

U.S. DEPARTMENT OF TRANSPORTATION
OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20590

REMARKS BY CAPTAIN CHARLES DORIAN, USCG, OFFICE OF TELECOMMUNICATIONS, OFFICE OF THE ASSISTANT SECRETARY FOR INTERNATIONAL AFFAIRS AND SPECIAL PROGRAMS, PREPARED FOR DELIVERY BEFORE THE ARMED FORCES COMMUNICATIONS ELECTRONIC ASSOCIATION AMATEUR RADIO GATHERING, SHERATON PARK HOTEL, WASHINGTON, D.C., 1:00 P.M., WEDNESDAY, MAY 15, 1968

Telecommunications in DOT. That sounds like a short but dull title. What does it have to do with AFCEA and amateur radio? How can you possibly have an interest? And yet, because of the unknowns and the answers I expect to provide, you should leave this luncheon a little bit more informed.

It was as far back as 1805 that a Federal transportation agency was first called for, by Secretary of the Treasury Albert Gallatin. But the even-expanding industry had to wait until 1966, when President Lyndon B. Johnson sent a special message to the Congress urging that transportation be accorded a seat in his Cabinet "to serve the growing demands of this great nation, to satisfy the needs of our expanding industry and to fulfill the right of our taxpayers to maximum efficiency and frugality in government operations."

The Congress quickly and overwhelmingly responded, and the Department of Transportation was officially established on April 1, 1967. As his first Secretary of Transportation, President Johnson selected Alan S. Boyd, of Florida. He had been Under Secretary of Commerce for Transportation, Chairman of the Civil Aeronautics Board and a member of the Florida Railroad and Public Utilities Commission.

What does this 12th Cabinet-level Department actually encompass and how does it operate? At birth, it gathered together more than 30 transportation agencies or functions that had been scattered throughout the Government. The Department has more than 90,000 employees and a yearly budget of \$6 billion, the bulk of it being \$4 billion in the Highway Trust Fund.

Foremost among the Department's functions is the general promotion of current and future transportation, plus the accompanying duty of protecting the public's interest.

The most obvious major area of endeavor within this broad mandate is safety -- safety for passengers, for shippers of freight, for employees of the transportation lines themselves and for the entire public. This essential responsibility is reflected in every program the Department administers. It entails research and experimentation in safety measures and techniques for vehicles in all modes, the enforcement of standards and the application of new technology in devising safe and rapid means of transport.

Equally important is the goal of achieving the most efficient, coordinated transportation network possible at the lowest cost to the user with a fair return to the carriers and their employees.

Among other specific areas in which the Department plays a role are oil spillage affecting coasts, administration of Uniform Time Act, emergency transportation, the supersonic transport project, noise abatement, highway beautification, resource conservation, ship safety and the interstate highway program.

In the Department itself, the transportation system is represented by five major operating divisions -- the Federal Aviation Administration, the Federal Highway Administration, the Federal Railroad Administration, The Coast Guard and the St. Lawrence Seaway Development Corporation. Additionally, the National Transportation Safety Board, which concerns itself with improving safety of all modes, operates within the Department but functions independently of the Secretary in substantive matters.

The Assistant Secretary for International Affairs and Special Programs is Mr. Donald G. Agger. Prior to joining the Department in 1967 he was President of American Nord-Aviation since 1959. From 1954 to 1959 he served in the Office of the Secretary of Defense, International Security Affairs, in Paris, France, as U.S. Representative to the 15-nation Infrastructure Committee of the North Atlantic Council.

He has six offices under him, one of which is the Office of Telecommunications. This office came into being last August under the efforts of Mr. Robert M. Lowe, who is now a Consultant to the President's Task Force on Communications Policy. The office is

currently in the charge of Mr. Richard L. Beam, who was associated with Hazeltine Corporation for many years and served as Director of that Corporation from 1957 to 1967 and as President from 1962 to 1966.

At present there are two Assistant Directors, one for Liaison, that I perform, and one for Planning, which is under Mr. Richard Gabel formerly GSA Associate Commissioner. It is anticipated that two additional Assistant Directors, one for Systems and one for Technical will be selected shortly.

The next pertinent question is what does this office do and what are its plans for the future.

