THE PROCEDURE OF MAINTENANCE OF THE MILITARY NAVIGATIONAL HANDBOOK IN THE CONSTANT UP TO DATE STATUS

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SUMMARY

Regarding the provisions of hydrographic data and material for the defense needs, Ministry of Defense of the Republic of Croatia in cooperation with Hydrographic Institute of the Republic of Croatia has published a military navigation handbook in analogous and digital format.

This paper presents the procedure of maintenance the military navigation handbook in the constant up to date status.

1. INTRODUCTION

Systematic data collection in the hydrographic, oceanographic and nautical survey, as well as cartographic processing of the collected data have a long tradition (Horvat, Duplančić, Železnjak 1999) .

Military navigation handbook, resulted from extensive hydrographic, nautical and cartographic activities, was worked out by computer processing, and was published in 1997 in analogous and digital format in two parts: 1st part (from Savudrija to Zadar) and 2nd part (from Zadar to Prevlaka).

Analogous format is edited in four colors; black, blue, yellow and purple and is

equipped by the mechanical binding, so that the number of total pages of both parts (.....) can be changed as needed..

2. HANDBOOK CONTENTS

More than 5500 km of coastline, 1242 islands, islets, rocks and rocks awash (Duplancic Leder et al. , 2000), numberless straits, passages and other areas dangerous for navigation along the east coast of the Adriatic Sea, causes this area to be an exceptionally complex navigational whole.

Handbook displays all harbours and marinas, most of the bays, anchorages, same passages, quays, berthing facilities and other navigational objects within Croatian part of the Adriatic Sea.
Besides graphical display, in form of various schemes and navigational plans, handbook includes the data necessary to get the knowledge of local characteristics: orientation, obstacles, meteorological conditions, sea currents, sea transparency, high and low waters, possibilities of entering ports, mooring and anchoring possibilities, repair services, coastline descriptions, offshore coastline description, stranding points, food, water and energy supply, medical insurance, travel guide to neighbouring places, local authorities, harbour installations (cranes, dock entrances, workshops), heights of quays and other data.
Handbook plans are shown without cartographic net, geodetic and height points as well as without height display of the ground. Nautical part of the plans is worked out under all rules of nautical charts and plans processing.
Digital version is made by DOS surround.

3. MODERNIZING HANDBOOK - MOTIVES, METHODS, PROBLEMS

3.1 Reasons for maintenance the handbooks in constant up to date status

Improvement of the safety of navigation, constant changes in aquatorium as well as a constant progress of technology are the main motives for the development of constant maintenance handbook system and its digital version.

Immediately after publishing first edition it was estimated that about 30% of graphical data must be renewed and some new data and objects must be inserted.

Through the analyse of all relevant facts , monthly notices (similar to Notices to Mariners) by which necessary corrections of data in analogous version could be made, is defined as the most proper mode of maintaining the handbook in revised state, avoiding need of publishing new editions every three months.

At first, publishing of new editions in analogous version was planned every five years, but respecting the voluminous changes that were shown in past two years trough the work on maintaining the handbook, new edition shall be probably published earlier.

3.2 Ground collecting data

For the collecting necessary data two modes are mainly used : official notices of the Port Authorities and their Offices and perambulation the ground with the responding surveys.

All objects shown at the handbook are perambulated twice a year. For all objects with lower level of change one-day works are foreseen containing geodetic and hydrographic survey (measurable ground survey and hydrographic

UV echo-sounder survey). All text data (supply, phone, police, transport connections etc.) are also regularly checked.

For all more distinctive changes new geodetic and hydrographic surveys are

undertaken at once.

3.3 Elaboration of the ground data and issuing notices

All collected data are processed at hydrographic, nautical and cartographic department and the results of those processing are incorporated into the revised data -base of the digital version .

