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If this FAQ has not answered your question, try sending mail to [csc@csc.noaa.gov](mailto:csc@csc.noaa.gov) with a subject line "Chartviewer extension question". Please make sure the question was not already answered in the FAQ before sending mail.

## **1A. What is the Chart Viewer extension?**

The Chart Viewer extension is a combination of Avenue® and C code to read the digital version of NOAA nautical charts as an image and display them in ArcView®. The nautical charts are in BSB file format. This is a proprietary format of BSB Electronic Charts, LLP (bought by [MapTech, Inc.](#)). Operations available for image file formats may be performed on the digital chart. A short [paper](#) is available discussing the extension.

### **1A.1 Where can I get the the Chart Viewer extension?**

The [Chart Viewer extension](#) may be downloaded from the NOAA Coastal Services Center.

### **1A.2 Where can I get the raster nautical charts?**

The digital versions of the NOAA nautical charts are available from [MapTech, Inc.](#) under a Cooperative Research and Development Agreement (CRADA) with the [National Oceanic and Atmospheric Administration](#). More information is available from the [NOAA Coast Survey](#). There are also non-NOAA charts in BSB format available from [Nautical Data International](#). These charts should work with the extension as well.

### **1A.3 Does the Chart Viewer work with encrypted charts (BSB 4.0 format)?**

Version 4.0 of the BSB chart format introduced encrypted charts. The charts with a .CAP suffix instead of a .KAP suffix are encrypted. Neither the Chart Viewer nor the Chart Reprojector can read the encrypted charts. However, MapTech has released an extension for ArcGIS that can read the encrypted charts.

## 1B. What is the Chart Viewer for ArcGIS 8+ and Imagine 8?

The [Chart Viewer for ArcGIS 8+ and Imagine 8](#) is a format dynamic link library (DLL) that allows the viewing of nautical charts in BSB format within ArcGIS 8 and Imagine 8. It was modeled after the Chart Viewer extension for ArcView 3.x, although there are a few differences resulting primarily from the current method of implementation.

### 1B.1 How does the Chart Viewer for ArcGIS 8+ and Imagine 8 differ from the Chart Viewer extension?

The ArcView 3.x version of the Chart Viewer was implemented as a separate extension, whereas this version is implemented as a single DLL that provides a more seamless integration of the BSB file type into the application. This implementation and other reasons forced us to remove some of the functionality provided in the ArcView 3.x version.

#### Charts in Mercator Projection

All charts in Mercator projection are displayed with a latitude of true scale of 0. This leads to inaccurate distance measurements, but gets around a problem experienced in ArcGIS when displaying multiple charts with different latitude of true scale. Setting the latitude of true scale to 0 appears to be the default behavior within the Imagine 8 application itself.

#### NOT for Navigation Message

No default "**NOT FOR NAVIGATIONAL USE**" graphic is automatically created when a BSB chart is loaded. Please be aware that these charts are NOT intended to be used for navigational purposes. The developers of this extension - the National Oceanic and Atmospheric Administration, Technology Planning and Management Corporation, Environmental Systems Research Institute, and MapTech, Inc. - assume no responsibility and can not be held liable for any end use of this software. For your own protection, please label all output with "NOT FOR NAVIGATIONAL USE."

### 1B.2 How can I handle reprojected charts?

The current version of Chart Viewer does not recognize the projection information from charts reprojected using the [NOAA Chart Reprojector](#). Projection information may be defined within ArcGIS 8+ or Imagine 8 as detailed below.

#### Reprojected Charts in ArcGIS 8+

Projection information may be defined using ArcCatalog®. Follow the steps listed below.

- Locate and highlight the reprojected chart from the file list in ArcCatalog.
- Right-click and select the **Properties...** option.
- Click the **Edit...** button in the Projection frame.

- Define the projection parameters appropriately and click **OK**.

### **Reprojected Charts in Imagine 8**

Projection information may be defined by following the steps listed below.

- Choose the **Layer Info...** option from the **Utility** menu.
- Choose the **Change Map Model...** option from the **Edit** menu.
- Set the map model appropriately.
- Choose the **Add/Change Projection...** option from the **Edit** menu.
- Define the projection parameters appropriately and click **OK**.

### **1B.3 Does it work with ArcGIS 9?**

Yes. Only the install script needed to be upgraded for ArcGIS 9 and no new version number of the actual extension was generated. A zip file with the install script that will work with ArcGIS 9 has been available since May 2004. In the event that you still have problems with the install, you may need to do the following in ArcCatalog so ArcGIS will recognize the file type.

