



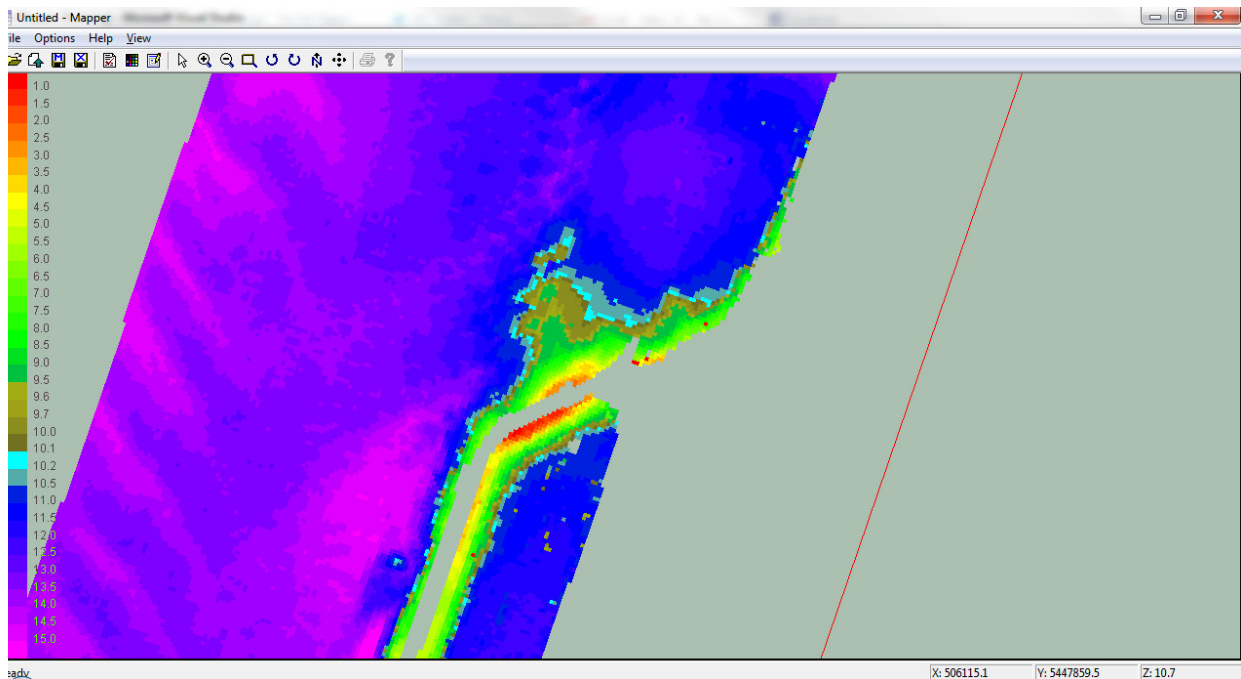
New Mapper Program

By John Marinuzzi

HYPACK® 2012 will include a new and improved MAPPER program. Some of the additions to the Mapper program will be an improved interface, one new file export option, and whole lot of differences behind the scenes.

THE NEW INTERFACE

FIGURE 1. *New MAPPER Interface*



The main difference in the interface is the ability to zoom and pan like the HYPACK® shell. Use the mouse wheel to zoom in and out at the mouse cursor position and the right mouse button to drag the display around the screen. You can also zoom window, rotate, and zoom extents using the menu buttons. These options make looking at your data considerably easier.

BEHIND THE SCENES AND A NEW FILE-SAVE OPTION

What is happening 'behind the scenes' is only interesting to talk about in that it enables a new file format option, a Matrix Database. In the old MAPPER program, all of the data was kept in memory. This could make working with larger matrices quite expensive in system resources. In the new program, we moved what was being done in memory to a database. This gives the user who doesn't mind 'getting his hands dirty' the option of using the database to extract any information they like from the data set. Any individual piece of data can be saved out to the same formats that MAPPER used to create (Matrix, XYZ, etc.), but with the database, if you

want to create a X-Y-Zmin-Zmax-Zaverage file for example, you could do that. You just need a little SQL (Structured Query Language) knowledge. Note that this export option is not available through the program, you would have to mine the data yourself.