For keeping analogous version up to date by monthly notices all changes are numerically displayed and text changes are clearly described and easy to apply. For the pages or part of the pages with lot of changes adequate coupons or complete new pages are issued so that the user can apply or replace them by himself.

Working out new pages contains working up new plans, nautical elaboration of

ground data, publishing and printing preparations for editing new page and new plan and other related jobs.

Every three months updated digital version of the handbook is issued for the users. The same is tested and copied on CD before.

3.4. Updating digital version procedure

Updating the handbook in digital version means updating caused by ground changes and changes in software systems. Updating by introducing new technologies is related to a software accessibility on Croatian market. First digital version is worked out in DOS surrounding. Afterwards Windows surrounding appears and other technologies progressed (better resolution, colored display possibilities) causing necessity of frequent editing renewed digital version handbooks. Introducing new software attains higher quality of pictures and simplicity of use.

3.4.1 Resolving plans geo-coding problems

Most measurements for the objects at the handbook are in large scale and in local system so on the resulting plans geodetic points (except lighthouses whose coordinates exists at digital data-base) are unfortunately missing.

At Hydrographic Institute geo-coding procedure of the plans as in 1st edition of the handbook (Ujević, 2000) is shown. For the purpose of geo-coding supporting points of the convenient position references are graphicly evidenced from the existing foundations (hydrographic originals, port plans) that are usually of the smaller scale than the plans at the handbook are.

To avoid occurrence of shrinking , subjective statements or other possible mistakes the decimeter net (if there is no one) is constructed and after scanning at high resolution computer display of co-ordinates of the supporting points is performed at AcadMap program package.

TIFF format is used for the raster form to retain quality and tint scanned on the resolution over 600x600 dpi. For the scanning originals reproduction originals are used .

First transformation eliminates base deformation. Co-ordinates of the top of the plans are defined and with adequate orders and options at AcadMap space transformation from the state co-ordinate system to WGS84 is performed.

Next step is raster transformation based on Helmert 2D transformation parameters. Four parameters from the Helmert 2D transformation are defined : two translations, rotation angle and scale. Raster position defined by parameters on theory of lowest squares presents optimal position between selected supporting points. Plotting into the frame at Merkator projection on WGS84 is performed by net options .

By this procedure of geo-coding metric preciseness is attained, only for some plans sub-metric. Ground surveys enables centimeter preciseness. Increase of the preciseness could be also gained by using extra data such as air-photogrametric photos, cadastre plans or ground planed photographing of the selected supporting point by classical methods or by using GPS receiver .

4. HANDBOOK POSITION AT MILITARY HYDROGRAPHIC INFORMATION SYSTEM

The system of hydrographic support to Navy presents an important segment of military system of making decisions and giving orders.

In the system C^3I (Command Control Communication and Intelligence) the optimum quantity of spatial information, i.e. the established military hydrographic information system has an essential significance in the control and analysis of the development of combat activities by using recent information technology.

C^3I system optimized a quantity of information on the Adriatic Sea area. The developed military hydrographic – cartographic information system essentially follows and processes battle activities, using the most advanced computer technologies.

The military hydrographic – cartographic information relay up on HIDRIS, hydrographic information system of the Croatian Hydrographic Institute (Solaric, Duplancic 1999).

At the moment, the production of this system is in the phase of initialization. New maritime navigation charts, publications and handbooks are produced in digital form together with formerly published nautical charts and publications, which are to be slightly modified and involved in the system (Horvat, Duplančić, Železnjak, 1999). The special place in this system has the military navigational handbook.

The users are not allowed to change the content of the navigational handbook on the CD-ROM.

5. CONCLUSION

Working out the handbook in analogous and digital format and its systematic maintenance in updated status increased the system of hydrographic insurance of the Navy and changed existed approach to the maintenance of such publications

showing at the same time necessity for comprehension the information technology into the determination process.

Except of keeping the military navigational handbook up to date with the changes in the aquatory the digital version is adapted for new software tools and electronic devices on the warships.

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