# Hydrographic Maps at National Level

Another Large Project Completed Using TNTmips

## National Hydrographic Charts

The following organizations each use numerous TNTmips in the maintenance and production of their national hydrographic charts. These activities are sensitive in nature so the details of how they apply the product are not available to MicroImages.

THE UNITED KINGDOM HYDROGRAPHIC OFFICE

- United Kingdom Hydrographic Office, Law of the Sea Division

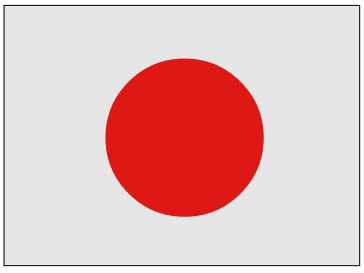
海上保安庁 JAPAN COAST GUARD

- Japanese Maritime Safety Agency

JODC JAPAN OCEANOGRAPHIC DATA CENTER

- Japanese Hydrographic and Oceanographic Department.

This organization reduced all the Japanese paper hydrographic charts to a base of Seamless Digital Hydrographic Data. The project used multiple TNTmips almost exclusively and was completed in 2 years. These activities are sensitive in nature, so samples of the charts are not available, but the attached summary excerpted from an on-line paper describes the project in more detail.



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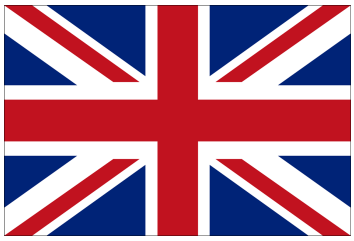

**The project is described in more detail in the attached summary reprinted from**
**www.hydro-international.com/v_hydro/archives/chapter_content.asp?v0=detail&v1=534**

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**Compiling digital smooth sheets using standard software**

*By Yoshihiro Matsumoto, Japan Hydrographic and Oceanographic Department, Japan*

# Seamless Digital Hydrographic Data

**In line with developments in survey equipment, Japan Hydrographic and Oceanographic Department (JHOD) has constructed a new stream of digital hydrographic data that allows smooth transfer from survey vessel to ENC through newly designed 'digital smooth sheets'. The author reviews the evolution of this GIS-based compilation system.**

In 1998 JHOD imposed the compilation of digital smooth sheets (including digital wharf-frontage sounding sheets) on hydrographic surveys. Conventional paper-based (or plastic-sheet-based) smooth sheets compiled manually from analogue hydrographic data have since been replaced by digital smooth sheets compiled on a Geographic Information System (GIS) from digitally obtained hydrographic data. For many years hydrographic data was obtained in analogue form and compiled into smooth sheets using manual processes. Recent development of measurement technology such as GPS and multi-beam echo sounding has not only enabled digital data acquisition but expanded the volume of digital hydrographic data. To establish a systematic digital data-processing scheme, JHOD designed a GIS-based 'digital smooth sheet compilation system' of which the data structure is compatible with that of the ENC.

**Functions Required**

The digital-smooth-sheet compilation system mainly aims at direct transfer of digital hydrographic data to Electronic Navigational Charts (ENC) database. System requirements for this purpose are summarised below.

- Import and Editing of Digital Hydrographic Data: ...
- Visual Appearance of Digital Smooth Sheets: ...
- Digital data output for ENC database: ...
- Utilisation of Previous Data: ...
- Digitising Conventional Smooth Sheets: ...

**Other Requirements**

For further applications ... some extensible analytic functions are desirable e.g. geospatial analysis, 3-D display, etc.

**Using Standard Software**

Creating and editing point/line/polygon vector data are salient procedures for the compilation of digital smooth sheets. From the viewpoint of reduction of cost and development period it is favourable to construct a 'digital-smooth-sheet compilation system' on a platform of general-purpose analytic GIS software which can visualise the group of geo-referenced digital data through map projection and can be customised to meet surveyors' demands. JHOD introduced **TNTmips from MicroImages Inc**. for this purpose. **TNTmips** is an analytic GIS software package which supports both vector and raster data and is function-rich in data editing and analysis. It comes at relatively low cost. The standard features of this software satisfy most of the required functions mentioned above. Data converters to/from S-57 Edition 3 and a series of symbols unique to smooth sheets have been newly developed on the platform.

**Structure Based on S-57**

In S-57 each element shown on the ENC is called an 'object' and various attributes attached to the object are called 'object attributes'. For the compilation of digital smooth sheets the same data structure is constructed on **TNTmips** using 'tables' attached to the vector objects. Each element of the vector data on **TNTmips** can hold records on the tables. Each record of the table corresponds to an S-57 object and each field of the record corresponds to an S-57 object attribute. **TNTmips** supports a powerful macro package that enables users to control expression and analyses of geospatial data. A series of macro scripts were developed for expression of each S-57 object that automatically select appropriate symbols and abbreviations corresponding to attribute values of vector data.

**Practical Aspects**

Unlike the compilation of paper-based smooth sheets, hydrographic surveyors are required to attach appropriate attributes based on S-57 to all surveyed data elements in digital smooth sheets. ...

**Conclusions**

It took less than two years after 1996, when GIS software (**TNTmips**) was first introduced at JHOD, for submission of hydrographic survey results to entirely shift to digital smooth sheets. Along with the spread of GIS in hydrographic surveys, its application has been expanding to other purposes, e.g. survey planning, compilation of other reference maps and so on. ...

**Biography**

Yoshihiro Matsumoto graduated with an MS degree in Geophysics from Kyoto University in 1997. He has worked for the Hydrographic and Oceanographic Department of Japan Coast Guard since 1997, mainly engaged in technical development on hydrographic surveys using multi-beam echo sounders.