THE ROLE OF PROFESSIONAL ORGANIZATIONS IN HYDROGRAPHY

Rear Admiral Robert C. Munson
Associate Director
Office of Marine Operations
National Oceanic and Atmospheric Administration
National Ocean Survey
Rockville, Maryland 20852

Abstract

Many of the hydrographic surveyors, scientists, and researchers are not cognizant of the international and national forums available to them for the essential exchange of information with their counterparts from around the world regarding technological, scientific, and procedural advances. These organizations have varied criteria for membership and all allow the hydrographic surveyor an opportunity to maintain a high level of proficiency by keeping abreast of the many advances in the profession. Hydrographic surveying requires a sizeable initial investment in equipment and training of personnel that should be protected by keeping the surveyor informed of the rapid advances in the profession. These organizations provide this essential ingredient for the successful hydrographic surveyor.

Hydrographers are entering into one of the most challenging periods in their history. The two principle reasons for this emphasis are: the criteria for boundary determinations as stated in the United Nations Conference on the Law of the Sea (LOS), and Offshore Exploration.

Rear Admiral G. S. Ritchie described the impact of the LOS deliberations on hydrographers in his most thought-provoking keynote address to Commission 4, Hydrographic Surveying at the XVIth Congress of the International Federation of Surveyors (FIG). Ritchie identified the various LOS articles that will require the expertise of the hydrographer in order to carry out the exploration and exploitation of the mineral and nonliving resources of the seabed and subsoil with special emphasis on boundary determinations.

The low water line, as marked on large-scale charts officially recognized by the Coastal State, is specified as the baseline from which the territorial sea and the Exclusive Economic Zone (EEZ) will be measured. The hydrographer establishes this baseline for the national chartering agencies from which the 12-mile and 200-mile limits are measured seaward. The demarkation of the EEZ between states with opposite or adjacent coasts will have to be settled by mutual agreement with the hydrographers providing the essential expert advice in determining the geographical coordinates of the limits and ultimately their display on the nautical charts.

Offshore oil production has steadily moved from the land seaward into ever-increasingly deeper water. This is dramatically in evidence in the North Sea, the Gulf of Mexico, and the Persian Gulf. Whether the aim is to chart natural features, to locate and mine seabed sources of sand, gravel, manganese or polymetallic sulfides, or to position an offshore platform for oil drilling or energy generation, highly precise hydrographic surveys will be required. The electronic age is providing exotic instrumentation for positioning at sea, both horizontally and vertically and the computer gives the capability to process literally mountains of data but in the end a hydrographic survey is only as good as the hydrographer executing the survey. Naturally, with so much dependent upon the hydrographer, the following questions must be answered:

Where do the hydrographers get their educational training? Once the trainees satisfy the necessary educational requirements, where do they gain the experience to become proficient? How do the trained and experienced hydrographers maintain their proficiency to stay current with the ever-changing state-of-the-art?

Wherein lies the answers to these questions?

Where do hydrographers get their educational training?

There has not been a school in the United States offering a degree in hydrography. Most hydrographers pursued a degree in civil engineering with the courses in mathematics, physics, photogrammetry, and surveying, providing a strong foundation to enter the field of hydrography. Many hydrographers did not start their careers with hydrography as a goal but made the decision based on the job training acquired along the way.

The deficiency in available educational training has been identified by some colleges and universities and they are considering offering a hydrographic surveying curriculum while the U.S. Navy Post Graduate School at Monterey is offering a curriculum to qualified Federal Government employees.
On the international scene, two professional organizations have banded together to develop a joint curriculum for sea surveyors. The International Congress of Surveyors (FIG) decided at its XIIth Congress in 1971 to form a working group to develop professional standards of competence for sea surveyors. At the Xth International Hydrographic Conference of the International Hydrographic Organization (IHO) in 1972, a working group was established to compile a standard syllabus for consideration by IHO Member States. The two organizations subsequently decided to combine the two working groups to jointly develop international educational standards. The joint FIG-IHO Working Group's report was accepted by both organizations in 1977 and an international Advisory Board was established to implement the Working Group's recommendations.

The Advisory Board published and distributed the "Standards of Competence for Hydrographic Surveyors" which provides an outline of training programs and syllabi for standards of competence for three categories of hydrographic surveyors. These standards are for certification of educational establishments and, thus far training facilities in Great Britain, France, and India have obtained recognition by the Advisory Board for training courses.

Where do the hydrographers gain the needed experience after satisfying the educational requirements?

Once the minimum educational requirements are acquired, the options to enter hydrographic surveying in the United States are quite limited. The choices are (1) national service, in the U.S. Navy, the U.S. Army Corps of Engineers, or the National Oceanic and Atmospheric Administration's National Ocean Survey, (2) research in the military or a school of oceanography or (3) geophysical exploration, in the Government or private sector.

