



“NETWORK OF DANUBE WATERWAY ADMINISTRATIONS”
South-East European Transnational Cooperation Programme

STATUS QUO REPORT ON ENC ACTIVITIES

SK - SVP

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1 LIST OF ABBREVIATIONS

ABBR.	Abbreviation
ECDIS	Electronic Chart Display and Information System
ENC	Electronic Navigational Chart
ENR	Low water level according to the recommendations of the Danube Commission in 2006 Acronym in French language as official Danube Commission language, RNW in German, HNRPV in Slovak
IENC	Inland Electronic Navigational Chart
ISRS	Inland Ship Reporting Standard
GIS	Geographical Information System
S-JTSK	Systém Jednotnej Trigonometrickej Siete Katastrálnej – coordinates system using in Slovakia
SVP	Slovenský vodohospodársky podnik/Slovak Water Management Enterprise
UTM	Universal Transverse Mercator coordinate system

2 SCOPE OF DOCUMENT

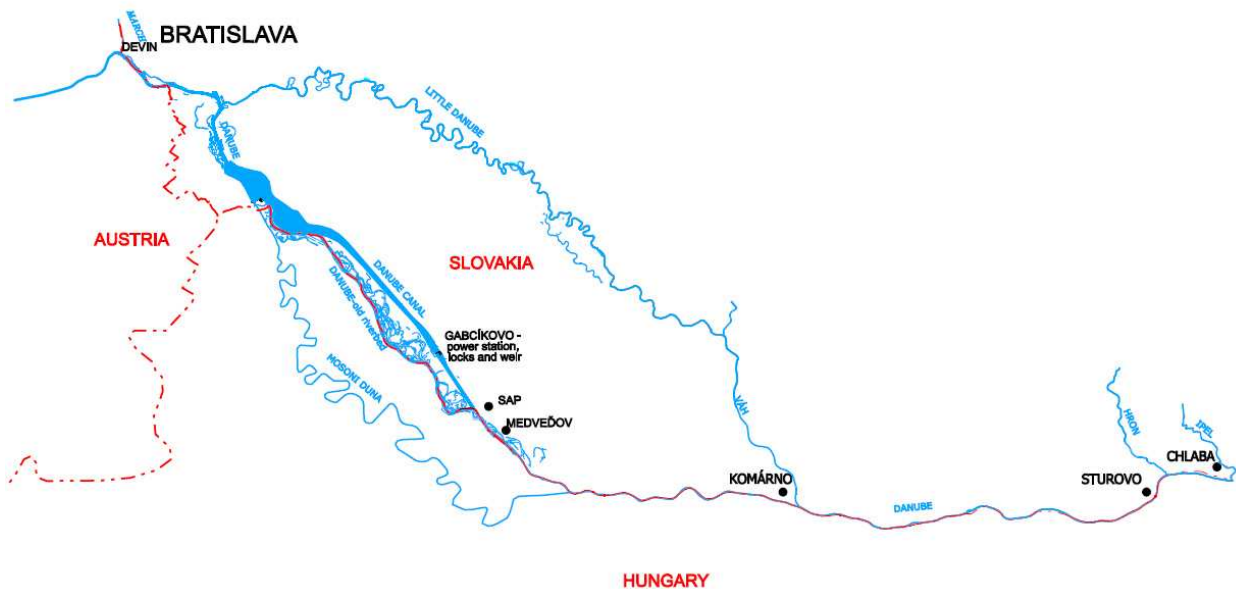
Activity 5.2 is related to the harmonization of activities in the field of Inland ENC production and distribution.

According to description of work SWP 5.2 (Task 5.2.3) every partner shall identify and describe the status quo on ENC activities and what are the problems. The status quo shall at least contain relevant information about:

- IENC coverage of the national stretch (incl. reasons and solution if this is not achieved so far)
- Availability of depth information within the Inland ENCs
- The IENC production process from raw GIS data into IENC objects, involved persons or organisations, used equipment and software tools
- IENC publication process (distribution of updates and new releases)
- Sources (data basis) and accuracy for IENC charts
- Create and maintain IENCs according to the Inland ECDIS Standard
- Cooperations
- Updates, updating circle

3 IENC COVERAGE

SVP is a producer of Inland ENC's in Slovakia. Our national IENC's are available according to Inland ECDIS Standard 1.02 in all section from km 1880.2 to 1708.3 (Devin – Chlaba) in addition to section between km 1853 – 1811 where Danube waterway is redirected to Danube canal. After the Danube canal and locks in Gabčíkovo power station began to use, the fairway was redirected from old Danube riverbed to Danube canal. Now depths conditions are not guaranteed in this section. Therefore IENC in this section we didn't produce.

