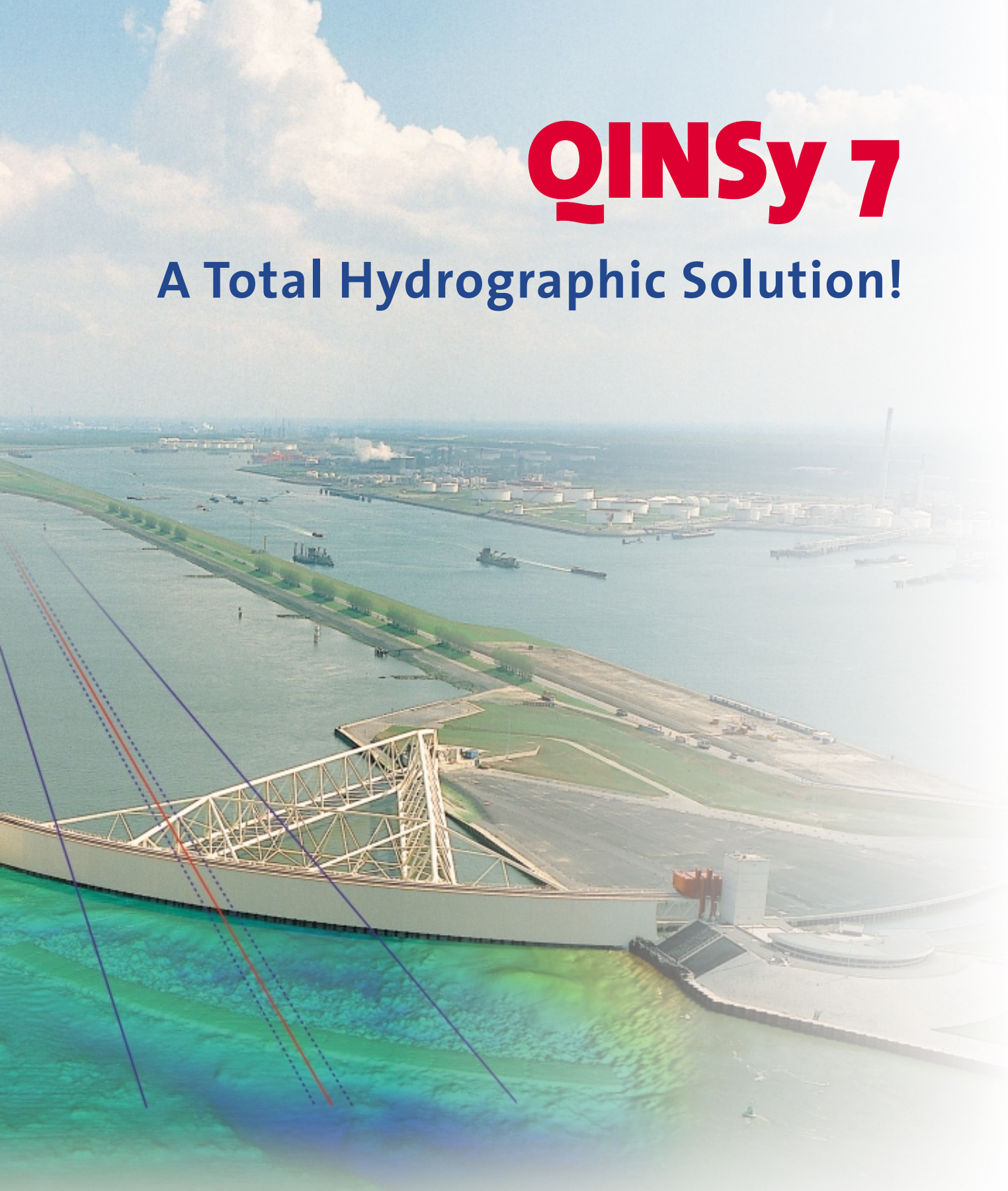
QINSy 7

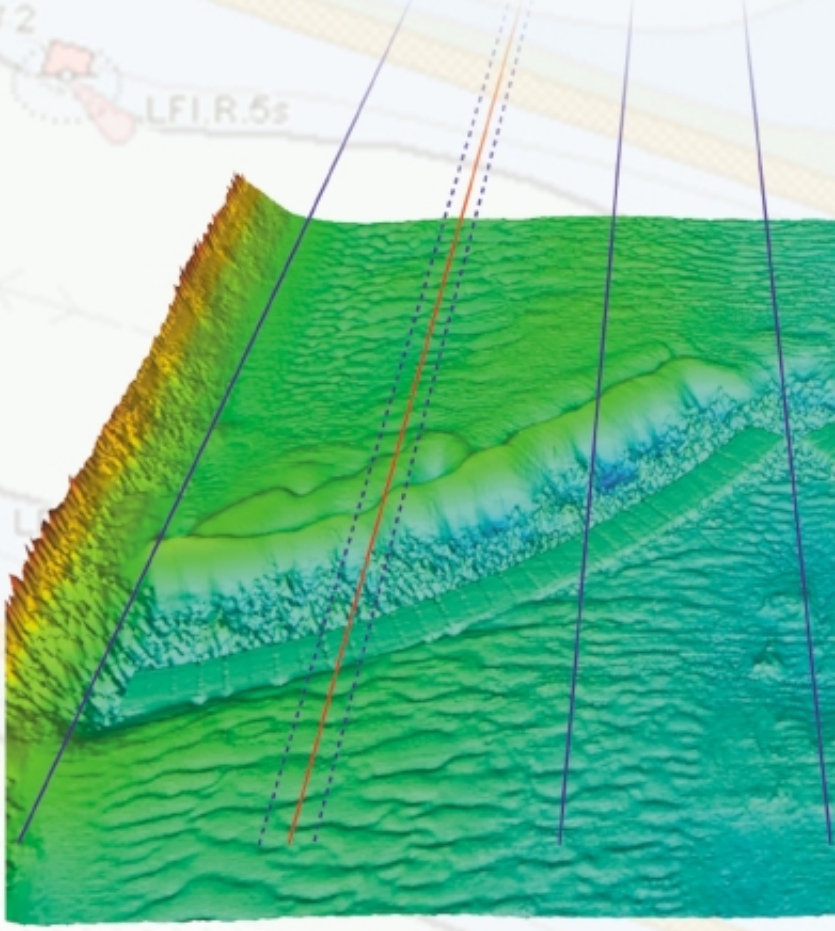
A Total Hydrographic Solution!

