

# SeaSonde<sup>®</sup> Radial Site Application Guide for



## SeaDisplaySetup



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## **1.0 Introduction**

**SeaDisplaySetup** application is used to produce geographical site maps for use in **SeaDisplay**, **RadialDisplay**, and **RadialEditor** applications.

Here is a list of the application features:

- Any coastline of in the world can be plotted on a site map
- The coastline can be shifted, expanded, contracted, etc. with the combinations of the arrow keys
- SeaSonde coverage areas of two or more sites can be displayed
- The location of the mouse pointer in terms of latitude and longitude can be displayed continuously
- The distance in Km between any two points can be displayed by click and drag
- Up to 64 SeaSonde sites can be placed on the coastline map
- Up to 128 markers of various shapes can be placed on the map
- Positions of SeaSonde sites, markers and all other map annotations supplied with the modeless dialog boxes can be entered by double clicking the mouse
- Maps and associated site data are saved in the resource file format that is required by the applications **SeaDisplay** and **RadialDisplay**
- Maps and associated site data may also be saved in a text file with Jpeg file format for transport to non-Macintosh systems
- The Lambert Conformal Conic mapping projection is required to insure compatibility with the applications **SeaDisplay** and **RadialDisplay**, but you may choose a variety of other projections
- Vector grids and all associated grid files required by the application **SeaDisplay** may be created
- Grid points that lie over land can be automatically deleted

This manual will describe the functions and features of the application **SeaDisplaySetup**. The basic menu features will be discussed, followed by a section dedicated specifically to describing the features within the *Map* menu. In addition, there will be sections focused on creating a site map as well as creating a vector grid.

## 2.0 Important Menu Features

There are three main drop-down menus in SeaDisplaySetup, the *File* menu, the *Options* menu, and the *Map* menu (all of which are shown in figures below). Each menu is outlined below, with detailed descriptions of various important features within each menu.

### 2.1 File Menu

The *File* menu items with their associated actions are listed below; more detailed explanations of various features are discussed in related sections.

File	Edit	Options		
New...		⌘N	<i>New...</i>	Creates a new map (default is San Francisco Bay)
Open...		⌘O	<i>Open...</i>	Opens a previously created SD Site file
Close		⌘W	<i>Close</i>	Close the active map window
Save		⌘S	<i>Save</i>	Save the active map in SeaDisplay format
Save as...			<i>Save as...</i>	Change file name and save for SeaDisplay or RadialDisplay
Save as JPEG...			<i>Save as JPEG...</i>	Saves the active map image in a JPEG format
Save as PICT...			<i>Save as PICT...</i>	Saves the active map only in PICT file format
Page setup...			<i>Page Setup...</i>	Brings up standard printer page setup
Print...		⌘P	<i>Print...</i>	Brings up standard print window
Print now		⌘U	<i>Print now</i>	Print without printer dialog box

## 2.2 Options Menu

Options	Map
Change Loc. format	⌘F
Show Location	⌘L
Show Km and Bearing	⌘T
✓ Identify land	⌘I
Slow draw	⌘M
Swap colors	⌘J
Memory...	

*Change location format*

Changes the format of the latitude/longitude display

*Show location*

Displays latitude and longitude of the mouse pointer

*Show Km and Bearing*

By checking this feature when *Show location* is checked, the display will include bearing angle and distance in km.

## 2.3 Options Menu: Detailed

This brief section will highlight the few features under the *Options* menu that require more detailed information such as:

- *Open...*
- *Save as...*
- *Save as JPEG...*
- *Save as PICT...*

### *Open...*

The application can open a file in either the *SeaDisplay Site XXXX* format or the *SDSite\_XXXX* text format. The application cannot open files in the PICT format because area and site parameters are not included in this file format. The open dialog lists only those files that are types *TEXT* or *Site*.

### *Save as...*

Maps and associated site parameters (also known as *site definition files* or *site map files*) may be saved with any file name you desire. However, to be properly recognized by the application SeaDisplay or RadialDisplay, the maps saved via *Save* and *Save as...* under the *File* menu must have names of the form *SeaDisplay Site XXXX* or *SeaDisplay\_Site XXXX*, where *XXXX* is the 4 character designation for your SeaSonde site.

### *Save as JPEG...*

When you save files in the JPEG format, the application gives the file a name in the form *SDSite\_XXXX* in order to distinguish this file format from the format discussed above. You can also select among various resolutions: normal, 150 pixels per inch, 300 ppi and 600 ppi.