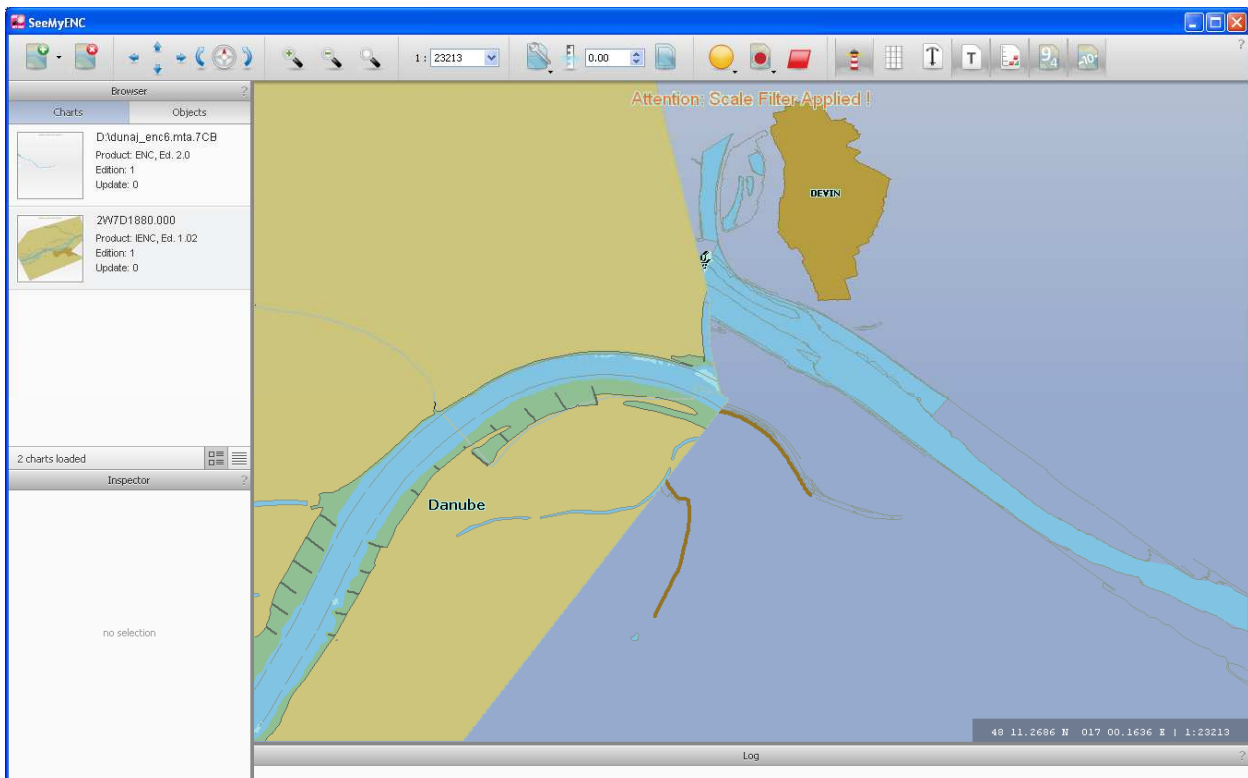


In Slovakia all objects included in an Inland ENC are regarding the Minimum Contents of Inland ECDIS Standard Edition 1.02