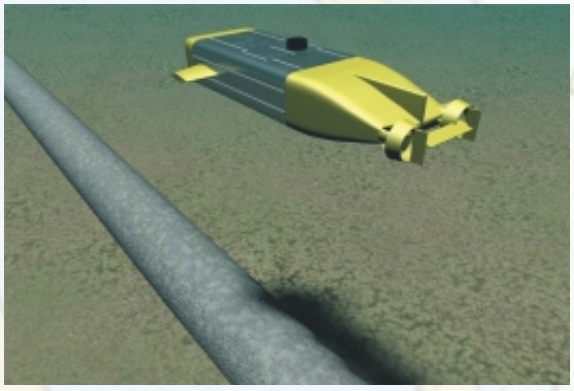


QPS

QINSy – A Total Hydrographic Solution!

QINSy 7 provides a user-friendly turnkey solution for all types of marine navigation, positioning and surveying activities. From survey planning to data collection, data cleaning, volume calculations and chart production, QINSy offers a seamless data flow from a large variety of hardware sensors, all the way to a complete chart product. QINSy runs on a standard PC platform under the Windows (NT/2000/XP) operating system. The software is not only independent of sensor manufacturer, but also hardware independent. You are free to buy your own off-the-shelf hardware components and QINSy will work with them. You are not tied to specific hardware in any way.



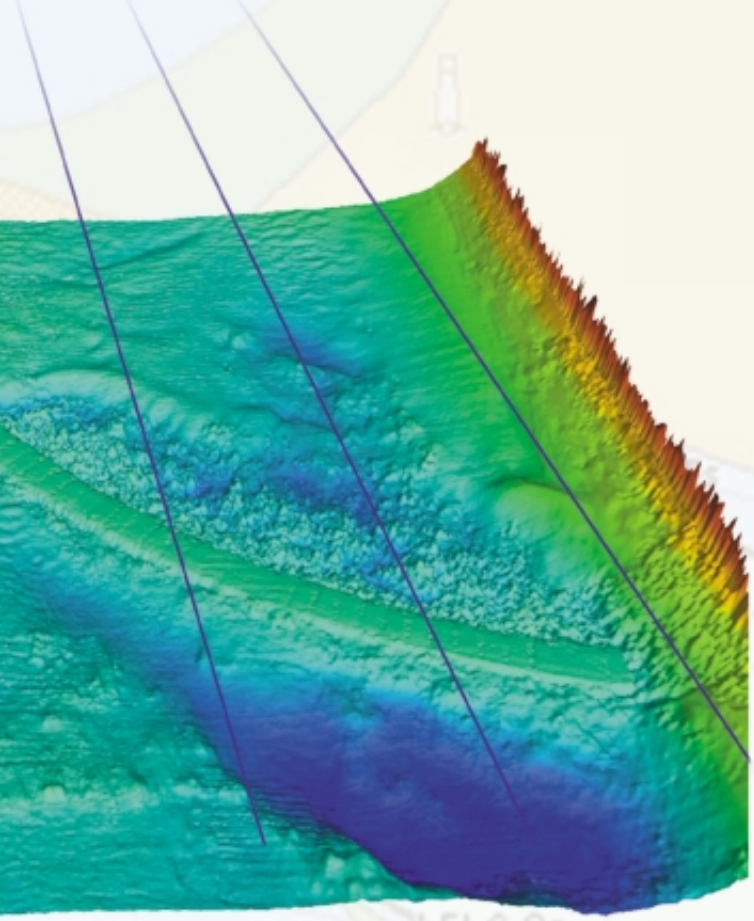


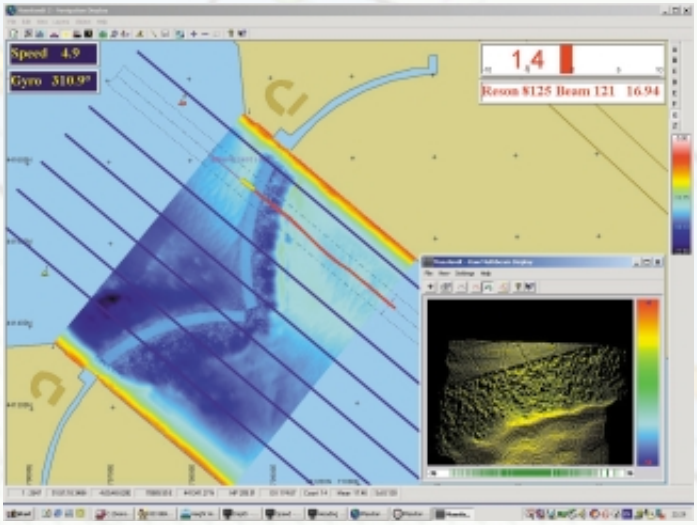
Extreme Versatility - Survey Applications