### *Save as PICT...*

When you save the map as a PICT file, the application cannot open that file because the site parameters are not saved with the file.

## 2.4 Map Menu

Map			
Sites...	⌘ 1	<i>Sites...</i>	Define the SeaSonde sites
Area...	⌘ 2	<i>Area...</i>	Define the map area boundaries
Title...	⌘ 3	<i>Title...</i>	Define the map title
Data base...	⌘ 5	<i>Data base</i>	Disabled. See detail of <i>Area</i> for data base selection
Km legend...	⌘ 6	<i>Km legend</i>	Define the km legend
Cm/s legend...	⌘ 7	<i>Cm/s legend</i>	Define the cm/s legend
Logo...	⌘ 8	<i>Logo...</i>	Locate the company logo
N/S arrow...	⌘ 9	<i>N/S arrow...</i>	Locate the North/South map arrow
Lat/Lon grid...	⌘ 0	<i>Lat/Lon grid...</i>	Define the lat/lon map grid
Colors...	⌘ ?	<i>Colors...</i>	Change the colors of land and sea
Date/Time...	⌘ -	<i>Date/Time...</i>	Locate the date/time annotation
Vector grid...	⌘ +	<i>Vector grid...</i>	Define the x-axis and vector grid
Coverage display...	⌘ ]	<i>Coverage display...</i>	Define the coverage area display
Markers...	⌘ m	<i>Markers...</i>	Define various map markers

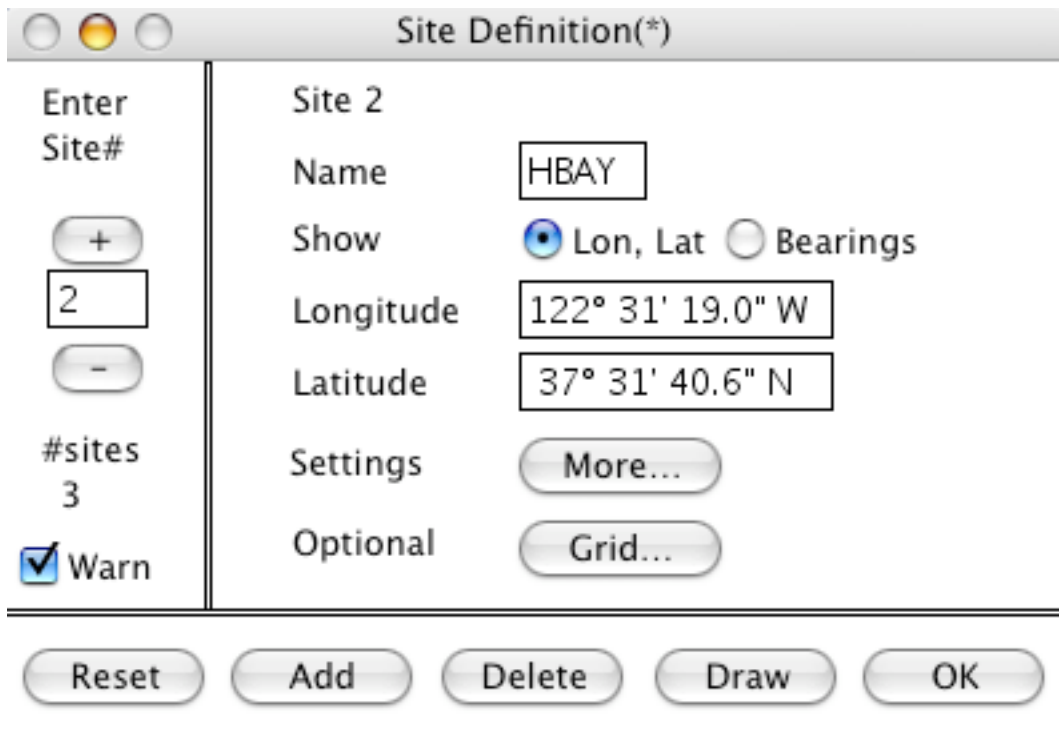
### 3.0 Map Menu: Detailed

The features of the *Map* menu are used to create SeaDisplay Site maps. Within the *Map* menu, the SeaSonde sites are determined, as well as the area of the map coverage area. In addition, map annotations such as the title, legend, N/S arrow, colors, date/time, etc. are all listed under the *Map* drop-down menu.

This section will give details and descriptions of the functions within this menu. Refer to the previous section for a layout of the *Map* menu.