From the tools menu, select options > raster > file formats > advanced > add new raster format, and point to bsbf.dll found in c:\program files\common files\esri\raster\user\lib\ntx86\rasterformats.

## **2. Projections**

### **2.1 What are projections?**

A map projection is a systematic representation of all or part of the surface of a round body, especially the Earth, on a plane (Snyder, 1987, Map Projections - A Working Manual, USGS Professional Paper 1395). In order to display some part or all of the earth on a flat surface, a map projection is required. This representation cannot be made without distortion. Generally, for charts covering a small area (large scale), the distortion is small, while charts covering a large area (small scale) will have significant distortion.

### **2.2 What projections do the charts have?**

The NOAA charts can be in any of the following projections: Mercator, Lambert Conformal Conic, Transverse Mercator, and Polyconic. Each projection type will have some parameters associated with it that minimize the distortion for that chart. Examples of these parameters include: latitude of true scale; central meridian; and standard parallels. The parameters are likely to be different for any two charts, making it can be difficult or impossible to put two charts in the same view. See the section on [Multiple Charts in a view](#) for more details on the problems associated with projections and multiple charts.

### **2.3 How do I overlay decimal degree vector data on a projected chart?**

When you load a chart with the chart button, you will be asked if you wish to apply the projection parameters. If you select **yes**, the view properties will be set to match the projection of the chart. What this means is that all vector data will be assumed to have decimal degree coordinates and those vectors will be projected to match the view. This allows you to overlay the vector data on the chart.

### **2.4 How do I overlay (your favorite projection) vector data on a chart?**

If your data is already in a projection, you may have a significant problem getting the data to overlay properly on a chart. For example, there is no way in ArcView to overlay vector data in UTM coordinates on an image that is in Mercator coordinates. ArcView does not have the ability to project coordinates from one coordinate system to another on the fly, unless the data is in decimal degrees. Therefore, you must reproject the vector data to decimal degrees or to the projection of the chart. Decimal degrees would be the better choice because the data could then be overlaid in ArcView on many different images in various projections instead of just one particular projection.

An alternative to this option, if you have many data sets in a set projection or need to display the final output in a given projection, is to reproject the image file to the projection of the other data sets. The NOAA Coastal Services Center has created a stand-alone program that will reproject

the BSB image file into another projection, creating a new file with the desired projection in BSB or TIFF format. This product may be obtained at the [chart reprojector](#) page.

## **2.5 If I use the measuring tool on a Mercator chart, I don't get the answer I expected. Why?**

You probably have the latitude of true scale set incorrectly. To get accurate distance measurements, the latitude of true scale needs to be the same as the latitude where you are measuring. See [section 4.3](#) for more about the latitude of true scale.

## **2.6 I want to change the latitude of true scale on a Mercator chart after I've read it in. Why doesn't it work?**

After you've started your project and loaded a Mercator chart and selected a [latitude of true scale](#), you may realize that you should have chosen a different latitude for some reason. You could try changing the view properties to reflect some new latitude of true scale, but that won't affect the chart because the view properties don't affect images. The next logical step is to try to delete the chart from the view and reload it with the new latitude of true scale. However, ArcView remembers some information about the image, even after you deleted it. This information includes the upper left corner coordinates and the pixel size - the two pieces of information affected by changing the latitude of true scale. ArcView does not update that information when you reload the theme, so it still thinks it has the old latitude of true scale. There are two ways you can get the latitude changed:

1. Delete the theme, save the project, close the project, reopen the project, and then load the theme with the chart button; or
2. Start over in a new view.

## **2.7 Can ArcView reproject the image files?**

The current version of ArcView cannot reproject images. If you project the view, only the vector data will be projected to the selected parameters. Reprojecting an image to match the current view properties each time it is displayed would be computationally taxing. A better approach would be to reproject the image to your desired projection once and use the reprojected file. See question [2.4](#) for some possible solutions.

## **2.8 Most of the charts have a spheroid of WGS84, yet ArcView 3.0 only allows a sphere for Mercator projections. How is this handled?**

The header information for the charts has latitude longitude values in WGS84 for reference points in the charts. These latitude longitude pairs are converted to projected units to determine the upper left corner of the image and the pixel size. For the Mercator projection, the latitude longitude pairs are projected assuming a sphere instead of a spheroid.

**Note** that the above method isn't really the proper way to project the data. The proper method would be to change the latitude longitude values from the WGS84 spheroid to latitude longitude

on a sphere (yes, they are different), and then project to a Mercator projection on a sphere. Why was the conversion done the wrong way? Because people are **much** more likely to have their vector data in WGS84 coordinates than in sphere coordinates and many people would not realize they are different.