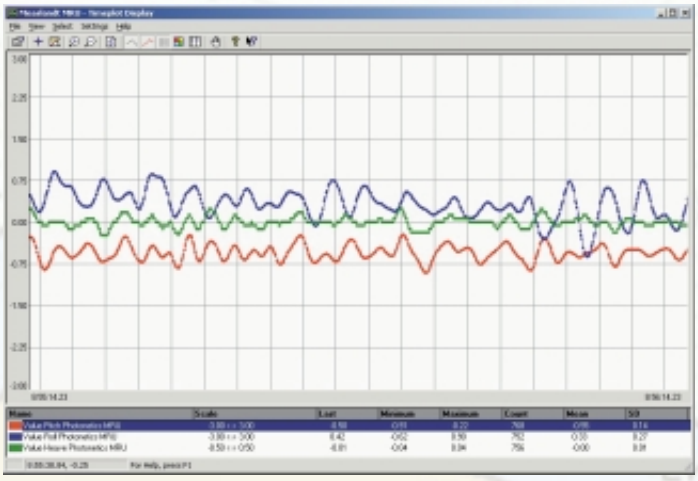
From scraping diamonds off the seabed to dumping rock on pipelines, from anchor handling to bathymetric or Side Scan Sonar surveys, its modular design and inherent flexibility makes QINSy perfect for a wide variety of applications. For example, it can be configured to perform:

- Hydrographic and Oceanographic Surveys
- Offshore Pipeline Inspection and Pipe-laying
- Dredging, Marine Construction including Offshore Oil and Gas
- ROV and AUV Tracking and Data Collection
- Barge, Tug and Fleet Management
- Chart and ENC Production

Since its launch in 1997, QINSy has been installed on over 500 vessels around the world. In other words, QINSy is setting the standard in marine surveying and chart production.





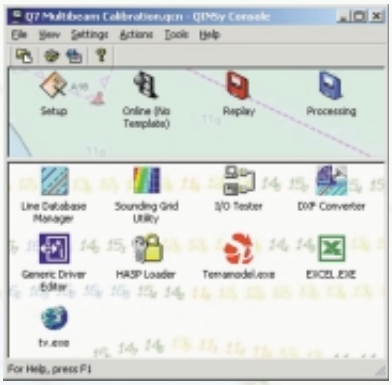


Great Flexibility - Sensor Support

Since the first release in 1997, a very large number of sensor I/O drivers have been developed, so QINSy can handle almost all your hydrographic related sensors right out of the box. QINSy 7 comes standard with around 600 field-tested I/O drivers. If an existing driver does not meet your need, the ***I/O Driver Utility*** will usually let you write your own. Failing that, the modular design of QINSy allows QPS to write additional drivers very inexpensively. QINSy 7 supports the following sensor types:

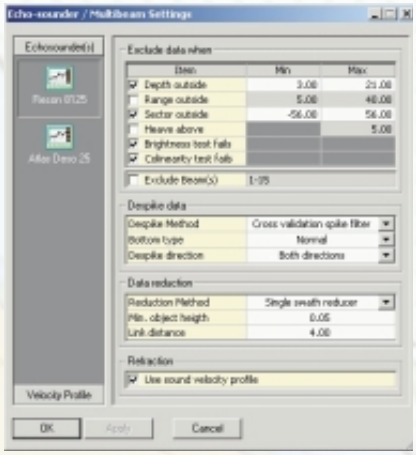
- **Navigation Sensors**
  - NMEA
  - GPS, DGPS and RTK
  - Gyro's and Compasses
  - Range/Range, Range/Bearing and Total Stations
  - Motion Sensors
  - ARPA and AIS
  - LBL and USBL
  - Inertial and Doppler
  - User Defined
- **Bathymetry Sensors**
  - Singlebeam and Multibeam
  - Mechanical Profilers
  - SVP and Moving SV Profilers
  - User Defined
- **Side Scan Sonar Sensors**
  - Digital and Analog
- **Auto Pilot Sensors**
  - NMEA
  - User Defined
- **Magnetometer Sensors**
  - NMEA
  - User Defined
- **Input and Output of Generic Sensors (analog, weather, rpm, environmental, etc.)**
  - NMEA
  - User Defined

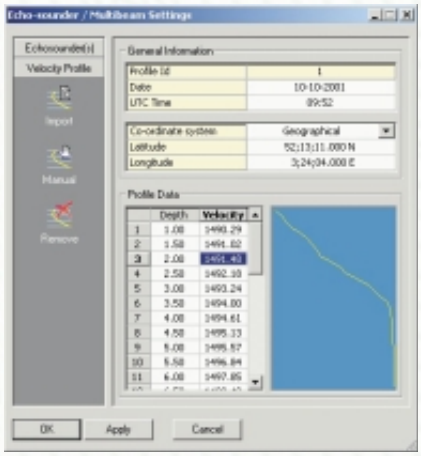
Very Easy to Use - The QINSy Console



Gathering and organizing the various QINSy 7 programs in a single desktop application, called the ***Console***, makes navigation through the program suite very intuitive at each phase of the project. You are guided through the various program modules designed specifically for survey planning, data collection, data processing and chart production. Moreover, ***Program Managers*** provide a complete overview of project status at each phase. The main program modules are:

- Planning
- On-line
- Replay and SSS Processing
- Processing and Data Cleaning





Icons for the following bundled utility programs are easily added to the Console, as are shortcuts to other programs relevant to your daily tasks, e.g. MS Word.

