## Multibeam Data Processing Software
MarineDiscovery9

This chart is a detailed bathymetric anaglyph of Nankai Trough based on the output obtained by Marine Discovery's processing of survey data. Based on the grid data created by Marine Discovery, creating a stereoscopic image with synthesizing shadow from two different light direction appears the detailed bathymetric anaglyph.
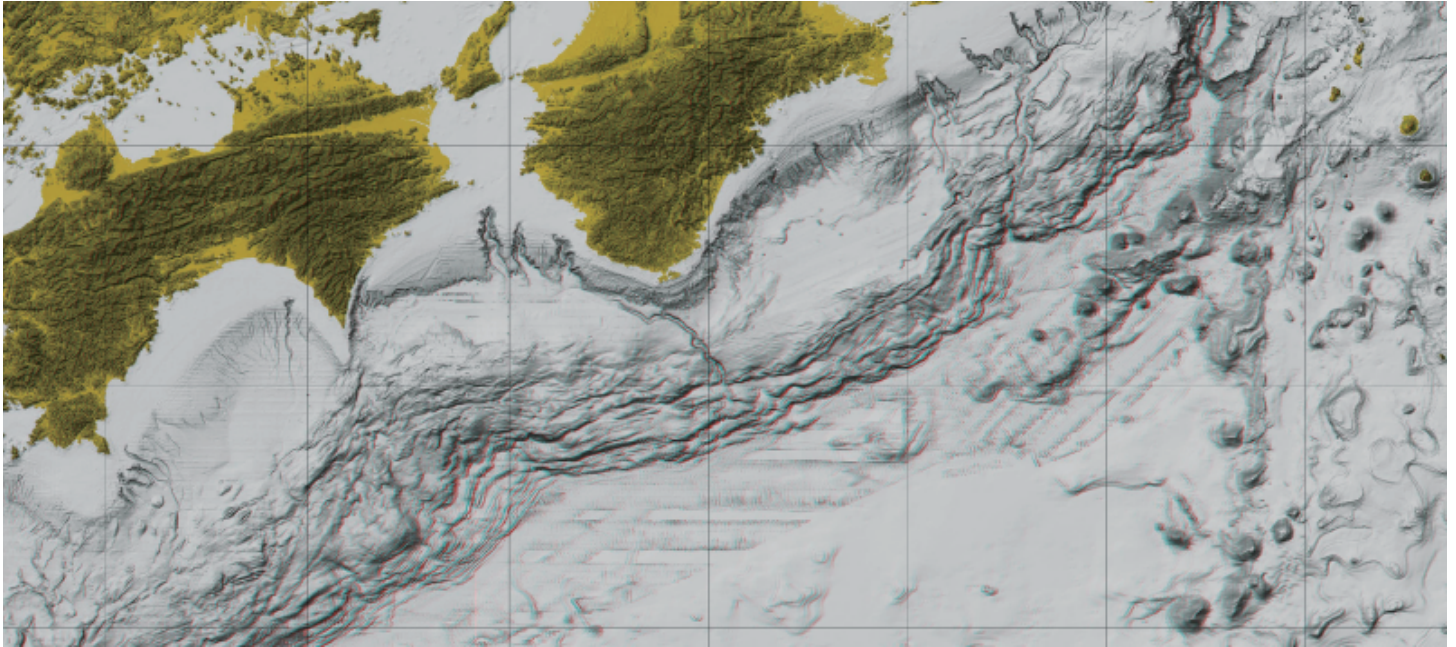

Nankai Trough
Nankai Trough is a submarine trough located in the south of Shikoku island . Its depth is about 4,000m. It is said that Nankai Trough is a very active and large-scale earthquake zone.

