and his staff that the *Proceedings* here carries three papers presented at the seminar by Coast Guard officers. Because the Merchant Marine is the major beneficiary of search and rescue successes, it is hoped that these papers, as well as the contributions of other nations to be carried in future issues, will spark much discussion by and among those who daily live and work near and upon the seas.

Search And Rescue Problem Areas

Capt. John M. Waters, USCG

Captain Waters is a 1942 graduate of the U.S. Coast Guard Academy. He saw World War II action aboard the Cutter Ingham *and the troop transport* Hughes. *He later commanded the destroyer escort* Savage *and the Cutter* Aurora.

Captain Waters completed flight training in 1948. He has served as Operations Officer of the Coast Guard Air Stations at Elizabeth City, N.C., and San Diego, Calif., and of the First Coast Guard District headquartered at Boston. He has commanded the Bermuda Air Detachment and Air Stations at Miami, Fla., and Salem, Mass. While in command of the latter, Captain Waters was commended for successfully executing an extremely hazardous rough sea landing to evacuate an injured seaman. He presently is Chief of the Search and Rescue Division at Coast Guard Headquarters.

IN THE UNITED STATES areas of SAR responsibility, despite the many forward steps taken in the last 10 years, we have many unsolved problems.

There has been a sizeable jump in our SAR cases caused primarily by the explosion in recreational boating. In the United States, for example, we now have over 8 million small boats. This move of people to the sea for recreation is sure to increase as the land areas become more crowded and as personal income goes up. We have also noted a recent rise in the number of large vessels in distress on the high seas. Aircraft accidents, while not increasing in numbers, usually involve more persons in each accident than formerly, due to the larger aircraft. Fortunately, the number of aircraft suffering en route engine failures is down appreciably, thanks to the more reliable jet engines. Even the loss of an engine is not as serious as in a reciprocating engine aircraft. The net result, however, has been that in the 5-year period ending in June 1964, Coast Guard SAR sorties increased from 21,337 to 41,666 yearly, or a percentage increase of 95 percent. At the same time, our manpower increased by only 6 percent.

A SAR unit is similar to a firehouse. If the fires in New York doubled, the fire department wouldn't have to be increased twofold. However, in the busy areas, it is quite conceivable that if a fire broke out on one block, the fire company could be fighting a fire elsewhere. This has happened to us on a number of occasions. Knowing that we are not going to get enough men and facilities to handle the increased load in an optimum manner, we must use our present forces more efficiently. This also holds true for other forces available to us from the other services, the merchant marine, and from our friends of the other countries along the Atlantic basin.

How can we raise the efficiency of operations? What are our problems? Let's examine them a bit closer. The full SAR cycle includes four basic phases:

- The awareness that a distress exists;
- The location or search;
- Recovery of the survivors (and their property);
- Evaluation.

Note that I put the word "property" in parentheses. The SAR Coordinator will make every effort to save property. However, once a ship is aground or wrecked, or merely requires a tow, it is a matter for commercial salvage, not SAR. An exception is made in the United States for small boats which would not justify the use of or could not afford the expense of a commercial salvage company. We tow or assist them free of charge.

Awareness of Distress

The first phase, becoming aware of a distress, is critical. We must not only learn about a distress, we must learn about it in time.

Aircraft do not present too much of a problem in this phase; nearly all file flight plans when flying over water, and the appropriate Air Route Traffic Control Center (ARTCC) will promptly notify the rescue organization if they fail to make position reports or do not arrive at destination. These alerts will usually go out less than an hour after an accident occurs, and the SAR forces can begin a prompt search of the track line. We usually have full information about the equipment carried, routing, etc. As a result, we usually find the scene of the accident, though in many aircraft accidents no one survives.

We could save a great deal of search effort and find the scene of distress more quickly if all large aircraft carried a crash locator beacon, which can be deployed manually when the aircraft gets in serious trouble, or ejected automatically in case of a crash. This has been a long-standing project, and the Navy now has a model in the test and development stage.

Merchant vessels are more of a problem, for if they sink without getting out a distress message, a number of days may elapse before an agent or the owners become concerned. In a recent loss, the vessel was several days overdue before we were alerted. Sometimes a vessel or the survivors are found by another ship or an aircraft just happening along. Last year, a Canadian Navy aircraft sighted a funny looking ship about 200 miles south of Halifax and went over to have a look. It turned out to be half of the tanker *Amphilion,* which had broken up without getting out a message.

Several years before, the cargo vessel *Southern Isle* was steaming alone in the wake of a hurricane. In the hours before dawn it broke in two and went down without a distress call. Another freighter happened to be several miles from it, and an alert mate saw the lights go out. As his ship passed the site, shouts were heard in the water, and the few survivors were recovered.

In still another case, a freighter sailed from a U.S. port for a European country and disappeared without a trace. European SAR forces were searching for this freighter for a number of days before we even heard it was missing.

One of the really bizarre cases occurred several years ago off the New England coast. A tanker broadcast a distress and an SAR aircraft soon located the stern in the heavy storm. After fixing the position, the pilot continued his search for the bow section. Shortly thereafter, he found it. As he circled it, however, he suddenly took another long look. The bow was not the bow of the distressed ship, but was from another ship which had broken up without sending out a radio signal. We had two distresses on our hands. Fortunately, most of the people were saved from the two ships, but only by rare chance did we become aware of the second distress.

Agreements involving international shipping proceed at a snail's pace, but isn't it time that the owners and agents of merchant vessels exercise a closer watch on the progress of their vessels? Is it unreasonable to require at least one radio transmission a day to insure that the vessel is still afloat? A daily position report would be preferable, but any type of message would be better than nothing. Lacking this, we pay a grim toll in lives when an accident occurs and the vessel is unable to get out a distress signal.

Large sailing yachts on ocean trips present a special problem because no one really knows their speed of advance or what track they follow. We found one yachtsman between the West Coast and Hawaii who was 28 days overdue. No one knew his plans. When one of these lads is missing, you can't just search a course line, you must search a large part of the ocean. Furthermore, weeks may have elapsed since the accident.

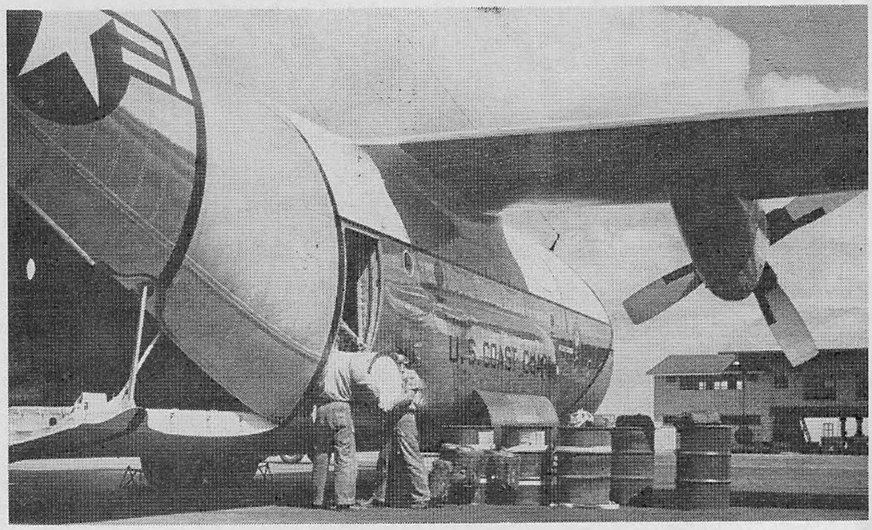
Several months ago, a Navy aircraft was flying several hundred miles offshore when it sighted people hanging onto a raft. They were survivors of the yacht *Gooney Bird,* which had sunk a day earlier. We didn't know they were even at sea, and but for a great stroke of luck, they would undoubtedly have perished. We spend so much time and effort checking out these long ocean yacht voyages that we are in self defense encouraging this type sailor to file a cruise plan with us, so that we will have something concrete to go on if he becomes overdue.

The last and most numerous type of uncertainty involves the small boat operator who goes out for the day and doesn't return. We first hear about it from his wife or a relative, and they usually have little knowledge of the boat, its description, or where the boater planned to go. It involves considerable detective work and digging to obtain the minimum information required to carry out a search. The actual launching of aircraft or vessels for search is usually preceded by a communications search, in which we attempt to obtain information by radio inquiries of other boats, by telephone calls, or by visits to the various marinas and possible mooring sites. Many times, we will find our missing boatsman tied up having a beer. If we can't locate him by the communications check, then we go into the active search phase.

In very busy boating areas, we have late afternoon patrols to check for boatsmen who may be broken down or in trouble. These have been fairly fruitful. In recent years everyone has taken to waving at helicopter pilots just as we older people used to wave at railroad engineers. The pilots enjoy the popularity, but it is time consuming trying to check out everyone who waves to see if he is in trouble.

We are presently studying the feasibility of using "cruise plans" with small boats. Under this plan, we would promote and supply free of charge a form that the boat operator would fill out before going out. This would be left with a friend who would then notify the Coast Guard if the boat didn't arrive on time. You may ask, "Why not have the plan filed with the Coast Guard?"

The answer is, of course, that we would be swamped by the very numbers. It will have to be a voluntary thing, with a friend or relative holding the cruise plan and notifying the Coast Guard only when someone is overdue.



A C130 being loaded with dropable rescue equipment

Search and Location

Once we are made aware of a missing craft, the search phase begins. An overdue report is first checked out by means of a communications check. Of course, on an SOS or a MAYDAY call, we would dispense with that, empty the hangar, and get out there. But once the decision is made to launch, what is our problem then?

First, we have to have a position of distress. If we have none, we must search an entire track, or a large area. If we do have one, we must try and determine how accurate it is. We have had large aircraft lost by several hundred miles. This past winter we had a large freighter pile up on the rocks fifty miles from where she gave as her position. Unfortunately, we will never know what happened. Everyone died with the ship. Now it is fairly simple arithmetic to realize that the more uncertain the position is, the greater the search area must be. With a large area we must spread thin our search effort to cover it, and the probability of detection drops. If an airman or seaman goes down at a great distance from where he is supposed to be, he is half dead already. I recall a very tragic case several years ago when a Navy man flying a light plane took off on an 80-mile flight to a town due east. He finally ran out of gas and crashed uninjured on the desert 200 miles south of the track line. We searched for a week and extended the search 50 miles either side of his intended course. He was found weeks later by a transient plane that happened to be flying over the desert. He had died of thirst in 9 days. Eight miles away was a village, but he had no idea where he had landed. Neither did the search forces.

Another big problem is determining the time of the accident. Suppose a fisherman goes out for a week's trip and doesn't return. Did the distress occur the first day or the last? It makes a great deal of difference where we look, for the drift rate is often great. For example, off the Florida coast, the Gulf Stream flows at about 4 knots. If a fisherman breaks down at 0800 just as he arrives at the fishing grounds, he will have drifted about 50 miles by the time he is overdue. If he broke down on his way back in, however, he will have drifted only about 10 miles.