- Line Database Manager
- Sounding Grid Utility
- I/O Tester
- DXF Converter
- I/O Driver Editor
- QINSy Mapping
- QINSy 3D Visualizer

Comprehensive Survey Planning –Never Easier

Survey Lines

The ***Line Database Manager*** is a comprehensive toolbox for survey planning, allowing the surveyor to manually define, automatically generate and/or import from ASCII and DXF files, the following line types:

- Targets and Symbols
- Single Lines
- Survey Grids
- Routes
- Wing Lines
- Cross Lines

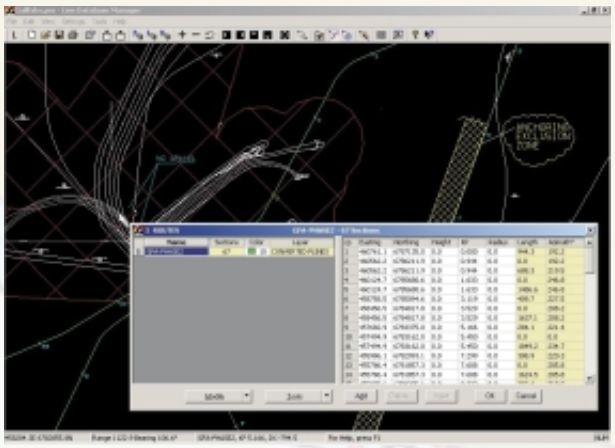
Data can also be exported to:

- ASCII
- DXF

The ***Line Data Manager*** works interactively in real-time with the Online Navigation Display where points, lines and routes can be generated right in the Navigation Display during data acquisition.

Survey Configuration

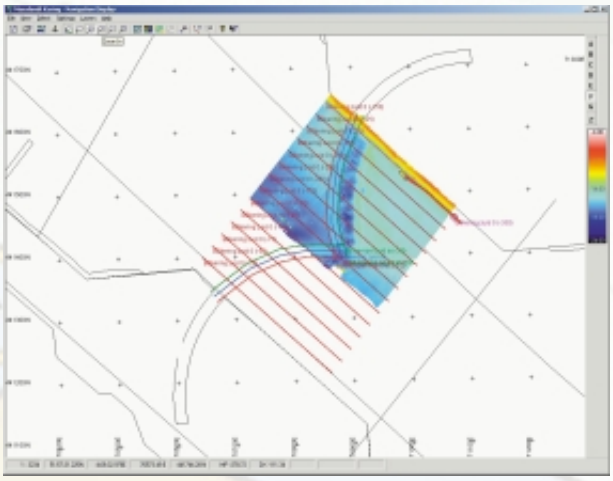
Created at the planning stage with the ***Setup*** program, a ***Template Database*** contains all survey configuration parameters pertinent to the project. QINSy supports most of the datums, projections, US State Planes, units and geoidal

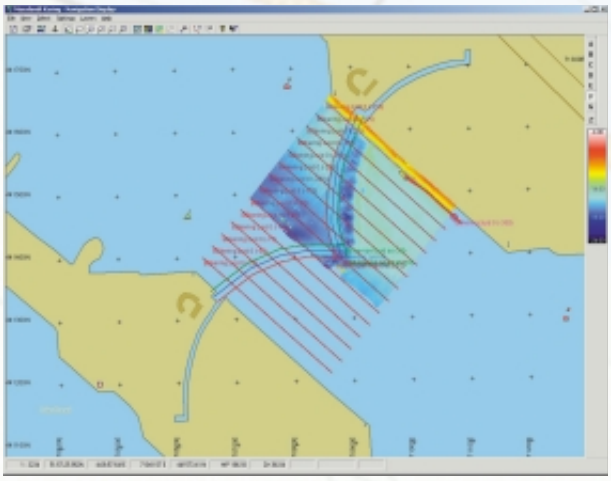


models used world-wide. The template contains vessel shapes, administrative information, as well as vessel offsets and I/O parameters. It is a complete reflection of your current survey set up, and fully editable to kick-start your next project.

Background display

Drawing files generated from CAD programs often contain more recent and accurate information than electronic charts. To ensure speedy refresh rates of real-time displays, these files are converted with the ***DXF Converter*** to a binary format at the planning phase for subsequent online display as an overlay to ENC data in the Navigation Display.





Real-time Final Results - Data Collection and Output

Raw Sensor Data

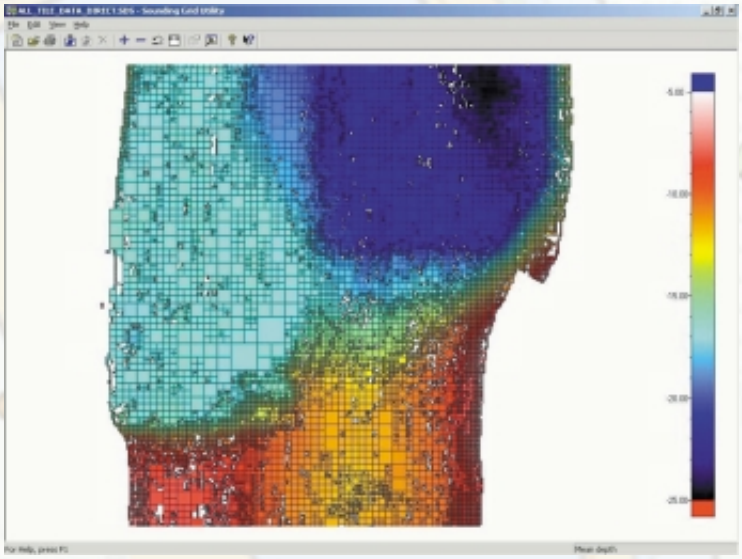
All raw *sensor data* is logged and permanently stored in a fast relational database (*.db) to which the entire survey configuration is copied from the template. Raw data can be analysed and edited using the ***Analyse*** program, making it ready for the ***Replay*** program and generation of new results if that is necessary. *Results data* (X,Y, Z and attributes) is stored to one of several formats, primarily the QPS internal format (*.qpd), but also to ASCII, FAU or Helical SDS format.