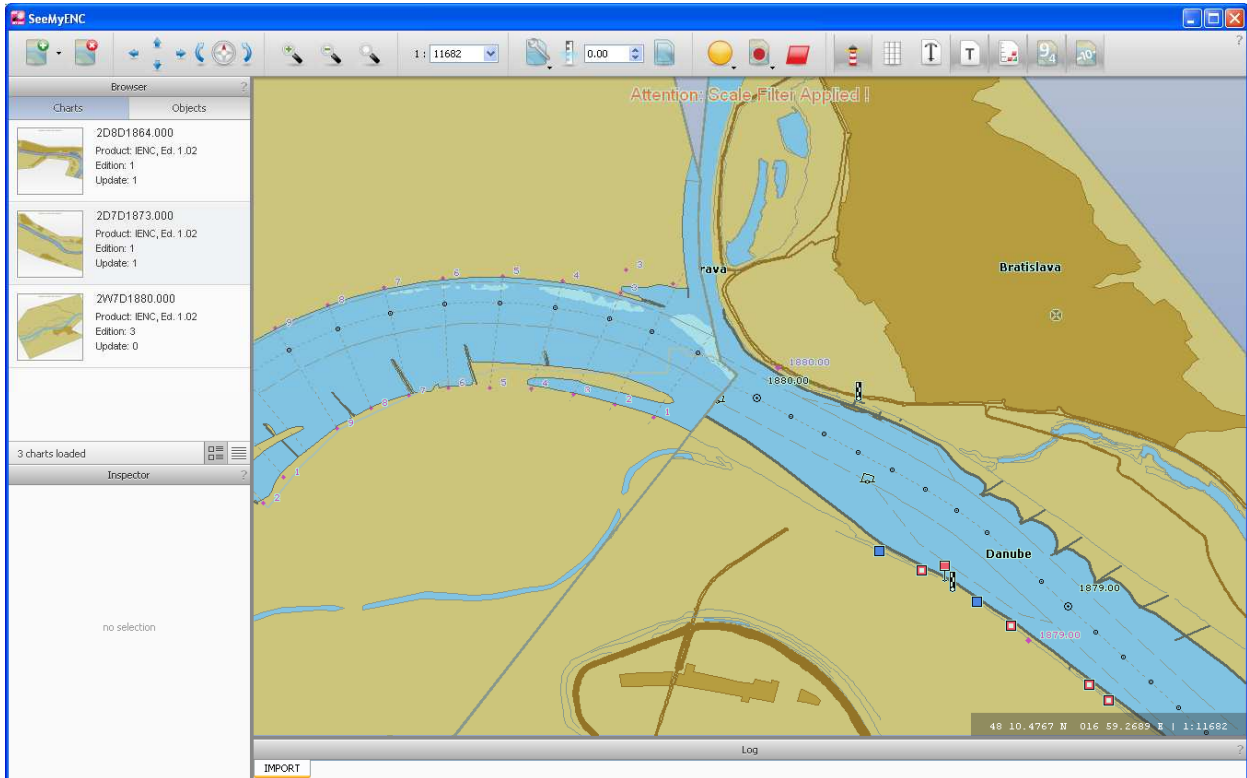
- kilometre marking with fairway axis, river axis, station point along the fairway and river axis, hectometre and kilometre marks
- topography - cell areas, land areas, land regions, water areas navigable and not navigable (for big vessels), fastened and unfastened river banks, (referred to mean water level - MW)/ENR, slope top lines, regulation structures, protection dams
- river bottom - constricted sections and fords (shallow sections)
- navigation – fairway, obstructions of navigation, wrecks, prescribed traffic lanes, notice marks, buoys and beacons
- constructions – weirs, flood barrages, gates of flood barrage, locks (lock basins), lock gates, bridges, harbours, landing stages, pontoons.

European agreement on main inland waterways of international importance (AGN) defines the waterways of international importance, ports of international importance and the technical and operational characteristics of the inland waterways of international importance. According this agreement the Danube is a waterway with the notation E 80.

Ministry of Transport, Posts and Telecommunications of the Slovak Republic emits Decree about details on the inclusion of waterways and their individual sections. Waterways are classified into classes by local and international importance. The most important parameter is size of ship which can sails in a waterway. By this decree section of Danube from km 1880.2 to 1867 is in class VIb and section from km 1867 to 1708.2 is in class VII. All IENCs have a uniform size and filling without gaps. There are problem on common Austrian-Slovak section of Danube (km 1880-1872) and Slovak national section (km 1872-1853 of Danube and km 38.7 – 0 of Danube canal) because IENC on these sections we worked out on the data in S-JTSK coordination system. Transformation data to WGS 84 coordination system by Geomedia technology was not enough successfully. When we loaded Austrian IENCs we saw differences about hundred meters.



Then SAG company work out convertor for us which can convert data to WGS-84 with better accuracy. But there were still little differences.



IENCs in common Slovak - Hungarian section (km 1811-1708) are worked out in UTM coordinates. As we have flying survey data in UTM coordinates too we rework all incorrect IENCs in all section in UTM coordinates. But bathymetric data we have in S-JTSK coordinate system only. For further work we have to order new bathymetric data in UTM.

Based on agreement it is possible obtain the IENCs for internal purposes. We have good cooperation with State Navigation Administration and we provide them our IENCs for their internal purposes.

4 COVERAGE OF DEPTH INFORMATION

We used own bathymetric data from other department (Department of morphologic monitoring) based on ENR (by the Danube Commission in 2006). They provide bathymetric data in S-JTSK coordinates system. Data in UTM coordinates we will have to order from this department. In this moment we don't have them therefore we rework out Slovak-Austrian section and Slovak section in UTM coordinate system without depth data. So depth data didn't include in the Inland ENCs.

All of 3 sections of Danube waterway in Slovakia are covered with depth data. Common Austrian-Slovak section of Danube (km 1880-1872) and Slovak national section (km 1872-1853) are monitored once a year, data are evaluated and treated on the Department of morphological monitoring. Austria receives only a paper version of common section. Density of measured profiles is 50 m.

Common Slovak - Hungarian section (km 1811-1708) are monitored every two years by both countries. This section is divided into two parts km 1811-1749 and km 1749-1708.2. Monitoring of these sections is exchanged every two years. Density of measured profiles is 50m too.

We would like provide depth points and isolines in scale 0.5 m., but depth point values are not visible, we don't know why. We provide only depth areas worked out in range 0-0, 0-2.5, 2.5 and more. We would like obtain depth data in UTM coordinates and we hope to solve this problem.