Just determining drift is a problem in itself. The oceanographers are at about the same place in their science as the physicians were when they were trying to scare evil spirits out to cure disease. We know very little about ocean currents and about currents generated by wind. Tidal, or rotary currents are even more complex. To make matters more complicated, we also know very little about leeway of rafts and small craft. We have been running some extensive tests to determine this for various craft. One of the interesting things we have found is that boats usually don't drift downwind, but make leeway as much as 40 degrees off the wind line due to the effect of their keel.

We realize that this whole drift problem is a can of worms, and we are trying to do something about it. On the one extreme, we have taken the very pragmatic approach of developing a Datum Marker Buoy. This is thrown over at the best estimated position of distress, and drifts at the same rate as would a man in the water. By means of a UHF signal emitted by the buoy, our aircraft can relocate it at any time for the next 50 hours. It tells us what the drift has been in that particular area of the ocean for a man in the water. Of course, if the man is in a raft, his leeway will be greater than in the water, and we will have to search downwind for him. We have already started using these, and the first uses have indicated that our computations on paper are often erroneous.

A second approach is the use of minimax plotting. Here, we are admitting that there may be considerable variations in time adrift, current, leeway, etc. Therefore, we take the maximum drift factors and combine them to obtain the furthest possible drift. We then take the minimum values and do the same. The best estimate of datum is then midway between, and the probable drift error approximately half the distance between the plotted positions. This method is shown in the last revision to the National SAR Manual, and does insure that you will probably have the target somewhere in your search area if its initial position was approximately correct.

Realizing that computing the drift is a complex and time consuming task, we are planning to program the AMVER computer to solve some of the problem. This will be most useful in large offshore searches, and of doubtful utility in the thousands of small local searches along the coast. By means of landline ties, we hope to make the computer search planning features available to our Pacific commander in San Francisco to aid him when required. We are just starting on this project, and it may require about 2 years before we obtain results.

Once we have computed drift and established the most probable position, we must then decide how big an area to search around that position. This is always a tough decision. If we select too large an area, our probability of detection within the area drops as our forces are spread thin. Quite often, we pick up a survivor, and he reports that he saw several aircraft that didn't see him. In the post mortem someone always suggests that we should have concentrated more aircraft in a smaller area. The next week, we may really saturate an area without success. When we finally locate the man a week later, we discover that we didn't extend our search enough, and he was never in our search area. He saw no aircraft. Then the critics proclaim that we should have searched an area large enough to insure he was in it.

Hindsight is a great thing, and it is unfortunate that we SAR people can't have it while we are searching. In the conflict between searching a large area lightly, or a small area heavily, we have come up with a solution that tries to please 50 percent of the people 50 percent of the time. It is called Repeated Expansion. In essence, we search with a moderate coverage factor, but research the area enough times to raise our probability fairly high. Each time we research, we also expand the area. At the end of five searches, the probability of detection near the center is over 95 percent, while that near the extremities is 50 percent. We have in effect concentrated our search where the target is most likely to be—near the datum—but have still not neglected the edges of the area.

Another big problem is accurate navigation in the search area. Far offshore it is difficult to maintain accuracy within a mile or so. We have been relying increasingly on the ship-plane team concept, where the ship steams along a track, while the aircraft flies a pattern that crosses over the ship midway each leg. Radar is often used by the ship to aid aircraft navigation. Sometimes, we may have a trained SAR aircrew for search, along with several crews who are unaccustomed to over-water searches. We team a couple of these "amateur" searchers up with a SAR aircraft in three-plane formation abeam leaving the navigation and communications to the trained leader.

The Sector Search is the most effective pattern I know, both for detection and for navigation. Midway each leg, you obtain another fix on the marked datum. It is a simple and flexible search pattern, incomparably better than the old expanding square.

I think you will be able to visualize the uses of the Datum Marker Buoy as a navigation aid. If the SAR aircraft has UHF/DF equipment, and most do, it can get constant navigation checks on the buoy, and the buoy is at the best estimated position of the survivors.

Once we are in the search area, and even assuming we can navigate accurately, we don't really know how far we can see an object. We are not even sure of our best search altitudes. Our present sweep width tables for various objects are really only estimates. We are doing some work on that now by computor analysis of 10,000 sighting reports, but we have a long ways to go. In the meantime, we receive reports from some very optimistic searchers who claim 75 percent probability of detection for a man in the water, with 20 knots of wind and whitecaps. The real probability is more like 3 percent. Quite frankly, when the water gets rough, a man in the water had better have detection aids, either visual or electronic, or he will not be found except by excep-

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tional luck, or even a miracle if you like. In extremely rough weather most visual aids such as smoke and dye are ineffective. Under such conditions, a night search is often best, for you can see a light even in very rough seas.

A realistic solution would be a small portable radio beacon available to any survivor. We have known this for over 20 years, and we have had numerous such beacons produced, but they are seldom used, or they have bugs of one kind or another. The Air Force has just ordered over 30,000 of a new type beacon, and we hope the pilots will use them. Unfortunately, the cost will probably scare off the seamen and the small boat operators.

Realizing that visual search is for the birds, if you will pardon the expression, we are striving to find a better detector than the human eye. One study is on infra-red detection of a body different in temperature from the water. It has promise, but is not effective in fog. Another lead is the use of super-sensitive television scan. This will pick up very faint light sources. Both of these projects are in the research and development stage.

So despite the many exotic developments, we are still relying on the eye, and it isn't very reliable. What can we do about it?

There is no doubt in my mind that motivation is a big factor. A crew that is really "up" for a mission will see things that a lackadaisical crew won't. Fatigue is a big factor. After the first 2 hours, lookout efficiency drops rapidly, and after 6 hours, you can for all practical purposes scrub that crew. If we had more lookouts, we could do better, but where are we going to find the men?

Our lookout windows and seats are generally poor, and despite our griping about this for years, we seem to make no progress. There is a school of thought that feels a comfortable seat will lull the lookout to sleep. These people should have to fly a couple of 10-hour missions. Lastly, I feel that we have neglected the training of our lookouts, and we are starting to do something about this. Good lookouts aren't born, they are made. We are most interested in any training programs others may have in this field.

But in 1965, let us frankly admit that visual search for small objects is not all we claim it to be. It is a major problem, and one that we must either solve, or substitute electronic search for it.

The same type patterns are called by different names in different countries. We have had this same problem, and have solved it by using lettered search plans, which are detailed in the National SAR Manual. This is not only used by U.S. forces, but by 25 other countries as well. There are only three or four basic search patterns, but we have detailed the many variations of these in the Manual, and have only to refer to a two or three letter designation to pinpoint the pattern. The searcher then opens the book to that pattern, and there is the picture. It saves a lot of words. If we could all agree on such a common system in the Atlantic basin, our coordination, especially on scene, would improve remarkably.

There exists a problem of coordination between countries on the mid-ocean searches. In one recent case, we knew what areas our units had searched, but many days elapsed before we were able to learn what coverage had been given on the European end. When we are searching a track line extending across the Atlantic, and ships and aircraft of three nations are involved, we must have instant and reliable exchange of information if the search is to be carried out efficiently. This is both a coordination and a communications problem, and I hope this meeting will help us start on a solution or a better means of achieving mutual cooperation. We have an ideal arrangement with our Canadian friends to the north. Our RCCs are connected by hot lines, and exchange of information is rapid and complete. On scene, Americans work for Canadians, and vice versa. It is a wonderful example of teamwork to accomplish a humanitarian mission.

Recovery

In the great majority of cases, once we have located the distressed unit, we can recover the people, or save the vessel. Aircraft can drop flotation equipment, or portable pumps to clear the vessel of water. Seaplanes can land under certain conditions, but I am happy to say that this is becoming a rarity with the new generation of helicopters able to go offshore, and themselves land in the sea if they are unable to hoist. By means of AMVER, or by an auto-alarm signal, we can divert merchant shipping to the aid of those in distress. But we do have problems even here.

Merchant vessels are often hard to maneuver in high winds and seas, and this is just when they are often needed. Don't think that AMVER is a panacea, or that the merchant marine can become the primary maritime SAR tool. The helicopter, despite its great versatility, has limitations as to weather and range. Hoisting from a vessel with high masts, especially at night, can cause a few gray hairs, though we have developed certain improved techniques here. We have been working for a number of years developing a capability in the helicopter for it to tow vessels, but recently we have found that there are hidden dangers here that may negate the usefulness. We have had a number of cases where helicopters trying to pick up downed airmen became tangled up with the parachute harness with disastrous results. We are now extending the offshore capability of SAR helicopters by operating and refueling them from our new *Reliance* class cutters, but we are limited by sea conditions and ships roll.

But one of our biggest problems is one that plagued Lord Nelson, and undoubtedly also bothered Eric the Red. How do we recover men from sinking vessels or from the water when weather is severe? Basically, we use the same methods as our grandfathers. We launch a small boat with all the dangers involved. We may decide to maneuver alongside people in the water, and put over swimmers. Perhaps we pass lines to a sinking vessel, and tell the people to tie them on and jump in. All of these have been successful—and, all of them have killed people. The only two new developments I have seen here in my lifetime have been the use of the rubber raft for transfers, and the use of swimmers equipped with protective wet suits and flippers. Recently, we have been trying out a lightweight SCUBA gear for swimmers, not for them to dive, but to allow them to swim and work in rough water without having to fight to keep their head above water. We welcome any suggestions, for this is a real problem.

Evaluation of Results

When we have concluded a case, we must then do a post mortem and see if we have learned any lessons, or if we could have done better. In our work we cannot afford mistakes to be repeated. If we do, people die. This year, we are introducing a new system of reporting the results of a SAR case that will allow for Automatic Data Processing on computers. It contains a correction feature when errors are made. We have also initiated a system of SAR Case Studies when we fail in a case, and are planning a periodic publication of the results. Only by constant monitoring and corrective action can we raise the efficiency of our SAR operations. It is imperative that we do so, for every day men die on the oceans. Some die because we aren't doing our jobs well enough.

RADIO: The Vital Search And Rescue Link

Capt. Charles Dorian, USCG

Captain Dorian is a communications specialist. He is a 1941 graduate of the U.S. Coast Guard Academy and saw World War II service aboard the Coast Guard manned attack transport USS Calloway *in the Pacific. He has served as communications officer for the 7th and 12th Coast Guard Districts and the Western and Eastern Areas. Captain Dorian has been executive officer of the Cutters* Mocoma, Androscoggin *and* Mackinaw, *and commanding officer of the Cutters* McCullough *and* Mackinaw. *He assumed his present duties as Chief, Communications Division at Coast Guard Headquarters in June 1964.*

The accompanying article is adapted from a presentation by Captain Dorian to the North Atlantic SAR Seminar.

