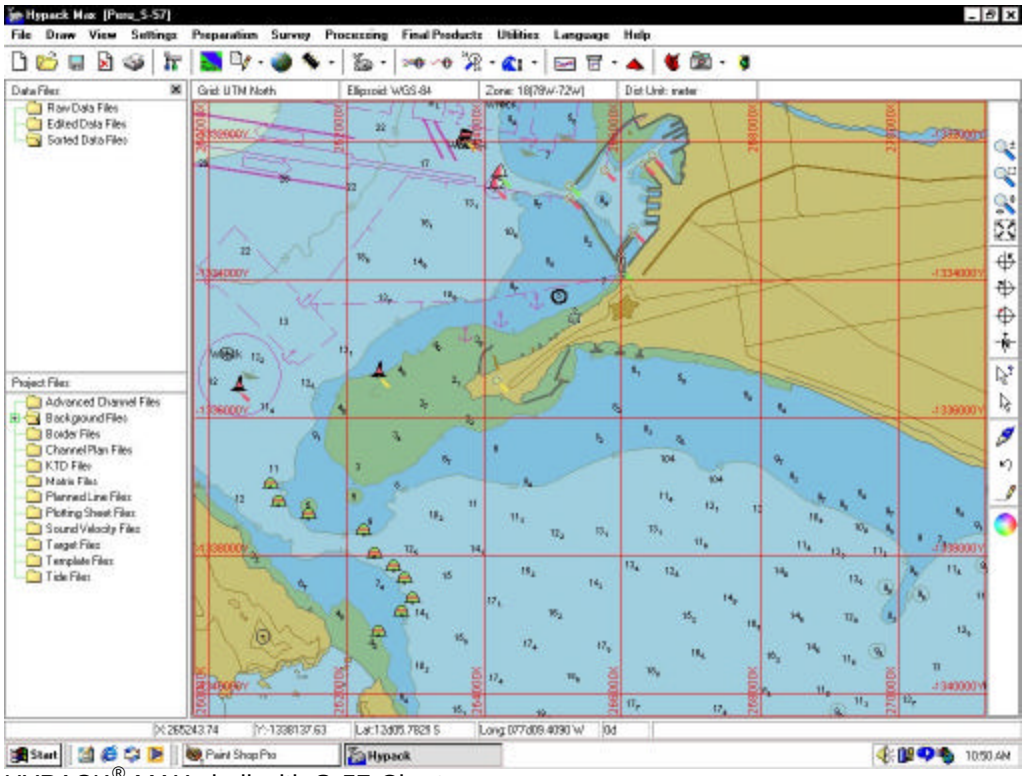
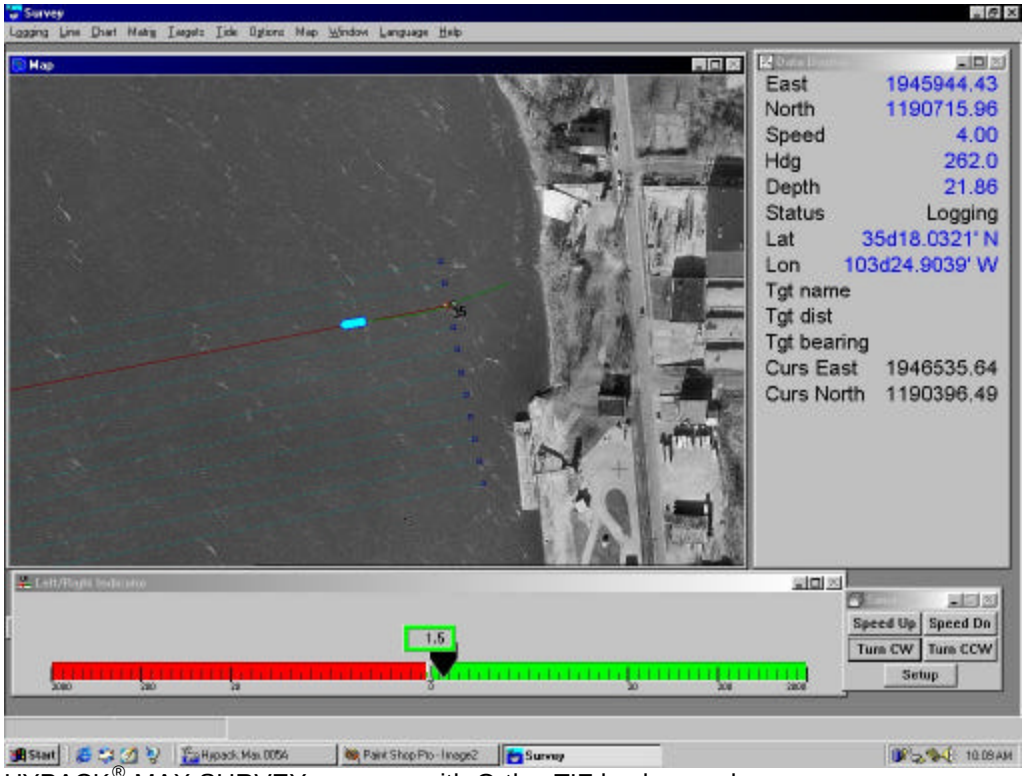


HYPACK® MAX shell with S-57 Chart.
[S-57 chart courtesy of Peruvian Navy]



HYPACK® MAX SURVEY program with Ortho-TIF background.
[Background chart courtesy USACE-Rock Island]

HYPACK® MAX

HYPACK® MAX is a Windows-based software package for hydrographic surveying and data processing.

It operates under all 32-bit operating systems from Microsoft, including:

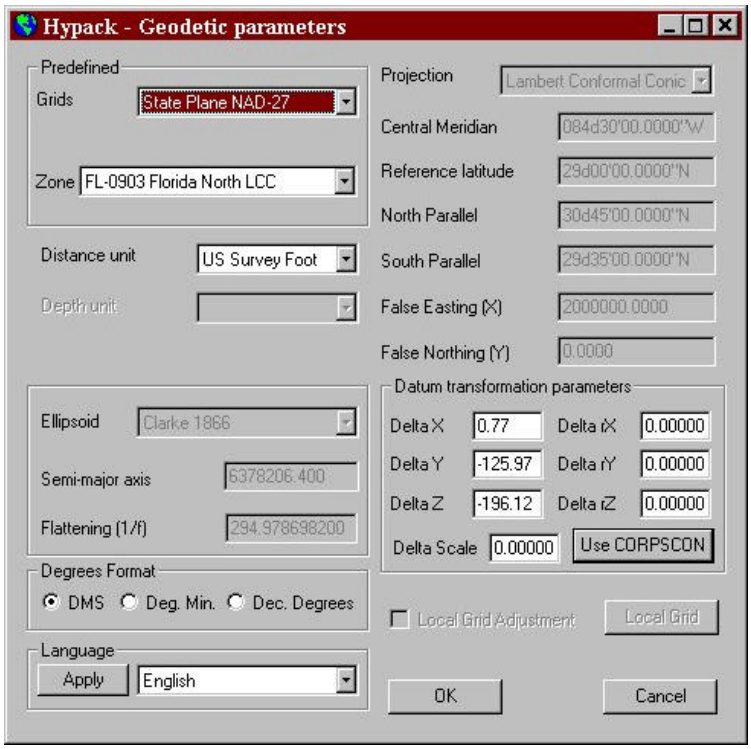
- Windows 95/98
- Windows NT
- Windows 2000
- Windows ME
- Windows XP

HYPACK® MAX can perform the following tasks:

- Survey Design
- Data Collection
- Data Editing
- Export of Data to CAD/GIS
- Cross Sectional Displays
- Volumes by Section
- Volumes by Surface Model
- Contouring
- Plotting of Smooth Sheets
- ADCP Collection/Display
- 3D Visualization

The optional HYSWEEP® module allows for the calibration, collection and processing of multibeam and multiple transducer sonars.

The DREDGEPACK® version of HYPACK® MAX allows you to maximize the efficiency of dredge operations by tracking and maintaining a history of where the cutting tool has passed and how deep it was.

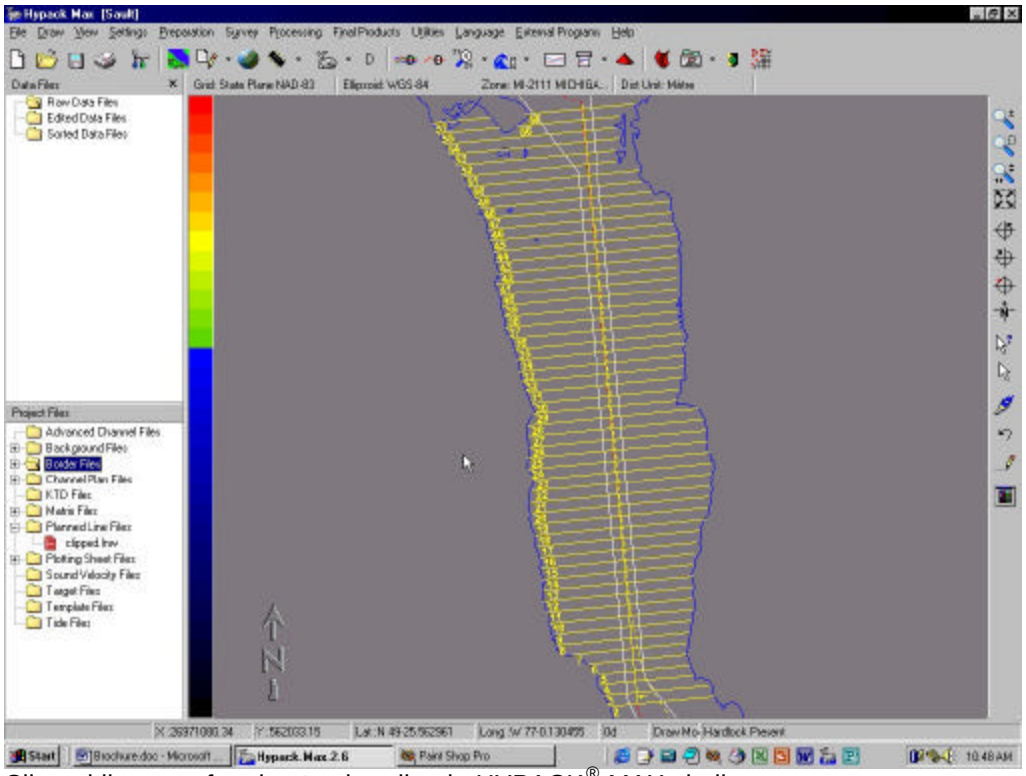


Setting Geodetic and Datum Transformations Parameters in HYPACK® MAX.

Geodesy

HYPACK® MAX allows you to quickly configure and save the geodetic parameters for you local survey.

