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Sounding Better!

Grid Convergence in MBMAX64

By Mike Kalmbach

A new option calculates multibeam and topo with automatic correction for grid convergence. When the option is used, the yaw offset from patch test calibration remains the same everywhere. Because convergence changes with location, this wasn't true before.

The option is selected in the MBMAX64 (64-bit HYSWEEP® EDITOR) Read Parameters, Processing tab under Sonar Processing. Choose to Apply Grid Convergence or not. The convergence correction is simply this:

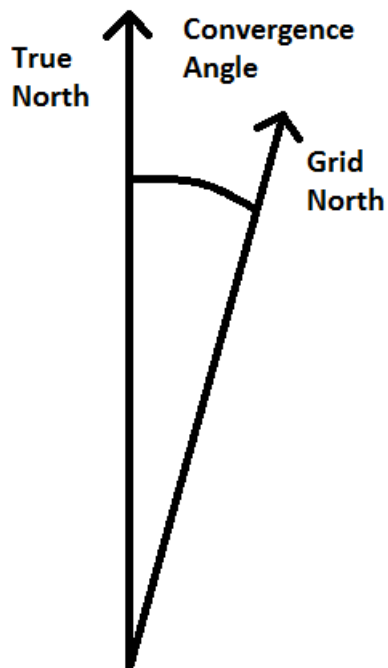
$$\text{Grid heading} = \text{True Heading} + \text{Grid Convergence.}$$

IMPORTANT: Be careful using this. Ask yourself if yaw calibration was done with or without the convergence correction. *If calibration is done with convergence, then use it in processing; otherwise don't.* Previous versions of MBMAX64 (before 18.1.4) did not correct for convergence.

GRID CONVERGENCE

Grid Convergence is simply the angle between true north and grid north ([Figure 1](#)). Heading sensors typically give true north but HYPACK® XYZ points require grid north. HYPACK® geodesy automatically calculates convergence at every point.

FIGURE 1. Relationship between true north, grid north and the convergence angle.



OPTION: APPLY GRID CONVERGENCE

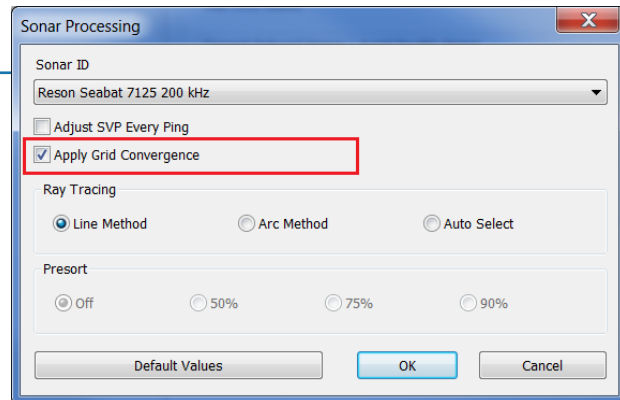
The convergence option is in Sonar Processing (Figure 2). You get to this in the Read Parameters Processing tab; click the Sonar button.

FIGURE 2. Make your selection in Sonar Processing.

To repeat...

If patch test offsets are calculated with **convergence enabled** then the correction is done automatically and not included in the yaw offset. You should not need to patch test for yaw every new location and MBMAX64 processing should be done with convergence enabled.

If patch test offsets are calculated with **convergence disabled** then the convergence angle is included in the yaw offset and (1) MBMAX64 processing should be done with convergence disabled and (2) patch testing for yaw is required at different survey locations. This is how MBMAX64 worked in the past.



YAW TEST

Figures 3 and 4 show patch test results with the convergence correction on then off.

FIGURE 3. Apply Grid Convergence = On. The convergence angle is shown in the error graph. At the test location grid convergence = 0.45 degrees and the yaw offset = 1.00 degrees accounts only for mounting.

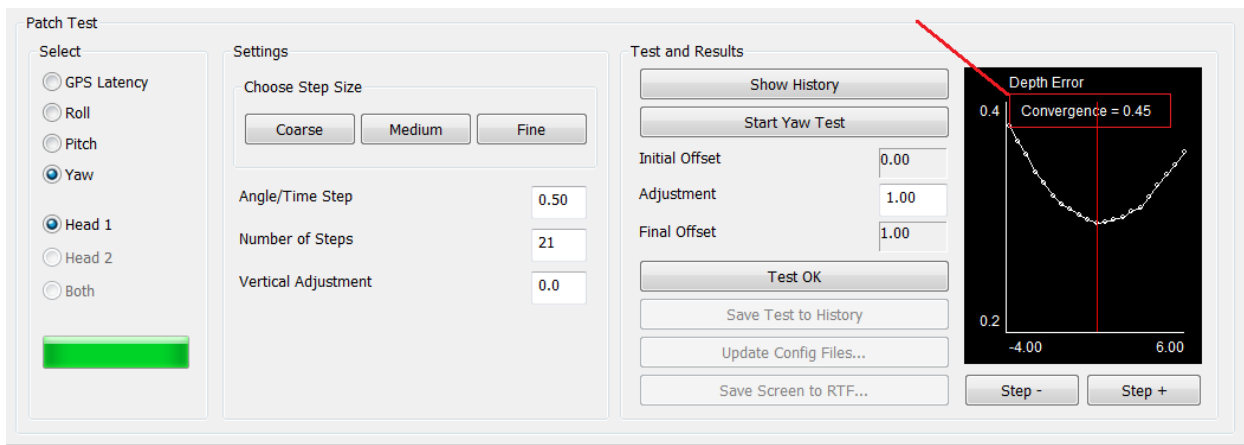


FIGURE 4. Apply Grid Convergence = Off. The convergence angle is not used and not shown. The yaw offset of 1.50 degrees accounts for mounting and convergence angles.

Patch Test

Select

- ☐ GPS Latency
- ☐ Roll
- ☐ Pitch
- ☒ Yaw
- ☒ Head 1
- ☐ Head 2
- ☐ Both

Settings

Choose Step Size

Coarse Medium Fine

Angle/Time Step: 0.50

Number of Steps: 21

Vertical Adjustment: 0.0

Test and Results

Show History

Start Yaw Test

Initial Offset: 0.00

Adjustment: 1.50

Final Offset: 1.50

Test OK

Save Test to History

Update Config Files...

Save Screen to RTF...

Step - Step +

Depth Error

0.4

0.2

-3.50 6.50

SOUNDING INFO

When convergence is used, the correction value is shown in MBMAX64 Sounding Info window (Figure 5). When convergence is not used the space is left blank.

FIGURE 5. Convergence correction is shown in the Sounding Info window.

Sounding Info

Line / File: 1 / 002_0808_N2S.HS2

Beam Data

Z: 47.0 Flag / Quality: OK / 3

Time: 08:08:15.479 Sweep / Ping #: 4 / 15209 Beam: 128

X: 294033.9 Y: 377944.0 Offset: -0.3

Range: 42.0 Angle: 0.44 Intensity: 17

SV: 4906.2 TVU: THU:

Corrections

Tide: 2.1 Draft: 0.0 Heave: 0.0

Pitch: 0.17 Roll: 0.04 Heading: 141.09

Convergence: 0.45

Sonar Settings