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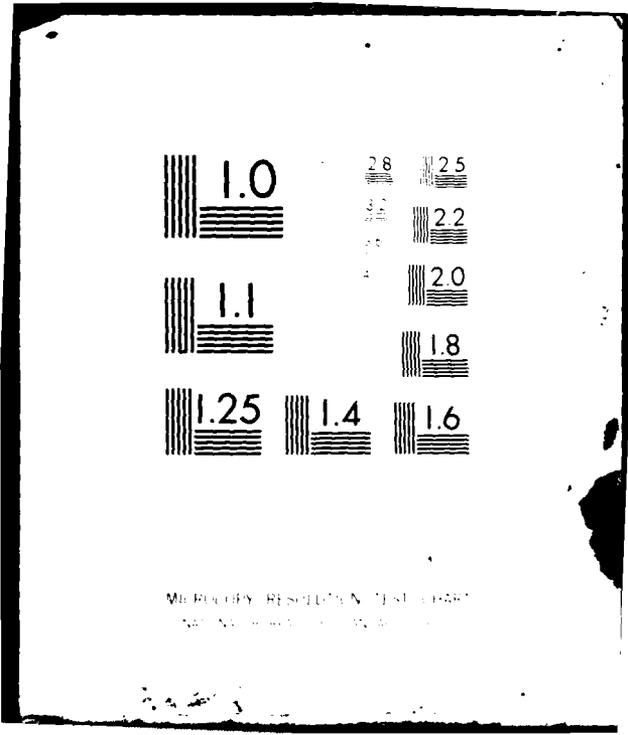
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THE WORLDWIDE NAVIGATIONAL WARNING SERVICE:(U)
1981 J E AYERS, J P LYALL

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In the early 1970's both the International Hydrographic Organization (IHO), an intergovernmental agency dedicated to the improvement of nautical charting, and the Intergovernmental Maritime Consultative Organization (IMCO), a U.S. agency dedicated to safety of life at sea, became concerned over the lack of a coordinated worldwide radio service to keep deep sea mariners aware of hazards to navigation. Through their joint efforts the Worldwide Navigational Warning Service (WWNWS) was established, becoming fully operational on 1 April 1980. The WWNWS covers all international shipping routes through a system

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of 16 NAVAREA Broadcasts, all of which transmit warnings in English (the primary language of the NAVAREA II broadcast is in French) and some of which transmit warnings also in an additional language. This paper describes the development of the initial WWNWS, the mechanism for service improvement and advances which have been made to date, and improvements foreseen for the future. Specific examples from the broadcast experience of the Coordinator for NAVAREAs IV and XII, the Northwest Atlantic and Northeast Pacific NAVAREAs, respectively, are given.

THE WORLD WIDE NAVIGATIONAL WARNING SERVICE

ABSTRACT

In the early 1970's both the International Hydrographic Organization (IHO), an intergovernmental agency dedicated to the improvement of nautical charting, and the Intergovernmental Maritime Consultative Organization (IMCO), a U.N. agency dedicated to safety of life at sea, became concerned over the lack of a coordinated worldwide radio service to keep deep sea mariners aware of hazards to navigation. Through their joint efforts the Worldwide Navigational Warning Service (WWNWS) was established, becoming fully operational on 1 April 1980. The WWNWS covers all international shipping routes through a system of 16 NAVAREA Broadcasts, all of which transmit warnings in English (the primary language of the NAVAREA II broadcast is in French) and some of which transmit warnings also in an additional language. This paper describes the development of the initial WWNWS, the mechanism for service improvement and advances which have been made to date, and improvements foreseen for the future. Specific examples from the broadcast experience of the Coordinator for NAVAREAs IV and XII, the Northwest Atlantic and Northeast Pacific NAVAREAs, respectively, are given.

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THE WORLDWIDE NAVIGATIONAL
WARNING SERVICE

J. E. Ayres and J. P. Lyall

BACKGROUND

In the early 1970's, most national systems for radio promulgation of navigational warnings covered only their own coastal waters. Some countries broadcast in English and their own language, others only in their national language. Reception was normally limited to vessels near their coasts. Further, a number of coastal states had no routine system for promulgating navigational warnings by radio. Although there was some interchange of warnings between certain countries, no formalized system of cooperation and coordination existed.