#### 3.1 Sites...

This dialog box allows you to create, edit, and draw up to 64 SeaSonde site locations on your SeaDisplay Site map. However, only the first 6 sites will contribute to total vector calculation. The *Site Definition* dialog box is shown below.



#### Site navigation

The current site number (Site#) that is being edited is shown on the left in the edit box between the *+* and *-* buttons. You can click those buttons to change site selections or entry the desired site number into the edit box. The total number of defined sites is shown under the *#sites* notation. If this number is zero then no sites are currently defined.

Use the *Add* and *Delete* buttons at the bottom to create and delete sites.

Once a site has been created you define its properties by filling in the *Name*, *Longitude* and *Latitude* edit boxes. And you further define the site by using the *More...* and *Grid...* buttons.

Use the *Reset* button to restore the current site definition to the state at the time the dialog box was opened, i.e. to undo any changes you have made since opening the *Sites...* dialog box.

Use the *Draw* button to ensure that your current settings are displayed on the map.

Note: When you delete a site, its definition is moved to the end of the current list of sites and the number in the list is reduced by one. When you add a site the number of sites is increased by one and the last definition in the list is displayed. This means you can rearrange the site order by clicking *Delete* and *Add* to move the current site definition to the end of the list and reinstate it to active status.

#### *Site definition*

Click the *Add* button to create a new site and fill in the edit boxes to define its name and location. The name must be exactly four characters in length. You can turn on the *Show location* option and set the *Show* radio buttons to *Lon, Lat* then double-click on the map at the location of the site to send the longitude and latitude to the dialog box. Use the *More...* button to define more characteristics of the site and the *Grid...* button to fill in values needed to define and display a radial grid for the site (see *Site Settings: More* button section below).

Latitude and longitude entries can be specified as fractional degrees or degrees with fractional minutes and it will be converted to degrees, minutes and seconds. You don't have to type the degrees, minutes or seconds marks; you do have to type the W/E and N/S letters at the end of the longitude and latitude.

Each site can have bearing limits imposed while drawing SeaSonde coverage displays or while computing vector grid files. You must select *Show Km and Bearing*, *Show location*, and the *Draw bearing limits* box in the *More...* dialog to display the bearing limits on the map and change them as you enter new limits. To send the bearing angles to the *Sites...* dialog, click on the site in the map window and drag in the direction of the desired bearing angle. When you release the drag, the bearing angle will be sent to the angle marked with (\*).

#### *Site Settings: More* button

In addition to enabling/disabling the bearing limits display, this dialog box allows you to:

- Define the range of the site with the 'Max Km' edit box
- Specify range rings to be drawn (0 means don't draw range rings)
- Change the size and color of the SeaSonde symbol for the site

### Site optional: Grid button

All of the information in the *Grid...* dialog box is used to create vector grids and grid files. In addition, the information in items 1 and 2 are used when creating SeaSonde coverage displays. The selections under item 3 will be disabled (grayed out) if the grid options have not been enabled in the *Vector grid...* dialog box.

### 3.2 Area...

The *Area* dialog box allows you to define the coastal area that you wish to see on your SeaDisplay site map.

Area Boundary(\*)

Mapping boundary:

Northwest corner  (\*)

Latitude

Longitude

Southeast corner  (\*)

Latitude

Longitude

Mapping options:

N/S degrees per inch:

Projection  ?

Earth Model  ?

Data Base  ?

You can either insert the latitudes and longitudes, or if you have entered site information you can check the *Use site info for boundary* box to see the approximate coastal area. The program will use the maximum range information of the sites to determine the size of the area to draw. From this point you can use the <arrow> key combinations to shrink, expand or move the area around.

You can use the *N/S degrees per inch* edit box if you want to change the map size using this scale. If you check the *Maximum sized window* box the map will be expanded to the program's definition of the maximum size that can fit on your screen. Either way, the map is not allowed to be bigger than this size.

The *Projection* drop-down menu gives you various choices of map projections that can be used when drawing the map. However, only the Lambert Conformal Conic will draw a map where distance in Km is linear in all directions.

For this reason the application SeaDisplay assumes that the Lambert Conformal Conic projection has been used to produce the map.

The *Data Base* drop-down menu lets you choose your coastline data base file. The default data base file is WVS250K.DAT due to its efficiency. If you select one of the closed polygon (GSHHS) files, the application will take some time to find and use the closed polygons that define your coastline area. After the polygons have been collected, and the map drawn, the notation 'V3' will appear in the bottom left corner of the map to let you know that you are using the version 3 (closed polygon) coastline data base.