WHEN THE DISTRESS signal SOS or MAYDAY is heard by the radio operator, a search and rescue incident commences and forces begin their rescue operation. The distress message may come from a small yacht, fishing vessel, an aircraft, or passenger liner with hundreds of persons aboard. Initially, it is difficult to tell the extent to which the rescue forces will participate or the magnitude of the communications involved. Although safety on and over the ocean has always been of concern to seafarers, the sinking of the S/S *Titanic* in 1912 stunned the world into a new era of maritime safety.

The primary means of making a distress incident known is through radio communications. A great many people have written on this subject, and have spent many hours and days at conferences in resolving the issues and agreeing on procedures which ultimately have become part of the International Radio Regulations or standards, practices and recommendations of the International Civil Aviation Organization, or regulations and recommendations of the Intergovernmental Maritime Consultative Organization. It is my intent to discuss various aspects of communications as they relate to search and rescue, and to recommend for further consideration, and possible ultimate acceptance, certain principles and ideas which I believe will improve safety of life at sea.

The communications involved with search and rescue may be divided into three categories:

Distress, urgency or safety.
On-scene.
SAR control.

The various standards and procedures to be used for distress, urgency and safety communications are adequately stated in the International Radio Regulations, Geneva, 1959. Additionally, such information for the Aeronautical Mobile Service is reiterated in Annex 10 to the ICAO Convention, entitled Aeronautical Telecommunications.

When the words "distress frequencies" are mentioned, the majority of persons think of 500 kc/s, the International radiotelegraphy distress and calling frequency, and 2182 kc/s, the International radiotelephony distress and calling frequency. In reality, there are four more frequencies which should be considered in the same light. They are:

1. 8364 kc/s—International lifeboat, liferaft and survival craft (CW)
2. 121.5 Mc/s—International aeronautical emergency (AM voice)
3. 156.8 Mc/s—International maritime mobile calling and safety (FM voice)
4. 243.0 Mc/s—International survival craft and U.S. military common emergency (AM voice)

Our large Coast Guard ships used for search and rescue routinely guard 500 kc/s, 2182 kc/s, 121.5 Mc/s, and 243.0 Mc/s. As VHF-FM equipment for the maritime mobile band is installed on these ships in the coming months it is anticipated that a watch will be maintained on 156.8 Mc/s. The multitude of calling, safety and distress frequencies imposes a serious problem in maintaining an adequate radio guard. The human ear and mind can only cope with a certain level of noise and multitude of conversation. The adequacy of radio watch keeping by search and rescue aircraft in a distress incident is also subject to the same problem. It is my belief we have reached the limit of human endurance, and efforts should be made by national and international groups to attempt reduction of the number of radio guard frequencies. At a maximum, only three, and preferably two continuous distress frequency guards should be required of any one man. Where possible, alarm receivers and/or squelch-operated receivers should be used.

It should be noted that a proposal to replace the present two distress-frequency bands, 500 and 2182 kc/s, with one distress-frequency band which would be common to telegraph and telephone, was formally raised at Geneva, 1959, by the Swedish administration. There has been evidence that other maritime countries are interested in this proposal, and it may be expected that further international action will be taken toward this objective. However, it should be noted that the International Radio Officers' Conference, held at London in July 1964, was opposed to this concept except when "unanimously agreed by organizations of ships officers, radio officers, and seamen whose lives may be in hazard."

In regard to 2182 kc/s, the ICAO Air Navigational Plan for the North Atlantic Region, Document 7674/8 states "The attention of all concerned should be called to the possibilities of using the frequency 2182 kc/s for communication between aircraft and ships in case of emergency or SAR operations."

The ITU Radio Conference Geneva, 1959, extended the obligations of ship and coast stations as regards the watch on 2182 kc/s. The conditions of use and specifications of the radiotelephone alarm signal were detailed.

Another item of interest is that the International Convention for the Safety of Life at Sea, 1960, requires ships between 300 and 1,600 gross tons, equipped primarily with radiotelephone, to maintain a continuous watch on 2182 kc/s in the place on board from which the ship is usually navigated using a loudspeaker or other appropriate means. Listening may be discontinued—

1. When the receiving equipment is being used for traffic on another frequency and a second receiver is not available, or

2. When, in the opinion of the master, conditions are such that maintenance of the listening watch would interfere with the safe navigation of the ship.

Recommendation 40 of the same convention recognized "that it is desirable to coordinate activities regarding safety on and over the sea" and "recommends that the Organization (Safety of Life at Sea), the International Civil Aviation Organization, the International Telecommunication Union and the World Meteorological Organization should pursue their joint studies on matters regarding the planning and providing of facilities for search and rescue and the dissemination of information concerning these arrangements and in other matters of joint concern to these organizations regarding safety at sea."

Recommendation 41 of the Safety of Life at Sea, 1960 Conference recognized "that there is a need for communication between aircraft and ships involved in cases of distress, and recommends that the Working Group established by the Organization, and International Civil Aviation Organization, the International Telecommunication Union and the World Meteorological Organization, should give urgent consideration to the best way of establishing such communication."

Although the requirement for a mandatory installation of radiotelephone equipment is rather limited, primarily to ships of 300 to 1,600 gross tons, the majority of oceangoing ships do have such equipment. A study of all available records reveals that approximately 64 percent of the ships of all nations, 1,000 gross tons or greater, are equipped with radiotelephone for use on 2182 kc/s and associated working frequencies.

It would appear that 2182 kc/s does have a universal appeal for a common ship and aircraft distress system. However, the path to this end is strewn with thorns and progress may be very slow.

The growth and future potential of the maritime VHF–FM communication system is of interest to us all. The development of this international system in 6 years since the Baltic and North Sea Radiotelephone Conference, Goteburg, Sweden in 1955 has been very rapid. The number of oceangoing ships, 1,000 gross tons or greater, that have VHF–FM radio equipment installed exceeds 3,400. This system provides the ideal means for short-range voice communications. It is of value for safety of navigation bridge-to-bridge communications, port operations, and public correspondence. Internationally, 28 channels have been assigned for this service. In some countries all 28 channels may not be available for use by ships. However, the system is adequately designed to serve the foreseeable needs of the maritime interest. The voluntary nature of this service has inherently limited a rapid expansion. Growth has been satisfactory, but there is no reason to delay any further. Shipping interests should install VHF–FM as rapidly as economic considerations permit. The use of this system could be a prime factor in preventing collisions and thus assist in preventing costly ship damage and loss of life. The insurance premium for a such a savings is very cheap indeed.

The U.S. Coast Guard early realized the outstanding advantages of VHF–FM capability, not only because of its potential as a safety of navigation tool, but also because we considered it to be exceedingly well suited as our primary search and rescue line-of-sight communication medium. We have instituted a program of VHF–FM implementation that will be nearly completed this summer. Every operational shore unit (210) will have installed a four- or six-channel transceiver. Every Coast Guard vessel 16 feet in length and above (1600) will have VHF–FM capability, ranging from single channel portable transceivers to 28-channel transceivers. We will be ready. We enjoin others to follow.

The second category of SAR communications is on-scene communications, the details of which are defined in various maritime and aeronautical publications. Here again there are a large number of frequencies available for use. They are:

1. 3023.5 kc/s—International HF on-scene air and surface (AM voice).

2. 5680 kc/s—International HF on-scene air and surface (AM voice).

3. 121.6 Mc/s—Aeronautical SAR scene of action in ITU Region 2 (AM voice).

4. 123.1 Mc/s—Aeronautical SAR scene of action in ITU Regions 1 and 3 (AM voice).

5. 138.78 Mc/s—U.S. joint SAR on-scene (AM voice).

6. 282.8 Mc/s—Joint/combined military scene of SAR (AM voice).

The proper procedures for handling messages on the distress frequencies are widely understood; however, this is not always the case when considering on-scene frequencies. There has been a tendency for each service, Aeronautical and Maritime Mobile, to consider their problems from an independent and somewhat narrow viewpoint. Examination into the status of the above frequencies as used by ships and aircraft reveals a wide discrepancy of availability. As a case in point, the International Radio Regulations specify that the frequencies 3023.5 and 5680 kc/s may be used "for intercommunication between mobile stations engaged in coordinated search and rescue operations at the scene of a disaster."

As presently written, the wording does not limit the use exclusively to aeronautical stations. Although these frequencies are within the aeronautical band, their use is not limited to aeronautical mobile stations but is authorized for use by any mobile station involved in on-scene communications. However, it is believed that, in general, mobile stations of the maritime service either have not been authorized the use of these two frequencies by their regulatory authorities, or the maritime operating organizations have not made an effort to outfit their ships' radiotelephone equipment with these frequencies. The question might be raised as to why there is a need for a common on-scene frequency. It might be proposed that the rescue units involved in the distress incident continue to use the distress frequencies for handling any on-scene communications. In those areas of the world where there are only a few ships operating, it would be possible to do this. However, in the areas such as off the Coast of Newfoundland, Cape Cod, Mass., or in the North Sea this would not be advisable because of the large numbers of other users of 2182 kc/s that might get in trouble and have to request help. Considering that the safety of human life is involved, it is essential that the distress frequencies be kept clear of unnecessary transmissions. It might be proposed that the ship-to-ship working frequency 2638 kc/s be used for this purpose. In some areas of the world this might be satisfactory. However, there are very few ship-to-ship working frequencies and, if one is used completely for on-scene communications, there would be serious interference to the many vessels not involved in the rescue incident. Extraordinary Administrative Radio Conference, 1951 and International Radio Regulations, Geneva, 1959 provide 3023.5 and 5680 kc/s for this purpose. It is my belief that far more efficient rescue service can be provided if both aircraft and ships have the immediate capability to operate on these channels. Universal adoption of 3023.5 kc/s as a world-wide common on-scene SAR frequency would be a step in the right direction.

During World War II this problem was quickly recognized and the frequency 3000 kc/s was established for this purpose. It was successfully used but had to be abandoned after the war since it did not have acceptance internationally. However, communication authorities and operations personnel continued to recognize the need for common on-scene frequencies.

The third category of SAR communications is "control." SAR control channels are almost as important as distress or on-scene channels. In fact, in some instances these channels play even a more vital role in turning a disaster into an effective and efficient SAR case with a successful ending. Normally, SAR control channels are those in nse by the aircraft or ship in its normal communications with its respective land terminal. This may be a ship/shore telegraph, teletype or voice channel, or an air/ground voice channel. Voice may be conventional amplitude modulation or single sideband. Obviously, with the many different types of control channels, the RCC's or mission coordinators must have a full understanding of the methods used for control. Again it must be pointed out that these channels may or may not be adequate for SAR control. If a rescue incident is major and involves the services of many ships, such as in the S/S *Lakonia* incident, or aircraft as occur during large scale searches for a missing plane, the control channel will be very busy with message traffic. If many different channels are utilized for control purposes by the various operators of the ships and aircraft involved, a rapid exchange of information among the many participating units is difficult to achieve. It is very desirable to utilize common control channels in order that all participants may readily know what is going on, to avoid repetitious

A Merchant Marine radio officer at work

relaying of messages and to insure speedy action. It appears that it may be desirable to work towards some common channels for SAR control that would in effect reduce the many paths that one message must take to reach all parties involved in a SAR case. It should be possible for us to consider the adoption of a series of frequencies to be available for SAR control. Consideration should be given to provide a family of frequencies for Continuous Wave/Radioteletype and voice Amplitude Modulation/Single Sideband for SAR control.