Also we have depth data from Hungarian partner in section km 1811-1708.2 in altitude (Baltic Vertical Datum - After Adjustment). But we need depth data based on ENR.

5 IENC PRODUCTION PROCESS

5.1. Used software

IENC production is a complicated therefore we used a few kinds of software. We use following software:

Microstation by Bentley, version v8 2004 – graphical data processing

Microstation Geographics by Bentley,

Geomedia by Intergraph, version Professional 6.1 – connecting graphical data with its attributes values, export to shape file format

Oracle Standard Edition 10g

ENC Tools by SevenCs GmbH – we have software support agreement with SevenCs therefore we used the newest versions

ENC Designer 4.4.4,

ENC Optimizer 2.4.1

ENC Analyzer 2.8.0

Profile 2000 by Kongsberg - bathymetric data processing

Microstation InRoads by Bentley - bathymetric data processing, creating DTM of riverbed and isolines reduced to ENR

5.2. Production and maintenance process

So far SVP is sole producer of IENCs but we cooperate with a few external companies – Geodis and Eurosense as suppliers of flying survey data, YMS as a consultant for Geomedia technologies, FGS and SAG as consultants for Maintenance and Web portal. Navigation information and information about harbours we obtain from State Navigation Administration.

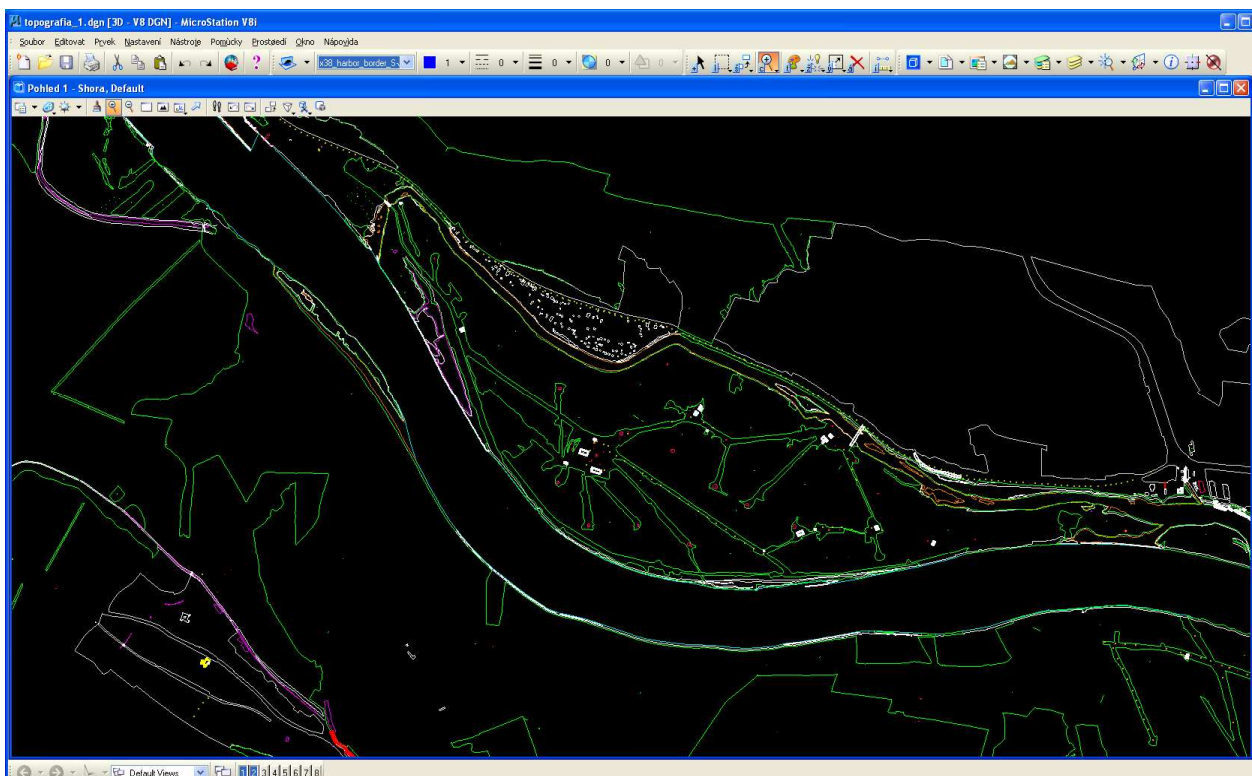
Most of IENC production within SVP is job of Department of water management development. This department does everything from data processing to IENC production. It cooperate with Department of morphologic monitoring which works out terrestrial measurements of Danube riverbed and then they process bathymetric data from these measurements and provide us depth points, isolines and riverbed terrain points.