The essential mission of the Office of Telecommunications is to assure that there is basic harmony of policy and purpose among the telecommunications activities of the various administrations. It will seek opportunities to make gains in efficiency and economy consistent with the overall goals.

It will initiate, develop and coordinate long-range telecommunications planning which will be responsive to the developing and changing needs of the Department and transportation. It will also participate in telecommunications-related research and development programs relating to transportation.

You may now ask where does amateur radio fit into the Department? As I mentioned earlier the two largest administrations within DOT are the Federal Aviation Administration and the U.S. Coast Guard. Within the Coast Guard there is considerable interest in amateur radio and has been for at least 20 years.

During World War II, Lt. Commander A. L. Budlong, W1BUD, was Chief of Frequency Allocation Section in the Communications Section in the Communications Division of the U.S. Coast Guard. Prior to the war he was Assistant Secretary in the American Radio Relay League (ARRL) organization and upon leaving the Coast Guard in 1945 he regained the ARRL and in 1948 he became General Manager and Secretary of the ARRL, Editor of QST and Secretary of the International Amateur Radio Union. John Huntoon the present General Manager and Secretary of the ARRL, and Editor of QST served as a Coast Guard radioman during World War II.

It was not surprising to see the development of amateur radio at Coast Guard units, first at the isolated LORAN stations in the Pacific and later on the weather ships, and icebreakers spending a long time at sea.

A "home" shore-based radio station was established as K3CG in 1957 at Coast Guard Headquarters here in Washington, D.C. In 1963 this was shifted to a more suitable location at the major Coast Guard Radio Station - Radio Washington - located in Fairfax County, four miles south of the City of Alexandria. The call became K4CG and the Station was placed under the trusteeship of that world famous amateur Vic Clark, W4KFC. With the full support of Cdr. W. Dawson, the original Commanding Officer of Radio Washington and the succeeding CO Captain Frank Barnett and Cdr. Charles Juechter and the operating crew of Dallas Carter, K4WUW and Bob Phillips, WA4WJJ, the station and its operation has continued to grow and grow.

K4CG has three operating positions which can be operated simultaneously, and in some cases on the same band with little or no mutual interference; are located in an enclosed operating space covering nearly 400 square feet of floor space. The three positions are composed of primarily Collins equipment, and are capable of running 1000 watts on CW and SSB. In addition one of the positions is equipped with both 60 and 100 wpm fully automatic radioteletype equipment. On 10, 15, and 20 meters a 5-element Telrex beam at 60 feet is used, and on the lower frequencies an ample quantity of dipoles, verticals, and inverted V antennas direct the RF very effectively.

In July 1966, it became a member of Navy MARS and since that date has handled over 52,000 messages. Most of the traffic handled originated in Vietnam for delivery to family and friends here state side. The operator participates in area MARS nets and meets various schedules during the day for accepting and disseminating traffic. On many of the MARS nets this station operates as net control. Last winter when the Navy MARS Master Control Radio Station, NAV, was being refurbished, the MARS station here was host to the operators from the Navy and assumed the tasks of NAV for nearly six months.

K4CG is known in many traffic nets. Among them are the Maritime Mobile Service Net, Intercontinental Traffic Net, Virginia Net, Virginia Sideband Net, and the North American Net. In addition to this, K4CG is the Net Manager for the Coast Guard Net and the QTC Traffic Net. The Coast Guard Net meets Monday through Friday on 14337 at 1700Z, and the QTC Traffic Net meets on 7240 Monday Through Friday at 1900Z.

K4CG proudly displays 18 consecutive BPL certificates, Worked All States, Worked All Continents, Official Relay Station, Amateur Radio Traffic Society Commendation, Worked Ten Tennessee Stations, 2nd Place Virginia entree 1966 Tennessee QSO Party, First Place Virginia QSO Party 1966, First Place Virginia WSO Party 1967, Second Place in 4th district in 1966 CQ World Wide DX Contest, Rag Chewers Club, Military Affiliate Radio System, Maritime Mobile Service Net Certificate, and an ARRL Public Service Award, received for operation and traffic handling during the 1964 Dominican Republic Crisis. To date 186 countries have been worked and DXCC membership has been applied for.