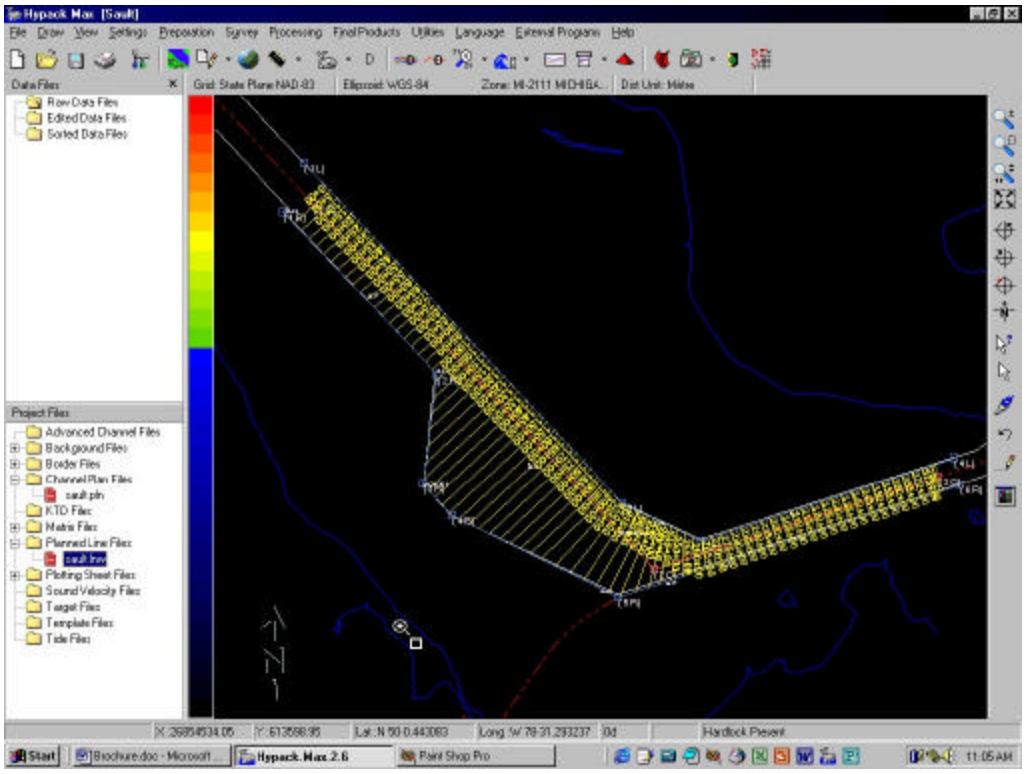
- National grids are pre-defined and available from a list.
- National datum transform-ations are pre-built into MAX for the USA, UK and France.
- Users can determine their datum transformation parameters from test points.
- Programs are included to transform from Latitude-Longitude-Ellipsoid height to/from X-Y.
- Common projections such as UTM are available.
- Users can operate on a local grid with GPS.


Clipped lines conforming to shoreline in HYPACK® MAX shell.

Planned Lines

You can quickly create planned lines for your hydro-graphic survey.

- HYPACK® MAX's Planned Line Editor allows you to enter X-Y or Latitude-Longitude pairs for waypoints.
- You can quickly generate additional lines using several 'offset' methods.
- Lines can also be imported from CAD/GIS systems.
- Lines can be 'clipped' to conform to the exact geometry required by your survey.



Generation of Planned Lines with Cross Section Templates in CHANNEL DESIGN.

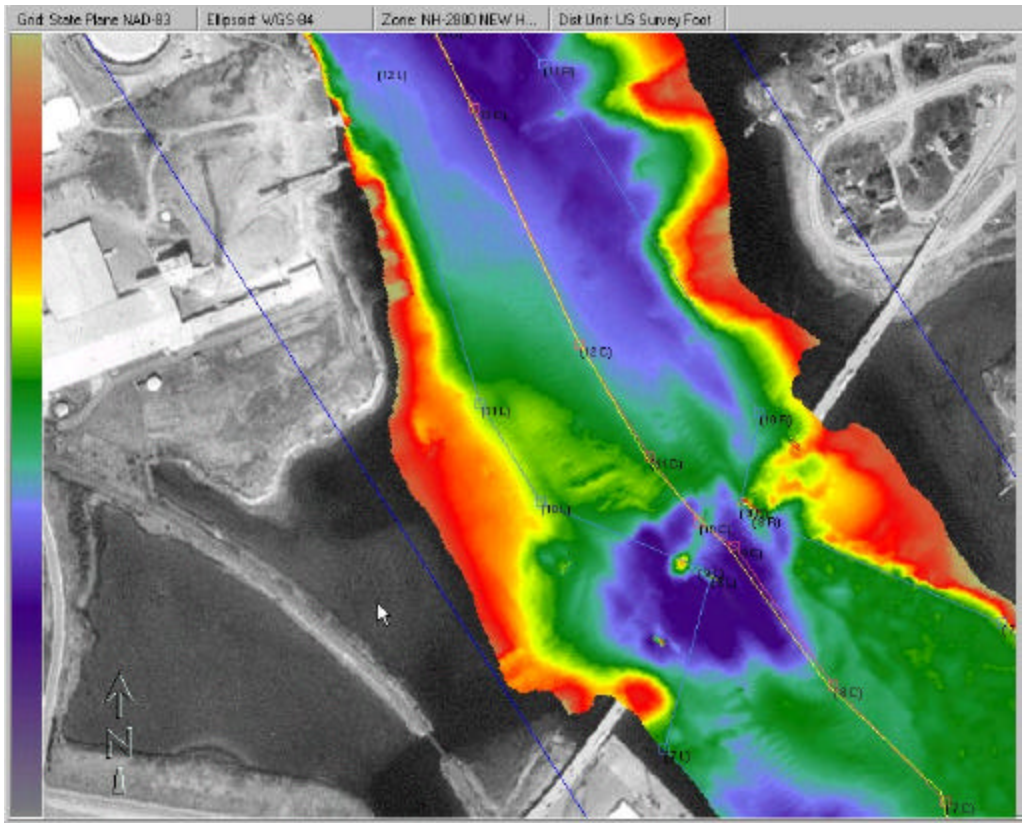
CHANNEL DESIGN

CHANNEL DESIGN is a special HYPACK® MAX program that allows you to create planned lines by entering the channel geometry.

By entering the following info:

- Left toe line positions
- Centerline positions
- Right toe line positions
- Side slope and depth

…CHANNEL DESIGN can generate planned lines that have the cross-sectional profile attached to each line.

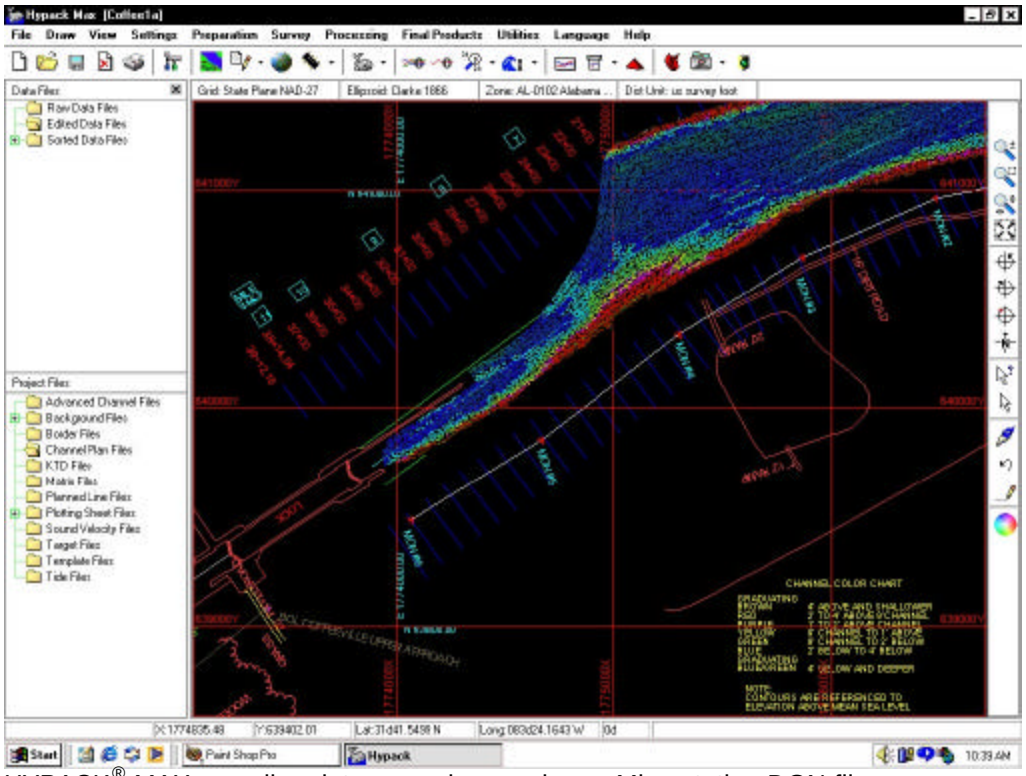


A Matrix File, color-coded for depth, superimposed on an OrthoTIF file for Portsmouth, NH. [Multibeam data courtesy USACE – New England District]

Matrix Files

A Matrix file (MTX) allows you to display bottom coverage and to quickly display color-coded representations of the bottom depth.

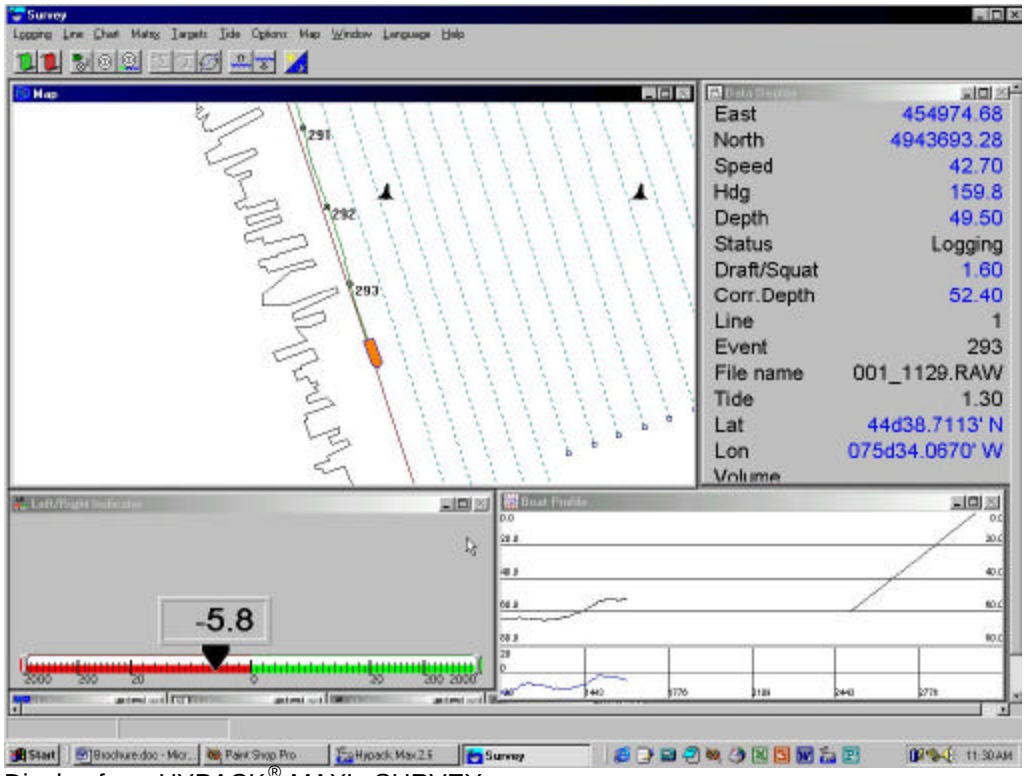
- MTX files are color-coded based on depth.
- You set the size of the 'cells' for each MTX file.
- MTX files can be filled in the TIN MODEL program
- MTX files can be displayed and updated in real time by Single Beam echosounders in the HYPACK® MAX SURVEY program or by multibeam and multiple transducer sonars in the optional HYSWEEP® modules.