Our ENC charts content a lot of information. There are

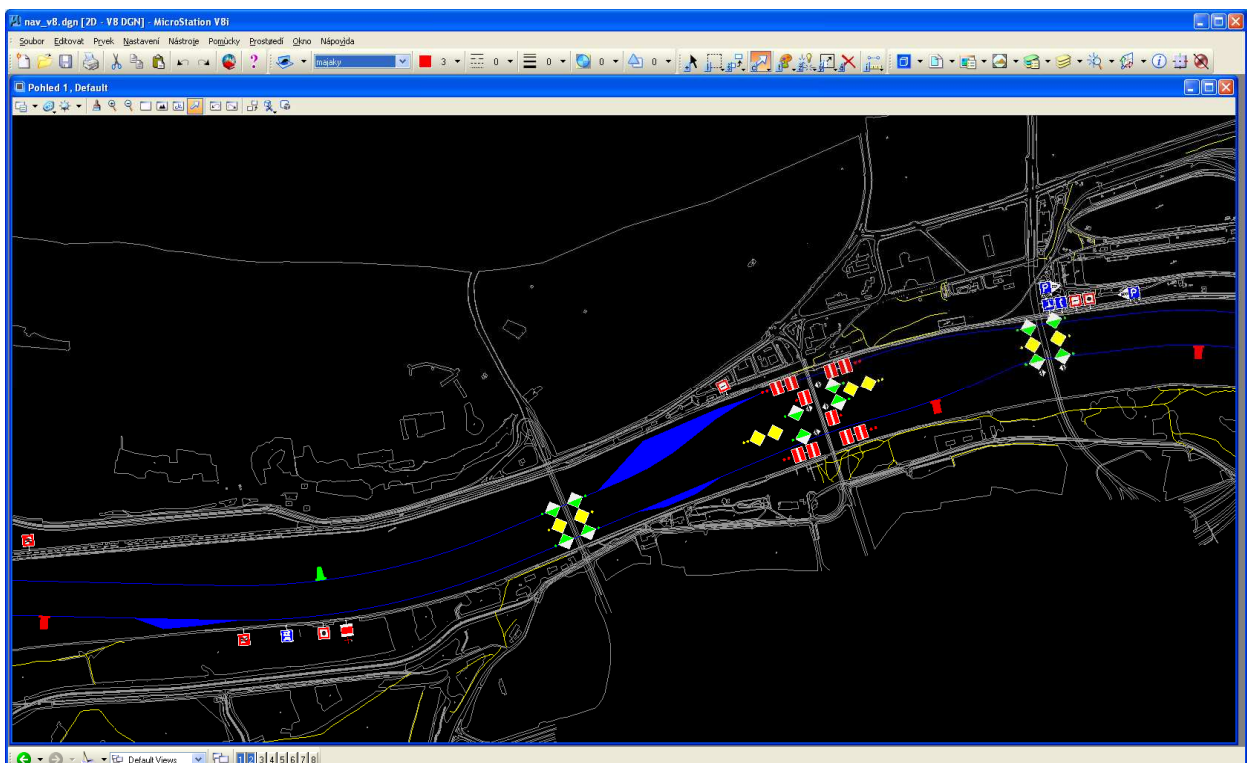
- topographical information – breaklines, river banks, islands, dams, built-up areas, buildings, traffic routes;
- hydrographical information – stage gauges, staff gauges;
- kilometer marking – waterway axis, station points along waterway axis, kilometre and hectometre marks;
- constructions – weir, locks, bridges, ferrys, harbours, pontoons;
- navigation information – notice marks, buoys, beacons, fairway, wrecks, places of berth, anchorage areas;

- borders and regions – international, provincial, county, communal, but this information are visible only in Maintenance portal but they are not visible in ENCs
- depth information – depth points, isolines and riverbed terrain points, but this information are not visible in ENCs, only depth areas