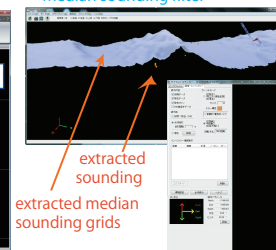# High Grade Functions and Friendly User Interface

Any type of raw data file to many kinds of charts in a single application

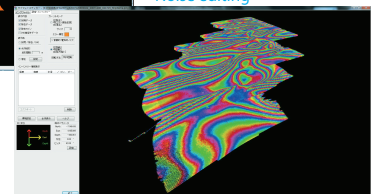Integrated management of Data and Applications

Strong Noise prefiltering and Various Noise editing

Median sounding filter

Track Chart

Data list

Main menu
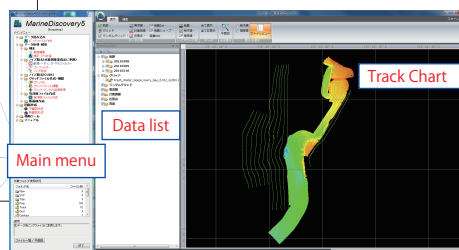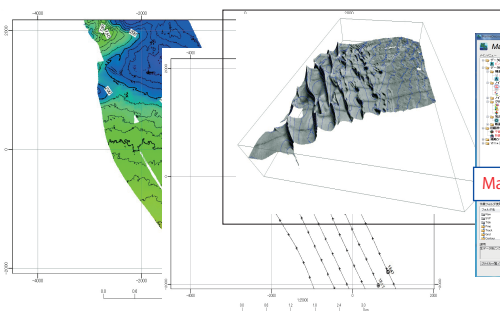
Cross Check of the results of Noise editing

extracted sounding

extracted median sounding grids

ALL in One / High grade Functions
As single software, Marine Discovery9 (i.e. MD) has high-grade diversity which gives you to import any type of raw data and to output many kinds of charts. So, you don't need to buy other software.

Friendly User Interface
MD provides accurate and efficient managing functions that enable to integrate data and applications and save your valuable time. Almost time for multi-beam sounding data processing is spent by noise extracting procedure. Therefore MD also offer useful tool of as like as pre-filter for accurate and efficient noise reduction.

Ocean High Technology Institute,Inc.

MarineDiscovery9(i.e. MD9)'s Features

Optimization of graphical user interface
The optimized user interfaces such as a ribbon bar and a file view improve operational efficiency.

By the same processing procedure, MD9 can process any type of raw data file and output many kinds of charts

Importable Data Formats
ACF, ALL, KMALL, GSF, HSX, imagenex, LOG, XSE, MB41, NM, S7K , XTF etc.
MD9 creates ping files from various data formats. Also, supports dualhead.

Reading of external file
MD9 reads positioning information, tide information, motion information and the sensor water depth information from an external file, and corrected.

MD9's outputting Charts
Contour Chart, Track Chart, Sounding Chart, Intensity Chart, Inclination Chart, Difference Chart, 3D Chart, Profile Chart at any optional line
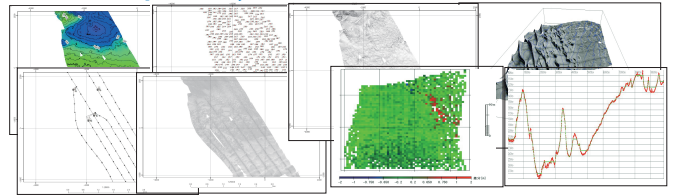
Quality control by corrections

Corrections
MD9 provides the correction function that enables to correct Sound velocity, Bias, Offset, Latency, Tide, Dynamic draft and information of the external sensor.

Batch Correction
MD9 provides Application of Batch Correction that enables to execute all corrections simultaneously. MD9 provides also Setting of Correction's Parameters that enables to set parameters after repeated trial and error.

The image of sound velocity correction

The example of Bias

The example in case bias correction for roll value is active.
The example in case bias correction for roll value is not active..

The image of offset

Keeping sounding accuracy by extracting error data

Track editing
MD9 provides track editing function that eliminates poor quality data and displays an ideal track chart. The editing function can also revive the omitted point data.
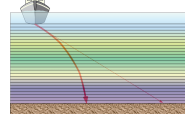
Automated filtering function based on IHO S-44 Standard
MD9 provides automated filtering function based on Internatinal Hydrographic Organization(i.e. IHO S-44) Standard.
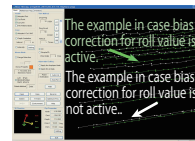
Noise extracting
MD9 provides various functions of extracting noise, which consisit of filtering noise automatically (Noise prefiltering) and eliminating noise by hands (Noise editing).
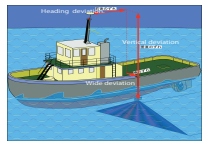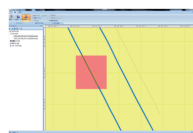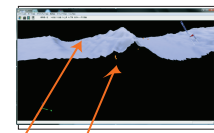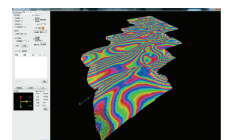
The sample of Track