HYPACK® MAX sounding data super-imposed on a Microstation DGN file.
[DGN file courtesy USACE – Tuscaloosa]

CAD/GIS Support

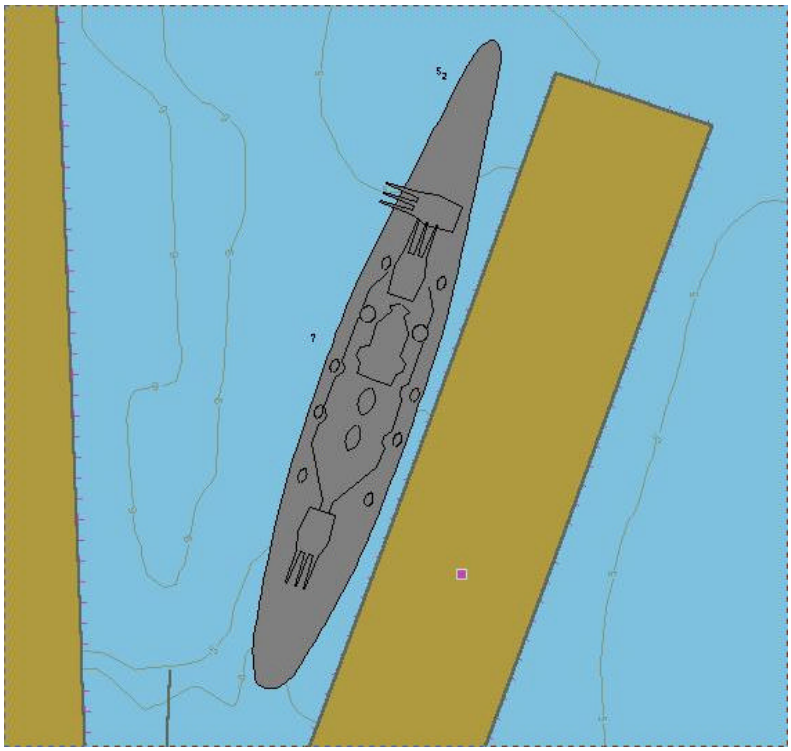
- HYPACK® MAX allows users to import several different background formats, including DXF, DGN, S-57, OrthoTIF, BSB, C-Map and VPF.
- These background files can be displayed during survey design and data collection.
- They can also be plotted to any Windows printer/plotter device.
- HYPACK® MAX also provides tools to export its data file and project files to DXF and DGN.



Display from HYPACK® MAX's SURVEY program.

SURVEY

- HYPACK® MAX's SURVEY program supports multiple devices
  - RTK, DGPS, and GPS systems
  - Range Azimuth
  - Range-Range
  - USBL systems
  - ROV systems
  - Single beam and dual frequency echosounders
  - Heave-Pitch-Roll sensors
  - Gyros and compasses
  - Magnetometers
  - Environmental sensors
- SURVEY provides windows for Area Map, Data Display, Left-Right Indicator, Boat Profile, Survey Devices and duplicate Helmsman windows.
- The Shared Memory Area of SURVEY allows you to generate custom messages to other sensors or access SURVEY data in other applications.

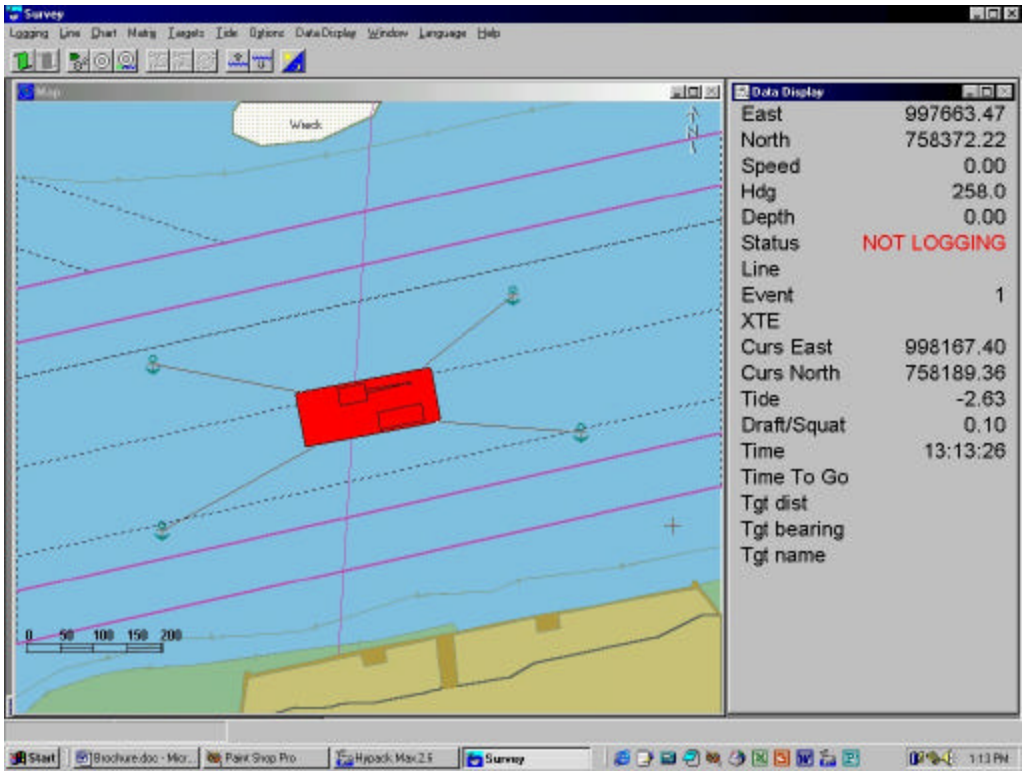


Sample boat shape file created in Boat Shape Editor. USS Washington.

Boat Shape Editor

HYPACK® MAX allows you to specify the exact shape of your vessel.

- All sensors are referenced based on their relative position to a 'boat origin'.
- The vessel perimeter is referenced to the same origin.
- The user can attach up to nine anchors anywhere on the vessel.
- You can display the exact perimeter of your survey vessel, work barge or dredge inside the SURVEY or DREDGEPACK® programs.
- DREDGEPACK® allows for multiple piece vessels, allowing for separate booms and drag arms.

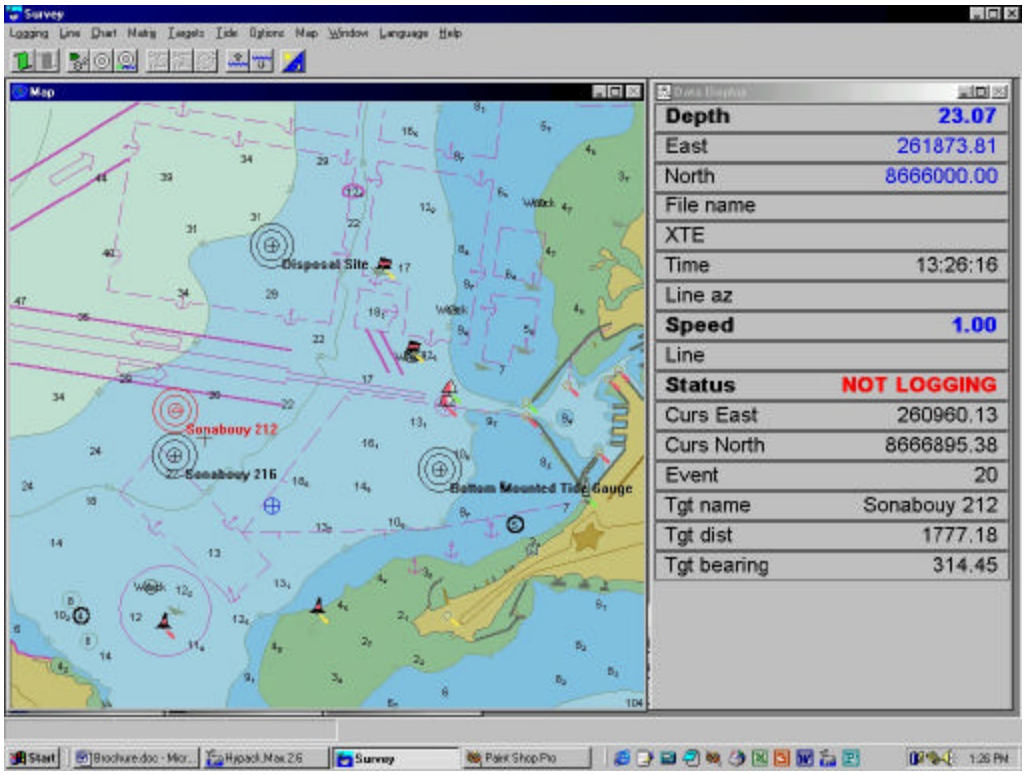


Example of work barge with 4-point mooring displaying vessel and anchor positions over cable.

Anchors

The SURVEY program of HYPACK® MAX allows you to deploy or raise up to nine anchors.

- Anchors may be attached anywhere on your vessel.
- You may 'drop' the anchor at its current location or at a targeted location.
- Anchor chains are drawn from the anchor touchdown location to its attachment spot on the vessel.
- Anchors can be raised by right-clicking on them with the mouse or by using the menu or keyboard options.

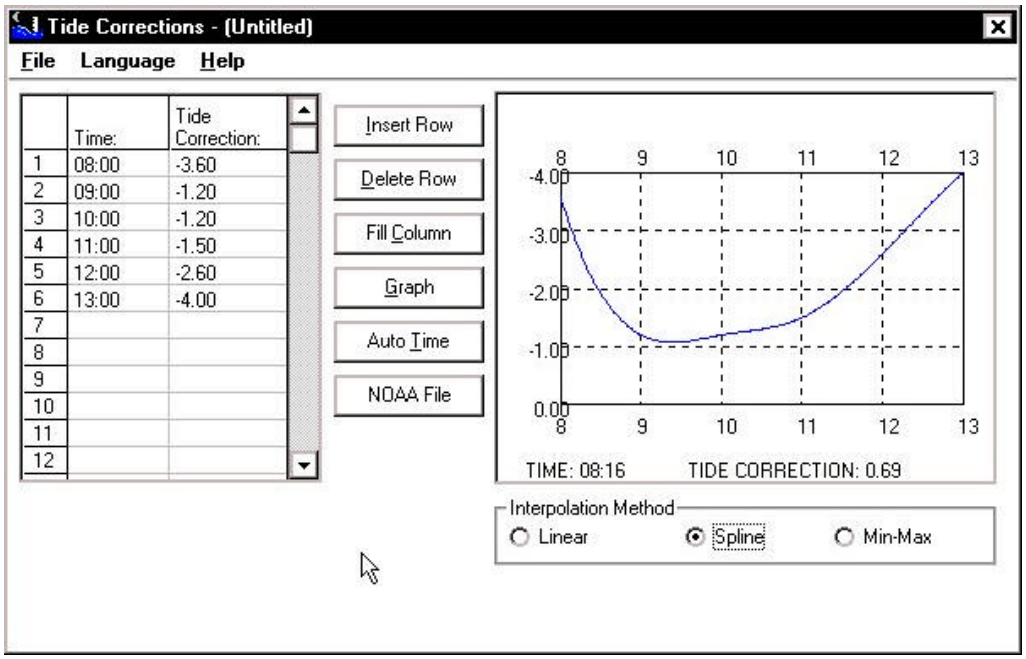


Targets displayed on SURVEY screen.