ArcView 3.1 supports spheroids for Mercator. If you load a chart into a view with ArcView 3.1 and the spheroid has not already been set to **Sphere**, a WGS84 spheroid will be used to calculate the chart position. To maintain backward compatibility, if the spheroid is already set to **Sphere**, a Sphere spheroid will be used for the calculations. This allows existing projects to be used without having to delete all the charts. Projects with a WGS84 spheroid for Mercator will not be backward compatible with ArcView 3.0. If you need the project to work for both 3.0 and 3.1, set the view projection to be Mercator with a Sphere prior to loading a chart.

ArcView keeps track of more details than you might think. It might not be possible to have the same chart in two different views with two different spheroids. It might not generate an error, but the second one loaded may have the coordinates of first one loaded.

## **3. Skewed Charts**

### **3.1 What does the skew mean?**

A chart with a skew is not oriented with north up. The skew is the clockwise angle of rotation that must be applied to orient the chart so that north is up.

### **3.2 Why do charts with a skew take longer to display?**

The interface currently available for ArcView to read image files does not include the notion of skew. ArcView displays images by creating a rectangular mesh of pixels, based on the location of the upper left pixel, the size of this pixel, and the number of rows and columns of data in the image. Therefore, the extension must perform the rotation and store a rotated version of the image in memory. ArcView then reads in rows of data from the image stored in memory. For small images, this is sufficiently fast and should not be a burden on the user. However, large images may require significant memory resources and time to be displayed. For skewed charts, an information window will pop up and give an indication of how much memory will be required to rotate the image. If your machine has less memory than the amount required, it may take a long time to draw the image and you will hear a lot of disk activity as your machine uses virtual memory to perform the task. Note that each time you pan, zoom, or otherwise require the image to be redrawn, it will have to repeat the process of loading the entire image and rotating it. One way around this problem is to reproject the chart with the [NOAA chart reprojector](#). Reprojecting to the same projection will result in a north up chart that doesn't require the additional processing for redraw.

### **3.3 Do I have to apply the skew? What if I just want to see the chart without the skew applied?**

While the ability to just display the chart without applying the skew could be accomplished without much additional coding, it was decided not to allow this option. A chart without its skew applied would be of little use in ArcView because it could not be georeferenced correctly.

### **3.4 The skewed charts have a large white border; how do I make it transparent?**

When the charts are rotated, they are essentially placed in a larger raster that is north up and can contain the rotated image. This often leaves a large white area that may mask out some other theme below it. To turn this extra border transparent, edit the colormap of the image. Edit by double clicking on the theme legend to get the *Image Legend Editor*, and select the *colormap* button to show the colormap. The extra border is always color number zero. Double click on its color to get the color editor and select the transparent color (the one with the "x" in it).

## **4. Multiple Charts in a view**

### **4.1 Why can't I display these two (or more) charts together?**

To be displayed correctly in the same view, charts must have the identical projection information, including projection type and projection parameters. This is rarely the case. But ... see the next question.

### **4.2 Which charts can I display together?**

Any charts with the same projection type and projection parameters may be displayed together correctly. It is possible for ArcView to display multiple Mercator charts in one view by setting a common "latitude of true scale." When the first Mercator chart is added to a view, the user can set the latitude of true scale for that view. When subsequent Mercator charts are added, they will be displayed using the same latitude of true scale.

See [question 4.3](#) for more details on the latitude of true scale.

### **4.3 What's the "Latitude of True Scale" that Mercator charts ask for?**

The latitude of true scale in a Mercator projection is the one latitude for which distance measurements are correct. In general, a Mercator chart will have a latitude of true scale in the center of the chart. However, if the latitude of true scale given in the chart were applied, it would not be possible to put multiple Mercator charts in a single view. Therefore the developers have provided a means for allowing the user to set the latitude of true scale that will be used for all Mercator charts in a given view. When setting the latitude of true scale for a view, two options are suggested: 0.0 degrees and the latitude of true scale that is read from the chart being added. The drawback to using 0.0 degrees is the resulting inaccurate measurements. Few, if any, NOAA nautical charts actually have the equator in them; thus, the scale is wrong everywhere in the chart and the error increases with latitude.

To allow the user to get reasonable distance measurements, a latitude of true scale may be entered for the first Mercator chart added to the view. Additional charts will use that latitude of true scale, so it is wise to pick a value in the center of your anticipated work area. This value does not have to be the original latitude of true scale of the chart; you may want to pick a value that is close to the center of your study area. Note that there will always be distortion, and therefore error in distance measurements not on the latitude of true scale.