Here is some information on how to do that:

The chosen database format is SQLite (www.sqlite.org). SQLite is free, open-source database that is being used by more and more applications. There are many free tools to view and query the data. Figure 1 is a screenshot of a Firefox Web Browser add-in called SQLite Manager with an .mtxdb file loaded.

FIGURE 2. A New Matrix Database (MTXDB) File displayed in SQLite

cell	ZMin	XatMin	YatMin	ZMax	XatMax	YatMax	DistCenter	ZCenter	XatCenter	YatCenter	BestAng	ZatAngle	XatAngle	YatAngle	ZSum	ZCount
43417	5.26	221.9307...	1001.055...	5.26	221.9307...	1001.055...	5.820766091...	5.26	221.9307...	1001.055...	0	5.26	221.9307...	1001.055...	5.26	1
43418	5.81	222.74...	1003.4...	5.81	222.74...	1003.4...	5.820766091...	5.81	222.74...	1003.4...	0	5.81	222.74...	1003.4...	5.81	1
43577	12.87	352.2240...	1379.240...	12.87	352.2240...	1379.240...	0	12.87	352.2240...	1379.240...	0	12.87	352.2240...	1379.240...	12.87	1
43578	12.82	353.0383...	1381.603...	12.82	353.0383...	1381.603...	5.820766091...	12.82	353.0383...	1381.603...	0	12.82	353.0383...	1381.603...	12.82	1
43579	12.84	353.8526...	1383.967...	12.84	353.8526...	1383.967...	5.820766091...	12.84	353.8526...	1383.967...	0	12.84	353.8526...	1383.967...	12.84	1
44351	5.26	218.7527...	999.5063...	5.26	218.7527...	999.5063...	5.820766091...	5.26	218.7527...	999.5063...	0	5.26	218.7527...	999.5063...	5.26	1
44353	5.57	220.3814...	1004.233...	5.57	220.3814...	1004.233...	5.820766091...	5.57	220.3814...	1004.233...	0	5.57	220.3814...	1004.233...	5.57	1
44354	5.89	221.1957...	1006.597...	5.89	221.1957...	1006.597...	0	5.89	221.1957...	1006.597...	0	5.89	221.1957...	1006.597...	5.89	1
44355	6.21	222.0100...	1008.960...	6.21	222.0100...	1008.960...	5.820766091...	6.21	222.0100...	1008.960...	0	6.21	222.0100...	1008.960...	6.21	1
44356	6.37	222.8244...	1011.324...	6.37	222.8244...	1011.324...	5.820766091...	6.37	222.8244...	1011.324...	0	6.37	222.8244...	1011.324...	6.37	1
44360	7.49	226.0817...	1020.779...	7.49	226.0817...	1020.779...	5.820766091...	7.49	226.0817...	1020.779...	0	7.49	226.0817...	1020.779...	7.49	1
44366	8.29	230.9677...	1034.961...	8.29	230.9677...	1034.961...	5.820766091...	8.29	230.9677...	1034.961...	0	8.29	230.9677...	1034.961...	8.29	1
44400	13.06	258.6550...	1115.325...	13.06	258.6550...	1115.325...	0	13.06	258.6550...	1115.325...	0	13.06	258.6550...	1115.325...	13.06	1
44401	13.11	259.4694...	1117.689...	13.11	259.4694...	1117.689...	5.820766091...	13.11	259.4694...	1117.689...	0	13.11	259.4694...	1117.689...	13.11	1
44402	13.19	260.2837...	1120.052...	13.19	260.2837...	1120.052...	5.820766091...	13.19	260.2837...	1120.052...	0	13.19	260.2837...	1120.052...	13.19	1
44403	13.15	261.0980...	1122.416...	13.15	261.0980...	1122.416...	0	13.15	261.0980...	1122.416...	0	13.15	261.0980...	1122.416...	13.15	1
44404	12.92	261.9124...	1124.779...	12.92	261.9124...	1124.779...	0	12.92	261.9124...	1124.779...	0	12.92	261.9124...	1124.779...	12.92	1
44405	13.04	262.7267...	1127.143...	13.04	262.7267...	1127.143...	5.820766091...	13.04	262.7267...	1127.143...	0	13.04	262.7267...	1127.143...	13.04	1
44406	13.08	263.5410...	1129.507...	13.08	263.5410...	1129.507...	5.820766091...	13.08	263.5410...	1129.507...	0	13.08	263.5410...	1129.507...	13.08	1
44407	12.87	264.3554...	1131.870...	12.87	264.3554...	1131.870...	5.820766091...	12.87	264.3554...	1131.870...	0	12.87	264.3554...	1131.870...	12.87	1
44408	12.95	265.1697...	1134.234...	12.95	265.1697...	1134.234...	0	12.95	265.1697...	1134.234...	0	12.95	265.1697...	1134.234...	12.95	1
44409	12.98	265.9840...	1136.598...	12.98	265.9840...	1136.598...	0	12.98	265.9840...	1136.598...	0	12.98	265.9840...	1136.598...	12.98	1
44410	13.26	266.7983...	1138.961...	13.26	266.7983...	1138.961...	5.820766091...	13.26	266.7983...	1138.961...	0	13.26	266.7983...	1138.961...	13.26	1
44411	13.2	267.6127...	1141.325...	13.2	267.6127...	1141.325...	5.820766091...	13.2	267.6127...	1141.325...	0	13.2	267.6127...	1141.325...	13.2	1
44412	13.2	268.4270...	1143.689...	13.2	268.4270...	1143.689...	0	13.2	268.4270...	1143.689...	0	13.2	268.4270...	1143.689...	13.2	1