Targets

A 'target' is an X-Y position of interest to the user.

- Targets can be created ahead of the actual survey, should you have locations of interest that you want to navigate to.
- Targets can be marked while in the SURVEY program.
    - Double-clicking on the desired location on the Area Map.
    - Hitting the F5 key or the Target Icon sets a target at the vessel position.
- Users can display the name of the current active target and navigational information such as the distance and bearing to the target in the Data Display.

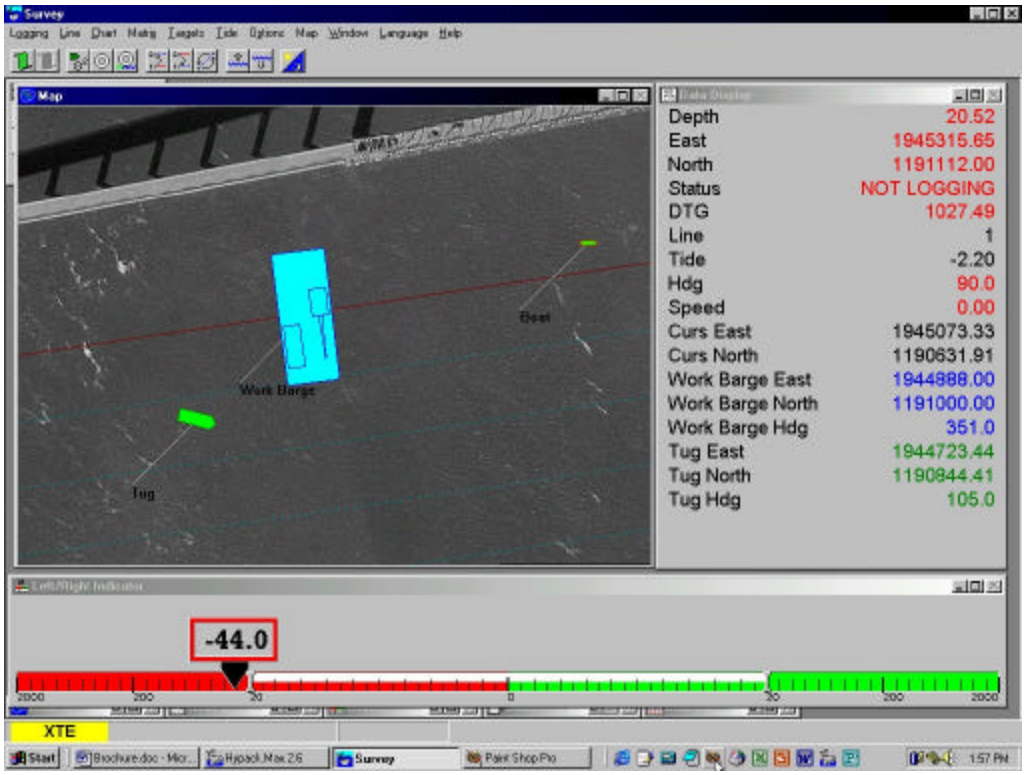


Creation of Tide Correction file from user-observed times and heights.

Water Level Corrections

HYPACK® MAX has several options for adjusting your soundings to tides or changes in water levels.

- Telemetry gauges interfaced to SURVEY in real time.
- Manually entered corrections in SURVEY
- Manually entered corrections in post-processing.
- Use of harmonic predictions or predictions from high-low water times and heights tables.
- Use of RTK GPS for real time water level corrections.

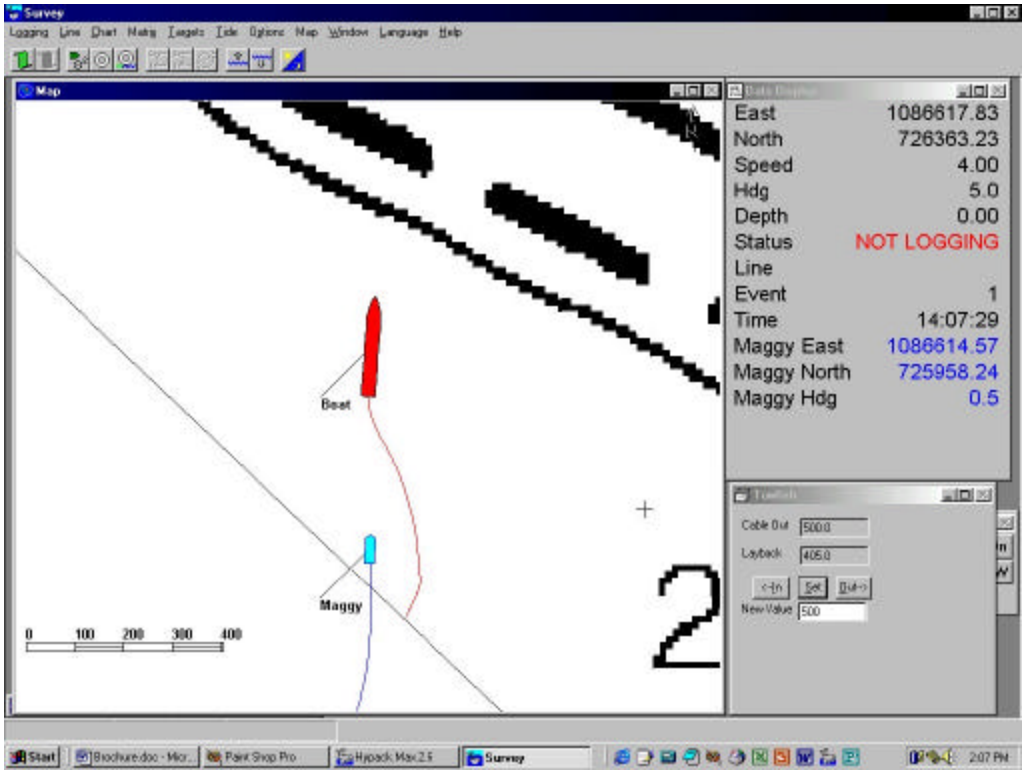


Multiple vessels displayed in SURVEY.
[Background file courtesy Rock Island District – U.S. Army Corps of Engineers]

Multiple Vessel Support

The SURVEY program can track up to eight separate vessels.

- Each vessel can be assigned a separate shape and color attribute.
- The names of each vessel can be labeled and displayed.
- Information from each vessel is available in the Data Display window. The info is color-coded to match the vessel's color attribute.
- Any vessel can be assigned as the primary vessel. Distance off-line, distance to go, distance-made-good, etc., is computed for the primary vessel.

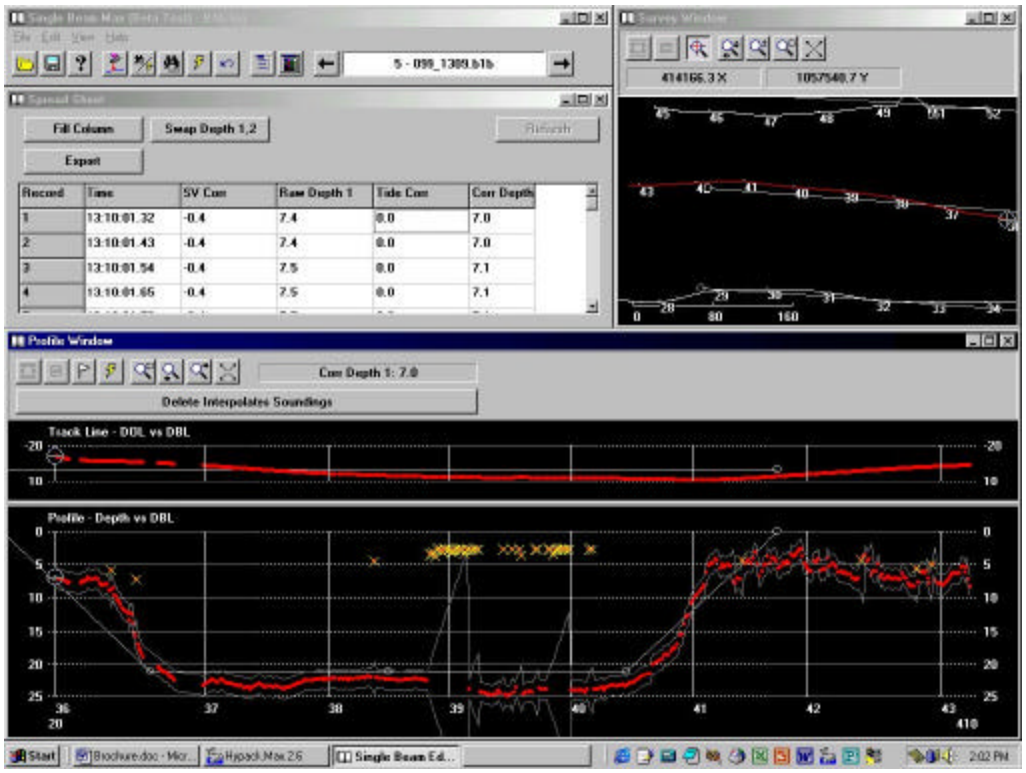


An ROV towed behind the main vessel in SURVEY.

ROV and Towfish Support

HYPACK® MAX's SURVEY program can simultaneously track and record the position and sensor information from your main vessel and your towfish.

- Acoustic systems such as Trackpoint, Trackpoint LXT and Nautronic ATS are supported.
- Support exists for USBL systems.
- The towfish can be assigned as the primary vessel. This means that left-right steerage info and start-of-line or end-of-line decisions can be automatically based on the towfish position.
- Adjustable layback drivers can read the 'cable out' from spool counters or you can manually enter it.

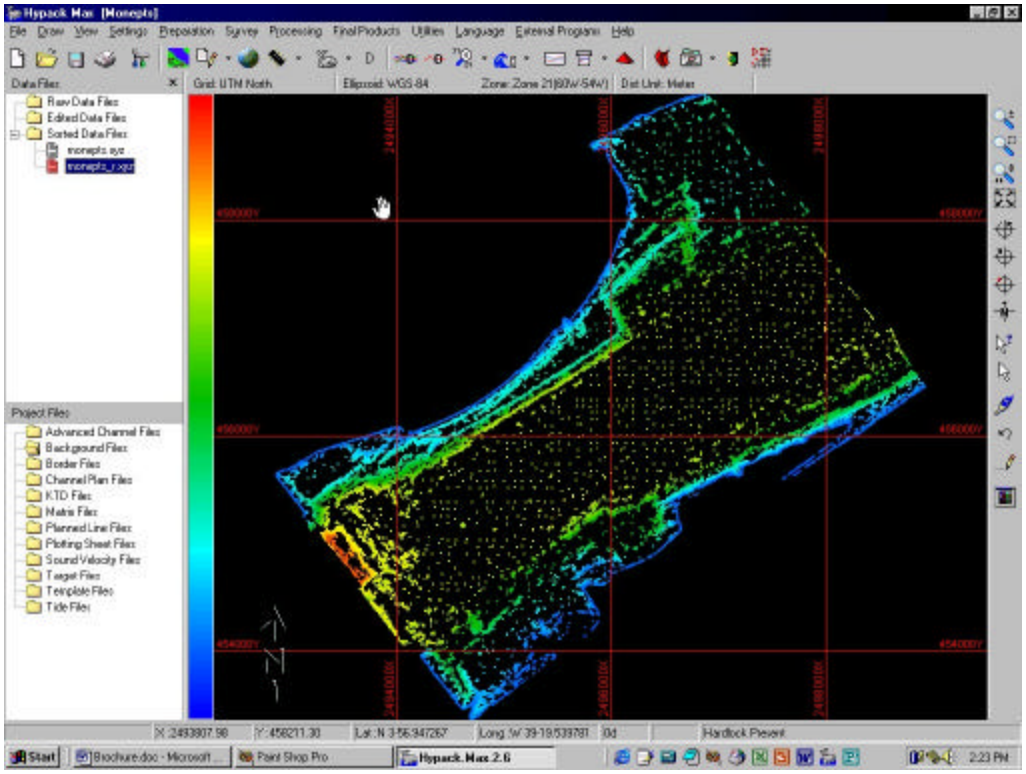


The new SBMAX Single Beam Editor allows you to quickly review and edit your single beam data.