Another area of common interest is communications associated with Rescue Coordination Centers (RCC). Rapid and efficient communications between Rescue Coordination Centers are essential during joint SAR incidents. Normal communication facilities, though highly reliable, have in some cases not provided the necessary speed of delivery of SAR messages. Delays due to circuit loading, occasional outages and switching facilities have resulted in unacceptable delivery times. To improve communications between New York, N.Y., Argentia, Newfoundland, San Juan, P.R., Halifax, Nova Scotia, Edinburgh, Scotland, and Plymouth, England, TELEX has been installed. TELEX is an international direct dialed record communication system between subscribers to the service.

Contact with other subscribers can be established within seconds provided the subscriber called is not utilizing his equipment at the time. Additionally, regular commercial telephone circuits are used for SAR coordination when direct facilities are not available.

Dedicated full-period telephone and teletype circuits presently provide direct communications between Rescue Coordination Centers and other major SAR Commands on the East Coast of the United States, and a dedicated full-period teletype circuit serves similar commands on the West Coast. It is planned to extend full period dedicated teletype circuits to Coast Guard SAR operational commands at Argentia, Newfoundland, San Juan, P.R., and Juneau, Alaska this year.

There is a need for close coordination of distress and SAR incidents which occur in the vicinity of the boundaries separating areas of SAR responsibility. It is quite likely there will be a repetition of the 1962 Flying Tiger ditching, where the incident occurred initially in one area and merged into another as the aircraft descended to the surface. Message delays of 4 to 8 hours were experienced between operational commands involved in this incident. A rapid communication system between RCC's serving the North Atlantic will alleviate this problem. Additionally, such a rapid communication system will

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AMVER Revisited; AMVER Expanded

Cdr. Mark Mitchell, USCG

Commander Mitchell is a 1945 graduate of the U.S. Coast Guard Academy. He has served in the Cutters Owasco, Taney, Escanaba, *and* Iroquois *as well as in the icebreaker* Northwind *and the USS* Aquarium. *He has been executive officer of the Cutter* Rockaway.

Commander Mitchell has a Masters degree from the University of California in Bioradiology. Besides his training in matters nuclear, he is a computer specialist. He has most recently served as AMVER Officer for the Eastern Area at New York. Commander Mitchell is presently engaged in bringing a comprehensive AMVER coverage to the Pacific area in his new capacity as AMVER Officer, Western Area, headquartered at San Francisco.

MISFORTUNES WHICH can overtake mariners and airmen in the wide expanses of the North Atlantic are legion. Large organizations have been designed and implemented to cope with, combat, and minimize the effects of accidental, or natural, disasters at sea.

In this modern age, the electronic computer enables the *A*utomated *M*erchant *VE*ssel *R*eport (AMVER) System to furnish Rescue Coordination Centers (RCC) with improved information concerning the locations and capabilities of participating merchant ships who may be called upon to render emergency assistance.

History

For many years the U.S. Coast Guard maintained a manual plot of coastal waters for those ships for whom agents submitted itineraries. Positions taken from weather reports were used to increase the accuracy of the plot. When regular forces were not adequate, appropriate merchant ships were asked to provide assistance during search and rescue (SAR) operations. The density and size of the plot were small, but the potential of such a system as the basis for a mutual assistance program was readily apparent.

When a relatively low cost computer with random access disk memory file became available, it was feasible to automate the plot and quickly evaluate the SAR potential of a large number of ships. Electronic data processing equipment was installed and the AMVER System was born on 1 July 1958. The number of ships plotted and the accuracy of their dead reckoned positions were increased by use of radio stations to relay sail plans from the ships to the Ship Plot Center. The radio sail plans included departure place and time, routing, destination, and average speed of advance.

As the participation grew, information was made available to Canadian rescue agencies for use in resolving emergencies. Radio Station NBA in the Canal Zone began to relay sail plans for ships using the Panama Canal. By the end of 1962, a plot was being maintained for about 650 ships underway in the western part of the North Atlantic Ocean.

During September 1962, the ditching of Flying Tiger Flight 923, at a point several hundred miles west of Europe near the boundary between different areas of SAR responsibility, emphasized how important it was to have better information concerning the location and capability of merchant ships in the vicinity. It was decided to utilize the AMVER computer to its full capability and the plotting area was expanded to the Prime Meridian.

In January 1963, revised instructions in 13 languages were issued to merchant ships in an international program initiated to increase participation. The density of the plot began to increase in the eastern part of the North Atlantic Ocean as Radio Station NAY in the Azores began to relay messages.

A major improvement was made in May 1964 when 12 Canadian Coastal Radio Stations became an integral part of the communication network, which now extended from Resolntion Island at 60° N. to the Canal Zone at 10° N. Canadian efforts helped increase participation. This marked the achievement of an integrated search and rescue capability by the two countries.

By the end of 1964, the average plot size was about 900 ships. Three thousand separate ships were being plotted on 6,000 passages each month. Almost 10,000 separate ships flying the flags of 62 nations had been plotted since 1958.

On 15 December 1964, a modern electronic data processing system was placed in operation in a new AMVER Center in the Custom House in New York City. The Center had been designed and the computer programed with the capability to maintain a world plot of merchant ships. The plot was expanded to include the entire Atlantic region, and ships remained on plot until reaching destinations in South Atlantic and European ports.

The AMVER System

The AMVER System consists of a network of radio stations, rescue coordination centers (RCC), the AMVER Center, and participating merchant ships.

Designated radio stations guard specified radiotelegraphy frequencies and relay the messages to New York by teletype. Halifax acts as a central collection and relay point for messages received by Canadian stations. The frequency bands guarded range from 500 kc to 16 mc. Guards are assigned to 25 coastal and island radio stations. Four U.S. Ocean Station vessels accept messages on 500 kc for relay.

The teletyped messages are received directly in the AMVER Center on a printer. They are manually checked and evaluated. If necessary, the reports are correlated with general information included in agents' schedules and publications such as Lloyd's daily and weekly reports. The completed sail plans, position reports, deviation reports, and arrival reports are placed into proper format, punched into tabulating cards, verified for accuracy, and entered into the computer for processing and storage.

The computer generates an electronic sail plan for each participating ship or corrects one already on plot and stores the results on magnetic memory disks ready for use during an emergency. New positions are calculated for each of the ships at intervals of 12 hours.

When an emergency occurs in an offshore area, the controlling RCC requests a Surface Picture (SURPIC) from the AMVER Center by the same teletype network. The computer prepares a SURPIC in about 2 minutes which lists the appropriate vessels on plot in the specified area, their predicted positions, and their rescue capabilities. A card is punched for each ship by the computer. They are placed in special data transmission equipment which sends the SURPIC by teletype to the requesting RCC for use with other available information.

Types of SURPICS

The RCC Controller must specify the parameters for the SURPIC desired. These include: The date and time to the nearest hour, present or future; the geographical area; and category of ships. The areas may be: A circle defined by a center point and radius of any number of miles; a rectangle whose sides are specified by parallels of latitude and meridians of longitude; or a path of any width along the track of a ship or aircraft described by two geographical points and the halfwidth of the path in miles. The request may be for all ships on plot or only those with a doctor on board.

The contents of the SURPIC include: Ship's name; international call sign; predicted position by latitude and longitude; time of position; course; speed; radio watch schedule; availability of radar, doctor, and radiotelephone; destination; and estimated date of arrival at destination.

Use of SURPICS

During 1964, 1740 regional SURPICS were forwarded to organizations having a SAR responsibility, as a routine precautionary measure. Many of these were further distributed to subordinate echelons.

Eight hundred and eighty-one SURPICS were provided upon request to help resolve actual or potential emergencies involving aircraft, medicos, ships, and miscellaneous incidents. This is a rate of almost three a day.

Once an aircraft has ditched or the pilot bailed out, the situation becomes a surface incident and is handled similarly to other cases where people are in the water. Often an aircraft alert never becomes more than just an alert, but it is wise to take certain precautions in case it should become a distress.

A trackline SURPIC may be one of these precautions. The computer prepares the cards for ships along the track and a sorter arranges them in the order that the plane will pass abeam. Data transmission equipment sends the information by teletype to the oceanic or RCC controller. Pertinent information is further relayed by radio telephone or phone patch to the pilot or escort aircraft. The positions of suitable ships along the track may be verified by radar, visual sighting, or radio. Voice communications can be established with about 65 percent of the ships on 2182 kc. Radiotelegraphy must be used for the others, and this normally requires relay by a coastal or ship station.

If the situation becomes critical, the pilot can arrange to ditch alongside or bail out over a ship which has made advance preparations to recover the survivors, thus saving valuable time. If no distress develops, the plane continues on its way.

For many years sick and injured seamen have been assisted by radio medical services such as that provided by the famous Italian organization, CIRM. The symptoms are diagnosed and treatment recommended by radio for use of the drugs and medicines in the ship's medicine chest. At least once a day a person at sea in the North Atlantic needs better medical care than is available on his ship. Since the ship is not in distress, only an all ships call is available to arrange directly for assistance from other ships. The SURPIC is very useful in resolving those cases where evacuation is considered necessary.

It is sometimes possible to arrange a rendezvous and evacuate the patient to a ship having a doctor on board. An emergency operation may be performed at sea such as was done three times in a short period in 1963 by the German liner *Bremen*. In each of these cases appendectomies were successfully performed at sea.

At other times a ship carrying a doctor is not suitably located to assist, but it is often possible for an outbound ship to transfer the patient to an inbound ship for hospitalization ashore. This procedure saves money and time that would otherwise be required for the outbound ship to return or divert to port.

There are many other emergencies at sea such as fire, sinking, survivors in the water, etc., where a summary of potential assistance in the area can save valuable time and reduce the volume of communications otherwise required to resolve the emergency. For example, on 23 July 1964 an aircraft sighted four men on a raft 340 miles NNW of Bermuda. The British merchant ship *Maidan*, appearing on a SURPIC, was estimated to be only 8 miles away. Communications were established, position and identity were verified, and *Maidan* rescued the four persons from the liferaft they had occupied since their motor sailer had sunk 8 days before.