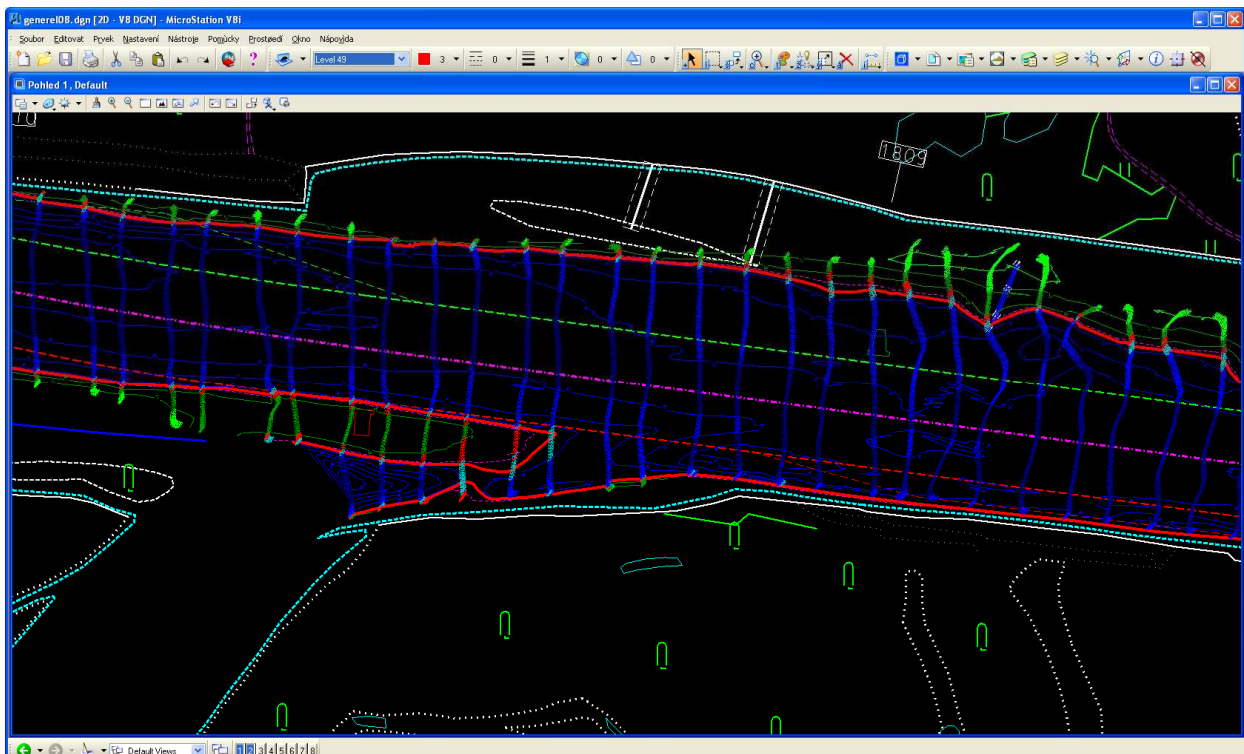
Topographical information and constructions are obtained from flying survey data. We edited this data in Microstation, data were sorting to levels by datamodel.



Navigation information we obtained from “Project of signalization fairway”. Data in this project are updated every two years. We have them in Microstation format too. This project is worked out by SVP - Department of water management development (graphical processing), Department of morphologic monitoring (depth information, isolines, fairway axis, kilometer marking) and Department of waterway operations in Branch Danube (notice marks, buoys, wrecks and other objects in fairway).



Bathymetric data are provided by Department of morphologic monitoring. They monitor Danube riverbed by vessel and rubber boat equipped with GPS receiver. They use echo-sounder for measuring of water depth. Measured points of the riverbed are loaded into Microstation InRoads. Further DTM of riverbed and DTM of ENR are created. By intersection of these models isolines reduced to ENR are generated.