Editing Single Beam Data

The SBMAX program provides a powerful graphical interface for editing your single beam and dual frequency data.

- Loads and saves an entire day's data in seconds.
- Applies water level corrections and sound velocity corrections.
- Permits smoothing of RTK Tides.
- Can display depth profiles based on distance along line or by time.
- Spreadsheet is configurable.
- Automated filters eliminate tedious editing.
- Filtered points can be restored.
- Edit your day's hydrographic data in minutes.

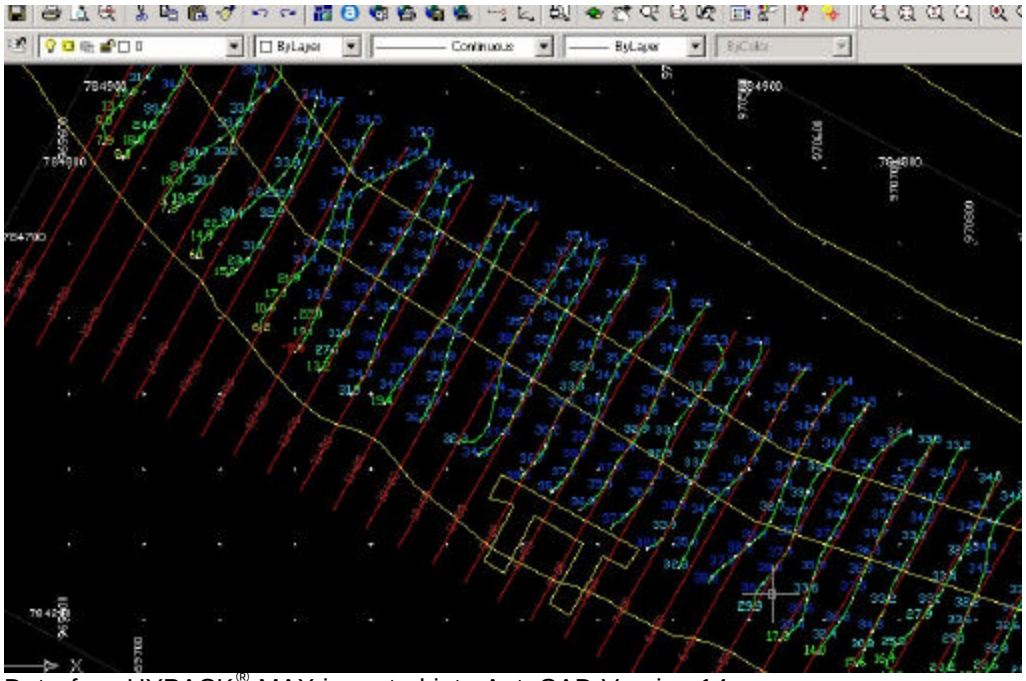


A subset of a multibeam data set created in SOUNDING REDUCTION.
[Multibeam data set courtesy David Evans & Associates, Portland, OR]

Sounding Selection Programs

HYPACK® MAX contains several sounding selection programs to help you reduce your data set for final products.

- SORT – Creates a cartographic subset, based on minimum or maximum depths that can then be plotted or exported to CAD.
- CROSS-SORT – Selects soundings to eliminate overwrites where survey lines intersect.
- MAPPER – A binning program for multibeam data sets.
- SOUNDING REDUCTION – Creates a subset of soundings that can be used to accurately model the original data set.



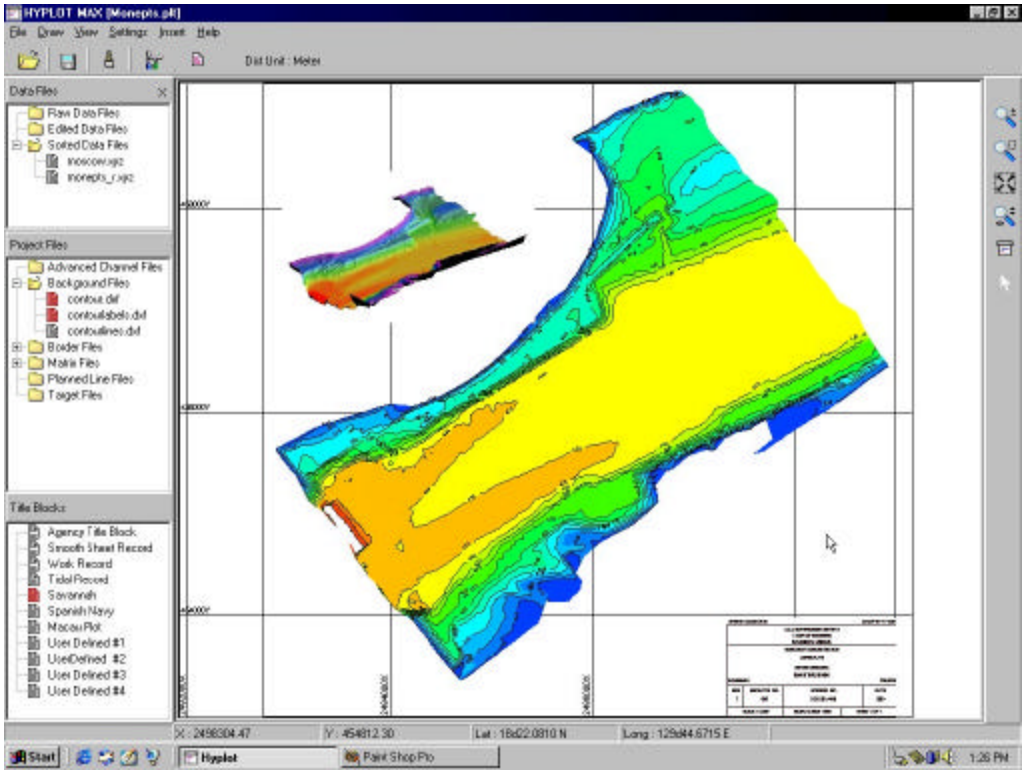
Data from HYPACK® MAX imported into AutoCAD Version 14.

Export to CAD/GIS

HYPACK® MAX has all the tools you need to transfer your hydrographic data to AutoCAD, ArcInfo, TerraModel, Microstation DGN and other CAD/GIS packages.

You can export the following information from HYPACK® MAX:

- Soundings
- Track Lines
- Projection Grid Tics
- Targets
- Planned Line Files
- Matrix Files
- Contours (Lines and Solid Fills)
- Cross Sectional Profiles
- Digitized shoreline and feature files.
- Channel Plan files
- Border files (fences)



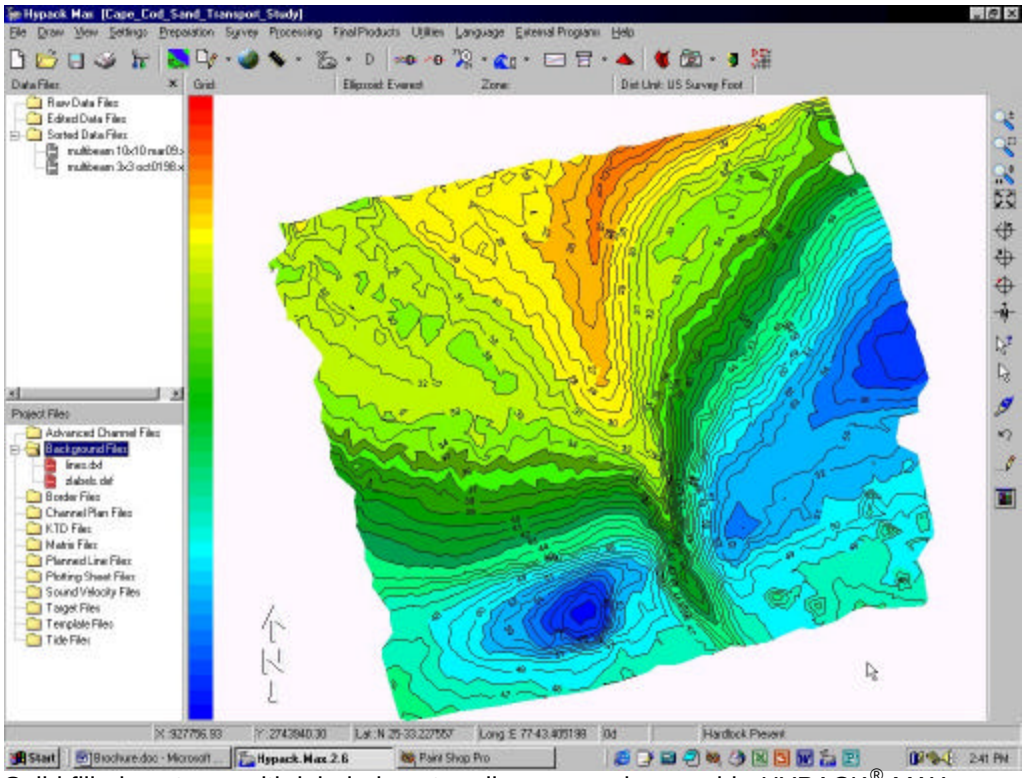
The new HYPLOT MAX program optimized output to inkjet printers and plotters.
[Multibeam data set courtesy David Evans & Associates, Portland, OR]

Plotting Smooth Sheets

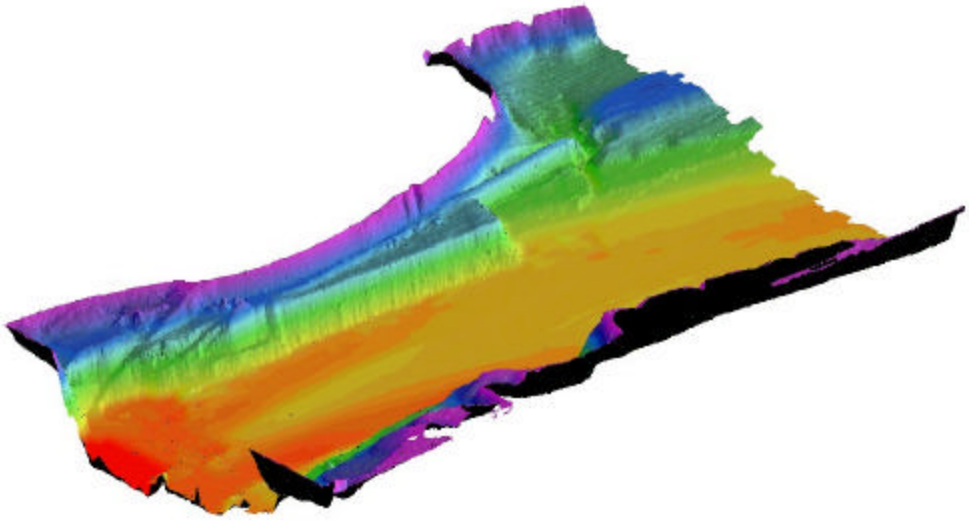
HYPACK® MAX contains plotting programs for pen plotters and for inkjet printers and plotters.