Since 1964, K4CG has operated in the ARRL International DX Contests Sweepstakes and Field Day, the CQ World Wide DX Contests and SSB DX Contests. These have been operated both single and multi-operator, by club members and guest operators. The Station has been active in the Virginia QSO party taking first place honors in 1966 and 1967. The Station also participates in the quarterly CD parties and several of the smaller weekly contests throughout the year. In the CQ World Wide DX Contest in 1966 the Station was awarded second place for the 4th district in the all band single operator class, and in a recent edition of CQ Magazine was listed as second high USA in the same 67 phone contest again an all band single operator effort. The latest effort in the 68 ARRL DX Test, with two operators the Station grossed over one million points on phone and almost that number of points on CW.

And, what about amateur radio at LORAN stations and on board ship? In the early 1950's a very active 20 meter LORAN net was in operation with a central control at Honolulu, T. H. The basic transmitter was the war surplus BC-610 and a 3-element yagi on a 30 foot pole was the antenna system. Shipboard amateur stations were limited to ships going on very long cruises -- generally icebreakers. Gradually the rules were changed to permit operation on other ships.

Today there are 37 amateur stations on board Coast Guard ships sailing from the Arctic to the Antarctic. Our ships on ocean station duty in the North Atlantic and Pacific usually have an amateur on board.

In addition to the ships there are over 35 Coast Guard shore stations in various parts of the World with an amateur station in operation. Some are at the usual continental locations but others are in more remote places such as KA9CG, Hokkaido, Japan; KX6CA, Kwajalein Island; KC6BY, Yap Island; KC6IF, Marcus Island; KJ6BV, Johnson Island; and OX5AO Cape Atholl, Greenland.

At all of these stations the service performed by the radio amateur has been a tremendous help to morale. A number of the stations are located at Coast Guard units which are very isolated and a normal duty assignment is one year -- a year away from home, family and sometimes civilization such as the cold and barren coasts of Labrador or Greenland.

What about activity in the FAA? In support of the national airways system, the Federal Aviation Administration operates one of the largest teletypewriter, telephone, and radio networks in the world. Under this communication environment, extensive interest in amateur radio operations has grown among the employees of the FAA.

Stemming from this interest, employee amateur radio clubs exist in each of the eight FAA Regions, at its Aeronautical Center in Oklahoma City and at its National Aviation Facilities Experimental Center at Atlantic City, New Jersey. Within these clubs there are some 165 licensed operators who have affiliated themselves with the MARS program.

While the activities of these clubs afford a wonderful hobby for their members, they more importantly represent an inbeing source for equipment and skilled radio personnel that can be called upon in time of emergencies. The ability of these amateurs to react and serve under these circumstances is well known within the FAA.

During Typhoon Karen which struck the Island of Guam in 1962, an FAA ham operator stationed on the Island was the first "voice" out of Guam after the Island was hit by the storm.

And again, during the Alaskan earthquake in 1965 amateur operators served in a vital role. The Amateur Radio Club, W5PAA, at the FAA Aeronautical Center, Oklahoma City, mobilized itself on receiving loud and clear signals from Alaska during the night of the quake. It stayed on the air continuously during the emergency.

Through contact with Alaska stations the club operators were able to ascertain the needs of FAA navigation facilities to ensure continuous air traffic operations; and also were able to relay word to the relatives of agency employees concerning their safety. During the period of this emergency, the operators of the FAA Aeronautical Center Amateur Radio Club worked some 2990 messages.

In April 1965, Bill Todd, W5UZX, stationed at the aeronautical center operating from home and from W5PAA was instrumental in the rescue of a man and his wife who were adrift off the Coast of Baja, California, on their 38 foot ketch "Seaway" when the engine failed. Rescue was made two days later by a Mexican Navy gunboat led to the scene by a U.S. Coast Guard aircraft directed by messages relayed by Todd.

The FAA encourages employee participation in amateur radio activities, and particularly endorses their affiliation with the MARS program. While appropriated funds are not authorized for equipment to be used in support of employee amateur radio activities, or participation in the MARS program, the FAA does authorize their use of available space, salvaged or spare equipment, and utilities. Also spare channels and equipment in place but excess to the immediate needs of FAA stations, may be used in cooperation with MARS and other emergency stations designed to cope with defense readiness needs.