The initial investment to acquire a platform, electronic positioning and depth determining equipment, and an experienced crew is so large that the small land surveying companies consider the risks too great to venture out into the water. The marine geophysical companies have flourished with the expansion of the oil exploration into the sea. Their product is based on collecting geophysical parameters and although of great benefit, the standards for collecting bathymetric data are not equivalent to those for hydrography in some areas.

How do the Hydrographers maintain their proficiency?

There are both international and national professional organizations, societies and conferences that unite hydrographers to enable them to share knowledge and experiences to keep up with the state-of-the-art and maintain their proficiency. Internationally, the International Hydrographic Organization, the International Federation of Surveyors, and The Hydrographic Society (THS) are among the most prominent organizations/societies that provide the essential avenue for the hydrographer to sustain professional proficiency. These three represent a wide variety of participants. The IHO is composed of Government members, the FIG is composed of representatives of national professional societies, the THS membership includes anyone interested in hydrography. On the national scene, the National Ocean Survey, the National Oceanic and Atmospheric Administration's electronic positioning and depth determining equipment, the Army Corps of Engineers each sponsor annual hydrographic conferences and the American Congress on Surveying and Mapping, ACSM, Marine Surveying and Mapping Committee is becoming active in a program to certify hydrographers.

Hydrographers realized that "some state of uniformity in hydrography" was needed and held conferences in Washington in 1899 and in St. Petersburg in 1912. But it was not until 1919 that the first International Hydrographic Conference was convened in London at the suggestion of the Hydrographers of Great Britain and France with 24 countries represented. The International Hydrographic Bureau (IHB), was founded in 1921 in Monaco with 19 member countries. In 1970, an intergovernmental convention on the organization came into force making IHO the organization of the member countries and the IHB the headquarters in Monaco.

The objectives of the IHO are to bring about:

(a) The coordination of the activities of national hydrographic offices;

(b) The greatest possible uniformity in nautical charts and documents;

(c) The adoption of reliable and efficient methods of carrying out and exploiting hydrographic surveys;

(d) The development of the sciences in the field of hydrography and the techniques employed in descriptive oceanography.

The principal work undertaken by the Bureau is required by the Convention to be:

(a) To bring about a close and permanent association between national hydrographic offices;

(b) To study any matters relating to hydrography and the allied sciences and techniques, and to collect the necessary papers;

(c) To further the exchange of nautical charts and documents between hydrographic offices of Member Governments;

(d) To circulate the appropriate documents;

(e) To tender guidance and advice upon request, in particular to countries engaged in setting up or expanding their hydrographic service;
(f) To encourage coordination of hydrographic surveys with relevant oceanographic activities;

(g) To extend and facilitate the application of oceanographic knowledge for the benefit of navigators;

(h) To cooperate with international organizations and scientific institutions which have related objectives.

The Bureau serves as a source of technical advice and as a coordinating body for the promotion of measures aimed at establishing and/or strengthening the hydrographic capabilities of developing countries. As a means of accomplishing the foregoing objectives, the Bureau provides advice relating to operational techniques, education and training as well as equipment and instrumentation.

The work of the Bureau is promulgated to its Member States in both French and English languages by routine correspondence and by the following publications, which are also available on sale to any other interested parties:

(a) The International Hydrographic Review published twice yearly, containing the professional articles on hydrography and related subjects.

(b) The International Hydrographic Bulletin published monthly containing information of current hydrographic interest.

(c) The Yearbook.

(d) In addition to the above, the IHB produces a series of special publications, each of which is a definitive work in hydrography. A list of publications can be obtained on request.

Steady progress in international cooperation has resulted from the regular series of International Hydrographic Conferences which, as a general rule, are held every 5 years, at which delegates of Member States, headed most always by the Hydrographers of each country, meet to discuss progress and problems. The IHO remains very strictly nonpolitical and works for the good of seafarers of all nations. The XIIIth International Hydrographic Conference was held in Monaco in April 1982, where 46 Member Governments, 16 non-Member Governments, 13 intergovernmental and international organizations and 15 national organizations were represented.

The FIG was founded on July 18, 1978, at Paris by delegates of seven national professional organizations from Belgium, Germany, France, Great Britain, Italy, Switzerland, and Spain. The FIG Statutes list the aims in Articles 1 to 3 as:

Article 1

(a) Confederation of National Societies and Professional Organizations of Survey Engineers of all countries for the purpose of discussion of general professional questions.

(b) Cultivation of good relations between all affiliated organizations.

(c) Open discussion of the social status of the professional colleagues of all member organizations in order to provide the benefits of general progress to every country.

(d) Encouragement of support by contributions and publications of useful research and inventions in the fields of science and technology, and the legal, economical, and social spheres.

(e) Unification of professional education in accord with new working procedures.

(f) Facilitation of communications with the appropriate authorities and the exchange of professional personnel among different countries.

Article 2 requires FIG to abstain from any interference in questions of politics, religion, and race.

Article 3 recommends that these aims be pursued by:

(a) International Congresses

(b) Meetings of Commissions

(c) Periodical conventions of delegates of the national member organizations which constitute the Permanent Committee (PC) of FIG.