The new HYPLOT MAX program provides several new features.

- A WYSIWYG display.
- New options for sheet borders.
- The ability to preview before plotting.
- Output to any printer/plotter supported with a Windows driver.
- Ability to import user supplied graphics.
- Compass roses, scale bars and other chart features.
- Drag and drop to place chart features and graphics.
- Enhanced routines for solid color contour fills.



Solid filled contours with labeled contour lines super-imposed in HYPACK® MAX.
[Data courtes y New England District – U.S. Army Corps of Engineers.]



A surface model of multibeam data from HYPACK® MAX's TIN MODEL program.
[Data courtesy David Evans and Associates, Portland, OR]

Contouring

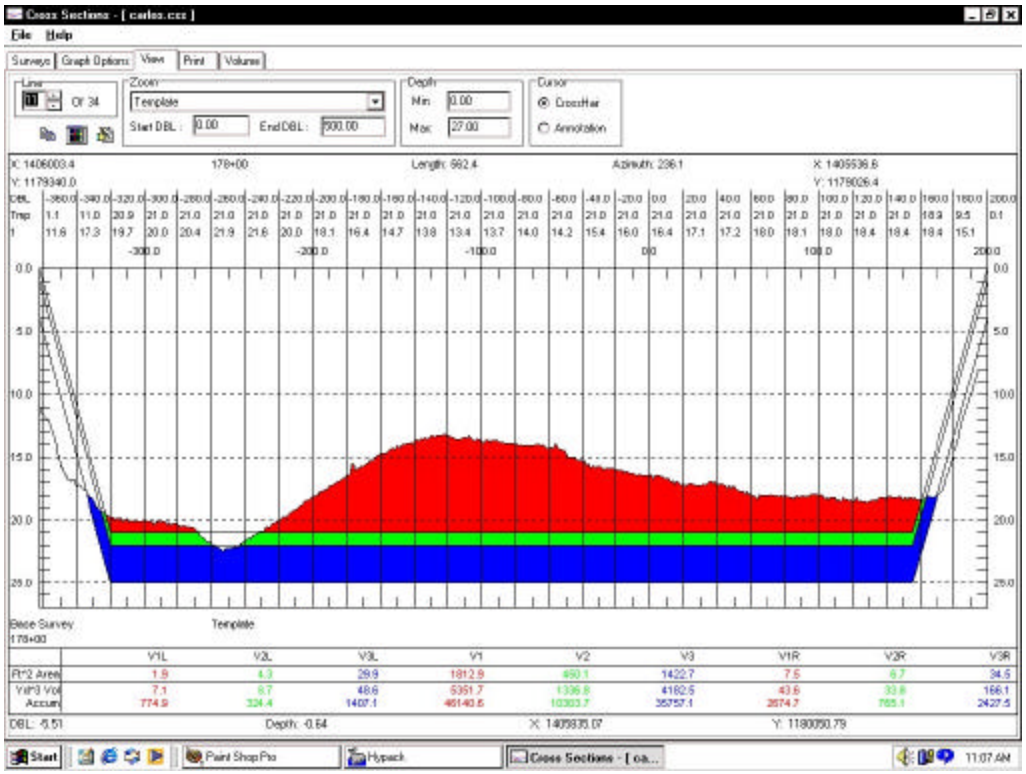
Contours are generated in the TIN MODEL program of HYPACK® MAX.

- Contours are saved in DXF format to allow easy import into CAD/GIS packages.
- Contours can be either lines or solid color fills.
- You may smooth contours or use un-smoothed contour lines.
- Contour lines may be color-coded for depth or output as black polylines.
- You can generate un-labeled contour lines or place labels at a defined distance along the contour line at a size of your specification.
- The TIN MODEL program accepts any HYPACK® MAX data file (edited or sorted single beam or multibeam data files) or an ASCII XYZ data file from any application.

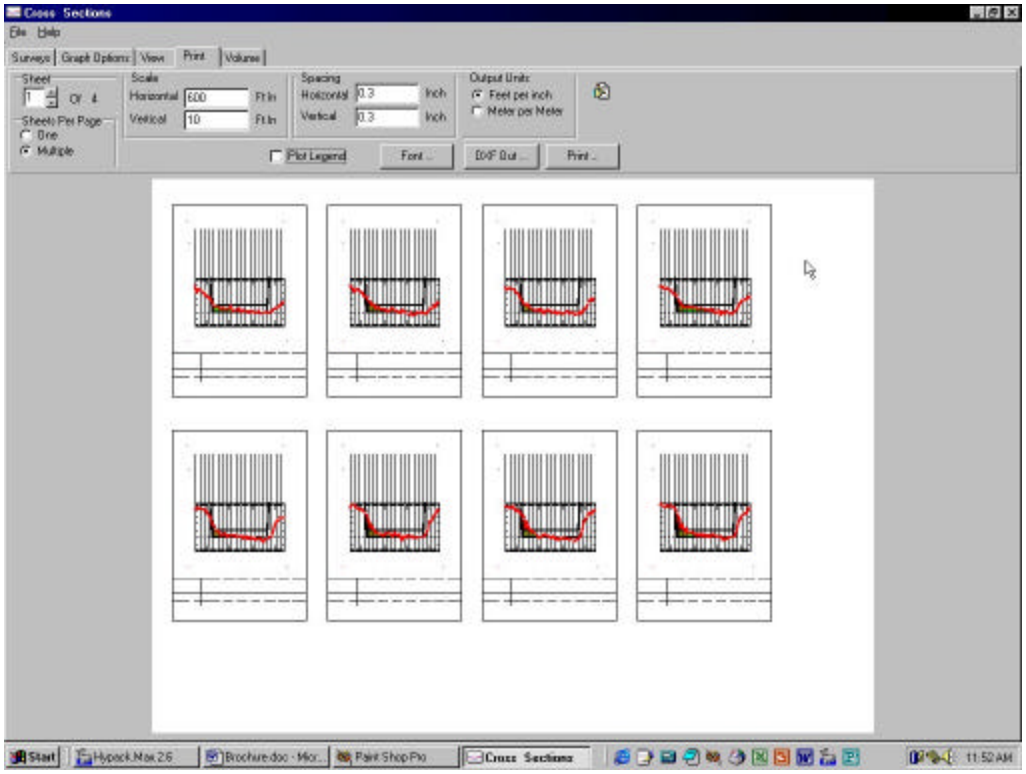
TIN MODEL

The TIN MODEL program creates a surface model of your data by connecting the XYZ data points into a Triangulated Irregular Network.

- Models can be displayed from any perspective and viewing angle.
- Models can be printed on any Windows compatible printer/plotter.
- The TIN MODEL can compute volumes using one of the following methods:
    - TIN to Level
    - TIN to Channel
    - TIN to TIN
    - Volume by sections



Display of cross section and volume data from CROSS SECTIONS & VOLUMES.
[Single beam data set courtesy USACE-Buffalo]



Output of multiple sections to the plotter/printer in CROSS SECTIONS & VOLUMES

CROSS SECTIONS & VOLUMES

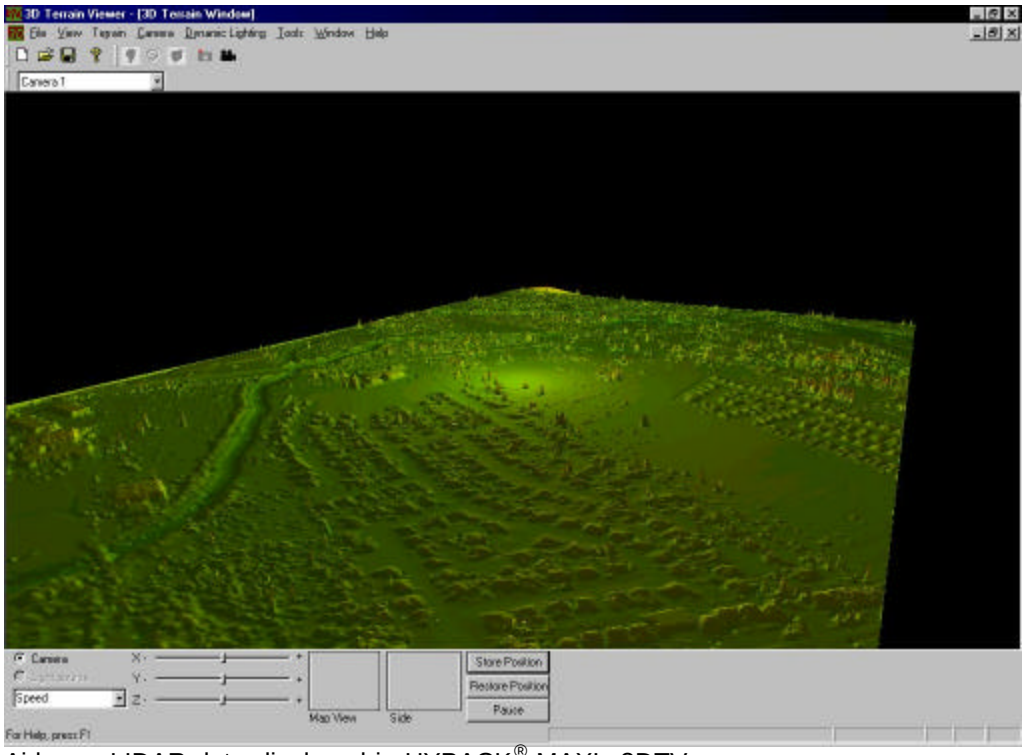
The CROSS SECTIONS & VOLUMES (CS&V) program of HYPACK® MAX allows you to computer volume quantities using several different methods.

Available methods include:

- AEA1 – Standard Average End Area report as used by the USACE.
- AEA2 – Standard Average End Area report as used by the USACE.
- AEA3 – Standard Average End Area report for pre-dredge vs. post-dredge survey by USACE.
- Philadelphia Pre-Dredge – Method used by USACE Philadelphia.
- Philadelphia Post-Dredge – Method used by USACE Philadelphia.
- Jacksonville Pre-Dredge – Method used by USACE Jacksonville
- Jacksonville Post-Dredge – Method used by USACE Jacksonville.
- Savannah – Special AEA method and report used by Savannah USACE
- Standard HYPACK – Improved method for non-parallel lines. Also computes fill values.
- CHEC I – Chinese Harbour Engineering method that can use multiple side slopes.
- CHEC II – Chinese Harbour Engineering method that uses a transitional side slope.

CS&V generates text and graphical reports.

You can design your own cross section design templates and customize the cross section profile displays.