Data Storage

How raw and results data files are split up during acquisition is your choice. Data may be stored on a line-by-line basis, by file size, or by manual intervention. Whatever the method, data is normally stored in several separate databases for convenience in processing.

Accurate Timing and Ring Buffers

Supremely accurate *timing* is imperative in many survey situations. QINSy uses a very sophisticated timing routine based on the PPS option (Pulse Per Second) available on almost all GPS receivers.
All incoming and outgoing data is accurately time stamped with a UTC time label. Internally, QINSy uses so-called "*observation ring buffers*", so that data values may be interpolated for the exact moment of the event or ping.



Real-time DTM Production

All *computations of position* are performed in 3D. In combination with RTK or real-time tide sensors, this means that all depth observations are immediately available in absolute survey datum coordinates. This unique technique is called "*on-the-fly DTM Production*". QPS was the first company introducing the "***delta heave***" method, which means that the quality of the final DTM is not longer affected by heave drift caused by vessel turns.

Advanced Gridding Methods

For *multibeam surveys*, "gridding" is the predominant data reduction method. However, achieved reduction usually comes at the cost of loss of resolution. In QINSy 7, QPS introduces 2 new gridding methods, namely;

1. An irregular gridding method in which the size of cells created in real-time is directly related to variation of the seafloor. In general, large cells, more appropriately called tiles, are created in flat seabed conditions and small tiles created in feature rich areas with slopes, wrecks, rocks, and sand ripples. This on-the-fly method effectively reduces the volume of data without loss of resolution.
2. A regular multi-level gridding method. Based on the minimum cell size, 5 additional grids are generated on-the-fly. Grid file size is no longer an issue, since there is no limit to the number of grid cells. If the minimum cell size is selected to be 1 x 1 meter, then automatically the following grid levels are being generated:
   - 2 x 2
   - 4 x 4
   - 8 x 8
   - 16 x 16
   - 64 x 64 being the overview level

   This grid can be used not only for bathymetry, but also for SSS Mosaicing, magnetometerdata, seabed classifications, etc.

Both methods provide maximum flexibility in data acquisition since there is no longer any need to pre-define grid boundaries.

XYZ Data

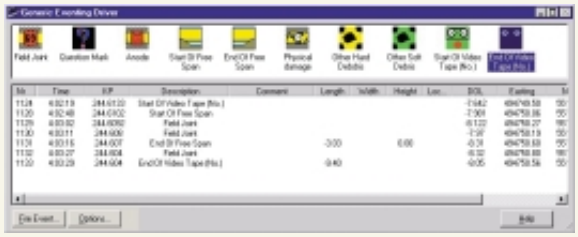
Reduced point data output to tiles is accompanied in parallel with output of **all** soundings to a second file (*.qpd, *.sds, *.fau, *.pts or other). Either reduced or full datasets are available for further DTM processing.

Side Scan Sonar Snippets

Full 3D geo-referenced *Side Scan Sonar data*, called "snippets" is available from most modern SSS and multibeam sensors. This geo-referenced SSS data, and/or data from dedicated side scan sonar sensors, is presented in real-time as a mosaic in the multi-layered QINSy Navigation Display. QINSy offers advanced real-time SSS target detection, which means a that SSS processing time is almost cut down to zero.
A dedicated SSS data viewer allows you to load, view SSS data and perform target detection in just seconds.

Eventing

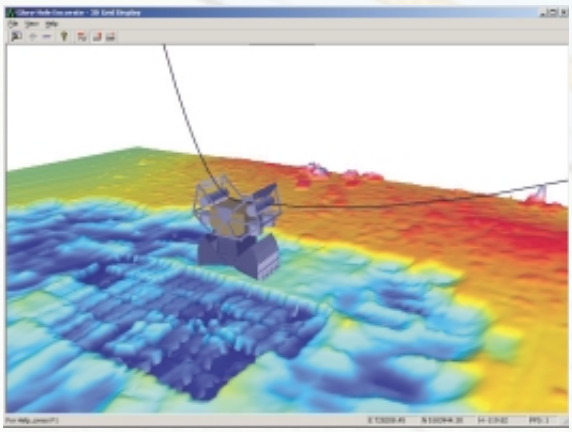
Used in many survey operations like for example pipe-laying, pipeline inspection, and buoy

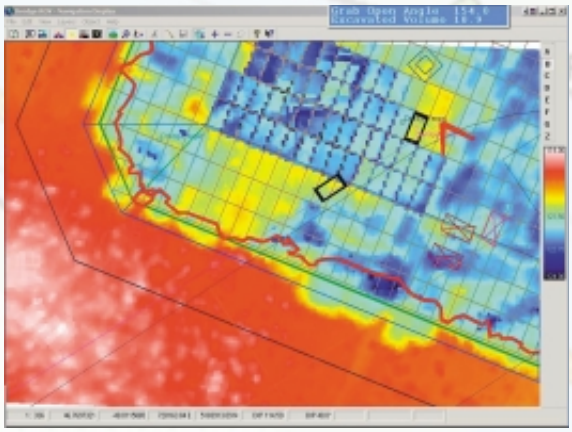


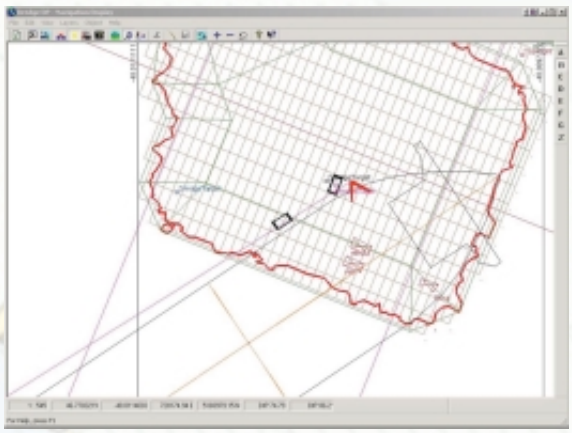
tendering, *eventing* is a powerful feature in QINSy 7. Using the *Event Tablet*, events are easily generated with a single mouse click, with an event log stored in real-time.