Median sounding filter

Cross Check of the results

extracted sounding
extracted median sounding grids

Visualizing grids, contours, etc.

Gridding and Contouring
In order to visualize multibeam data, MD9 generates grid files, multiple grid files and contour files with soundings at equal intervals. Also MD9 is corresponding to the rotation coordinate system centered on the arbitrary origin.

Quality control by visualizing
MD9 provides visualizing functions that can overlap grids and soundings in order to evaluate grids' quality. If grids' quality is lower, MD9 can feedback the output to the previous process.
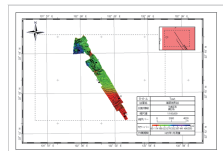
Charting
MD9 provides charting functions that display grids, random grids, multiple grids, contours or track, and output data to printer, plotter, PDF, DXF or Postscript.

3D view
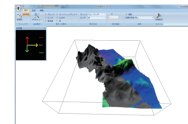
The example of Charting

Exportable data (to CAD,GIS, etc.)
MD9 provides the export function that enables to export Soundings, Grids or Contours to CAD, GIS, etc. Following types of formats are available.
In the case of converting Grid data to GeoTIFF's data, addition of color and shade information is also available to display clear bathymetric shape file.

Exporting Soundings	Exporting Contours		Exporting Grids (Type of GeoTIFF)	Exporting Grids (Genaral Type)	
⇔ASCII Ping	⇔ASCII	Contour	→GeoTIFF	⇔ASCII Grid	
→XYZ	Contour	→KML		→netCDF, →Shape file	
→mb41	⇔Shape file	→S57		→XYZ	
→LMD	→DXF			→DXF, →KML, →S57	
→Shape file of track	←CSV			→LandXML	

ICT

High working efficiency by System Control

Management of Applications
MD9 manages applications by Main menu. Application and Help can be activated by Main menu. Routine works are listed in the Main menu in order of daily routine process, therefore, routine works can be done in order of the main menu's list.

Management of Data
ICT ① Management of Inspection and Survey Quality
MD9 can calculate the difference of water depth between two intersecting survey lines for management of inspection and survey quality.
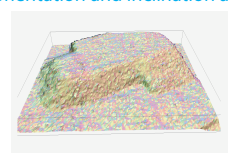
ICT ② Sounding Density
From the created grid file, MD output the fraction (achievement rate) of the grid which has 3 pointa or more.

3D plan data and survey data

survey's suface
survey's profile
plan's surface
plan's profile
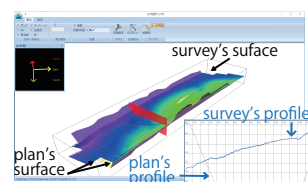
3D synthesis charting (Tilt orientation and inclination amount)

Other convenient functions

Enhancement of drawing new plan line
Application can be drawing new plan line more easier. Drawing methods can be serected by rectangle range, cross survey line of a axis, parallel survey line and double cross survey line.

ICT ### Quantity calculation・Form management
MD9 provides the function of calculation of the amount of dredged soil or dam sediment.
In quantity calculation, MD9 calculates the amount of soil less than the standard water depth including excavation. In form management, MD9 calculates the amount of soil or the difference without excavation. Each calculation result can be visualized by the MD Viewer.

Inclination calculation
MD9 provides the function of Inclination calculation that calculates inclination from grids and displays it with clear bathymetry.

Environment
OS: Windows7 SP1, or later (64bit)
CPU: Intel Core i7 2.6GHz, or more
Memory: 16GB, or more
Hard Disk: 50GB, or more
Resolution: 1400 x 1050 pixels, or higher
Number of Colors: True Color 32bit, or more