### 3.3 Title...

The *Title...* dialog allows you to specify and place the map title anywhere on the map. In this case the location of the mouse when it is double clicked is translated into a percentage in the x and y directions of the screen. In order to use the double clicked location you must select *Custom (x,y)* from the *Placement* drop-down menu.

### 3.4 Data base...

This item has been disabled because its functionality has been moved to the *Area* dialog box. In order learn about changing the coastline data base, see section 3.2 *Area*.

### 3.5 Legends, Date/Time, Lat/Lon grid and Markers

#### *Km legend...*

The *Km legend...* dialog allows you to place and tailor the distance legend of the coastline map. The *Enable* box must be checked if you want this legend drawn on the map. If you double click the mouse to position this legend, the mouse location will be translated into percent from left and percent from top of the map window. This means if you zoom the coastal map in or out the relative location of the legend will stay the same. It will not follow its original (longitude, latitude) position. However, the site locations follow their (longitude, latitude) position when zooming in or out.

#### *Cm/s legend*

The *Cm/s legend...* dialog allows you to place and tailor the vector speed legend of the coastline map. The *Enabled* box must be checked for this legend to be drawn on the coastline map. However, it is not drawn on the saved maps because applications SeaDisplay and RadialDisplay redraw the legend based upon your settings made here. Application SeaDisplay must redraw the legend because it allows you to change the units and with each unit change there must be an annotation of the new units.

#### *Logo...*

The *Logo...* dialog allows you place both the COS and your own (User) logo on the coastline map. The double-click location will go to which ever logo has the (\*) radio

button checked. To enter your own (User) logo, copy your logo into a JPEG file named *ULogo.jpg* and place the file in the same folder as application **SeaDisplaySetup**. Then you will be able to position, scale and copy the logo in various modes.

#### *N/S arrow*

The *N/S arrow...* dialog allows you to place, color and size the North-South map orientation arrow. Double-click locations are translated into percent from left and percent from top screen locations. The *Enabled* box must be checked for the annotation to be drawn on the map.

#### *Date/Time*

The *Date/Time...* dialog allows you to specify the location at which applications SeaDisplay and RadialDisplay will draw the date and time of the files of current vectors that it displays on the map. The *Enabled* box must be checked for a sample of the date/time annotation to be drawn for you. The sample is not copied to saved maps.

#### *Lat/Lon grid...*

The *Lat/Lon grid...* dialog allows you to define the grid of latitude and longitudes lines that are drawn on the map. The *Enabled* box must be checked for this annotation to be drawn. Every other line is annotated. The radio buttons determine on which side of the map the annotation will appear. You can double-click on the side of the map that you desire and the annotation will be switched to that side.

#### *Markers*

Using the *Markers...* dialog you can place up to 128 markers of various shapes on the map. The markers may be placed at a longitude and latitude location or they may be placed relative to the map window - percent from the left and percent from the top of the map. The *Markers...* dialog box is similar to the *Sites...* dialog box in content and operation. Double clicks may be received as (longitude, latitude) or (% from left, %from top). Set the *Location* radio buttons accordingly. You specify the characteristics of the marker with the *Mark...* button that brings up a dialog box containing symbols to choose from.

### 3.6 Colors...

The *Colors...* dialog box allows you to specify the colors for the sea, the land, the lakes, etc. If you check the box *Coastline*, the coastline will be drawn in the same color as the land instead of black as in the past. This removes the black coastline that sometimes interferes with map annotations that pass over the coastline. This option is especially helpful along coastlines that have many small islands or very jagged outlines.

The box *Mac polygons for coloring land* gives you the option of using the Macintosh QuickDraw objects named 'polygons' to color in the land or the Macintosh QuickDraw

objects named 'regions' to color in the land. The polygons tend to use less memory space. This becomes an issue when you try to write a JPEG file at high resolution (300 or 600 dots per inch). The Mac OS has a memory size limit of 64KB for each of these objects. If you exceed this limit while writing a JPEG file try switching to the polygons. If that fails you will have to use a lower resolution, 150 dpi for example.

The box *Use bit patterns for fill colors* allows you to select between bit patterns for color or the usual RGB (red, green, blue) color specification. This will become an issue only on devices that have limited 'pixel depth' when drawing colors.

