

ECDIS DEVELOPMENT IN CHINA

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Following several years of hard work on ECDIS development, numerous ECDIS, with various functions have now appeared and been put into use in the world. There are now many international and national organisations and services (IHO, IMO, national Hydrographic Offices, and other institutes) which are actively engaged in the development of ECDIS. To meet the needs of different users, some manufacturers are constantly introducing new versions of ECDIS.

In the People's Republic of China, competent hydrographic authorities, as well as some colleges and marine equipment institutes, have been paying particular attention to the progress of ECDIS and following the effects of its use in navigation. They are contemplating ECDIS development and applications in China. Whilst Chinese mariners are looking forward to the appearance of commercial ECDIS products, much work has been done on these tasks: collecting information available; examining administrative matters related to ECDIS; studying problems involved in ECDIS manufacturing; considering aspects of safety, copyright, legal responsibility concerned; data exchange between HOs; evaluating prospects of ECDIS application in the shipping sector; and taking the first step on the development of China's ECDIS.

In 1988, China established closer contacts with the IHO Committee on ECDIS (COE). Meanwhile, some institutes and colleges started their work on ECDIS, with the initial move being confined to research and limited to the ship-board system. The research work was carried out based on the ECDIS Specifications developed by COE and by the Radio Technical Commission for Maritime Services (RTCM). Some special considerations had to be made, both to meet the realistic requirements of navigation and to meet the relevant technical standards, currently in force in the Chinese electronic industry.

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CURRENT STATUS

1. International Contacts

In order to take an advance position and accelerate ECDIS development in China, the Ministry of Communications, one of the governmental authorities responsible for hydrography, has highlighted the contacts with COE/IHO. Representatives from China have attended a number of COE conferences and seminars on ECDIS. They were impressed by the developments and achievements gained under the guidance of COE. Some representatives had the opportunity to pay a visit to a trial test in the 'NORTH SEA PROJECT' in 1988, thus were aware of the progress made by institutes and manufacturers in other countries and obtained much valuable information, which has resulted in a positive effect on the current ECDIS development in China.

2. Development of Equipment

China's first ENC (Electronic Navigational Chart) equipment was completed at the end of 1988. It should, strictly speaking, be regarded as an ECS (Electronic Chart System) rather than an ECDIS. This equipment has the following functions and characteristics:

- It calculates ship's position promptly and correctly; displays, at any time, the past track and indicates and records navigational information required by the mariner. Chartwork is carried out on a Cathode Ray Tube display.
- Navigational information is displayed on a high resolution colour display. For safe navigation, it identifies important features and correctly reflects geographic characteristics and changes in sea areas; indicates in detail navigable areas, aids to navigation, obstructions, spot soundings, currents, etc.; provides terrestrial references, landmarks, residential areas, etc. along the coasts; provides a latitude-longitude grid. Relevant textual indications and notes (such as date, time, ship's position, compass heading, planned course, distance run, bearing of important turning-point, distances, course offset, soundings, information for next course, etc.) are displayed on an alpha-numeric display.
- The symbol for 'own ship' is always maintained within the central area of a chart's 'window', so there is a sufficient field of vision around the ship. When it reaches the boundaries of the central area, the chart display changes automatically.
- The method of man-to-machine interactive communication is applied with the aid of Chinese menus.
- Interfaces are provided for the echo sounder, electronic compass and navigational aids (Loran-C, GPS, etc.).

- The whole suite consists of a high-performance computer, a high-resolution graphic colour display, and alphanumeric monochrome display, a plotter and interface circuits. It is placed in one cabinet to comprise an integrated electronic chart system.
- Low water datum (sounding datum) is adopted for vertical datum, and the prevailing projection for conventional paper charts, the Mercator projection, is applied. Scales are divided into three ranges:
 - a) General:
Normally smaller than 1:750 000. Stressing aids to navigation, obstructions and other offshore features beyond the 30-m contours.
 - b) Coastal:
Normally 1:200 000-1:300 000. Stressing aids to navigation, obstructions and other offshore features beyond the 10-m contours.
 - c) Approach and Harbour:
Normally greater than 1:80 000. Stressing aids to navigation and obstructions along coastlines, approaches and fairways. Presenting most objects for geographic positioning.

This equipment is now on evaluation aboard ship so as to examine its performance and to gain practical experience. Modifications will be made in accordance with ECDIS specifications recommended by the COE.

The designers were unable to see the Draft Specifications by COE until the last phase of the development, so that the system's performances and functions are slightly inconsistent with that described in the Specifications.

Some Chinese institutes made a relatively late start in ECDIS development, but they received, in time, relevant documents from the COE and therefore are directly affected by COE. Achievements of the working groups of COE were and will be, absorbed and utilized by the institutes as they attempt to meet the Specifications. These institutes are now working hard on development of shipboard ECDIS and on the generation of ECDB in different respects.

3. Electronic Chart Database (ECDB)

In China, it is many years since computer technology was applied to chart data processing, but attempts have never been made to establish chart databases with such technology. An era of digitisation has obviously arrived. The digital chart is drawing more and more attention. The authorities concerned have taken initiatives in chart digitisation. Relevant specifications have been drafted, in which ENC ranges, compilations, features, colours, scales, symbols, abbreviations, etc. are defined. As the work on ECDIS is going on, efforts have also been made on the establishment of ECDB. Some institutes and colleges have, by means of varied equipments, tried different methods of data entry (manual entry of source data on the keyboard; entry of the source chart by a video-camera; entry of the paper chart by a digitizer). Database models have been set up (by using UNIX and CCDOS operating systems, and C, PASCAL and FORTRAN high-level

languages) on the HP 386 VAX computer. A considerable number of personnel, equipment and funds are concentrated on this ongoing work, demonstrating that the Ministry of Communications is taking into consideration the speeding up of the development of ECDB.

SUGGESTIONS AND IDEAS

The Chinese Hydrographic Office wish the COE to make every effort to introduce, as soon as possible, the official specifications for ECDIS, ECDB and data exchange format which may be used as the guideline to our ECDIS development. While on the part of China's national authorities, they should:

- enhance co-operation and contacts with the COE and its working groups, enthusiastically take part in conferences, seminars and professional exchanges organised by COE, so as to acquire more information and guide the national development of ECDIS;
- reinforce administrative functions of the competent hydrographic office, establish administration and research systems for ECDIS, perform a function on directing and coordinating the research institutes and potential users, guide ECDIS manufacturers to relevant specifications recommended by COE/IHO;
- formulate appropriate policies advantageous to ECDIS development, raise funds for the research work, muster experts and equipment to speed up, both in depth and scope, the development of ECDIS and ECDB;
- try best to collect, sort out and make use of information, achievements and experience from other countries, and manufacture, in the light of China's specific conditions, a competitive ECDIS which will meet the requirements of IHO and IMO.
- carry out further study in respect of the copyright, legal responsibility, data exchange, etc. related to Electronic Chart.

It is fully realised that the COE is playing a most important role in guiding and coordinating the world ECDIS development, and its ECDIS specifications should be followed by the institutes and manufacturers of China.