Advanced Dredging Functionality

QINSy adds advanced dredging functionality to speed up and control the quality of dredging operations in real-time. The various layers are presented in longitudinal and cross-section views, the latter being dynamically updated based on object heading. The entire dredge process is monitored via the groundbreaking real-time 3D display, employing multiple perspectives from different camera views.
If available as 3DS files, objects like dredge heads and hopper dredgers are seen moving in a virtual 3D environment at the same time that the dredged depths are updated in the 3D grid, all in real-time.



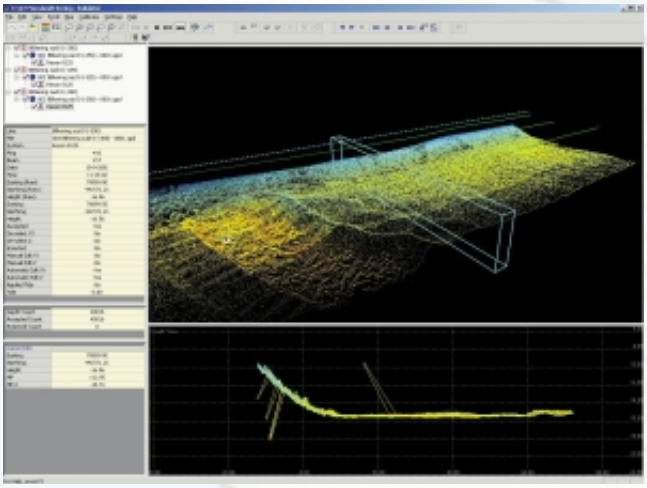


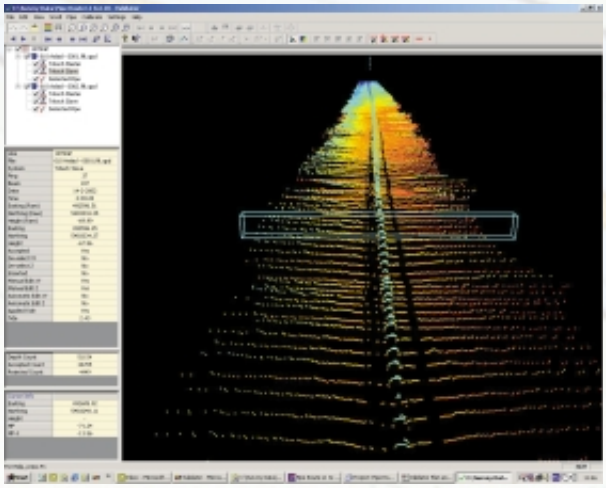


Speedy Processing - Data Validation, Editing, Calibration and Tide Reduction

Data Cleaning and Filtering

Applying various filters and corrections for motion, tide and refraction, QINSy is designed to output almost final results at the time of data acquisition. Moreover, the many quality assurance functions equip the surveyor with tools to qualify results data in real-time. Starting with cleaner and thinned data, effectively reduces time spent in post processing.





XYZ Attributes

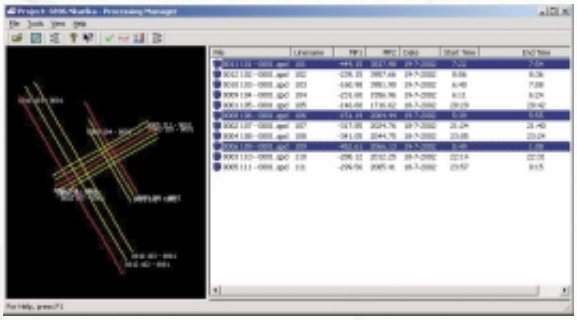
All X, Y, Z and attributes are stored during data acquisition in a fast database, with the following attributes attached to each point:

- Identification (vessel name, system type, ping number, beam number, etc.)
- Status (accepted, rejected, filtered, manually edit, etc.)
- Backscatter
- Full 3D Geo-Referenced Side Scan Sonar (Snippet)
- User Defined On-line Flags
- Quality Parameters

The QINSy Processing Manager

All XYZ files are listed in the QINSy Processing Manager, tabulated against a history of processes performed on each file. This provides a complete overview of the project processing status. Processing programs are launched from the Processing Manager:

- The Tide Definition and Processing utility supports various methods for tidal reduction.
- The Validator supports both manual and automated data cleaning including advanced 3D splined surface cleaning.