### 3.7 Vector grid...

The 'Vector grid...' dialog allows you to enable/disable the vector grid feature of the application and to define the x-axis of the vector grid, define the spacing and number of grid points in the x and y directions and select among a number of grid display options. The button *Grid options...* is enabled only when the *Enable grid options* check box is checked. The *Enable grid options*' check box is handy when you are using the closed polygon (V3) coastline data base and do not want to work with vector grids. If you leave the box unchecked then the application will not attempt to compute nor display a radial or total vector grid even though you may have all the parameters defined.

To define a total vector grid you should first define all of the radial grids using the *Grid...* button in the *Sites...* dialog. Then you should use the three buttons in top-down order of this dialog, i.e. start with the *X-axis definition...* button.

#### *X-axis definition*

For the new Combine software the x-axis is usually chosen to be a horizontal line on the map. You can specify an x-axis for the new Combine software in three different ways corresponding to the three radio buttons *Specify two (lat,lon) points*, *Origin (lat,lon) and bearing*, and *Default (East-North, centered)*.

For the original Combine software the x-axis of the total vector grid is usually chosen to be a line joining two of the SeaSonde sites. There must be at least two SeaSonde sites to compute total vectors. Use the *Change...* button to activate a dialog box that will let you select the SeaSonde sites that are to be the end points of the x-axis.

Use the *Show the x-axis and origin* check box to draw the specified x-axis on the map.

#### *Grid Definition...*

The grid definition is similar to that in application SeaDisplay. You specify the grid spacing in Km and the number of grid points in the x and y directions. The grid point at the origin is numbered (0,0). Each x index identifies a column of grid points and each y index identifies a row of grid points. The values minX and maxX are the starting and ending index numbers of the columns. The values minY and maxY are the starting and

ending index numbers of the rows.

The quantity,  $avgR$ , is the radius of the averaging circle in Km. It is used to find all radial vector grid points that are 'near' each undeleted total vector grid point. The meaning of 'near' is the value you specify. The quantity  $maxV$  is the maximum expected total vector speed in cm/s; t will be used to remove bad vectors

### 3.8 Coverage display...

**Two Site Coverage Display**

Show the two site coverage area.

Exclude the unstable region.

Draw top half.

Draw bottom half.

This display applies to the site-to-site pair (See X-axis in 'Vector Grid'). It uses Max Km in 'Sites.../More...' for range info.

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**Multi-Site Coverage Display**

Type:

Enforce bearing limits

Enforce range limits  
(Requires grid + delete shadowed)

Exclude unstable regions

Due to limits on the size of 'regions', this display may not be printable. It uses #Range Cells, Dist to 1st and RC spacing in 'Sites.../Grid...' for range info.

---

**Stability Criterion**

erf, Error factor: ( 1 - 10)  
or  
era, Error angle: ( 5 - 90 )

When combining two radials into a total vector the angle between them must be  $\geq$  era and  $\leq$  (180 - era).

---

Enable the coverage display

The coverage display shows the area of the ocean over which the current site configuration can calculate total vectors. There are two methods employed in calculating the coverage area. These methods correspond to the top two sections of this dialog box shown to the left.