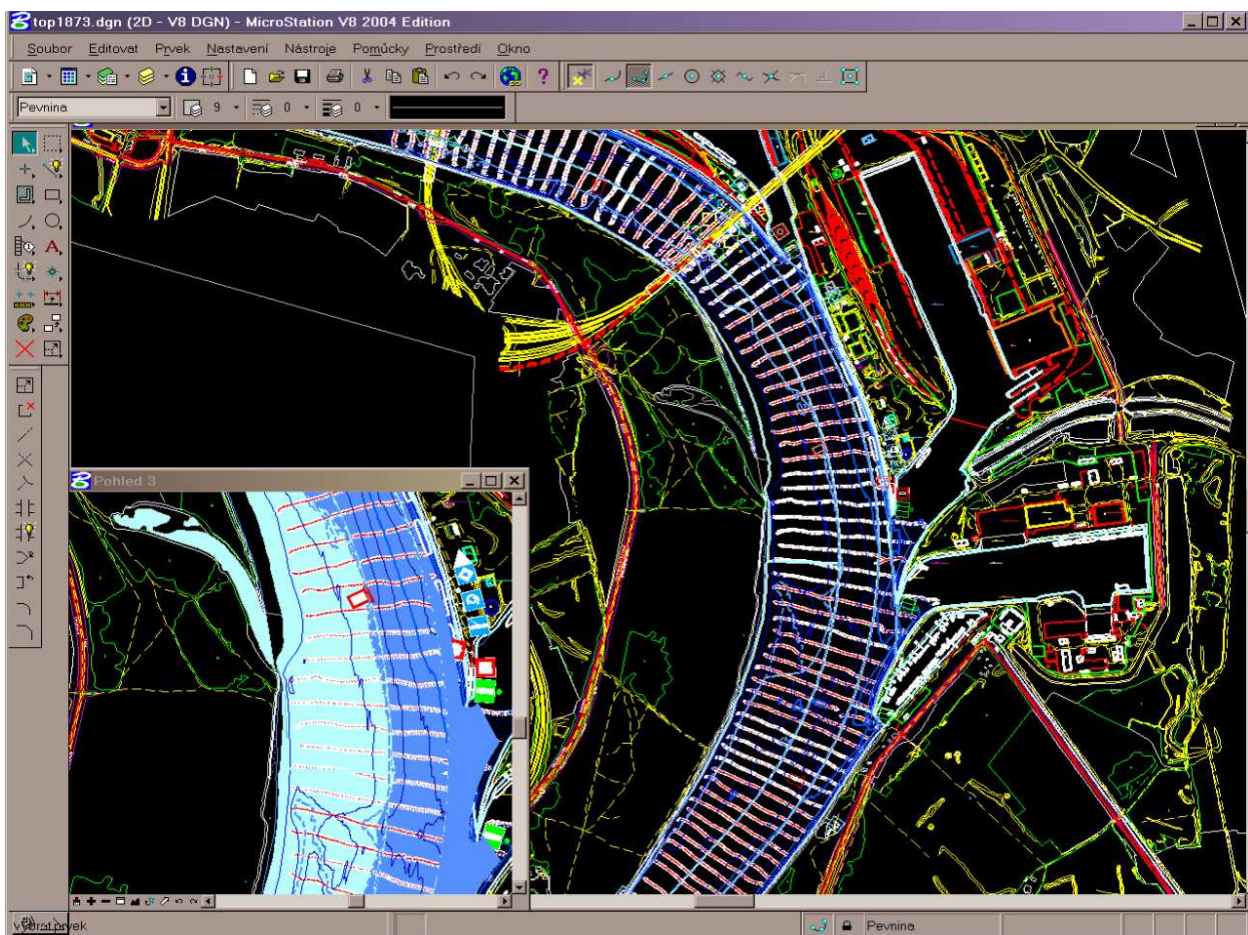
SVP is responsible for depth information and navigation information, external companies Geodis and Eurosense are responsible for topographical information. Slovak Navigation Administrative is responsible for some voyage planning - objects in harbours, other areas appointed for navigation (buildings, service, customs house, etc.) Data are provided in different layers by features based on Object catalogue D4D. Data prepared in Microstation and Geomedia are in different layers, shape files are created by these layers too. Also in Maintenance portal and Web portal data are differenced to layers. IENCs are one-layer only. All objects are in one layer.

6 IENC PUBLICATION PROCESS

Charts are not published yet. As already mentioned we had problem with transformation data between coordinate systems and we had problem with some attribute values therefore we don't have worked out all section yet. We are thinking to publish at least some maps which are correct. We would like publish them on our web site (www.svp.sk) as soon as possible. They will publish in S-57 format and they will be available for free.

7 IENC SOURCES AND ACCURACY

For ENCs production we used several data sources. At first we order new flying survey and detailed 3D digital terrain model based on this survey by external companies Geodis and Eurosense. We obtain data with accuracy 0.25 cm. These companies worked out only graphics data. Terrestrial measurements of the Danube riverbed (isolines, riverbed terrain points, depth points) were obtained by our own sources. Other external data sources we obtained from State Navigation Administration - objects in harbours, other areas appointed for navigation (buildings, service, customs house, etc.). All graphical data are in dgn format, flying survey data are in S-JTSK coordinate system and in UTM coordinates too. Bathymetric data are in S-JTSK coordinate system only but we can order these data in UTM and in the future we would like provide isolines in UTM coordinates.



8 INLAND ECDIS STANDARD

IENCs are produced according Edition 1.02 of the Inland ECDIS Standard. But we would like converted to higher version. It is planned to publish updates of the IENCs for each version of the standard as soon as it is official.

We control quality ongoing during production process. The most important objects are controlled only. The IENCs quality control checks haven't been by the ENC Analyzer yet. Though we have this software and we will use it after training courses.

9 UTILISATION OF LOCATION CODES AND RIS INDEX

The first version of RIS Index in Slovakia was created in 2007 by KIOS Company. This version is used in “Notice to Skippers” application. It is not published anywhere but it is possible provide it on request.

State Navigation Administration (SPS) manage RIS Index in Slovakia now. In this time they work out a new version which will already available. There are a few new objects and data are updated in this version. First public version should be finished in next weeks and it will be contain basic objects data only.

SPS is responsible for the provision of the Minimum Data (i.e. also the RIS Index) as prescribed in the Annex I of the RIS Directive 2005/44/EC in Slovakia. They provide RIS index according the RIS Index Encoding Guide.