A rather unusual use is made of a SURPIC by the U.S. Weather Bureau. A SURPIC is requested for the area surrounding an embryo storm when insufficient weather reports are available from ships regularly reporting. Special reports are requested by the Weather Bureau for ships predicted to be located in critical positions. The special reports permit the intensity and movement of the storm to be estimated more quickly and a forecast made to warn coastal areas and shipping.

Limitations

It is important that users of AMVER information understand that although it is the best information available, it is not complete. Sometimes the estimated positions are in appreciable error because the ship masters may not have reported changes in original intentions. Mistakes sometimes occur in the System because of communication garbles or for other reasons. Therefore, actual positions of ships should be verified before a final decision is made. The average error in predicted positions is less than 50 miles.

The density of the AMVER plot varies from region to region for two reasons: The density of shipping varies greatly; and the percentage of participation currently ranges between 0 percent and 75 percent over the greater Atlantic Ocean.

The absolute value of SURPICS depends upon many factors and varies greatly from situation to situation. It is important that SAR personnel understand how to request, evaluate, and use them in a realistic manner.

Many SAR emergencies do not meet the criteria for a distress. Assistance offered by merchant ships is entirely voluntary. Since delays are costly for shipping companies, ships should not be asked to assist when long delays are involved unless their help is essential and then only for the minimum time necessary.

Predicted positions of ships included in SURPICS are not to be made public except for use in resolving an incident. This is to prevent information from being used for commercial advantage.

Participation

The voluntary nature of AMVER participation by merchant ships is emphasized. No more is expected of a participating ship than from any other ship in the area.

Participation is not limited by the size of ships, although they are usually 1,000 gross tons or larger. The ability to engage in long range, two-way communications is more important. This is usually by radiotelegraphy. Only offshore passages of more than 1 day in duration are normally reported. There are no agreements to sign nor special obligation inferred. Ships of all nations are urged to participate.

Detailed instructions guiding participation by ships are included in a document identified as AMVER 1. Information about the supporting radio stations including frequencies and schedules is in the insert, AMVER 1–C. Reports are relayed at no cost to the ships through the cooperating radio stations.

The computer will maintain a mathematically accurate plot of a ship's advancing position by dead reckoning navigation only to the extent that the ship follows the speed and passage routing last reported to AMVER. Position reports are encouraged at approximately 15 degrees change of latitude or longitude, depending upon direction of travel. Frequent reports increase the accuracy of the resulting plot. Positions are extracted from weather observation reports made by participating ships, but only about 10 percent of the ships send weather reports regularly.

About 70 previously unplotted ships enter the AMVER System each month. The average plot size for the Atlantic has risen to more than 1,000 ships.

Support

The overall effectiveness of AMVER is largely dependent upon the active support of members of the international maritime community; shipowners, ship masters, government agencies, maritime organizations, communication networks, and SAR organizations. It has already received wide support from many private citizens as well as organizations.

The 1960 Conference of Safety of Life at Sea adopted Recommendation 47, urging contracting governments to encourage all ships to report their positions when traveling in areas where arrangements are made to collect their positions for search and rescue purposes. Subsequently the Maritime Safety Committee of the Inter-Governmental Maritime Consultative Organization (IMCO) reported in 1963 that experience has shown that these arrangements are contributing to the success of search and rescue operations. Consequently every effort is being made to induce ships to participate. CIRM, the Italian radio medical service, has endorsed AMVER and cooperation is bringing mutual benefits. Communication organizations have been helpful; so have the marine sections of many consulates and the various government agencies with responsibilities related to maritime safety. Both management and labor associated with shipping are helping to establish participation as a standard practice. The news media have been especially helpful in informing the maritime world about new developments.

AMVER uses all reliable information currently available to supplement or correlate its own sources of data about movements or characteristics of ships. There is much information of this type gathered in many parts of the world by other organizations, but it is not readily available to AMVER. In many cases, elimination of minor complications could make the information available.

Cdr. Mitchell conducts a group of visitors through the AMVER center

Semiannually, the AMVER Center prepares a SAR reference manual called "List of Merchant Vessels with SAR Data" (CG–371). This manual includes the SAR characteristics of about 17,000 ships. It is available for use by recognized SAR organizations. A great deal of help is needed in making this manual comprehensive and accurate.

SURPICS are available to any RCC to support the obligation of SAR agencies of any country. However, additional radio stations and increased participation are needed for the potential growth of the AMVER System to be realized.

The Future

At least 3,500 ships larger than 1,000 gross tons in size are underway at the same time in the greater North Atlantic region. About 18,000 to 20,000 merchant ships of the international fleet are potential participants. The size of an AMVER plot could conceivably become as big as 10,000 ships underway or offshore passages in the oceans, seas, and gulfs of the world.

Plans are being made to expand AMVER into the Pacific Ocean during the fall of 1965. Radio stations in the North Pacific as far west as Guam are being considered.

(Continued on page 190)

MARITIME SIDELIGHTS

CG COMMENDATION MEDAL WON BY THREE IN HELPING AVERT PUERTO RICO DISASTER

U.S. Coast Guard Commendation Medals for meritorious performance in assisting the tanker *Daniel Pierce,* which was in imminent danger of exploding in Guanica Harbor, P.R., on July 14, 1964, have been awarded three Coastguardsmen.

Recipients of the Medal are Lieutenant Commander William D. Derr, Lieutenant (junior grade) Branson E. Epler, Jr., and Boatswains Mate First Class Luis Manuel Lopez.

Rear Admiral Irvin J. Stephens, USCG, Commander, Third Coast Guard District made the presentation to Lt. Cdr. Derr.

When advised of this emergency search and rescue case, Lt. Cdr. Derr, commanding the Coast Guard Cutter *Aurora,* immediately proceeded to Guanica, from San Juan, 120 miles away. Upon arrival at the scene, he found that the sulfuric acid cargo of the 392-foot Panamanian tanker had become contaminated with salt water and, because of the corrosive action of the acid on her shell plating, the vessel was sinking at the dock. The vessel was loading 98 percent sulfuric acid at the time.

After receiving a summary report on the incident, Lt. Cdr. Derr, together with Lt. Epler and Boatswains Mate Lopez boarded the *Daniel Pierce* to evaluate the situation. When it was discovered that hydrogen gas was being released from most of the vessel's tanks Lieutenant Commander Derr directed the evacuation of 2,000 residents of the town of Guanica Playa. He also ordered the vessel's engineering plant secured and the crew to evacuate the ship.

To minimize the extent of the explosion, which would have been disastrous, the three voluntarily reboarded the tanker to open cargo vent covers and hatches and to search for survivors.

After being on the scene for 3 days, and after the danger had passed, the 165-foot *Aurora* returned to San Juan.

A former merchant marine officer, Lt. Cdr. Derr entered the Coast Guard after receiving a direct commission as an ensign in January 1950, and has subsequently served in marine inspection duties.

Lieutenant (junior grade) Epler, USCGR, was assigned at the time to the Captain of the Port, San Juan and Boatswains Mate Lopez to the San Juan Coast Guard Base.

COAST GUARD PATROLS VIETNAM COAST AGAINST VIETCONG SMUGGLERS

A special Coast Guard squadron of speedy shallow draft cutters has been dispatched to Vietnam to help stem the flow of arms, personnel, and supplies to the Vietcong from the sea.

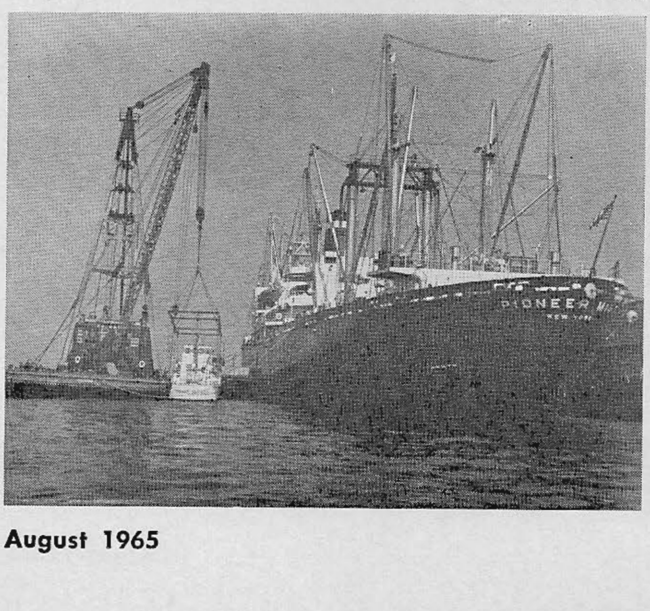
Seventeen 82-foot patrol boats have been transported to the combat zone on vessels of the American merchant marine.

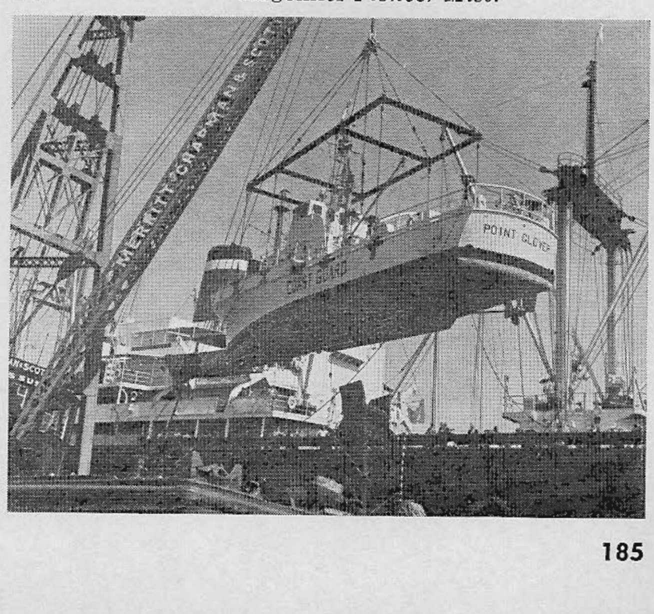
The mission of the Coast Guard squadron will be to interdict the junk fleet supply line of the Vietcong in the shoal waters of Vietnam that in the past has served as a natural sanctuary for these near-flat-bottom straw and wood boats. While performing this mission these cutters will be under the operational control of the U.S. Navy.

Coast Guard personnel who have acquired extensive experience in enforcing immigration, customs, and fiscal regulations will participate in these operations.

Experience obtained in discharging law enforcement duties against smugglers and others will enable the Coast Guard to protect against fast smuggler boats as well as the disguised fishing boats which mingle with the familiar Vietnamese fishing junks.