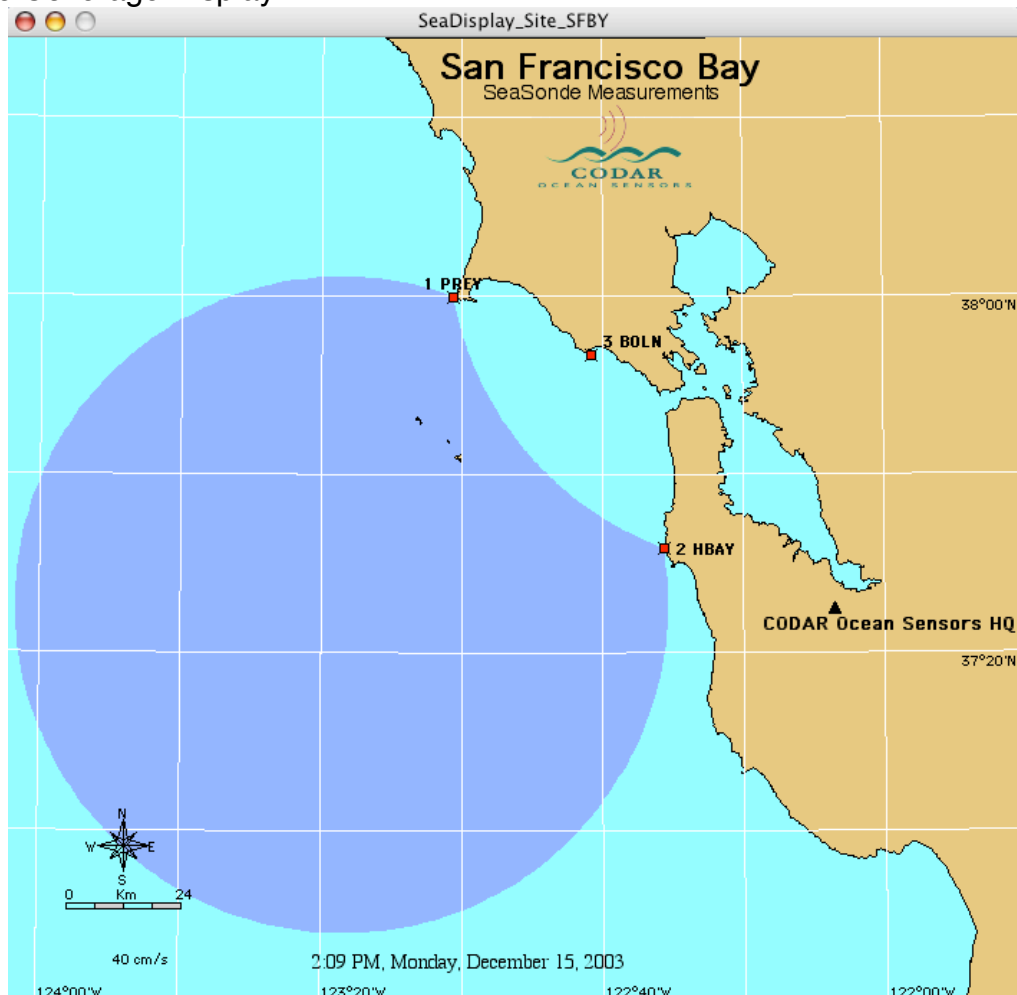
The bottom section of the dialog box applies to both methods. This section allows you to define the stability criterion and to enable/disable the coverage display. This last item allows you to turn the coverage display on and off without changing the settings. It is also used when you want to save a coverage display in place of the black & white map within the *SeaDisplay\_Site\_XXXX* file. The dialog box and a coverage map are shown on the next page.

#### *The Two-Site Coverage Display*

The *Two-Site Coverage Display* method assumes ideal coverage based on the maximum range of the individual sites; however, landmasses and obstructions are not excluded from the coverage display. The ideal coverage is computed and drawn first and then the land areas are drawn on top of that.

The coverage area and stability region are each computed as the intersection of two circles. The portions of the map that lie outside of these intersections are represented internally and colored with Macintosh QuickDraw 'polygons'.

## Example Coverage Display



### *The Multi-Site Coverage Display*

The *Multi-Site Coverage Display* method overcomes some of the limitations of the first method by enforcing bearing limits and detecting shadow zones (range limits). This method can be applied to the two sites that define the baseline, or to all two site pairs or to all three site pairs. However, the price paid for these additional abilities is that the method relies on the Macintosh QuickDraw 'region' operations to compute intersections and unions of various segments of the coverage area. And the Macintosh Operating System (Mac OS) imposes a 64KB limit on the size of any one region. This is no problem for maps displayed on the screen. But, the limit will be exceeded if you try to write JPEG formatted files at high resolutions of 300 or 600 dots per inch.

Another restriction of the second method is if you wish to enforce range limits then you must define radial grids for the SeaSonde sites and delete the shadowed grid points. As in the first method of coverage display, you can exclude the regions of instability in this method. And, if you wish to see just the stable, you can check the *Show stable regions only* box.

## **4.0 Creating a SeaDisplay Site file**

SeaDisplay and RadialDisplay requires a site definition file that has a name in the form *SeaDisplay Site XXXX*, where *XXXX* is a four-character name for your SeaSonde site installation. This section describes how to create this SeaDisplay site file.

### **4.1 Starting Out**

#### *Format of the SeaDisplay Site file*

The site definition file is a resource file containing three types of resources: picture, string and a private type named MySU. The picture type resource contains three pictures of the coastal map. One picture is in full color and is used for the map displayed on the computer monitor. One picture is in black and white for monochrome monitors, but may be replaced with a coverage map. The third picture is geared toward printing the map, therefore the sea color is set to white.

SeaDisplay uses the parameters embedded in the MySU resource. The strings can be viewed with any application that displays the contents of the resource fork of a file, such as ResEdit.