As amateurs you can appreciate the range of activities I have just given. Needless to say, it is the cooperation of people like you who man the shore end of the many public service message traffic nets which have been of great morale benefit to DOT personnel. In behalf of them and the Department I thank you for your cooperation and assistance.

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OFFICE OF THE ASSISTANT SECRETARY FOR INTERNATIONAL AFFAIRS AND SPECIAL
PROGRAMS, PREPARED FOR DELIVERY BEFORE THE NATIONAL CONFERENCE ON
AIRCRAFT LOCATOR BEACON IMPLEMENTATION, HOTEL AMERICA, WASHINGTON,
D. C., 2:00 P. M., WEDNESDAY, APRIL 3, 1968

THE MARINE VIEW OF EMERGENCY BEACONS

SUMMARY

International action by the maritime community on the "emergency position-indicating radio beacon" (EPIRB) began in 1960 when the International Conference on Safety of Life at Sea (SOLAS) agreed to a recommendation. This Recommendation, No. 48, requested that the Intergovernmental Maritime Consultative Organization (IMCO) should consult with the International Civil Aviation Organization (ICAO) and the International Telecommunications Union (ITU) with the view of determining the standards of world-wide application to which the radio characteristics of emergency position-indicating radio beacon should conform.

In 1967, at the World Administrative Radio Conference (WARC) to deal with matters relating to the Maritime Mobile Service, action was taken to agree on the characteristics for such a beacon to be

used on 2182 kHz and 121.5 and 243 MHzs. Various countries principally Japan, Norway, France and the United Kingdom, have since begun some form of implementation of such beacons. At present the beacons in use have characteristics that are not uniform. In spite of the intention of Recommendation No. 48 the marine community is still proceeding in several directions.

BACKGROUND

In addition to SOLAS, 1960, Recommendation No. 48 there are Recommendations Nos. 40 and 41 which are concerned respectively with coordination of safety at sea and in the air and ship-aircraft communication. Recommendation No. 40 states that IMCO, ICAO, ITU and the World Meteorological Organization (WMO) should pursue their joint studies on matters regarding the planning and providing of facilities for search and rescue, the dissemination of information concerning these arrangements, and other matters of joint concern to these organizations regarding safety at sea. Recommendation No. 41 speaks to the need for communication between aircraft and ships involved in cases of distress, and again recommended that these organizations should give urgent consideration to the best way of establishing such communication.

With this kind of encouragement, an "Interagency Working Group on Coordination of Safety at Sea and in the Air" met in May 1962 in London. In the report of the meeting, this group was of the opinion that it appeared extremely difficult to solve the problem of the EPIRB in a satisfactory way on a world-wide basis with equipment which would use a single frequency and that IMCO and ITU should pursue, as a matter of urgency, the problem of establishing uniform specifications for emergency position-indicating radio beacons. It appeared to the Working Group that, on a world-wide basis and for ships sailing in different seas, the equipment should allow the the use of two frequencies. For smaller ships, it should rest with States to determine whether a single frequency equipment would be adequate.

IMCO and ICAO both advised the ITU of the action being taken by them. The problem then was referred to the International Radio Consultative Committee (CCIR), the operational and technical committee organization of ITU, and considered at the CCIR 10th Plenary Assembly, Geneva, 1963. Study Group XIII (Mobile Services) of CCIR considered the problem and posed three questions addressed to ICAO and IMCO in order that these organizations might better provide answers. The questions were:

1. Are the beacons intended for homing only or both for alerting and homing?
2. What class of stations (e.g., aircraft, ships, coast or aeronautical) are expected to receive the transmission from the beacons?
3. Up to what distance must the beacons be receivable?

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These questions were subsequently considered by both IMCO and ICAO. The IMCO Maritime Safety Committee reviewed the problem and submitted its recommendations to the IMCO 4th Assembly, September, 1965 where they were adopted (Resolution A.91 (IV)) and later forwarded to the ITU for consideration by CCIR. At the September, 1965 meeting of CCIR Study Group XIII, consideration was given to the radio characteristics of emergency position-indicating radio beacons and a new study question was adopted. Due to the urgency of this matter for the safety of life at sea, the Director of CCIR was requested to circulate the new Question among administrations with a view to its adoption in order to enable the final meeting of Study Group XIII to be held in Oslo in 1966 prepare a suitable recommendation for submission to the CCIR 11th Plenary Assembly that followed it.