The *Point Glover,* one of the Vietnam bound 82′ cutters, is shown below being loaded aboard the U.S. Lines cargoliner *Pioneer Mist.*



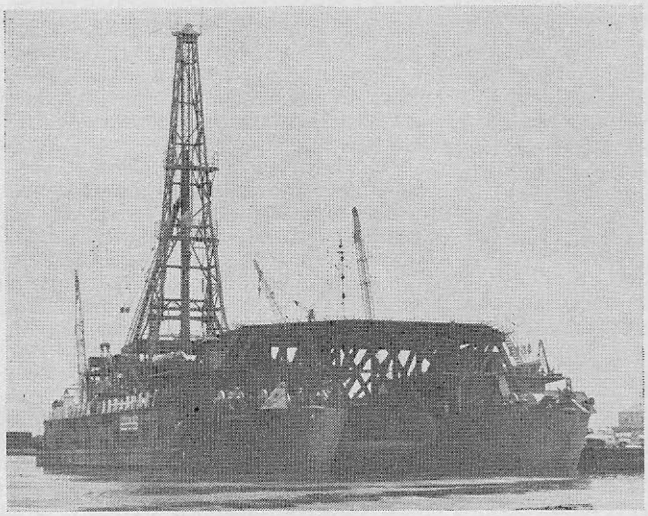


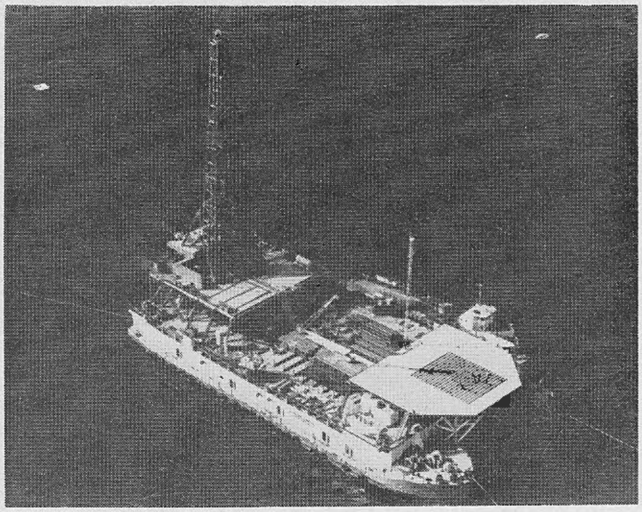
COMMANDANT'S ACTION

Drilling Barge C. P. Baker Sinking Findings Approved

During the early morning hours of June 30, 1964 the drilling barge C. P. Baker *was rocked by the violent geysering action of a gas pressure blowout while drilling in the Gulf of Mexico. The vessel sank with loss of life as a result of this blowout.*

After due consideration of the findings, conclusions, and recommendations of the Marine Board of Investigation convened to investigate the mishap, the Commandant has announced his action. It follows verbatim below.





Two views of the *C. P. Baker* prior to casualty

TREASURY DEPARTMENT
UNITED STATES COAST GUARD

23 April 1965

Commandant's Action on Marine Board of Investigation; explosion, fire, and sinking of the Drilling Barge *C. P. Baker* in the Gulf of Mexico, 30 June 1964

1. The record of the Marine Board of Investigation convened to investigate subject casualty, together with the findings of fact, conclusions and recommendations has been reviewed.

2. At about 0300 c.s.t., 30 June 1964, while drilling in Block 273, Eugene Island area, Gulf of Mexico, a "blowout" occurred which erupted gas and water over and around the *C.P. Baker*. The gas exploded, continued to burn, and the vessel sank. Of the 43 persons on board the *C.P. Baker*, 8 are dead; 13 are missing and presumed to be dead; and 22 were injured. In addition, one person died, and another was injured on board the M/V *Delta Service* which was moored alongside the *C.P. Baker*.

3. The *C.P. Baker* was a catamaran type vessel, 260 feet long, 126 feet wide and was composed of two Navy YF type hulls which had been joined together with a steel framework. The horizontal distance between the inboard side of each hull was approximately 30 feet, and this opening was referred to as the keyway. Aft, the drilling platform was centered over this keyway and straddled the two hulls. There was a helicopter landing platform forward over the keyway, and a rack was constructed for stowing pipe in the midship portion of the vessel. A crane was mounted at the outboard edge of each hull for handling drilling materials and other supplies. Each of the hulls had seven watertight bulkheads. Along the main deck, both inboard and outboard of each hull, were watertight doors which led to the interior of the vessel and into the holds. Eight anchors, two at each end of each hull, were used to maintain the vessel's position when drilling. The anchor windlasses could be controlled from a central station.

4. The weather at the time of the casualty was clear with good visibility, calm to light winds out of the south, and 2½ to 3 feet swells from the southwest.

5. On 28 June 1964, the *C.P. Baker* anchored on a southeasterly heading in 186 feet of water in approximate position 28°25'26" N., 91°34'49" W. During the afternoon of 29 June, drilling commenced on the proposed 10,000-foot-deep well. The drilling plan called for a 30-inch guide pipe to be sunk from the mud line to solid bottom. With this in place, a 26-inch diameter hole would be drilled to a depth of approximately 750 feet below the surface of the water. A 20-inch conductor pipe would then be sunk into the 26-inch hole and the annular space surrounding it filled with cement. With the 20-inch conductor pipe thus firmly in place, a riser and blowout preventer would be installed. This is essentially the same procedure used by *C.P. Baker* in drilling other wells. The U.S. Department of Interior, Geological Survey, Outer Continental Shelf, Gulf Region Order No. 2, requires that a blowout preventer be installed before drilling more than 3,000 feet (true vertical depth).

6. At about 0300 on 30 June 1964, the 30-inch guide pipe was in place, and the 26-inch diameter hole was drilled to a depth of approximately 684 feet. Drilling was progressing at approximately 30 feet per hour. A drilling crew consisting of 13 men was making preparations to sink and cement the 20-inch conductor pipe. The remaining personnel on board the *C.P. Baker* were in the quarters forward in the port hull. The M/V *Delta Service* was moored alongside the *C.P. Baker* with the M/V *Mr. Jake* moored outboard of the *Delta Service*.

7. The first indication of anything amiss was a "bubbling," "boiling," or "geysering" action of the water between the two hulls of the catamaran, together with a "trembling" of the vessel. The geysering effect increased until water was striking the bottom of the drill platform with great force and cascading back onto the hulls of the vessel. Water entered the hulls through the open doors on the main deck. Electric power was soon lost, and crewmembers, realizing that a blowout was occurring, attempted to rouse the crewmembers of the two boats moored alongside and others sleeping in the forward portion of the *C.P. Baker*. Shortly thereafter, a massive explosion followed by fire encompassed the *C.P. Baker* and the two service vessels alongside. Crewmembers of the *C.P. Baker* abandoned the vessel by jumping overboard. Most of the survivors left the vessel by the port bow. Personnel of the *Mr. Jake* got the vessel underway and departed the area of the fire almost immediately. The operator of the *Delta Service*, after using the vessel's propeller wash to assist survivors in escaping the flames, got his vessel underway and remained in the area to rescue 26 survivors. The *C.P. Baker* sank before the last survivors had been rescued. The survivors were subsequently transferred to the M/V *Mr. Jake* and taken to a nearby drilling barge where they were evacuated by helicopter.

8. Gas continued to erupt and burn for approximately 13 hours after the *C.P. Baker* sank. On 1 July 1964, divers found the *C.P. Baker* in a capsized position. Examination revealed that the hull was apparently intact. Three craters were found on the ocean floor in an approximate straight line. There were two small ones approximately 7 to 8 feet in diameter and 5 to 6 feet deep and a large one approximately 15 to 20 feet across and about 10 feet deep.

REMARKS

1. Concurring with the Board, it is considered that this casualty was caused by the drill penetrating a high pressure gas pocket before any protection against blowout had been provided. Although the exact source of ignition cannot be determined, it appears that the most probable source was sparking from the exhaust of the diesel engine.

2. The Board's conclusion that the drilling plan was in accordance with accepted practices and existing Federal regulations is concurred in.

3. Further concurring with the Board, the rapidity with which the situation developed made fire-fighting impossible and precluded any preventive action such as closing the watertight doors through which water entered the hulls, or moving the vessel with its anchor windlasses.

4. In the conclusions and recommendations, the Board commented on the organization of the *C. P. Baker* with regard to procedures to be followed in emergencies of this type. It further recommended that deck doors in the vicinity of the keyway should be quick-acting, watertight doors and kept closed continually during drilling operations. Similarly, that doors in transverse watertight bulkheads should be required to be of the quick-acting watertight type and kept closed during drilling operations. The Board's comments and recommendations are concurred in and will be referred to the Offshore Oil Panel of the Merchant Marine Council. The recommendation that a panel be established consisting of representatives of the offshore oil industry and the Coast Guard to make further recommendations for the best safety measures that can possibly be adopted is concurred in. Accordingly, the Board's report will be referred to the Offshore Oil Panel for consideration of the below listed items:

a. A station bill that would encompass the worst possible condition that might be encountered, such as a blowout and resulting fire.

b. Drills, instructions, and indoctrination of personnel working as a team to meet such conditions.

c. The establishment of a suitable control center manned at all times and capable of controlling and designating the emergency procedures to be followed. Such center to be provided with necessary communication facilities.

d. The possibility of moving a drilling rig under emergent conditions.

e. The proper designation of the line of command of personnel assigned to a drilling rig.

f. The need for emergency power or lighting and the appropriate type to be employed as well as the best procedures to be utilized during emergency conditions regarding the control of the various sources of power and ventilating systems.

g. The safest method of debarkation of personnel under such emergent conditions.

h. The indoctrination of standby tenders in emergency procedures.

i. The control of all possible sources of ignition of gas in the event of a blowout.

5. Pursuant to the Board's recommendation, a copy of its report will be forwarded to the Geological Survey, Department of the Interior, for information and study with regard to those items coming within its jurisdiction.

6. The Board's conclusion that Mr. Cecil LaForce, operator of the M/V *Delta Service*, displayed commendable qualities of presence of mind and courage in a situation of grave stress and personal danger, and that acting on his own initiative he was responsible for rescuing many of the survivors, is concurred in. The Board's report and the Record of Investigation have been referred to the Coast Guard Board of Awards for consideration.

7. Subject to the foregoing remarks, the Record of the Marine Board of Investigation is approved.

E. J. Roland
Admiral, U.S. Coast Guard
Commandant

nautical queries

DECK

Q. What color must sidelight screens be painted?

A. Light screens required by the Pilot Rules for port and starboard sidelights shall be painted with a glossy black paint.

Q. What is the datum of soundings for charts on the Atlantic coast and Pacific coast of the United States?

A. The datum on the Atlantic coast is mean low water, while on the Pacific coast it is mean lower low water.

Q. What are the general duties of a mate?

A. (1) Obey all orders emanating from his superior officer;

(2) Assist in the navigation of the vessel to the best of his ability;

(3) Report to the master whenever he is of the opinion that a danger exists if the orders of his superiors are carried out;

(4) Keep a good lookout while on watch;

(5) See that all lifesaving and firefighting equipment is kept ready for use and in good condition;

(6) See that the crew know their stations in case of fire or collision;

(7) Keep the passengers out of dangerous places;

(8) Not to molest the passengers; and to show an example to the crew by obeying all orders promptly.