The QINSy Validator

Multibeam exploded the volume of point data and created data handling challenges both at the acquisition and processing phases.
The QINSy Validator is probably the most powerful data-cleaning program on the market today. Inherently fast data access allows loading and viewing of millions of points in just seconds.
The Validator has 4 different views, 3 of which can be opened simultaneously:

- Plan View
- Cross View
- Profile View
- 3D View

Multibeam Calibration

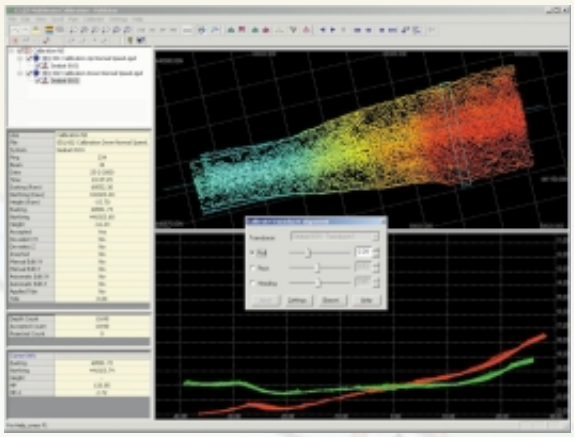
Multibeam calibration with QINSy is inter-active and very easy. The Validator offers tools to calibrate for errors in:

- Roll
- Pith
- Yaw
- Timing

Singlebeam and Multibeam Data Editing

Editing of singlebeam or multibeam data has never been easier. A variety of automated cleaning algorithms are available:

- Apply On-line Flags
- Clip Below / Clip Above
- Adaptive Clipping
- Median and Mean
- Butterworth
- 3D Spline Surface Despiker
- Multiply/Shift

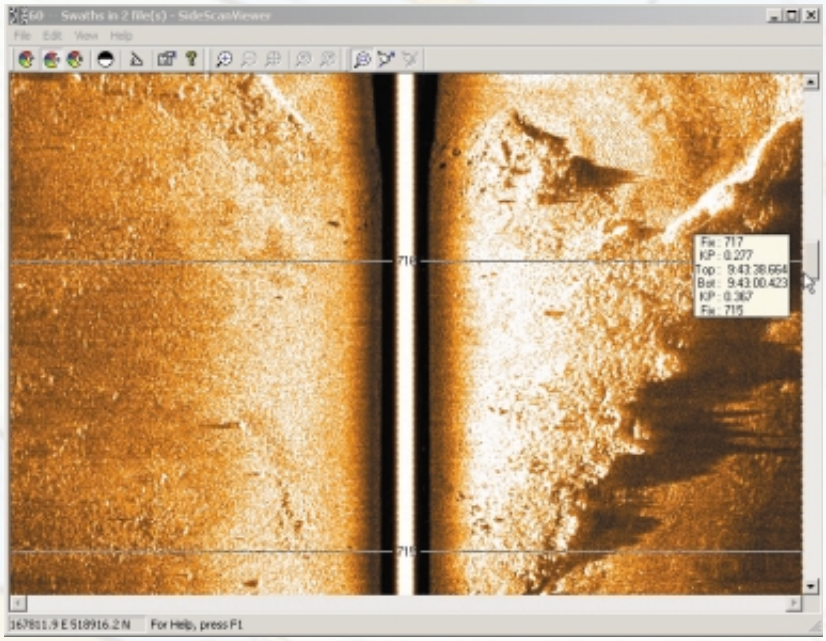


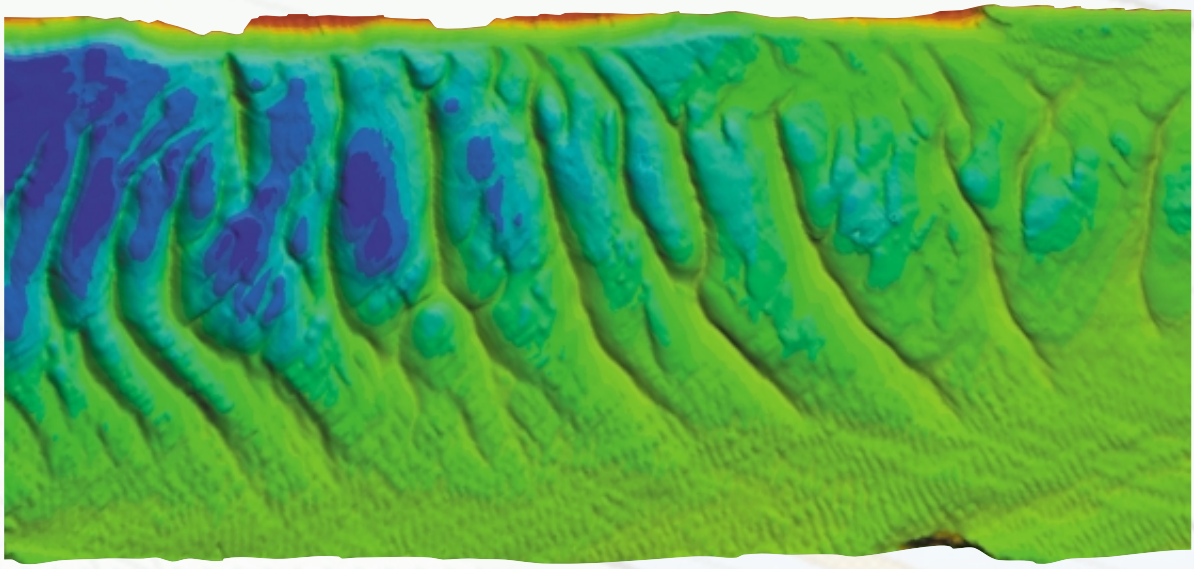
The Validator adds fully automated pipeline detection features, such as:

- Top of Pipe Detection
- Bottom of Trench
- Mean Seabed Detection

Powerful Side Scan Sonar Functionality

Side Scan Sonar data is viewed and processed with the ***Side Scan Sonar Viewer program***.
It offers the same look and feel as the SSS Display which is used during data acquisition.
Powerful target detection tools allow you to export targets and GeoTIFF images (geo-referenced bitmaps) to the QINSy Mapping database to provide a complete targets overview.

