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Stručni članak

Thematic Nautical Charts and Handbooks for the Sea Area of the Eastern Adriatic Coast

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ABSTRACT. This paper briefly reviews the maritime hydrographic and nautical cartographic activities in the Republic of Croatia through history and nowadays, especially considering the production of thematic nautical charts and handbooks for military purposes.

Key words: nautical chart, hydrography, Croatia, Adriatic sea

1. Introduction

The Adriatic Sea is an elongated basin (ca 800 km long and 200 km wide). The northern part of the basin is a concave-shaped shelf, whose maximum depths (around 280 m) occur in the Jabuka Pit. The bottom rises at Palagruža Sill (130 m), then deepens in the southern part – the South Adriatic Pit – to about 1200 m, and rises again in the Otranto Strait (780 m). The western coast of the Adriatic Sea is smooth, isobaths run parallel to it, and depth increases gradually seaward. The eastern coast is composed of many islands and headlands rising abruptly from the deep coastal water.

A thousand islands and more than 5000 km of coastline, 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. Adriatic subsea topography, as a part of the macrotectonic origin subsea valley between the Apennines, Alps and Dinarides.

Such area needs constant hydrographic and oceanographic survey, as well as production of high quality nautical charts, handbooks and publications, and various thematic charts and handbooks.

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2. Short Historical Review of Hydrographic and Cartographic Activities

Organized and systematic hydrographic and nautical chart production for the east coast of the Adriatic Sea has a long tradition. French hydrographer Charles-François Beautemps Beaupré performed the first hydrographic survey along the east coast of the Adriatic Sea (Figure 1). From 1806 to 1809 during his campaign, he surveyed the most significant Croatian harbours, performing also astronomic, geodetic, hydrographic and geomagnetic measurements. An atlas with 15 maritime plans and 2 panoramas was given as the result of this campaign (Duplančić 1999).

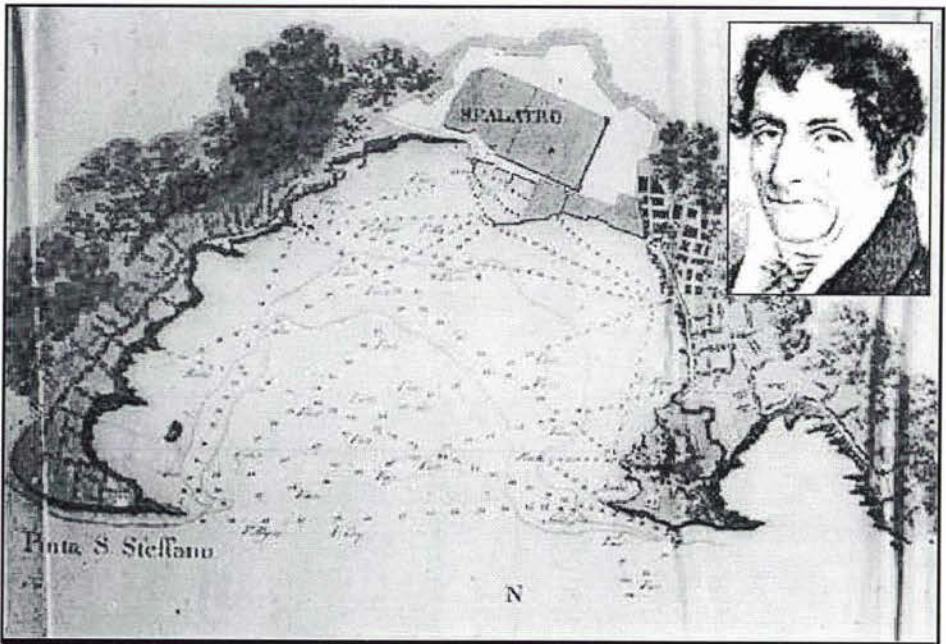


Figure 1. A part of Beautemps Beaupré's maritime atlas

During the campaign from 1822 to 1824 Austro-Hungarian Navy performed a systematic survey of the east coast of the Adriatic Sea. The result of campaign were 2 general charts, 22 sailing charts and 7 harbour panoramas. The Empire of Austria-Hungary established the first Hydrographic Office in Trieste during 1861, which moved to Pula the next year. Since then till nowadays hydrographic service has had almost a century and a half of continuous activity (with breaks during world wars) over the east coast of the Adriatic Sea. Over 1000 hydrographic originals on different scales in Gauss-Krüger projection according to Bessel 1841 were produced during that period of time.