In addition to these short range coastal services, a few national long range warnings broadcasts existed. While criteria and modes of operation differed, all attempted at least to give a degree of warning coverage over extensive ocean areas and to incorporate the more important coastal warnings issued by other countries in those areas. Such systems included:

- U.S.A. HYDROPACS & HYDROLANTS in English.
- COMMONWEALTH's NAV SYSTEM by the United Kingdom, South Africa, Australia and New Zealand in English.
- FRANCE's AVURNAVS in French
- USSR's NAVIPS in Russian and English

There were, however, large areas covered by these services for which very little information was received or where information was received only after long delay because the country operating the system was too remote from the area.

Reflecting its continuing concern over the adequacy of radio warnings, particularly

those required by deep sea mariners, the IHO at its 10th I.H. Conference in 1972 adopted a technical resolution recommending the urgent establishment of a joint commission of the IHO and IMCO to: "study questions related to the promulgation of radio navigational warnings to shipping and to plan ways and means of improving existing methods of the distribution of such warnings through international cooperation."

This proposal was accepted by IMCO, where similar concerns had been expressed, and the joint body was set up in 1973 as the "Ad Hoc Joint Committee on Radio Navigational Warnings."

DEVELOPMENT OF THE PLAN

A single 5-day meeting of the Ad Hoc Committee was held, at the I.H. Bureau in Monaco in May 1973. This meeting elected Cdr. Peter B. Beazley, RN (Ret.) of the U.K. Hydrographic Department (for the IHO) as Chairman and Mr. Odd Andersen of Norway's Telecommunications Department (for IMCO) as Vice Chairman. Representatives of 14 countries and 3 international non-governmental organizations participated.

Soon after commencing deliberations, all those involved came to realize that the problem was more complex than many people had realized. Existing organizations were found clearly inadequate, and large areas of the world's sea routes - some carrying heavy traffic - were found to lack the required coverage.

It was decided that progress could best be made by concentrating on a comprehensive scheme for the long range warning broadcasts to replace the various national long range services. A "Provisional Plan" was drafted which divided the world into a number of ocean basins, in each of which one country would act as a coordinating authority to collate information; decide whether it should be disseminated as a long range warning, and then to broadcast it. A list of messages considered representative was drawn up, and many technical points discussed.

It was agreed that any scheme would initially rely on existing facilities and expertise, and that the coordinating country in each area should have a well established hydrographic service as well as effective and adequate broadcast facilities covering the

area. A number of countries provisionally indicated their willingness to take responsibility for particular areas. It was realized that the Plan represented only the ocean part of a total warning system, and that the coastal part would have to be considered later, but this was appropriate as the conditions governing a coastal warning system varied widely and, therefore, details of coastal schemes could be better handled regionally. It was felt that the Provisional Plan could provide the initial framework on which regions could build.

IMCO, in December 1973, and in later sessions studied the various suggestions made, as well as considered the suitability of existing facilities in countries which might agree to act as coordinating authorities. It also prepared recommendations for consideration by the International Telecommunications Union (ITU) World Maritime Administrative Conference held at Geneva in 1974. These recommendations resulted in amendments to the ITU Radio Regulations on the use of the Safety Signal and the introduction of a special alerting signal for vital navigational warnings which, although found not applicable to the long range broadcast service because its radiotelegraph transmissions were to be at fixed times, are pertinent to coastal and local warning services.

Unfortunately, by a decision of its Council IMCO was required in February 1974 to withdraw from participation in joint committees with organizations not affiliated with the United Nations. However, it was agreed between the Directing Committee of the I.H. Bureau and the Secretary General of IMCO that the IHO component of the Ad Hoc Committee should be named the "IHO Commission on Promulgation of Radio Navigational Warnings," and should continue under the same Chairman to undertake the same task as the Ad Hoc Committee. The IMCO responsibilities would be undertaken by its Sub-Committee on Radiocommunications. Responsibilities were divided roughly as follows:

- IHO responsible for guidance on:
 - Subject matter & priority of warnings
 - Area division
 - Message format

- Number of broadcasts necessary
- Distinction between types of warnings
- Duties of Coordinators
- Language to be used
- IMCO responsible for guidance on:
 - Broadcast schedules
 - Classes of emissions & other technical details of the transmissions
 - Conformity with Radio Regulations
 - Use of code
 - Use of Safety Signal, Navigational Warning Signal, etc.