The tables that make up a Matrix Database are tbl_Header and tbl_Data.

The header table contains all of the information about the structure of the matrix file. The columns in the table are:

- **id**: Unique ID of the row. Since the table only contains one row, this record has the id of 1.
- **x_ref**: X reference point of the matrix corner.
- **y_ref**: Y reference point of the matrix corner.
- **mtx_width**: The X width of the matrix.
- **mtx_length**: The Y length of the matrix.
- **cell_width**: The cell width of the cells in the matrix.
- **cell_length**: The cell length of the cells in the matrix.
- **rotation**: The rotation of the matrix.
- **type**: The type of matrix (HYPACK®, HYSWEEP® or SeabedID).

This data should be familiar if you have ever looked at the header of a matrix (.MTX) file.

The data table stores a lot of information for each record. If you have used the MAPPER program in the past, you know that some of the data selection choices are things like

minimum, maximum, range, average, etc. Each record in the data table contains all of those data options. The columns in this table are:

- **cell**: The cell number in the matrix.
- **ZMin**: The minimum Z value in that cell.
- **XatMin**: The X value (relative to the matrix reference point: all X and Y values are saved this way) at the minimum Z.
- **YatMin**: The Y value at the minimum Z.
- **ZMax**: The maximum Z value.
- **XatMax**: The X value at the maximum Z.
- **YatMax**: The Y value at the maximum Z.
- **DistCenter**: The field is saved to keep track of the XY value nearest to the cell center.
- **ZCenter**: The Z value nearest to the cell center.
- **XatCenter**: The X value for the sounding nearest to the cell center.
- **YatCenter**: The Y value for the sounding nearest to the cell center.
- **BestAng**: For SWP and HS2 files to keep the sounding closest to the best given angle.
- **ZatAngle**: The Z value at the best angle.
- **XatAngle**: The X value at the best angle.
- **YatAngle**: The Y value at the best angle.
- **ZSum**: The sum of all Z values to hit that cell.
- **ZCount**: The number of Z values to hit that cell.

As an example, if you wanted to create an XYZ file of the minimum sounding, you could use the following SQL query in an SQLite viewer:

```
SELECT tbl_Header.x_ref + tbl_Data.XatMin, tbl_Header.y_ref +  
tbl_Data.YatMin, ZMin FROM tbl_Data, tbl_Header;
```

This, of course, is not necessary as the program itself can export an XYZ file with the minimum sounding as the data selection already, but you can create whatever queries might be useful to you. The one piece of data that would be difficult to retrieve would be the X and Y at cell center (or corners). The SQLite engine does not provide trigonometric functions to factor in the rotation. It could be extracted with a 0 rotation matrix however.

Look for the new MAPPER program in the HYPACK® 2012 release. I can send a beta version now if you would like to test it out. There are still a few pieces that need to be added for the final release (like saving to Excel and HTML). If you have any questions about the functionality or how to extract other data from the database, please feel free send me an email at nuzzi@hypack.com.