Q. A vessel is 471 feet long, 56 feet in beam, drawing 28 feet and its coefficient of fineness is 0.6; what is its displacement in salt water?

A. $\frac{471\times 56\times 28\times 0.6}{35}=12{,}660$ tons

Q. What precautions must be observed in obtaining drinking water in port?

A. Water for drinking and cooking must be obtained from a supply of known purity. Definite knowledge must be had that the water is wholly safe before it is put in the vessel's tanks. To secure this the health officer of the port should be consulted. In American ports, water should not be purchased from any water boat which does not hold an unrepealed certificate from the U.S. Public Health Service. Firehose should not be used to fill tanks. For this purpose it is best to have a special hose which is used for no other purpose.

ENGINE

Q. Describe the original tests made upon new arc- or gas-welded pressure vessels.

A. Arc- or gas-welded vessels which have been both stress-relieved and radiographed shall be hydrostatically tested to not less than 1½ times the maximum allowable pressure for a sufficient time to permit an inspection of all joints and connections. Welded vessels which have not been stress-relieved and radiographed shall be given a thorough hammer or impact test and following the hammer test, the vessels shall be hydrostatically tested to 1½ times the maximum allowable pressure.

Q. Should the blast air pressure and the period of fuel injection be varied when increasing or decreasing the load on most air-injection-type diesel engines?

A. When increasing the load on an air-injection engine the blast-air pressure should be increased and the period of injection, which is controlled by the valve lift, should be increased. When the load is decreased the blast-air pressure should be reduced and the period of injection shortened.

Q. Should scavenging air be admitted to the cylinders of two-cycle oil engines before or after the opening of the exhaust ports or valves? Give reasons for your answer.

A. The scavenging air is always admitted after the opening of the exhaust ports because the pressure of the burnt gases in the cylinder at the end of the working stroke is considerably greater than the pressure of the scavenging air and, therefore, part of the gas must be allowed to escape and the pressure reduced before the scavenging air is admitted. The entry of the scavenging air is timed to being when the pressure in the cylinder is the same or slightly less than the pressure of the scavenging air.

Q. Why is the engine-driven centrifugal blower usually not suitable for scavenging two-cycle diesel engines?

A. The pressure developed by the centrifugal blower is proportional to the square of the r.p.m., therefore at low speeds there would be insufficient scavenging pressure and at high speeds the pressure would be unnecessarily high.

AMENDMENTS TO REGULATIONS

The *Proceedings* does not normally reprint Federal Register material in toto because of space limitations. Rather, as a public service, mention is made on this page of those Federal Register items published during the month that have a direct effect on merchant marine safety. Then, should one wish to read the regulation in its official presentation, he must purchase the applicable Federal Register from the Superintendent of Documents. Always give the date of the Federal Register when ordering. This date can be found in the *Proceedings* coverage of the item. See instructions in publications panel inside back cover.

TITLE 46 CHANGE

DANGEROUS CARGO REGS. AMENDED EXTENSIVELY

Extensive changes were made in the dangerous cargo regulations at the March 22, 1965 Public Hearing. Those changes have been published in the Federal Register of June 5, 1965.

* * * * *

At the present time there is no certification required for Class C explosives and the Interstate Commerce Commission does not require such certification. Several accidents and near misses attributed to improper description have occurred with Class C explosives. The most recent serious explosion occurred February 25, 1965, on the 39th Street Pier, New York, N.Y., when a truck carrying materials manifested as "toy fire works" and "practical joke articles" exploded killing one man and injuring seven others, two critically. No warning markings were applied to the containers and the material was not properly packaged.

The 1960 Safety of Life at Sea Convention, which became effective May 26, 1965, requires that all dangerous cargoes carried aboard ship shall be certificated or declared as "properly packaged, marked and labeled and in proper condition."

The present Dangerous Cargo Regulations require an importer to advise the foreign shipper of all the U.S. requirements governing transportation of specific dangerous cargoes, including the obligation of certifying shipments of explosives. The amendment to 46 CFR 146.05–11(a) removes the exception for Class C explosives so that in the future the certifications will be a standard practice for the shipment of all explosives.

The provisions of R.S. 4472, as amended (46 U.S.C. 170), require that the land and water regulations governing the transportation of dangerous articles or substances shall be as nearly parallel as practical. The provisions in 46 CFR 146.02–18 and 146.02–19 make the Dangerous Cargo Regulations applicable to all shipments of dangerous cargoes by vessels. The Interstate Commerce Commission in Order Nos. 60, 62, and 66 has made changes in the ICC regulations with respect to definitions, descriptive names, classifications, specifications of containers, packing, marking, labeling, and certification for certain dangerous cargoes, which are now in effect for land transportation. Various amendments to the Dangerous Cargo Regulations in 46 CFR Part 146 have been included in the June 5 Federal Register in order that these regulations governing water transportation of certain dangerous cargoes will be as nearly parallel as practicable with the regulations of the Interstate Commerce Commission which govern the land transportation of the same commodities. For those changes in 46 CFR Part 146, which involved changes other than shippers' requirements, the proposed amendments were considered at the Merchant Marine Council Public Hearing held on March 22, 1965.

Interpretations of law, or revised requirements to agree with existing ICC regulations, or changes which are editorial in nature, are also included.

* * * * *

TITLE 33 CHANGE

ADVANCE NOTICE TO CAPTAIN OF THE PORT OF VESSEL'S ARRIVAL

The provisions of 33 CFR 124.10 set forth the requirements regarding the advance notice of vessel's estimated time of arrival to be furnished to the Captain of the Port. The purpose for amending this section is to clarify requirements concerning which vessels are required to submit an advance notice of arrival report, especially at ports in the Florida area.

The amendment reads as follows:

* * * * *

§ 124.10 Advance notice of vessel's time of arrival to Captain of the Port.

(a) * * *

(7) For that vessel which is engaged in operations in and out of the same port to sea and return without entering any other port, or on coastwise voyages between ports in the same Coast Guard District, or on voyages between ports in the First, Ninth, Thirteenth, or Seventeenth Coast Guard Districts and adjacent Canadian ports, or between ports of the Commonwealth of Puerto Rico and ports in the Lesser Antilles, or between ports in the Lesser Antilles, or between ports on the east coast of Florida and the Bahama Islands, the Coast Guard District Commander having jurisdiction may, when no reason exists which renders such action prejudicial to the rights and interests of the United States, prescribe conditions under which such vessels may be considered by the Captains of the Port as being in constructive compliance with the requirements of this section.

(Federal Register of June 3, 1965)

STORES AND SUPPLIES

Articles of ships' stores and supplies certificated from June 1 to June 30, 1965, inclusive, for use on board vessels in accordance with the provisions of Part 147 of the regulations governing "Explosives or Other Dangerous Articles on Board Vessels" are as follows:

CERTIFIED

Texo Corp., Dana and Floral Avenues, Cincinnati, Ohio, Certificate No. 538, dated June 7, 1965, TEXOL 207.

Aetna Chemical Corp., Wallace Street Extension, East Paterson, N.J. Certificate No. 616, dated June 14, 1965, MULPINE DEGREASER and FLYING A DEGREASE SOLVENT A–1.

Montgomery Chemical Co., Post Office Box 187, Jenkintown, Pa., Certificate No. 617, dated June 23, 1965, MONCO ELEKTROKLEEN ONE ELEVEN.

Dunn Chemical Co., 571 7th St., San Francisco, Calif: Certificate No. 534, dated June 23, 1965, DUNALL O.S.E.; Certificate No. 535, dated June 23, 1965, DUNALL 129; Certificate No. 618, dated June 23, 1965, DUNALL OT–130.

AFFIDAVITS

The following affidavits were accepted during the period from May 15, 1965, to June 15, 1965:

Nibco/Scott, 500 Simpson Street, Elkhart, Ind., VALVES.

HYDRAULIC CAST IRON VALVES

Manufacturer	Type	Identity	Maximum allowable pressure (p.s.i.)
Benjamin Lassman & Son Route 8 Glenshaw, Pa., 15116.	Vertical check; pilot operated flow check.	1¼"–1½" P.1654–B, P2627	3,500
Racine Hydraulics & Machinery, Inc.	Directional control	*D4–D*HS–*10S	2,000
Do	do	*D4–**HS–*02S	2,000
Do	do	*D4–**HT–*02S	2,000
Do	do	*D4–**HS–*03*	2,000
Do	do	*D4–**HS–*06*	2,000
Do	do	*D4–**HT–*06*	2,000
Do	do	*D4–**HT–*08*	2,000
Do	do	*D4–**HF–*06*	2,000
Do	do	*D4–**HF–*08*	2,000
Do	do	*D4–**HS–*10*	2,000
Do	do	*D4–**HT–*10*	2,000
Do	do	*D4–**HF–*10*	2,000
Do	do	*D2–PTHS–*03*	2,000
Do	do	*D2–PTHS–*06*	2,000
Do	do	*D2–PTHS–*10*	2,000
Do	do	*D2–PTHP–*03*	2,000
Do	do	*D2–PTHP–*04*	2,000
Do	do	*D2–PTHP–*06*	2,000
Do	do	*D2–PTHP–*08*	2,000
Do	do	*D2–PTHP–*10*	2,000
Do	do	*D2–PTHR–*03*	2,000
Do	do	*D2–PTHR–*04*	2,000
Do	do	*D2–PTHR–*06*	2,000
Do	do	*D2–PTHR–*08*	2,000
Do	do	*D2–PTHR–*10*	2,000
Do	do	*D2–ETHS–*06*	2,000
Do	Pressure control	*E*–P*AH–S03*	2,000
Do	do	*E*P*AH–S06*	2,000
Do	do	*E*–P*AH–S10*	2,000
Do	do	*E*–P*AH–P03*	2,000
Do	do	*E*–P*AH–P04*	2,000
Do	do	*E*–P*AH–P06*	2,000
Do	do	*E*–P*AH–P08*	2,000
Do	do	*E*–P*AH–P10*	2,000
Do	do	*E*–P*AH–R03*	2,000
Do	do	*E*–P*AH–R04*	2,000
Do	do	*E*–P*AH–R06*	2,000
Do	do	*E*–P*AH–R08*	2,000
Do	do	*E*–P*AH–R10*	2,000
Do	Flow control PC	*F2–DHS*–02*	2,000
Do	do	*F2–DHS*–03*	2,000
Do	Flow control	*F1–SHPO–1***	2,000
Do	do	*F1–SHSO–1***	2,000
Do	Pilot operated check	*B1–POH*–103N	2,000
Do	do	*B1–POH*–104N	2,000
Do	do	*B1–POH*–106N	2,000
Do	do	*B1–POH*–108N	2,000
Do	do	*B1–POH*–110N	2,000
Do	Check valve	*B1–XOHP–1**N**	2,000
Do	do	*B1–XOHS–1**N**	2,000
Vickers, Inc., Machinery Hydraulics Div., Waterbury Plant, 172 East Aurora St., Waterbury 20, Conn.	Directional control	Model DG17S4–06**–**	3,000

Harvel Plastics, Inc., P.O. Box 757, Easton, Pa., PIPE & TUBING.[1]

Stockham Valves and Fittings, 4000 10th Avenue North, Birmingham, Ala., VALVES, FITTINGS & FLANGES.[2]

Joseph M. Loeffler, Machine and Brass Works, U.S. Highway No. 1 and Robbins Avenue, Penndel, Pa., FITTINGS.