The IHO Commission also held only one meeting, 3-6 December 1974. Representatives from 19 countries and 3 outside international organizations attended. It discussed the Ad Hoc Committee report and IMCO recommendations, made changes to area limits, and took further decisions on Area Coordinators. The Commission also had before it two reports of regional working groups which had produced coastal warning schemes for their areas. Those regions were the North Sea and English Channel, and the Baltic Sea. The schemes were designed to be in harmony with the Provisional Plan and provided useful criteria which were later adopted for incorporation in it. As a result of this meeting the Plan was considerably expanded, and it included a number of useful definitions including specifically "coastal" and "local" warnings. By the end of the session enough progress had been made that it was considered that outstanding matters necessary to set a system in operation could be resolved either by the IMCO Sub-Committee, to the next meeting of which member governments were invited to include Hydrographers in their national delegations, or by direct correspondence between the Chairman and some 36 national Hydrographic, or other concerned, administrations.

Progress had not been hindered by the required withdrawal of IMCO, for at each session of the Sub-Committee on Radiocommunications pertinent matters were studied by

a Working Group chaired by Mr. Andersen, the Vice-Chairman of the defunct Ad Hoc Committee. An average of 12 nations participated in those Working Groups, and many more commented on the Working Group Reports in the Sub-Committee plenary. Discussion subjects included routing of information, changes in the boundary between Areas XII and XVI, introduction of a code, use of the Safety Signal and Navigational Warning Signal, and proposed Broadcast schedules submitted by designated Area Coordinators. As a result, the Plan was further revised with the final edition containing changes to 30 June 1976. Of particular importance was a recommendation that the planning had reached such a stage that the scheme should be put into operation on a provisional basis as soon as each Area became ready.

The final Plan of 1976 was accepted by the IHO at its 11th I.H. Conference in April 1977 and by IMCO at its Assembly the following November. It was recognized as an incomplete but very useful framework on which to start a service and build a total system. At the time of approval one major section, that guiding the exchange of information between Coordinators and between an Area Coordinator and world charting authorities still had to be developed and the Coordinator for one Area had yet to be confirmed. However, 9 NAVAREAS were broadcasting and the service was obviously viable.

THE SERVICE

It is time to speak of what the Worldwide Navigational Warning Service (WWNWS) is, now that we know how it came about. It is a coordinated global service for the promulgation by radio of information on hazards to navigation which might endanger international shipping. For purposes of the Service, the world has been divided in 16 NAVAREAS. Within each NAVAREA one national authority, designated the Area Coordinator, has assumed responsibility for the coordination and promulgation of warnings. Designated "National Coordinators" of the other coastal states in a NAVAREA

are responsible for collecting and forwarding information to the Area Coordinator. In the Baltic, a Sub-Area Coordinator has been established to filter information prior to passing it to the Area Coordinator.

Much progress has been made since the adoption of the Plan. The last Coordinator to confirm his acceptance of the post (the Government of Japan) commenced broadcasting 1 April 1980 from a new, powerful transmitting facility. The Routing of Information section has been completed, and as a result NAVAREA Coordinator responsibilities not only include the promulgation of hazardous information to the mariner, but also the expeditious notification to all other national authorities who issue charts in his Area of warnings, which can be expected to remain in force for 6 weeks or longer, in order that those charting authorities may issue Notice to Mariners correcting their affected charts. The Service has therefore not only improved the timeliness of warnings radioed to the mariner, but has also significantly improved the flow of long term information required to correct charts.

While the individual Area Coordinator has heavy responsibilities in insuring proper service, he also has extensive authority within the system. For example, he is the final judge of information to be included in his Area broadcast or to be routed to others.

All broadcasts are by radiotelegraphy, A1A emission, in the English language. (French is the primary language in NAVAREA II broadcasts.) Many are duplicated in other official languages of the United Nations, and in two areas (II and III) broadcasts also use forward error correction teletype, F1 emission, a mode which is strongly endorsed. Warnings are to be transmitted in inverse order to receipt, with the text following the Standard Marine Navigational Vocabulary where appropriate.

Broadcast schedules appear in an Annex to the ITU "List of Radiodetermination and Special Service Stations," Vol. II, and in the lists of radio signals published by various national hydrographic authorities. Transmissions usually occur frequently enough during a day to fall within at least one normal radio watch period, and the information is repeated

with decreasing frequency as time passes until either the danger has appeared as a Notice to Mariners correction or has been cancelled. A summary broadcast, usually each week, notes all warnings still in effect, and mariners can request any not held which appear pertinent to their intended track. Broadcasts should be receivable throughout the entire NAVAREA, and for 700 miles beyond as well to serve ships approaching the region.