The results of the aeronautical study of the problem are contained in the report of the 4th Air Navigation Conference, Montreal, December, 1965. The final results were ultimately incorporated in Annex 6 and 10 to the Convention on International Civil Aviation. These Annexes contain the requirements for the carriage of survival radio equipment, the specifications of the equipment and the radio frequencies to be used. In international civil aviation the mandatory date for carriage of such beacons is January 1, 1969. Within the USA the Federal Aviation Administration has informed general aviation pilots it is considering rules that would require them to carry crash locator beacons on some flights.

The World Administrative Radio Conference (WARC) to deal with matters relating to the Maritime Mobile Service which met in Geneva, 1967, adopted to insert into the Radio Regulations the operational conditions and the technical characteristics of the emergency position-indicating radio beacon.

WHY THE USE OF 2182 kHz?

The U. S. position to various telecommunication conferences, both marine and aeronautical, has recommended the use of VHF radio beacons. Internationally this concept has only been accepted in the aeronautical field. In the marine field, the majority of maritime countries prefer the use of 2182 kHz and the use of beacon signals related to the internationally agreed radio telephone alarm signals. This has occurred because:

1. International agreement on the use of 2182 kHz as the international radiotelephone distress and calling frequency.
2. Many merchant ships and fishing vessels as well as naval ships are fitted with 2 MHz radiotelephone equipment.
3. Chapter IV, Regulation 7 of the SOLAS 1960 Convention

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requires a continuous listening watch on compulsory fitted radiotelephone ships.

4. Many coast stations keep a continuous watch on 2182 kHz and some simultaneously carry out direction finding of distress calls on this frequency.

In the North Sea and the waters adjacent to Western Europe 2182 kHz is the major distress frequency. In excess of 60 percent of the world's shipping have the potential to listen on this frequency whereas they have virtually no capability to receive on 121.5 and/or 243 MHz. On the coast of the North Sea there is a well developed shore based direction finder system that provides service on 2182 kHz. Some countries have a strong recommendation that installed ship direction finders have the capability for direction finding (D/F) or homing on 2182 kHz. In at least one country approximately 85-90 percent of the radiotelephone equipped ships have a 2182 kHz D/F or homing capability. At international maritime conferences, these combined factors are sufficient to control the decision as to the preferred beacon characteristics and radio frequency to be used.

WHY THE USE OF 121.5 AND 243 MHz?

Since there is such a strong case for the use of 2182 kHz you might ask why has the USA been strongly advocating the use of 121.5 and 243 MHz. The following are the primary reasons:

1. The excessive use of 2182 kHz in the waters adjacent to the USA caused by our 150,000 licensees.
2. The numerous Coast Guard and military search and rescue aircraft which are fitted with a 121.5 and 243 MHz receive and D/F capability as well as the majority of military aircraft which have a 243 MHz receive and D/F capability.
3. The large number of civil aircraft, scheduled and general, that are capable of listening on 121.5 MHz.
4. The great range at which a 121.5/243 MHz signal may be heard by search aircraft at search operational altitude.
5. The extremely small size, reliability, and efficiency to which a 121.5 and/or 243 MHz beacon may be constructed.
6. The simplicity of antenna design for the beacon and for the search aircraft direction finding equipment.
7. The significant success achieved to date by the U. S. military in the rescue of pilots equipped with VHF beacons.

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As the result of a lack of ability by almost all ships (Coast Guard and naval vessels excluded) to receive on 121.5/243 MHz aircraft must be used for initial searches for EPIRB's using these frequencies. Aircraft should be used for any search where positive and assured position location is not known. This also means that once an aircraft has found the accident scene it must communicate this information to the rescue services. If the accident is at sea the closest ships should be alerted. How is this to be done? This is the problem to which Recommendation No. 41 of SOLAS, 1960 speaks. What is the answer today? If there is to be any communication between ships and aircraft it must be on 2182 kHz. There is no other common frequency. Yet, in general, since neither ship nor aircraft are listening on 2182 kHz continuously, how is mutual contact to be made?

There must be some prior alerting either via visual means (the aircraft buzzing the ship) or via radio contact through a shore radio station or stations - aircraft to a ground station, then via landline circuit to a rescue coordination center; then to a marine coast station for relay to the ship. Sometimes this is successful, sometimes it is not. So in spite of Recommendation No. 41 there are still message delivery problems eight years after the SOLAS Conference. Where do we go from here?