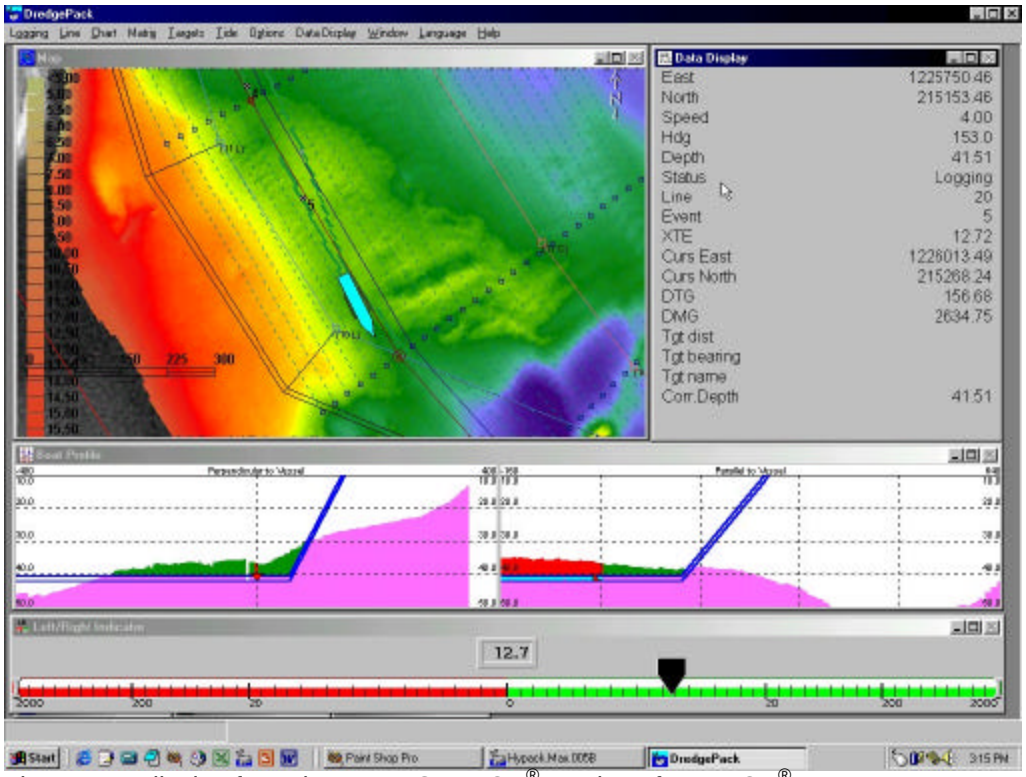


Airborne LIDAR data displayed in HYPACK® MAX's 3DTV program.
[LIDAR data set courtesy 3001 Inc., New Orleans, LA]

Terrain Visualization

The 3D TV allows you to visualize topographic and hydrographic data in real time or in post processing.

- In real time, the 3D TV program sets the camera position to the current position and orientation of your vessel. This provides a real time display of what is beneath the vessel or a look ahead.
- In post-processing, you can manually fly the camera or send it along a predefined track using a planned line.
- Input to the program is any ASCII XYZ data file.
- The program allows you to capture the screen to a JPG or BMP file or to log video to an AVI file.

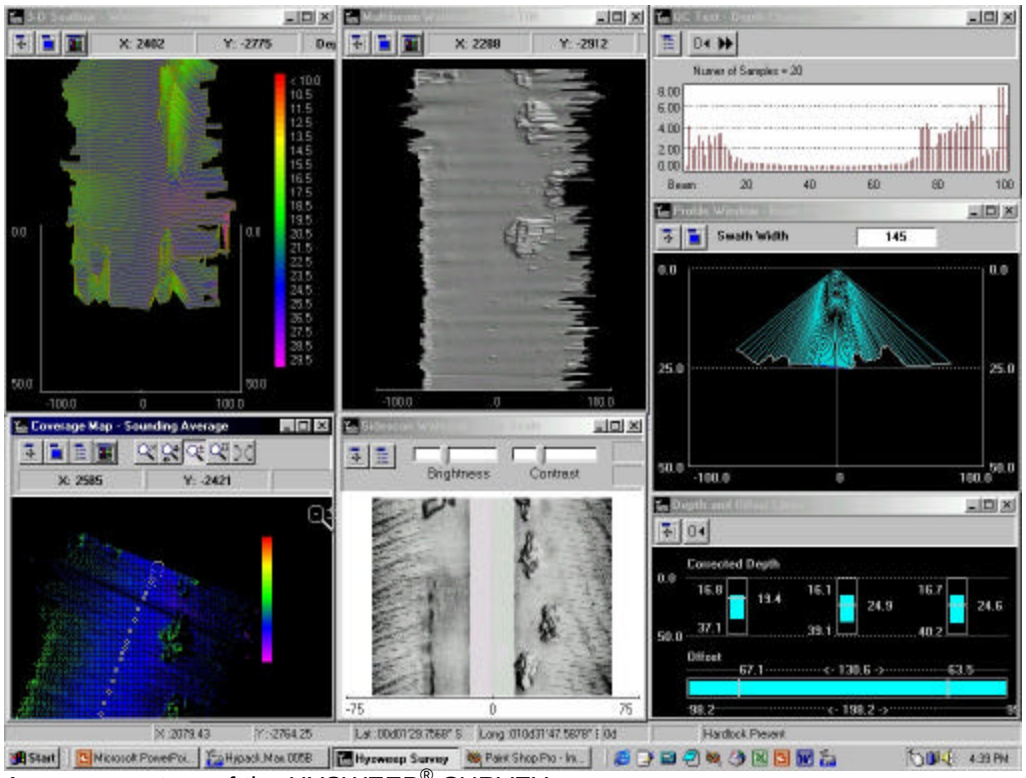


The screen display from the DREDGEPACK® version of HYPACK® MAX
[Background TIF and multibeam data courtesy USACE-New England]

DREDGEPACK®

DREDGEPACK® is a special version of the HYPACK® MAX SURVEY program, modified to support dredging operations.

- DREDGEPACK® keeps track of the "As Surveyed" and the "As Dredged" surface in real time.
- It re-maps the "As Dredged" surface in real time, based on the position and depth of the digging tool.
- DREDGEPACK® provides real-time cross-sectional profiles through both surfaces, super-imposed with the channel design templates.
- The sections can be perpendicular and parallel to the vessel's orientation or to the centerline at the vessel's location.

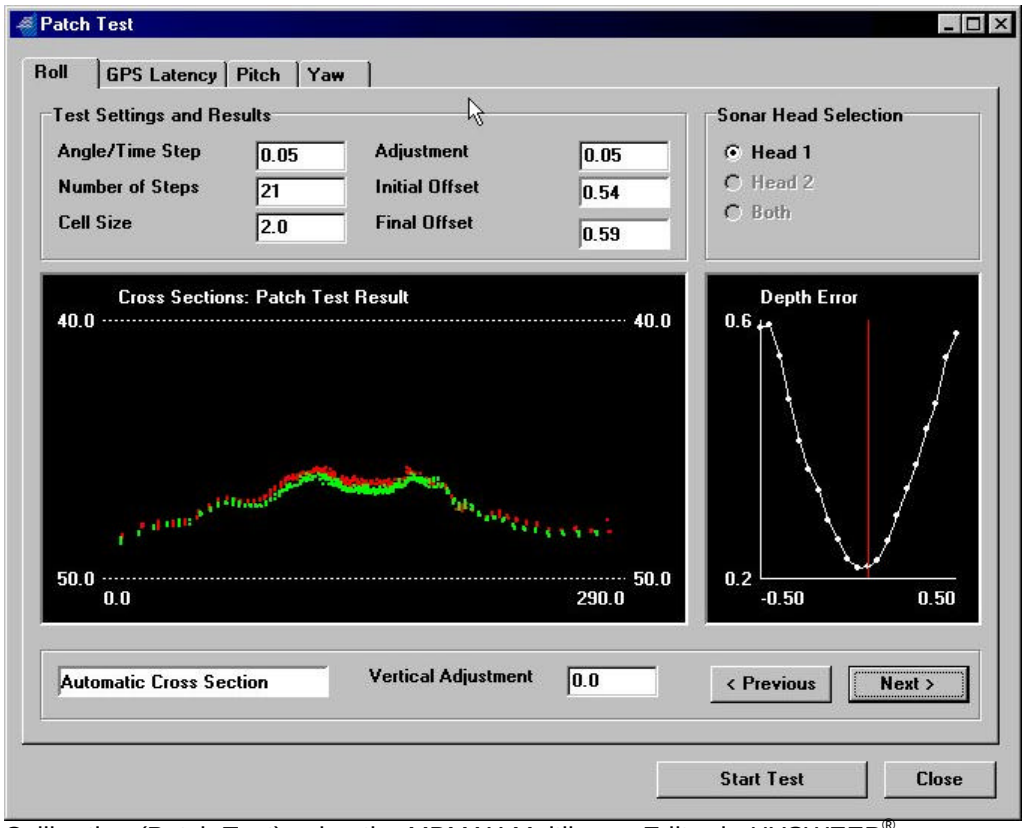


A screen capture of the HYSWEEP® SURVEY screen.
[Multibeam data set courtesy of TOYO Corporation, Tokyo, Japan]

HYSWEEP® SURVEY

The HYSWEEP® option to HYPACK® MAX adds the ability to calibrate, log and edit data from multibeam and multiple transducer sonar systems.

- Integrates multibeam sonars from:
  - Atlas
  - Elac/Seabeam
  - Odom
  - Reson
  - Simrad
- Provides for real-time display of:
  - Bottom coverage
  - Swath wire frames
  - Swath TIN surface
  - QC information
  - Side scan
  - Nadir beam to single beam comparison.

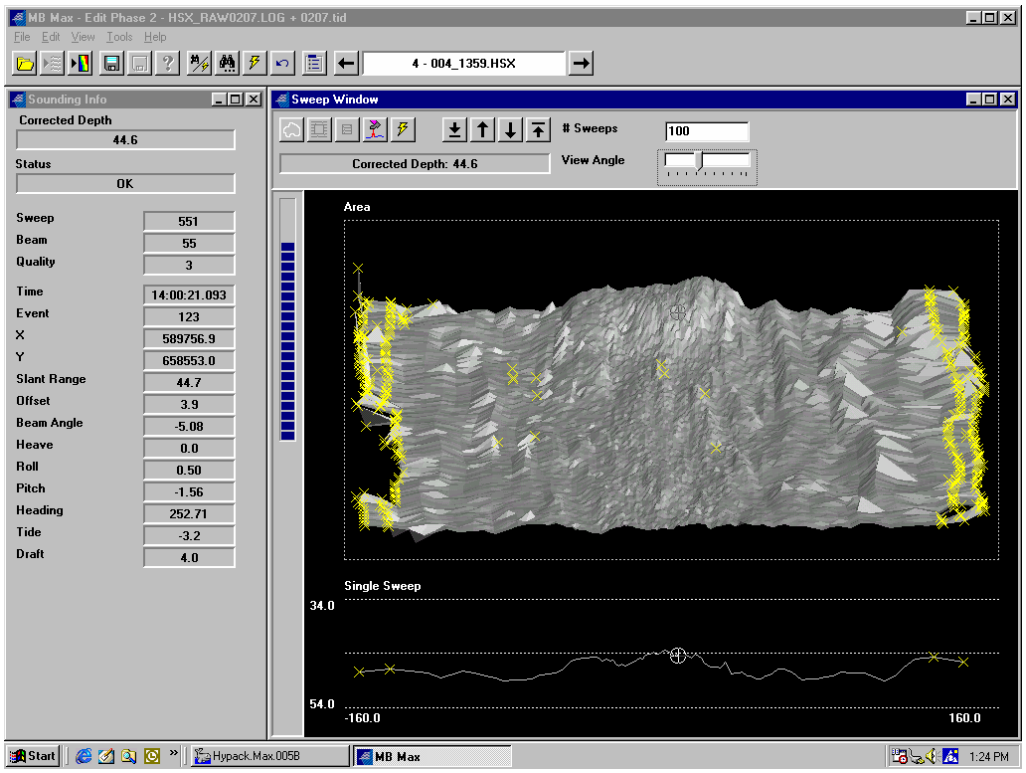


Calibrating (Patch Test) using the MBMAX Multibeam Editor in HYSWEEP®.