Warning information is restricted largely to that which might affect the deep sea mariner, in order to avoid overloading the system. Representative subjects include failure of or changes to major navigational aids; changes to routing systems; newly discovered wrecks or natural hazards in or near main shipping lanes; and areas where search and rescue, undersea operations, or anti-pollution operations are underway. Weather forecasts, unless they refer to major storms which are serious threats to large ships or navigational aid, are not included although Area Coordinators are recommended to schedule their broadcasts for just after meteorological transmissions.

Because the Service deals with main shipping lanes and largely with offshore hazards, it is a complementary rather than an all-inclusive warning system and should be used in conjunction with the appropriate coastal or local warning broadcasts when the mariner is closing a coast or approaching a port. The line of demarcation between coastal and NAVAREA warnings is blurred, and while the NAVAREA Coordinator will tend to err on the side of greater coverage, especially in a geographic sense, if the system is working properly the coastal warnings service will contain a great many more items of information pertaining to its coverage area than does the NAVAREA broadcast for the same region.

EVOLUTION

Following the adoption of the WWNWS Plan by IHO and IMCO, the IHO Commission was reconstituted to include all Area Coordinators of the 16 NAVAREAS, the Baltic Sea Sub-area Coordinator (Sweden), and National Coordinators from 9 other nations such as Ecuador, Germany, Greece, Italy and Zaire. A representative of the IMCO Secretariat

sits as an ex-office member. A major task of the Commission is to consider problems arising in the WWNWS, and to recommend corrective action where appropriate for approval by the IHO and IMCO. As it has turned out, the Commission has not only proved an effective mechanism for evaluating the Service's operation, it has served also to bring into focus quickly other areas where the unique capabilities of the WWNWS could make a positive contribution to maritime safety. This can be seen in a brief review of a few of the matters which have been considered to date, many of which have resulted in IHO/IMCO action to amend the "WWNWS guidance document," the name by which the earlier "Plan" now goes. These include:

- **OVERDUE OR MISSING SHIPS OR AIRCRAFT:** NAVAREA broadcasts carry notices of seriously overdue or missing ships or aircraft, and of those in distress, in, on or over the open sea. Through IMCO, nations have been urged to advise their Rescue Coordination Centers of the WWNWS and their appropriate Area Coordinator, and amendments are being made to the IMCOSAR Manual to reflect the WWNWS capability. Area Coordinators have also taken initiative in the matter. The action was proposed by an Area Coordinator following the BERGA VANGA marine incident in the South Atlantic.
- **USE OF A STANDARD SYSTEM OF NOTATION FOR GEOGRAPHIC COORDINATES:** Coordinators are now recommended to use degrees, minutes and a decimal of a minute (rather than seconds) to express a precise geographic coordinate. The Commission is now also clarifying the use of a bearing and distance from a charted object to fix a position on a larger scale chart of restricted waters.
- **MARITIME HAZARDS FROM UNDERWATER OPERATIONS:** Underwater operations such as seismic exploration and submersible investigation are usually scheduled by the operators far enough in advance to allow timely

notification of the mariner through Notices to Mariners, if the information could be made available quickly to the proper authorities. Because of its unique organizational links, the WWNWS was deemed the proper system to coordinate the collection and dissemination of such information. This added task for Area and National Coordinators is just being implemented.

- ROUTING OF INFORMATION: The actual scope and dispatch means of information exchange between Area Coordinators was investigated, and the perceived needs of each Coordinator were noted. As a result weaknesses in the system were uncovered and corrected, and communications improved. All Coordinators are now linked by TELEX (the Government of Peru is an exception), and that medium is widely used in warning data exchange. It should perhaps be noted here also, that a major benefit of the WWNWS to date has been a vast improvement in the flow of warning information among the world's nautical charting authorities.
- USER OPINION ON THE WWNWS: An information brochure on the Service and user critique response forms in post card and lettergram format have been developed recently for use by the mariner, in a serious attempt to determine how well the Service is meeting his requirements and how the broadcast operations might be improved. The documents, copies of which are available at this Symposium, have been furnished in bulk to many shipping companies and have been reproduced in the Notices to Mariners of several nations. Response has been good, and in part surprising for we are receiving critiques of not only the WWNWS but of national coastal and long range warning broadcast systems as well. The reports are usually forwarded by the mariner to the Chairman of the IHO Commission, who takes immediate action to notify the Area Coordinator, or other appropriate authority if the critique concerns a broadcast other than that of the WWNWS, of problems noted. If the problem is

of broad applicability, all members of the Commission are advised. Some valuable critiques have been received prior to the issuance of these forms, and improvements made as a result of their comments. It is hoped now, however, to broaden the evaluation by the mariner to include all NAVAREAs and reception conditions from all parts of those Areas.