The MySU type resource is a copy of the site and coastal parameters that application SeaDisplaySetup used to create the area map. These parameters are used in application SeaDisplay in a variety of ways from the creation of the vector grid to the proper location of latitude and longitude points of the display screen.

#### *Files and Folders*

Before you start, you need to have the necessary files and folders in place. In addition to the application SeaDisplaySetup, you will need the coastline database files. These files are usually kept in the subfolder *MapDataBase* within the same folder as the application SeaDisplaySetup. The coastline database *WVS250K.DAT* is the file most used, but you might like to have the others on hand if you want to work with different resolutions or create vector grids. For more information on the types of databases available, click the “?” next to *Data base* under the *Area* sub-section in the *Map* drop-down menu.

### **4.2 Making the Initial Map**

There are various ways that this step can be done; one will be discussed here. You need to know the approximate latitude and longitude of a point along the coastline of your proposed installation. With this information you can create the initial map by first launching the application SeaDisplay Setup. Then, select *New* from the *File* menu to get the default Monterey Bay coastline. Then select *Area* from the Northwest and Southeast corners of the area. Then enter your approximate longitude and latitude for

the Northwest and Southeast corners of the area. Then check the box *Maximum-sized window* and a coastline map will be drawn.

Now you can use key commands to adjust the size of the displayed coastal area and the map window.

- <arrow> will shift the coastline left, right, up or down
- <shift><arrow> will expand and contract the displayed coastal area
- <control><arrow> will expand and contract the window
- <option><arrow> will zoom-in and zoom-out

### *Adding SeaSonde Sites*

Turn on the *Show location* option under the *Options* menu. Select the *Sites...* dialog from the *Map* menu. Now add your first site by clicking the *Add* button and entering a site name. Then you can enter the longitude and latitude of the site on the map.

Add the second site in a similar fashion. For both sites, supply an approximate maximum range by clicking the *More* button of the *Sites* dialog and then entering the value into the *Max Km* edit box. These values can be used to draw a two-site coverage display, which can be helpful while you are adjusting the size of the map window.

### *Adding Map Annotations*

It is possible to add map annotations such as a title, a N/S arrow, a legend, etc. from the *Map* menu. For each item, you must define and position the annotation. Once you have positioned your annotation(s), click *OK* to have it saved. Here is a sample map for the SF Bay area with many added map annotations.



### 4.3 Saving the site definition file

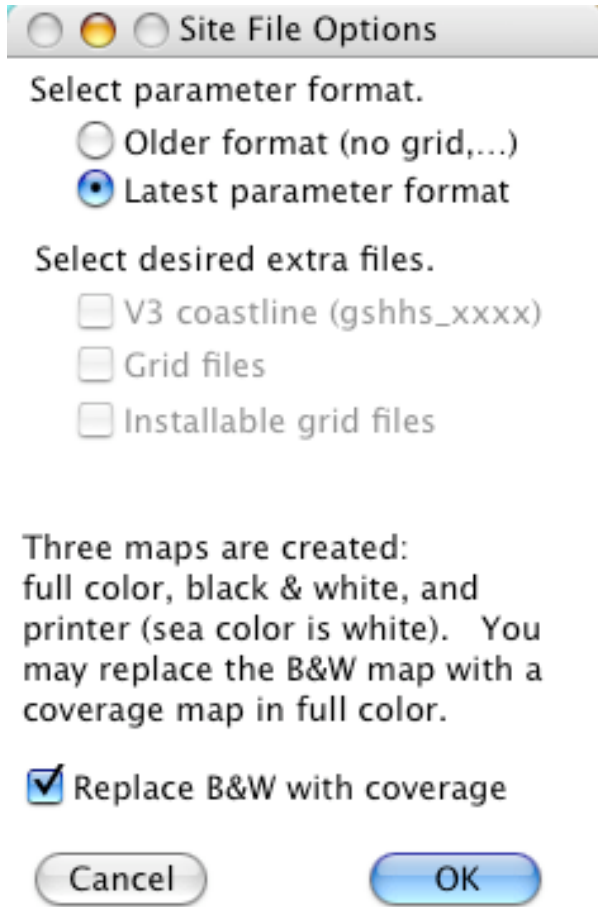
To save the file, select the item *Save as...* from the *File* menu. Then, select your desired options and give the file a name in the form of *SeaDisplay\_Site\_XXXX* where *XXXX* is the four characters you have chosen to represent the SeaSonde installation of this area.