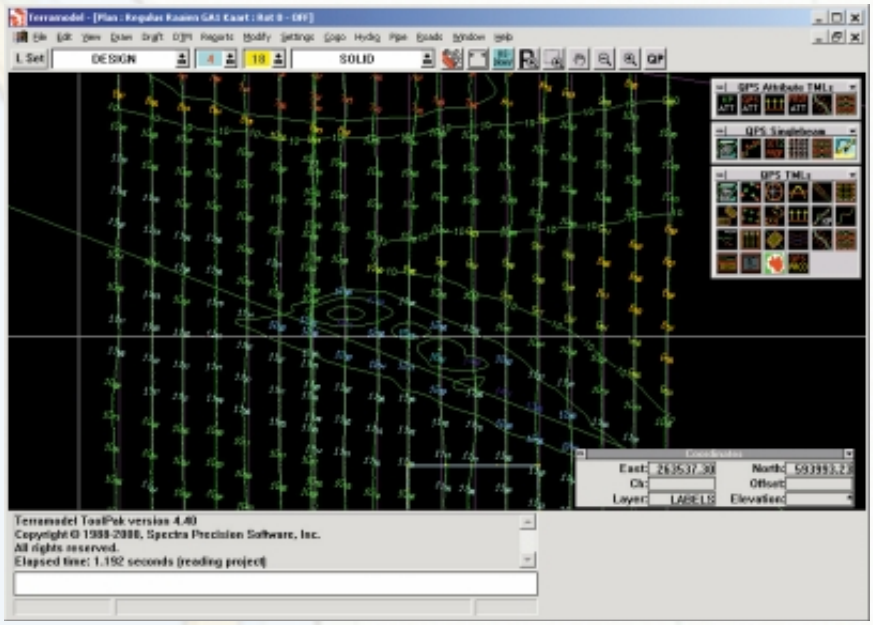




Eye-Catching Products – DTMs, Profiles, Volumes, Chart Production and ENC's

QINSy Mapping is a powerful processing package for the marine surveying and construction industry. With its many task-specific macro utilities, the software performs all necessary calculations, quickly and easily produces plots, generates contours and spot soundings, and calculates precise volumes in just seconds. A dedicated add-on module is available to export depth contours and spot soundings directly into IHO S57 ENC vector chart format.

The QINSy 3D Tool generates not only great looking images of the seafloor, but also realistic fly-through video clips ideal for client presentations.



QINSy System Definition	Lite	Survey	Office	Mapping	3D Tool
Single Sensor Support	✓	✓			
Multiple Sensor Support		✓			
Dredging Support		add-on	add-on		
PPS UTC Timing Support	✓	✓			
Serial and LANNetwork Driver Support	✓	✓			
Weighted Least Squares Adjustment	✓	✓	✓		
DGPS QC	add-on	add-on	add-on		
Integrated Doppler and Kalman Filters	✓	✓	✓		
7 Parameter Datum Shift	✓	✓	✓		
User Defined Projections and Units	✓	✓	✓		
Geoidal Models and Sounding Datums	✓	✓	✓		
Coordinate Conversions	✓	✓	✓		
Import/Export to ASCII	✓	✓	✓		
Import/Export to DXF	✓	✓	✓		
CMap ENC Support	✓	✓	✓		
IHO S57, Primar, ENC Support	add-on	add-on	add-on		
AIS Transponder and ARPA Support	✓	✓	✓		
Real-time I/O and Status Alerts	✓	✓	✓		
Advanced Quality Control Functions	✓	✓	✓		
RTK Support	✓	✓	✓		
On The Fly DTM Production	✓	✓	✓		
Regular Color Coded Grids	✓	✓	✓		
Irregular/Tiled Color Coded Grids	✓	✓	✓		
Multibeam Support and Calibration	add-on	add-on	add-on		
Pipeline Detection and Eventing	✓	✓	✓		
SVP Import from File	✓	✓	✓		
SVP Import from Sensor	✓	✓	✓		
SVP Real-time Updates	✓	✓	✓		
Remote Display Client via LAN	add-on	add-on			
X-Section View and Profile Display	✓	✓	✓		
3D Grid Display	✓	✓	✓		
3DS Object Support	✓	✓	✓		
Tug Management Display		✓			
Tidal Reduction	✓	✓	✓		
Complex Tidal Reduction Models	✓	✓	✓		
2D/3D XYZ Data Cleaning	✓	✓	✓		
Automated/Area Cleaning	✓	✓	✓		
Export to XTF	✓	✓	✓		
USBL and LBL Support		✓	✓		
ROV and AUV Support		✓	✓		
Barge and Fleet Management	✓	✓	✓		
Side Scan Sonar Imagery Display	add-on	add-on	add-on		
Side Scan Sonar Processing	add-on	add-on	add-on		
Full 3D Geo-Referenced Mosaicing	add-on	add-on	add-on		
Export Contours and Sounding to S57	add-on	add-on	add-on		
Maintenance and Support Plan	✓	✓	✓		
Surface Modeling by TIN				✓	
Volumes by X-Sections				✓	
Volumes by Area				add-on	
Cut/Fill Volumes				✓	
Import/Export to DWG				✓	
Import/Export to DGN				✓	
Contours Splined and Overhauser				✓	
Ao – A4 Scaled Plots				✓	
Site Design Functions				add-on	
Channel Design Functions				add-on	
Single Layer 3D Visualization				✓	
Arc View Support				add-on	
Draping and Image Overlay				add-on	
Multi Layer 3D Visualization AVI+JPG					✓

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