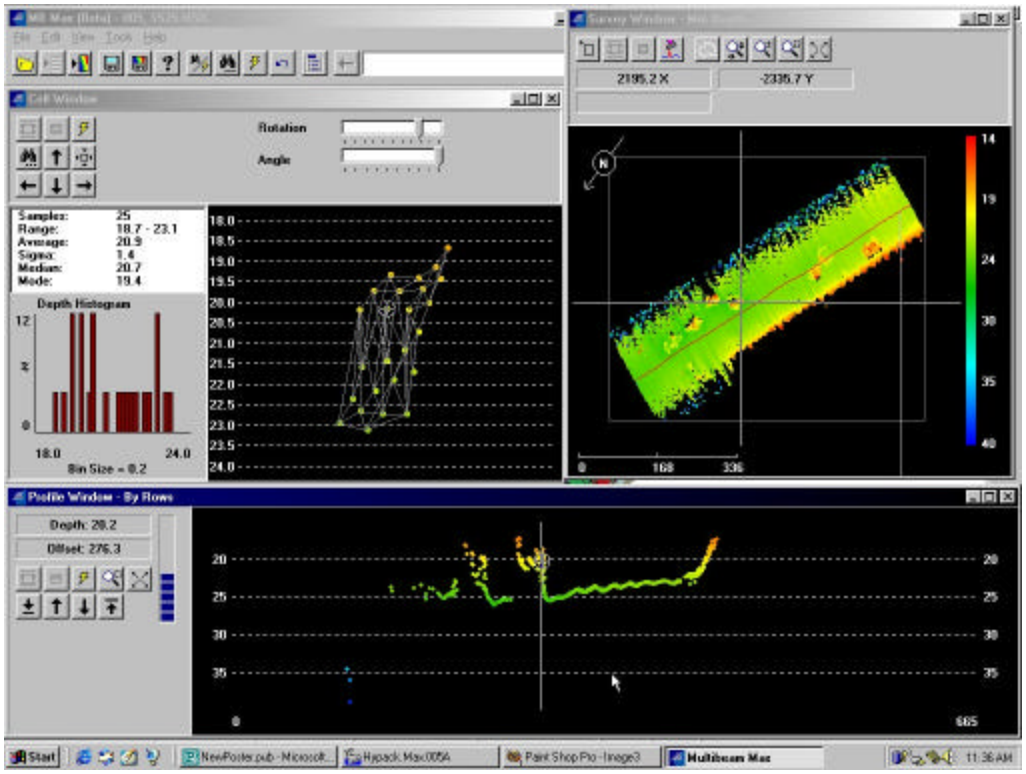
HYSWEEP® Calibration

HYSWEEP® provides tools to allow you to quickly and accurately calibrate the orientation of your multibeam transducer and the time delays between the sonar and positioning system.

- The Patch Test function inside the MBMAX multi-beam editor computes the following errors from a set of test lines:
  - Roll
  - Pitch
  - GPS Latency
  - Yaw
- Data that has already been collected can be corrected for alignment and delay errors.
- System calibration should be a matter of hours, not days.



The Sweep Editor in MBMAX allows you to review and filter individual survey lines.

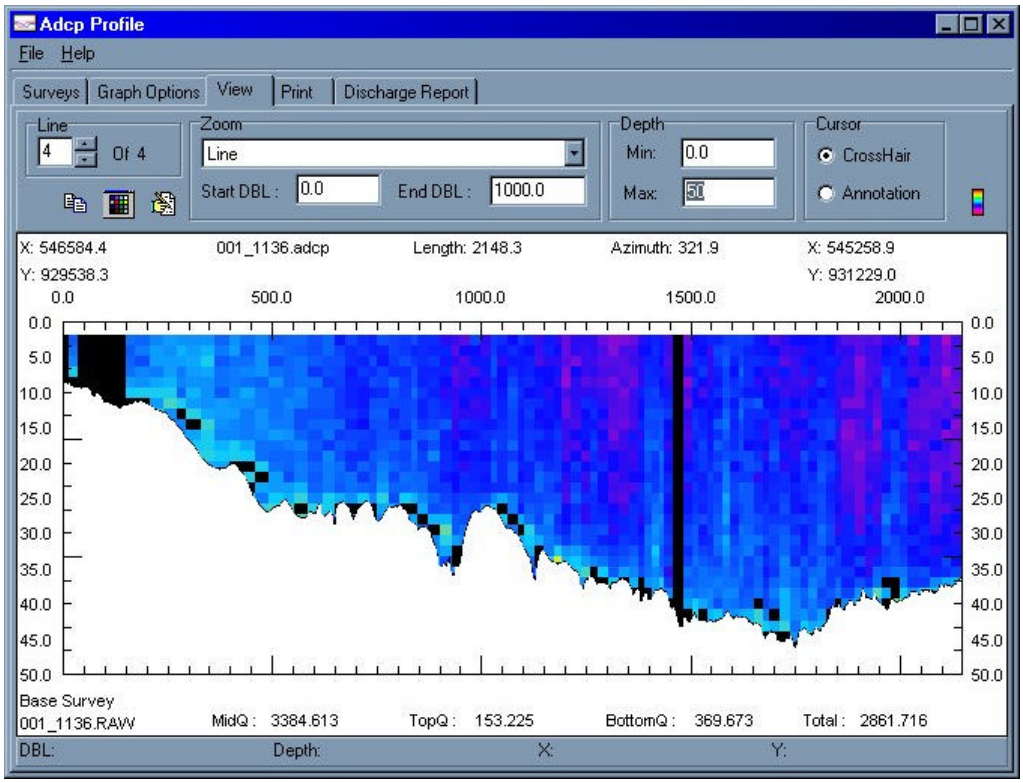


Final editing in MBMAX allows you to examine sections and cells.

HYSWEEP® MBMAX

The MBMAX program is allows you to edit your multibeam and multiple transducer data.

- MBMAX allows you to enter a tide correction file or to use water level corrections determined by RTK GPS elevations.
- The first stage of editing in MBMAX allows you to review and edit:
    - Vessel tracklines
    - Heave-pitch-roll
    - Gyro
    - Tide
    - Draft
    - Sound Velocity
- The second stage of editing takes you to the Sweep Editor. During this stage, you can visually review each line and graphically edit or apply automated filters to each line. Filters include:
    - Min/Max Depth
    - Spike
    - Overhang/Undercut Topography
    - Sonar Quality Flag
    - Port/Starboard Beam Angle Limits
    - Specific Beams
- During the third stage of editing, data from all multibeam lines is combined and displayed. Statistical filters can now be applied based on the surrounding multibeam data points. Displays include:
    - Survey window
    - Profile window
    - Cell window
- The third stage also contains the calibration (Patch Test) and System Performance tools to judge the overall quality of your multibeam system.

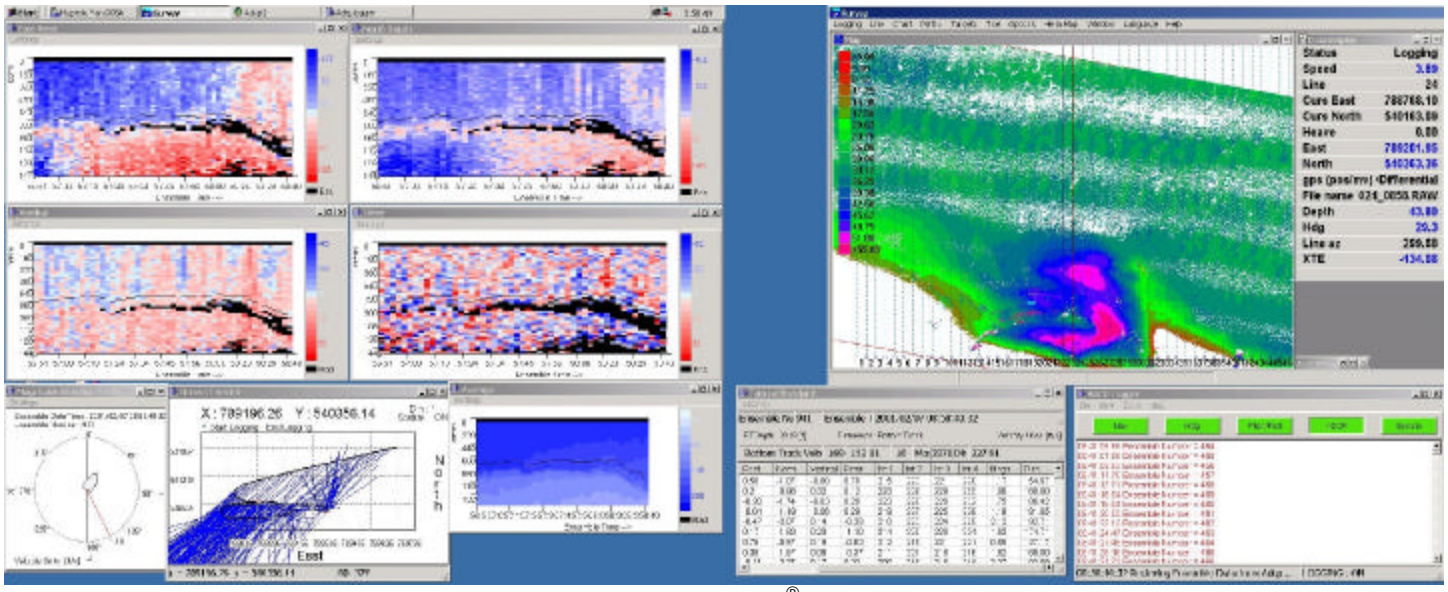


The ADCP PROFILE program provides cross-sectional flow diagrams and flow computations. [Data set courtesy of ASB Infotech, Mumbai, India]

ADCP Support

HYPACK® MAX now supports ADCP sensors from RD Instruments. The following programs are included in MAX:

- **ADCP Logger:** Runs simultaneous with SURVEY. Allows you to 'deploy' and log data from the RD Instruments Workhorse and Rio Grande ADCPs.
- **ADCP Profiles:** Combines velocity data from the ADCP files with cross sectional data from the edited HYPACK files. Provides color-coded flow diagrams and overall flow values.
- **ADCP to DXF:** Allows you to export DXF current vectors at selected depth levels for import of velocity data to CAD/GIS.



The ADCP LOGGER program, running concurrently with HYPACK® MAX.
[Data set courtesy USACE-St. Louis]

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