Corrective action, where deemed appropriate is normally quickly taken even where a change to the formal guidance document is ultimately required since the Commission, in its deliberations leading to the recommendation for change, has involved all Area Coordinators. Those authorities are quick to adopt procedural improvements while they await, and support, IHO and IMCO action. I should add here that an updated guidance document will be published by the I.H. Bureau in December and those interested may obtain a copy by writing to the Commission Chairman at the address given in the WNW'S information brochure.

A number of other matters have been and are being considered by the Commission, and it is anticipated that the body will continue indefinitely. The Chairmanship is now located in the I.H. Bureau, an arrangement which has proved effective from an administrative standpoint. In the future, an Area Coordinator may assume the Chairmanship and past experience has shown this to be an equally effective arrangement since the Bureau continues to lend administrative support.

THE FUTURE

As noted, the Commission will continue to review operations and recommend improvements. While problems will still be raised by individual Coordinators, it is believed that the major source of information on deficiencies and suggestions for improvements will be the mariner.

The Service must stay tuned to the advances of technology, and this is expected to require that all broadcasts include forward error correction teletype transmission by the

mid-1990's. As noted earlier, both France and Spain (Areas II & III) now broadcast in that mode as well as by AIA emission. The United States is experimenting with such broadcasts, and may initiate duplicate service in that mode shortly. When this happens, all remaining single mode broadcast Area Coordinators will be queried on their plans for teletype broadcasts. The rate at which the mode is adopted, as well as any action to phase out AIA emission broadcasts, will depend upon the radio reception capabilities of the ships using the WWNWS system.

The WWNWS has already replaced several of the national long range radio navigational warning services which were operational before its advent. This has improved the timeliness of warnings to the mariner, for the WWNWS broadcast should be the first general broadcast to carry information on an appropriate hazard.

The WWNWS will also be influenced by the development of a global service for coastal warnings on 518kHz, using narrow band direct printing transmissions. These shorter range broadcasts have been tested successfully in the Baltic and North Seas, and operational services are now being planned. Close coordination between the two systems will be required to insure proper information exchange, and in some locations the authority charged as Area Coordinator for the WWNWS may also be responsible for coordinating the regional coastal broadcasts on 518kHz. The main constraint to the expansion of this remarkable new coastal warning service will be the willingness of the ship operators to invest in a suitable receiver.

The same constraint governs the adoption by the WWNWS of the option to relay warnings by INMARSAT broadcast. The feasibility of such relay is clear, as is the advantage to the mariner of satellite communication. But ships must be properly equipped in fairly large numbers if the expense to the broadcaster of the warnings is to be justified, for satellite relay would not remove the need for continuing other modes of broadcasting.

THE USA EXPERIENCE

As this international symposium is being held in the United States, and the United States also serves to coordinate WWNWS broadcasts in 2 NAVAREAS, it is appropriate that a few words be given on the experience the U.S. Coordinator has had with the international system under discussion. The Area Coordinator of NAVAREAS IV and XII has found that ...

(John Lyall Speaks!)

CONCLUSION

It is clear that the Worldwide Navigational Warning Service is proving very effective from a producers standpoint, with major benefits to charting authorities in the field of information exchange. It is less clear, because of a lack of user comment, that the Service is effectively fulfilling the needs of the mariner. The system very much needs feedback from the ships at sea. Further, to quote a point made strongly at the first meeting of the Ad Hoc Committee and repeated often since, the ultimate success of any system depends on the mariners determination to make the best use of it by listening to and acting on the warnings information. It is hoped that you in attendance at this important ISOSO conference can help by encouraging the mariner to take advantage of the Service and to send in his critiques. Be assured that both the minds and the hearts of the many National and Area Coordinators of the WWNWS are involved in the operation, and that every effort will continue to be made to develop and effect improvements.

Thank You!

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