Few hydrographic institutions could boast such a long hydrographic, oceanographic and cartographic activities. From 1991 the hydrographic service takes place in Hydrographic Institute of the Republic of Croatia (HHI).

3. Hydrographic and Cartographic Activities Nowadays

Nowadays, hydrographic survey uses integrated hydrographic systems with DGPS positioning methods, which provides exceptional accuracy. Specific topography of the sea bottom is given by side-scan sonar image correction survey, as well as multibeam technique survey. Hydrographic information system – HIDRIS is used to collect and process hydrographic and oceanographic data. Hydrographic survey data are partly measured in the local coordinate system and partly in WGS 84.

Solution for all cartographic activities, for civil maritime economy as well for the Croatian Navy, are certainly the existing interactive computer graphical systems within HHI, with modern hardware / software equipment. Wide analogue and digital cartographic data bank is the basis of cartographic information system – CIS.

Croatian Hydrographic Institute covered the Adriatic Sea with 8 general charts (scales from 1:750 000 to 1:2 500 000), 30 sailing charts (scales from 1:150 000 to 1:300 000), 21 coastal charts (scales from 1:50 000 to 1:100 000), INT charts (scales 1:250 000) and various plans on scales 1:3 000 to 1:40 000 in several editions and publications. Apart from nautical charts this Institute provides numerous different informative, auxiliary and special thematic charts.

Cartographic activity, apart from new analogue and digital chart production, proceeds in several mutually connected directions: transfer of all analogue charts to digital form, digitalization of hydrographic originals, cartographic data bank production, IHO's recommendation standardization for display on charts, solving problem of incompatible nautical charts of HHI's production towards the neighbouring countries nautical chart production. These are the significant steps nowadays.

4. Military Cartographic System Production

C³I (Command Control Communication and Intelligence) 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 (Horvat 1992).

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.

For military purposes HHI produces special charts in analogue and digital form, as well as various handbooks and other products such as: navigational handbooks, nautical-topographic charts scaled 1:25 000, raster system of coastal, sailing charts, plans and sedimentologic charts of the Adriatic Sea.

4.1. Navigational Handbook

Navigational handbook is produced both in analogue and digital form. Handbook is the result of systematic data collection in the hydrographic, oceanographic and nautical survey, as well as cartographic processing of the collected data. Handbook di-

splays all harbours and marinas, most of the bays, anchorages, quays, berthing facilities and other navigational objects within Croatian part of the Adriatic Sea.

Besides graphical display handbook includes the data necessary to get the knowledge of local characteristics: orientation, meteorological data, currents, sea transparency, high and low waters, possibilities of entering ports, mooring and anchoring possibilities, repair service, coastline descriptions, offshore coastline description, stranding points, food and water supply, medical insurance, travel guide to neighbouring places, harbour installations (cranes, dock entrances, workshops), heights of quays and other data.



Figure 2. Part of maritime-topographic chart

4.2. Nautical-Topographic Charts, scale 1:25 000

For areas of special navigational interest, HHI produces nautical-topographic charts, scaled 1:25 000. Detail display of land contents on these charts uses standards valid for topographic chart production, as well as symbols valid for topographic contents. Nautical contents are displayed with details according to rules that are valid for nautical chart production, with the symbols used on nautical charts.

Till now, 12 of the planned 37 charts have been produced in analogue form (Figure 2). These nautical-topographic charts are produced in Gauss-Krüger projection, according to Bessel 1841 data. Formerly produced charts have been modified by overprinting the cartographic grid in magenta, according to WGS 84. New charts are produced in vector form with the cartographic grid within the state coordinate system and according to WGS 84.

In the following period, full implementation of the standards in hydrographic and cartographic activities according to the International Hydrographic Organisation (IHO) and the International Sea Maritime Organisation (IMO) recommendations is planned.

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Tematske pomorske karte i priručnici za istočnu obalu Jadranskoga mora

SAŽETAK. U radu se daje kratki pregled pomorskih i hidrografskih djelatnosti Republike Hrvatske tijekom povijesti i u današnje vrijeme. Posebno se razmatraju tematske pomorske karte i priručnici izrađeni za vojne potrebe.

Ključne riječi: pomorske karte, hidrografija, Hrvatska, Jadransko more

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