### **4.4 Why can't the other projections be reprojected "on the fly" like the Mercator can?**

For the Mercator projection, the reprojection to a given latitude of true scale is a simple matter of altering the reported pixel size and the upper left corner coordinate. For other projections the change is not as simple. They may require warping, which is beyond the scope of this extension.

If you need to get two charts into the same projection, you would be better off using the chart reprojector tool mentioned in an [earlier question](#).

#### **4.5 When I put multiple charts in a view, they often have very different sizes. Why?**

This is simply a matter of scales. If you combine a 1:1,200,000 scale chart with a 1:10,000 scale chart and then zoom to the extent of the small scale chart (1:1,200,000), you probably won't be able to see the 1:10,000 scale chart. Likewise, if you zoom to the extent of the 1:10,000 scale chart, the lines on the small scale chart will look enormous. To have two charts with the same size lettering at a given extent, they must have the same scale.

#### **4.6 How do I get rid of the border on the charts?**

The white border and the black lat-lon decoration on the charts have the same color code as white and black in the rest of the chart, so there is no simple way to turn them invisible without turning all the white and black in the chart invisible. However, one user found that you could set the theme boundaries using Theme Properties menu and clicking on the definition icon to get rid of most of the borders. In his words "It's a little hokey, but it does the job fairly quickly."

## **5. Chart Accuracy**

### **5.1 How accurate is the georeferencing?**

Tests with a small sample of the charts indicate that the charts are within National Map Accuracy Standards. For more details a short [paper](#) is available.

### **5.2 Why doesn't my shoreline vector overlay exactly on the chart's coast?**

The charts and your shoreline probably have different source data. The charts were designed with the goal of safe navigation. Thus, a small island may appear larger on the chart than it does in your shoreline. In addition, the charts may represent data from many years and shorelines change over time.

## 6. Files

### 6.1 There are .bsb files on the CD, but the extension only shows .kap files! What's going on?

The .bsb files don't contain the image data. The .kap files do. Please note that the extension only sees files with a lower case .kap extension.

### 6.2 How do I find the chart name instead of just the chart number? I have no idea where in the world chart XXXXX\_X covers.

At the top of each .kap file is some ASCII text that includes the chart name. You could look at that. A better way, however, is to get the index of charts from NOAA Charts (1.800.638.8975) or a marine chandlery - it should be free. The index shows a map with the chart outlines and their numbers drawn on it. The [NOAA Coast Survey](#) page has an interactive map to find charts in addition to a wealth of other information about the nautical charts. The CD-ROM with the charts may also have a list of chart numbers and names inside the liner notes.

### 6.3 Why can't I add a chart with the normal "Add Theme" button instead of the chart button?

The chart button does a few things for you that the normal *Add Theme* button does not.

- Reads the projection information and optionally sets the view projection for you.
- Alerts you to skewed images and their potential resource needs, allowing you to bail out.
- Allows you to set a latitude of true scale for the Mercator projections to non-zero.
- Adds the big red "**Not for Navigational Use**" text string.

Adding a chart with the normal *Add Theme* button will work, you just might not get everything you wanted.

### 6.4 What's the big red "**Not for Navigational Use**" text all about?

This is basically a liability issue. For NOAA nautical charts, only the paper versions produced by NOAA are considered to be for navigational use. If you produce a chart from the digital data and fail to label it "Not for Navigational Use," you may be liable for losses that occur because somebody used your chart for navigation. Therefore, it is in your own best interest to label the charts "Not for Navigational Use." To help you with this, the charts will get a big red label in the middle when you display them.

## 7. Installation Problems

### 7.1 Why can't ArcView find "chartview.dll"?

Make sure that the chartview.dll is located in the bin32 (PC users) or bin (UNIX users) subdirectory of the ArcView installation directory (see your systems administrator for this location.) See the *readme.txt* file in the distribution or the [on-line installation instructions](#) for information.

## **8. Known Bugs and Other Stuff**

### **8.1 Conflicts with other extensions**

A problem in versions before July 2, 2001 (version 3.2.1) may cause failure with other rasters. This is particularly evident with ArcView 3.2a, but may affect earlier versions as well. If you have the latest version of the Chart Viewer and it seems to be conflicting with other extensions, please report it to [csc@csc.noaa.gov](mailto:csc@csc.noaa.gov).

### **8.2 Failure with MapTech version 3 charts**

There was a bug in the Chart Viewer causing a failure when reading version 3 of the MapTech charts. A new dll file was created to solve this problem on June 15, 2000. Version 3.1a or later of the Chart Viewer will work with version 3 of the MapTech charts. Prior versions are likely to fail.

### **8.3 Will there be an extension for Arc 8.x?**

Yes! See question [1B.0](#)