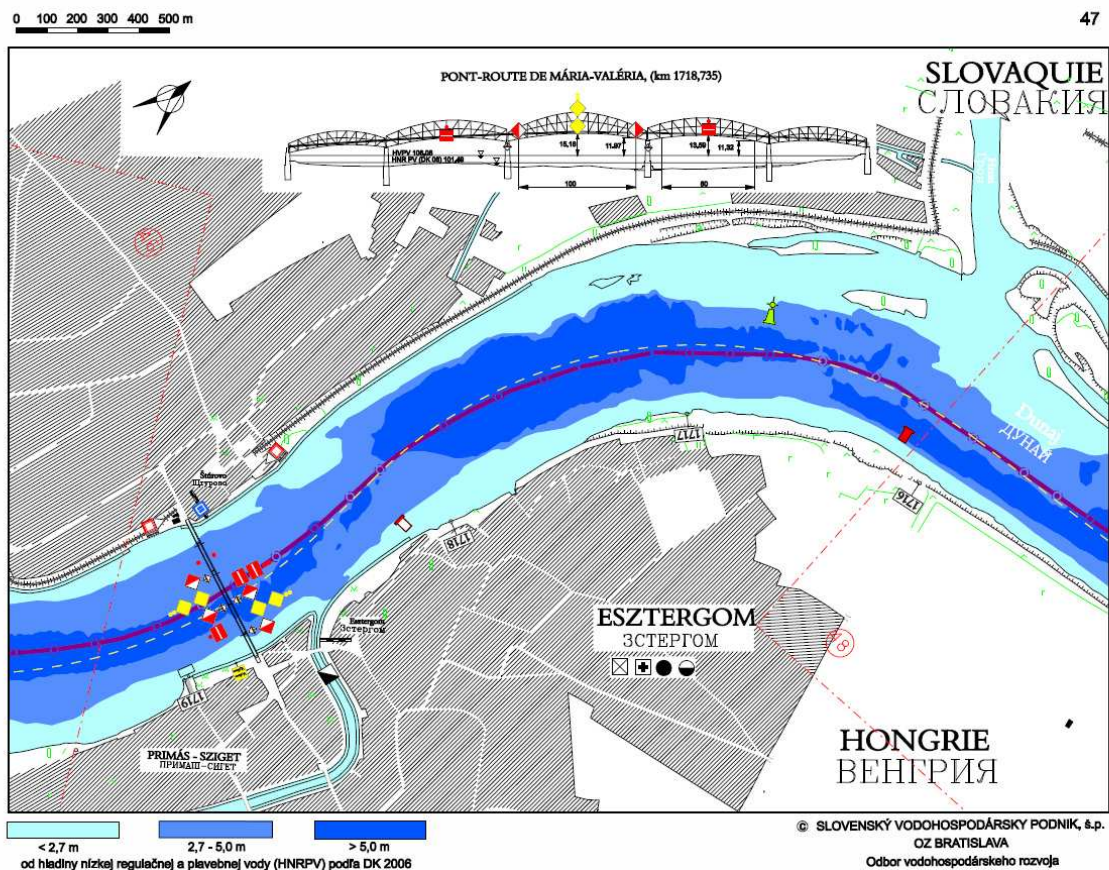
SPS provides RIS Index for all section of Danube fairway in Slovakia (km 1880 – 1708). So far it doesn’t provide RIS Index for other fairway.

It is not clear in this time how often SPS will update of the RIS Index.

Objects in the RIS Index are not aligned with the objects in the IENCs. Objects in our IENCs aren’t encoded with the 20 digit ISRS Location Code. Development of IENCs was not coordinated with development of RIS Index, data are not fully harmonized (e.g. different names of some objects). Our next task will be cooperated with SPS and synchronized IENCs with RIS Index.

10 COOPERATIONS

We cooperate with Austrian and Hungarian partners in some other projects within Danube River especially in common sections. Cooperation in these sections is via Border Commissions. These commissions discuss about signalization and marking out of the fairway, dredging, removing barriers in fairway, repairing of river bank fortification etc. Within these projects we exchange some data e.g. flying survey data or bathymetric data. There are cooperation with Hungarian partner on e.g. "Project of signalization fairway" or "Project for dredging of the Danube riverbed". "Project of signalization fairway" contain notice marks and objects on waterway. Project is updated every two years. By convention on common Slovak - Hungarian section of Danube, one of countries creates all section. So each country does not create own side of Danube once a two years, but one of countries create both sides once a four years. Both partners have a several meetings during production process. Project is exchanged preferentially in paper form but we exchange data in CD too (pdf, dgn, dxf format). Each country is responsible for notice marks on its side of river. Responsibility for signalization of fairway (buoys) is shared between both countries. One of country is responsible for section km 1810-1791, second country is responsible for section km 1791-1790. Every two years we exchange responsibility for these sections each other.



“Project for dredging of the Danube riverbed” is worked out every two years. Project determines location of dredging. Both countries divide these locations equally.

We have similar cooperation with Austrian partner.

11 CHART UPDATES, UPDATING CIRCLE

Our charts are not published yet therefore discussion about updates is difficult. As already mentioned we are working out on ENC's update of common Austrian – Slovakian and national section where transformation data between coordinates system was not successful. Where it will be - it is difficult question. We hope soon. And then we will expect feedbacks.

- End of document -