HIS FEATURES AND FUNCTIONALITY – full list.
Numbers in brackets refer to powerpoint slides.

1. Survey planning and management (6-13)

The main workflow starts with determining Survey Area. This is a folder with data from survey lines, files containing area borders, meta-data, defined underwater objects and all processed depths. All in simple ASCII format.

· HIS is set to read these files and automatically fill/update database from them;

· All survey data together with metadata can be uploaded to HIS and later downloaded for data cleaning or for using in other systems. Metadata can be edited and later exported.

· The system tracks the status of survey areas, logs, who changed the data, what operation did he do and when was it carried out.

· When an area is processed, its status changes and the change is immediately visible to the other users of HIS.

· Object data can be further managed in HIS, e.g. object type can be changed from obstruction to wreck, data added from other sources, etc.

· Survey areas are spatially classified by

IHO44 standard,

survey time,

survey stage.

2. Store and access collected data

HIS keeps hydrographic data from different surveys in a single database together with the necessary metadata. It stores, manages and displays the following data:

· **Survey areas** – borders and metadata. Metadata includes the status and size of the area, total length and amount of survey lines, survey time, equipment, ship, persons involved (surveyor, data cleaner, data validator), basic statistics (min/max of depths and coordinates, amount of depth points), quality estimations (standard deviation, mean, IHO S-44 order evaluations). Quality estimation is based on overlapping depths from different survey lines.

· **Depths** are stored up to 1 m resolution.

For faster presentation, in DB depth are organised into cells by resolutions from 4 to 200 m, therefore resolutions starting from 4 m are displayed. Cells also store depth **contours** at 1 m intervals.

· **Underwater objects** – rocks, shipwrecks, obstructions. Wrecks can have a lot of information associated, starting from dimensions and coordinates, and ending in long records of the ship's history and different images of the wreck and the ship.

· **Sediment data** – mud, clay etc is loaded from collected samples.

· **Points of interest** – this can also be called a "user layer". The intention is to store and show important places which need attention or resurvey for some reason.

Aids to navigation, waterways and harbours are integrated from other sources.

· When uploading rocks, obstructions and wrecks, automatic comparison is done with data already stored (13)

3. Map presentation

HIS has its own map engine and OpenGIS compatible map server, which

· can use different WMS **background maps** (14)
Presently HIS uses S-57 and maps from Land department as background choices and

- present **layers** both from its own databases or imported, presently

  Survey areas;

  Wrecks;

  Rocks;

  Obstructions;

  Harbours;

  Spot soundings;

  Depth contours;

  Depth 3D model;

  ENC frames;

  PC frames;

  Frame of Chart folio;

  Aids to Navigation (*from other source*);

  Fairways;

  Ship trail ;

  Problems (*users added layer*).

- Navigation. Zoom and pan with mouse or special buttons. Additionally: a**rea zoom** and browsing **view history;**
- Create **a profile (**slide 16);
- Create a link;
- Search of coordinates;
- WMS and WFS service.

4. **Complex textual and area-based queries** (14 -20)

Queries can be textual, spatial and combined. Textual queries are performed using query builders for any data type in HIS (*slide 18*). Spatial queries are performed by keying in coordinates or drawing polygons on a map. Such defined areas act as additional restriction to textual query if so desired. Outputs can be redirected to tables on screen or to different types of file output (slide 19).

5. **Queries from map spot**

- List of objects and depth in tooltip
- Detailed data of objects on left click
- Coordinates, survey areas and map frames on right click

6. **Outputs for Electronic Navigation Charts (ENC)** (21-26)

- selecting the area
- setting the parameters

  required information - only depth points, only objects, or the whole fairsheet (depth points, contours, objects);

  output format - DAF, DXF, XYZ, KLM, SHP, BAG (S-102 or S57);

  scale to generate- 1:1000, 1:2000, 1:3000, 1:4000, 1:5000, 1:7500, 1:10 000, 1:20 000, 1:50 000 or 1:100 000;

  soundings interval (m);

  coordinate system;

  height System;

  minimum object height;

  generalisation of stones;

  reduce depths frequency;

  group depths;

contour making scale - set, maximum or from base area;

contour interval - set or from a file;

generalisation of contours.

· fairsheet generation:

data suppression, contour generation and final map compilation will be done automatically based on metadata of survey areas. HIS takes into account the properties of overlapping survey areas to ensure that the most accurate and up to date data is selected for processing and exporting.

7. Serving WMS and WFS

INCLUDED OR IN ADDITION:

- Prepare and share data for different user groups;

- Automatic data comparing (overlap handling) and
  output compilation for different usages (incl. fairsheets for compilation of nautical charts);

- Automatic data input from data processing software;

- Automatic data validation during input;

- Automatic 3D models and contour generation;

- Automatic backups generation;

- Validation of survey data;

- Management of survey data;

- Management of metadata;

- Migration of existing (proprietary) database;

- External GIS database integration;

- Data search by coordinates, polygons and other metadata;

- Vector and raster background information import;

- Workflow management.