(d) By lectures, exhibitions and tests of new procedures and new instrumentation.

(e) By a periodically issued international News Bulletin containing information on conventions and the administrative, technical, and professional work of the Federation.

(f) By distribution or circulation of literature among the affiliated organizations which is of interest to the profession.

(g) By establishing centers of information and assistance within the member organizations in providing opportunities for study, for work or recreation for teaching personnel, students, apprentices, professionally active surveyors or to other individuals who desire such information.

There are nine FIG commissions with Commission 4 Hydrographic Surveying getting its start in 1968 as a separate entity and growing in strength and vitality with each passing year. The other commissions of interest to the hydrographer are Commission 1: Professional Practice, Commission 2: Professional Education, Commission 3: Professional Literature, and Commission 5: Survey Instruments and Methods.
The United States membership in Commission 4 is through the American Congress on Surveying and Mapping. Presently, ACSM has designated me as the U.S. delegate to Commission 4. The FIG convenes a Congress meeting on a 3-year cycle. The last Congress was held in Montreux, Switzerland, and the next meeting will be held in 1983 at Sofia, Bulgaria.

At each Congress, Commission 4 establishes Working Groups (WG) to work during the intervening years on subjects of immediate concern to hydrographers throughout the world.

Noteworthy reports developed in recent years are:

- WG 414a Data Acquisition and Processing Systems
- WG 416b Positioning Systems
- WG 415 Techniques for Detection of Underwater Anomalies

These reports are used by hydrographers as reference documents in procuring, testing, and operating electronic equipment for hydrographic data acquisition and processing.

Commission 4 decided at the XV Congress in 1977 at Stockholm that the rapid changes taking place in the technology associated with hydrographic surveying warranted a conference dedicated solely to this subject. Largely through the determination and leadership of then Commission 4 Vice-Chairman T.D.W. McCulloch, FIG cosponsored with the Canadian Institute of Surveying and the Canadian Hydrographic Service, the First International Hydrographic Technical Conference at Ottawa, Canada, in May 1979. It was attended by a strong contingent of hydrographic surveyors and other interested individuals from around the world including all officers of Commission 4. The Conference was considered an unqualified success by over 400 persons who participated in the sessions and the associated events. The papers dealt with the techniques and technology of hydrographic surveying in use around the world with authors representing Government, commerce, and academia. The Second International Hydrographic Technical Conference is now being planned in 1984 by The Hydrographic Society.

The Hydrographic Society membership form reads: Membership is international and broadly based, in order to unite surveyor, equipment manufacturer and client. Members, from over forty countries, represent the areas of hydrography, oceanography, geophysics and civil engineering at all levels of expertise. Organizations represented include contract survey companies; port authorities; Government, military and public services authorities; petroleum companies; research and educational institutions; professional bodies and societies; engineering consultants; post and telecommunications organizations; acoustic and electromagnetic instrumentation manufacturers; oceanographic and land survey instrument manufacturers; dredging and salvage contractors, and surveyors of all fields of private practice.

The Society unites the interested members through the issues of The Hydrographic Journal, and the Information Sheets, Special Publications, a biannual symposium, and about five meetings held in London during the year. The Hydrographic Society offers a free two-way employment service, whereby members are informed of situations vacant and employers are informed of members availability. The Society has decentralized in recent years with regional branches being established in Great Britain and national branches established first in the United States followed by one in the Netherlands.

The U.S. branch of The Hydrographic Society elected a new slate of officers this summer and has pursued a very active program that will be attractive to anyone with an interest in the sea.

The major national efforts in North America are focused in the hydrographic conferences conducted each year by the Canadian Hydrographic Service, the U.S. Army Corps of Engineers, and the National Ocean Survey. The convenors of these conferences are purposely concentrating the subjects of the meetings towards the working hydrographer. Some sessions are in the form of workshops which provide an excellent opportunity for hydrographers to have open and frank discussions on subjects ranging from electronic equipment to field procedures. The conferences were started to meet a need in each organization to get their hydrographers together each year to freely exchange information. The attendance at the meetings has grown each year which is ample proof that a need is being successfully fulfilled. Meetings such as OCEANS 82 are not solely dedicated to the subject of hydrography, but do provide an opportunity for segments such as this session for the subject.

Finally, when the hydrographer has been educated, trained, gained experience and kept up with the state-of-the-art of the profession, how is this achievement recognized by the employer or contractor? ACSM's Marine Surveying and Mapping Committee is pursuing this task. A five-chair Certification Board is being established to supervise the development of workshops, preparing and administering certification examinations, and recommending candidates for certification. The ACSM President will certify hydrographers and provide the names to the public. This is the subject of the next paper "CERTIFICATION OF HYDROGRAPHIC SURVEYORS" by James Collins.

The international and national professional organizations/societies provide an unparalleled opportunity for the hydrographic surveyors to obtain and maintain a high degree of proficiency in the profession.

Make use of them!