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BSB Chart Format Update and Raster Options

By Bill Bergmann

This article will explain recent changes in our raster chart handling inside of HYPACK®. The impetus was customer complaints that Maptech BSB charts were not aligning as well as they have in past versions of the software. Digging into the problem revealed a dirty secret buried for a long time. Read on to learn more.

The Maptech BSB chart format is a raster image with built-in geo-referencing that maps pixels in the picture to corresponding latitude, longitude values. This format has a strong proponent in NOAA (National Oceanic and Atmospheric Administration). These charts are available for automatic download from a NOAA server. The easiest way to acquire them is by using the ENC Web Maps tool. Using this tool to full effect is detailed in an earlier newsletter article: Getting Background Charts Made Easy.

Improper Geo-Referencing Swept Under the Rug

HYPACK has always made the fundamental assumption that projected data is appropriate for the geodesy of the project with which it is associated. Perhaps one day we will tackle the geo-database paradigm and this will change, but for now this means that it is your responsibility to ensure this caveat is met. If you have projected data in, for example, Mercator and try to display it in Lambert Conformal Conic, you can expect discrepancies. In the case of BSB charts, the programmer came up with a, shall we say, “clever kludge” to attempt better geodetic alignment. The chart was aligned at the moment of display to the current latitude and longitude of the center of the screen. An average pixel scaling of 6 dimensions was then applied to spread the rest of the pixels to the edge of the display window. That's a mouthful, but the end result is thus: the center of the screen was the only properly geo-referenced pixel, and the error was spread in all directions to the screen edges. A passable solution perhaps for very tight zooms but, as one zooms out, the picture deviates increasingly.

The proper solution would of course be to re-project the image from its source encoded geodesy to the current project geodesy. This is what we have done. You may right-click on a KAP file and select Open in Notepad. Look for the KNP/SC line and you will see nearly human readable information about the native encoding of the chart. The GD tag describes the datum and the PR tag the projection. Other tags provide geodetic particulars. Using this information, HYPACK® is now able to perform a transformation from source to project geodesy on-the-fly. The end result is that every displayed pixel is geo-referenced correctly, not just the screen center!

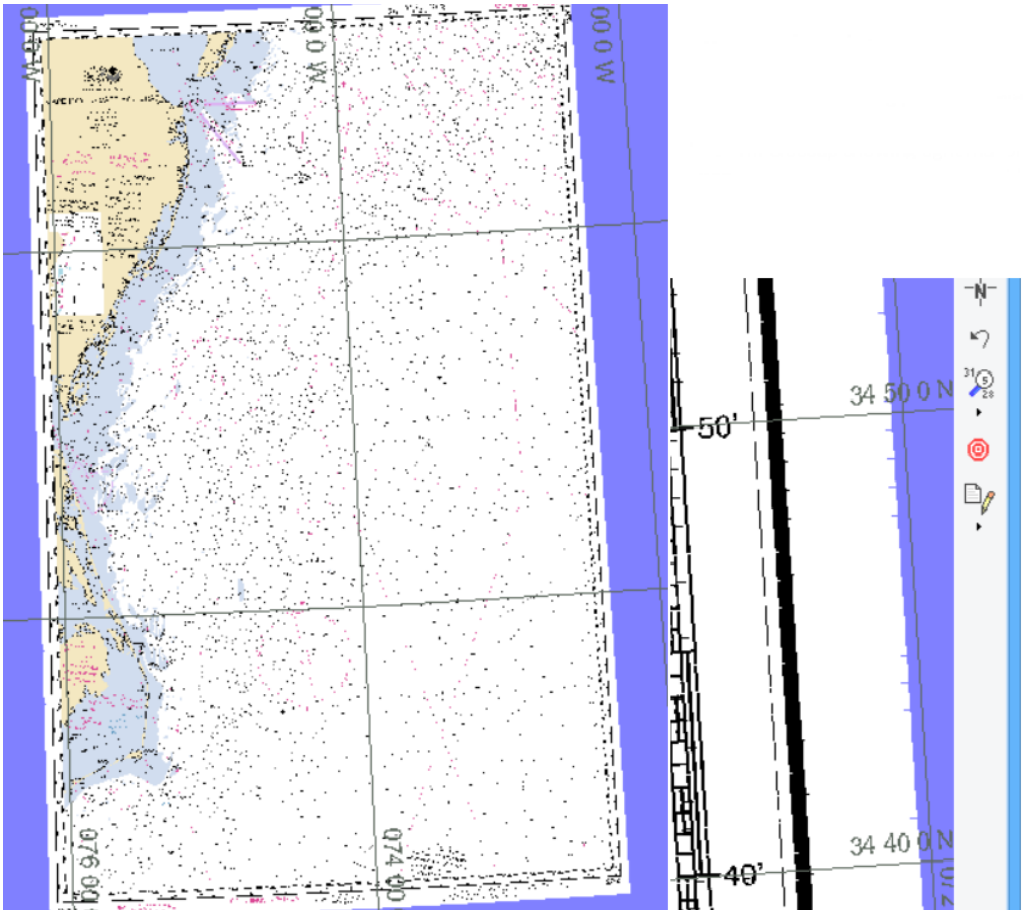
We did a review of hundreds of KAP files we have collected over the years and added support for the following geo-referencing methods:

Datums	• WGS-84, • NAD-83, • European 1950
Projections	• Mercator, • Transverse Mercator, • Universal Transverse Mercator, • Polyconic, • Lambert Conformal Conic
BSB chart geo-referencing	• Polynomial [a] • Ground Control Points

a. Preference given to Polynomial method when available.

The following is a chart demonstrating proper conversion when zoomed out. Note the warping of the square source image into the geodetic grid.

FIGURE 1. *BSB Geo-referencing: Overview Showing Proper Grid Warping (left), Closeup Showing Tight Mapping of Image Grid Graticules to HYPACK® Grid*



Cost and Solutions

Re-projecting an image takes time; there’s no way around it. For example, the image in Figure 1 has dimensions 12780px x 20512px. That's over 262 million pixels to re-project! We spent a lot of time to, first ensure the math is correct, then a bit more to optimize the conversion. The results aren't bad! On my off-the-shelf computer, it took a little under 6 seconds to get the chart loaded.

IMG Files

The target for conversion is our IMG format with geo-referencing encoded using the standard world file format as seen in, for example, a TFW file. Once the KAP is converted, enabling and disabling the file is nearly instantaneous. The cost here is that the IMG file can be enormous in relation to the source KAP.

Continuing the same example, the KAP file is approximately 6 mb while the corresponding IMG file is about 1 gig. We have added a **Keep .Img Files** Raster option in the Charts tab of the Control Panel (F9) so you may now choose the hard drive space or conversion time, whichever best suits your needs.

Convert to TIF

We have also added a BSB Options group on the same settings tab. Select the **Convert to TIF** option to write out a re-projected TIF file with embedded geo-referencing. This file is larger than the source KAP but smaller than the IMG due to its use of LZW compression. When enabling a KAP file, HYPACK® will use this file for display rather than re-projecting the source image, if available. This is an option you can use to perhaps save time. The TIF can be viewed using the Windows® Picture viewer or sent to third-party software, which is nice for verification purposes.

A second option, called **Despeckle**, cleans up artifacts in the re-projected image. It is on by default and there is little reason to turn it off except to gain a small modicum of conversion time.

Geodesy Check

Lastly, we have added logic to detect changes to the project geodesy. In such cases any active KAP files will automatically undergo a re-projection cycle. This is an attempt to keep your data files properly synchronized.

Transparent Raster Color

A final change, applicable to all raster charts including BSB, has been implemented in the Set Transparency dialog. We have added a checkbox for the **Transparent Color**. An oversight since in previous versions, there was no way to not have a single transparent color. It is off by default.