WHAT HAPPENS NEXT?

In two recent sinkings involving U. S. ships, the SS MARINE SULPHUR QUEEN and SS DANIEL J. MORRELL, the resulting Boards of Investigation by the U. S. Coast Guard have recommended the carriage of an emergency position-indicating radio beacon. The SS MARINE SULPHUR QUEEN sinking occurred in February 1963 between Texas and Norfolk with the loss of all hands, 39 lives. To this date, in spite of an extensive search above and below water, the only items found have been a few bits and pieces of wreckage on the Florida Keys. The SS DANIEL J. MORRELL sank on Lake Huron in November 1966 with the loss of 28 lives. One man survived when he was found 38 hours after the sinking.

The Board of Investigation on the SS MARINE SULPHUR QUEEN recommended, inter alia,

Consideration should be given to the implementation at the earliest practicable date of the provisions of Recommendation 48 of the International Convention for the Safety of Life at Sea, 1960, concerning the carriage of an Emergency Position-Indicating Radio Beacon, which would automatically transmit a distress signal in the event of the sinking of a vessel.

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The Commandant, USCG Action on the Board on this matter advised that the recommendation is being actively considered on an international basis.

The Board of Investigation on the SS DANIEL J. MORRELL recommended, inter alia,

That there be provided a datum marker buoy with the capacity of transmitting on 2182 Kc/s and capable of being either manually activated or automatically released and activated at a predetermined depth upon the sinking of the vessel. This could be stored with one of the required life rafts or attached with a pressure-release device to the side of the pilot house.

It should be noted that there is a bilateral USA/Canada Agreement which establishes radiotelephone communication and 2182 kHz as the Great Lakes distress system.

The Commandant, USCG Action on this case stated,

"The absence of a distress message precluded prompt institution of search and rescue efforts. Therefore, the recommendation that vessels be provided with a datum marker buoy has considerable merit. This subject has been under discussion and study by the Maritime Safety Committee of the Intergovernmental Maritime Consultative Organization for some time. There is now international agreement on the characteristics and frequencies of such marine emergency position-indicating radio beacon. Therefore, the Coast Guard will undertake a study in consultation with concerned industry representatives, government agencies and others to determine whether this emergency radio beacon should be required on U. S. vessels. In the interim the voluntary equipping of Great Lakes vessels with the device is encouraged."

Within the United States as the result of these two sinkings and the subsequent boards of investigation, a study program by the Coast Guard has been recommended. Initially, the technical and operational problems would be explored and then, a joint study in conjunction with industry and other government agencies would follow. This is where we stand today in the USA regarding emergency position-indicating radio beacons.

As a matter of information the Japanese have been so concerned with the problem that they have established requirements for such beacons

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and as of June 1967 had over 12,000 in use. These devices transmit "SOS" automatically on the frequency 2091 kHz. Such a device is already compulsory for general shipping. Numerous coast stations and patrol vessels are already guarding this frequency.

In order to use these automatic devices you must apply to the Japanese Government. A call sign is issued which is inserted on the cam of the device. It sends "SOS" two times followed by "de", the call sign and a long dash (for direction finding). It keeps repeating the signal. There are at least two types of these automatic devices -- a smaller version has a duration of about 30 hours and cost \$200; the larger one lasts 72 hours and cost about \$320.

Norway has established national requirements for use of the internationally agreed emergency position-indicating radio beacon operating on 2182 kHz. Fishing vessels of a certain size operating beyond a certain distance off-shore are required to use the beacons. At least 500 have been purchased.

The United Kingdom and France have a permissive use of 2182 kHz beacons manufactured in accordance with the internationally agreed standards.

Thus, it may be seen that the maritime community is moving in the direction of implementing the carriage of the emergency position-indicating radio beacon. However, in spite of international agreements, a common frequency is not in use at the moment nor is there any international standardization of systems although there is hope that time and experience with existing EPIRB systems will resolve the problems.

It is my urgent plea that positive action should take place soon and not let another eight years pass before there is a final solution. The maritime community should take notice of ICAO's action as an example of what action can be accomplished in order to improve safety.

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