Ellwood Ivins Steel Tube Works, Inc., Horsham Road, Horsham, Pa., PIPE & TUBING.

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[1] Acceptance covers PVC pipe and tubing manufactured in accordance with commercial standard CS207-60 and 46 CFR 51.90-1.

[2] Approved by letter dated May 7, 1963 but omitted from listing in CG-190.

CIRCULAR

RED FLARE DISTRESS SIGNALS FOR PLEASURE CRAFT EXPLAINED IN NVIC 5-65

Coast Guard regulations do not require either the approval of or the carriage of distress signals on uninspected vessels. However, it is recommended that boatmen carry reliable distress signals for emergency use. This is the crux of Navigation and Vessel Inspection Circular 5-65, written to inform boat owners, operators, boat suppliers, and other interested parties about the use of pyrotechnic distress signals on uninspected vessels.

In recent years, manufacturers of certain types of signals have requested Coast Guard approval of their devices. Their requests came because boatmen and marine dealers had mistakenly believed that, if distress signals were carried on uninspected pleasure craft, they must be approved types. Approved distress signals are required on Coast Guard inspected and certificated vessels, but they are not required on uninspected vessels such as pleasure motorboats.

Rule 31c of the International Rules of the Road states that "Rockets or shells, throwing red stars fired one at a time at short intervals" constitute a signal of distress and a request for assistance. Any devices should make a red signal in order to meet the above provision for a distress signal. Both distress signals approved by the Coast Guard and those specified or purchased by Government agencies are reliable types. Reliable signals are considered a definite aid to a boatman in need of assistance.

NVIC 5-65 may be obtained at the local marine inspection office or by writing Commandant (CHS), U.S. Coast Guard, Washington, D.C., 20226.

RADIO continued

permit the immediate delivery of an AMVER surface picture to any requester in the North Atlantic basin and facilitate SAR action in the case of merchant ships reported overdue, missing, or in distress.

Effort should be made to interconnect associated rescue coordination centers via rapid communications. If the volume of mutual communications is limited then a TELEX at each RCC will be adequate. If there is a sufficient volume of messages consideration should be given to establishing dedicated full period circuits, either teletype or telephone, or both.

There are occasions when the on-scene commander requires concurrence of his superior for an immediate change in plans or resolution of a new or unusual situation. Direct communications can be established between a SAR Mission Coordinator ashore and the On-Scene Commander of a SAR incident by the medium of radio telephone patching facilities. Utilization of such facilities provides for direct and immediate coordination of a SAR incident.

The test of any system is its ability to perform during emergencies. One of the significant factors in being ready is past experience. However, it is not always possible to acquire experience, particularly when aircraft and ships won't conveniently create a SAR incident every week or month. In order to maintain efficiency regular operational exercises and communication tests should be conducted at frequent intervals. When necessary critiques should be held and the pertinent points for improvement should be made known to all concerned.

I should like to reiterate the points I have presented to you. They are:

1. Consider reduction of the number of required radio distress frequency guards.

2. Consider establishment of a common radiotelegraph/radiotelephone distress frequency in the 2 Mc/s band.

3. Consider 2182 kc/s for a common ship and aircraft distress frequency.

4. Expand use of VHF-FM for short range communications as rapidly as possible.

5. Consider universal adoption of 3023.5 kc/s as a common on-scene SAR frequency for ships and aircraft.

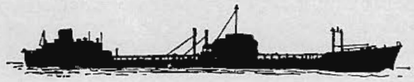
6. Establish a family of frequencies for SAR control.

7. Provide TELEX service or full period dedicated SAR circuits to interconnect associated rescue coordination centers.

8. Consider increased use of radio telephone patching facilities for effective coordination of SAR operations.

9. Conduct regular operational exercises and communication tests.

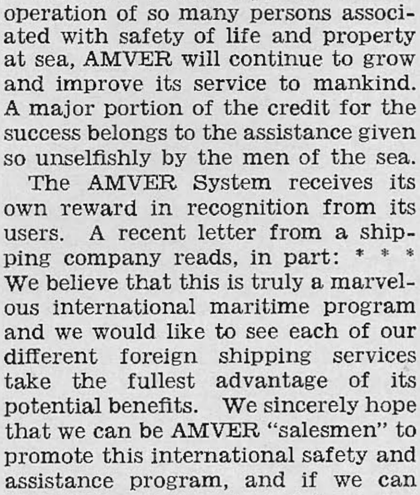
In conclusion, may I implore those in the aeronautical and marine pursuits to work together more closely in achieving these common goals in search and rescue communications. ⚓



AMVER continued

With the active support and cooperation of so many persons associated with safety of life and property at sea, AMVER will continue to grow and improve its service to mankind. A major portion of the credit for the success belongs to the assistance given so unselfishly by the men of the sea.

The AMVER System receives its own reward in recognition from its users. A recent letter from a shipping company reads, in part: * * * We believe that this is truly a marvelous international maritime program and we would like to see each of our different foreign shipping services take the fullest advantage of its potential benefits. We sincerely hope that we can be AMVER "salesmen" to promote this international safety and assistance program, and if we can only do a small part. * * * we feel we will have at least accomplished a start in the right direction." ⚓



THIS MANNING THE WHEEL ONLY DURING THE T-V COMMERCIALS IS GETTING ME JITTERY!

Courtesy Maritime Reporter

MERCHANT MARINE SAFETY PUBLICATIONS

The following publications of marine safety rules and regulations may be obtained from the nearest marine inspection office of the U.S. Coast Guard. Because changes to the rules and regulations are made from time to time, these publications, between revisions, must be kept current by the individual consulting the latest applicable Federal Register. (Official changes to all Federal rules and regulations are published in the Federal Register, printed daily except Sunday, Monday, and days following holidays.) The date of each Coast Guard publication in the table below is indicated in parentheses following its title. The dates of the Federal Registers affecting each publication are noted after the date of each edition.

The Federal Register may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402. Subscription rate is $1.50 per month or $15 per year, payable in advance. Individual copies may be purchased so long as they are available. The charge for individual copies of the Federal Register varies in proportion to the size of the issue but will be 15 cents unless otherwise noted in the table of changes below. Regulations for Dangerous Cargoes, 46 CFR 146 and 147 (Subchapter N), dated January 1, 1965 are now available from the Superintendent of Documents, price $2.75.

CG No.	TITLE OF PUBLICATION
101	Specimen Examination for Merchant Marine Deck Officers (7–1–63).
108	Rules and Regulations for Military Explosives and Hazardous Munitions (8–1–62).
115	Marine Engineering Regulations and Material Specifications (9–1–64). F.R. 2–13–65.
123	Rules and Regulations for Tank Vessels (4–1–64). F.R. 5–16–64, 6–5–64, 3–9–65.
129	Proceedings of the Merchant Marine Council (Monthly).
169	Rules of the Road—International—Inland (6–1–62), F.R. 1–18–63, 5–23–63, 5–29–63, 7–6–63, 10–2–63, 12–13–63, 4–30–64, 11–5–64, 12–18–64, 5–8–65.
172	Rules of the Road—Great Lakes (6–1–62). F.R. 8–31–62, 5–11–63, 5–23–63, 5–29–63, 10–2–63, 10–15–63, 4–30–64, 11–5–64, 5–8–65.
174	A Manual for the Safe Handling of Inflammable and Combustible Liquids (3–2–64).
175	Manual for Lifeboatmen, Able Seamen, and Qualified Members of Engine Department (3–1–65).
176	Load Line Regulations (7–1–63). F.R. 4–14–64, 10–27–64.
182	Specimen Examinations for Merchant Marine Engineer Licenses (7–1–63).
184	Rules of the Road—Western Rivers (6–1–62). F.R. 1–18–63, 5–23–63, 5–29–63, 9–25–63, 10–2–63, 10–15–63, 11–5–64, 5–8–65.
190	Equipment Lists (8–3–64). F.R. 10–21–64, 10–27–64, 3–2–65, 3–26–65, 4–24–65, 5–26–65.
191	Rules and Regulations for Licensing and Certificating of Merchant Marine Personnel (2–1–65). F.R. 2–13–65.
200	Marine Investigation Regulations and Suspension and Revocation Proceedings (10–1–63). F.R. 11–5–64, 5–18–65.
220	Specimen Examination Questions for Licenses as Master, Mate, and Pilot of Central Western Rivers Vessels (4–1–57).
227	Laws Governing Marine Inspection (6–1–62).
239	Security of Vessels and Waterfront Facilities (7–1–64). F.R. 6–3–65.
249	Merchant Marine Council Public Hearing Agenda (Annually).
256	Rules and Regulations for Passenger Vessels (4–1–64). F.R. 6–5–64.
257	Rules and Regulations for Cargo and Miscellaneous Vessels (9–1–64). F.R. 2–13–65, 3–9–65.
258	Rules and Regulations for Uninspected Vessels (1–2–64), F.R. 6–5–64, 6–6–64, 9–1–64, 5–12–65.
259	Electrical Engineering Regulations (7–1–64). F.R. 2–13–65.
266	Rules and Regulations for Bulk Grain Cargoes (7–1–64).
268	Rules and Regulations for Manning of Vessels (2–1–63). F.R. 2–13–65.
269	Rules and Regulations for Nautical Schools (5–1–63). F.R. 10–2–63, 6–5–64.
270	Rules and Regulations for Marine Engineering Installations Contracted for Prior to July 1, 1935 (11–19–52). F.R. 12–5–53, 12–28–55, 6–20–59, 3–17–60.
293	Miscellaneous Electrical Equipment List (6–1–64).
320	Rules and Regulations for Artificial Islands and Fixed Structures on the Outer Continental Shelf (10–1–59). F.R. 10–25–60, 11–3–61, 4–10–62, 4–24–63, 10–27–64.
323	Rules and Regulations for Small Passenger Vessels (Under 100 Gross Tons) (2–3–64) F.R. 6–5–64.
329	Fire Fighting Manual for Tank Vessels (4–1–58).

CHANGES PUBLISHED DURING JUNE 1965

The following have been modified by Federal Registers:

CG–239 Federal Register June 3, 1965.

Regulations for Dangerous Cargoes Federal Register June 5, 1965.