#### Note:

Before saving the site definition file, you should select the item *Vector grid...*, under the *Map* menu, and click the *X-axis definition*. Click the *Show the x-axis and origin* button to view and check your x-axis (uncheck this box to make this axis invisible on your map).

In addition, it is a good idea to view the coverage of your sites before saving; this is done by selecting *Coverage display* from the *Map* menu. At the bottom of this dialog box, click the *Enable the coverage display*. You can adjust what coverage you prefer by selecting various radio buttons and inputting various *Stability Criterion*. This feature is discussed in greater detail in the section *Map Menu: Detailed*.

The first dialog box that appears after selecting a name for your site file is shown below:



Typically, the default parameters shown in the figure on the left are used; i.e. the *Latest parameter format* and *Installable grid files* with *Replace B&W with coverage*. However, if you'd like to change these settings, the other options are listed below.

The radio buttons *Older format (no grid,)* and *Latest parameter format* allow you to select an older file format in case you need to be compatible with an older version of SeaDisplay. The resulting format will not contain grid information, markers, color sites or other additional features.

The check boxes allow you to create extra files. Checking the *V3 coastline (gshhs\_XXXX)* box will cause a reduced closed polygon file to be written, provided that your map was created with a closed polygon database. This special file is a set of closed polygons that covers only the region of your map.

Checking the *Grid file* box will cause a folder to be created and all of the files necessary to use SeaDisplay will be included in that folder. Checking the *Installable grid files* box will cause a folder to be created and all of the grid files required by the Combine software will be included in that folder. The *Original format* check box allows you to specify the older format for those files.

## **5.0 Creating a Vector Grid**

You may want to create a vector grid in SeaDisplaySetup. This is not necessary if you are using your site map only in RadialDisplay. In addition, grid files are generally created in SeaDisplay for use in SeaDisplay. However, SeaDisplaySetup has the capabilities to create a vector grid. This following section discusses how to create a vector grid in SeaDisplaySetup.

To create a total vector grid and its associated grid files you will need these three items:

- A previously created site definition file
- The range cell specifications for each SeaSonde site
- A closed polygon coastline data base file

The site definition file is a file named *SeaDisplay Site XXXX*, where *XXXX* is the 4-character installation name. Section 4.0 *Creating a SeaDisplay Site file* describes how to create this site file.

The range cell specifications for each site are the number of range cells, the distance to the first range cell in Km, the distance between range cells in Km, the range cell reference angle (almost always 90 degrees), and the angular resolution (usually 5 degrees). All of these values except the angular resolution can be supplied by the file named *Header.txt*; this file is found at each remote site in the *RadialConfigs* folder.

The closed polygon coastline data base file that is generally used for the purpose of creating vector grids is either *gshhs\_h.b* (high resolution) or *gshhs\_f.b* (full resolution). Follow the steps below to create the vector grid and associated grid files.

### **5.1 Create a reduced closed polygon coastline file**

In order to create a grid file in SeaDisplaySetup, you must first select *Area* from the *Map* drop-down menu. Next, select the *Data Base* drop-down menu, and highlight any map data base beginning with *gshhs*. These coastline data bases contain more than 180,000 closed polygons arranged in size of area from largest to smallest. The largest area is the closed polygon representing the combination of Africa, Europe and Asia. This polygon contains more than 1.4 million points.

Application SeaDisplaySetup must sort through all 180,000+ polygons to find all that intersect your desired coastline area. This can take up to 4 minutes on a G4 Macintosh computer. This polygon search is triggered every time you change the coastline area or whenever you switch to a closed polygon database.

After you have switched to the *gshhs\_f.b* database file and let the application finish its search and draw a new map (the notation 'V3' will appear in the bottom left corner), you can save a short form of a closed polygon data base file that has only those polygons

used to draw the new map. Do this by selecting *Save as...* from the *File* menu and checking the box *V3 coastline (gshhs\_XXXX)* before clicking the *OK* button to save the site definition file.

A file named *gshhs\_XXXX*, where *XXXX* is the same 4 characters in your site definition file name, will be created in the same folder as the new site definition file. And, the next time you open that site definition file the *gshhs\_XXXX* file will be used to draw the map.

## 5.2 Create the radial grid for each site

After you have switched to a closed polygon data base file (a file named *gshhs\_?.b*), there will be the notation *V3* in the lower left corner of the map window. Now select the *Vector grid...* item under the *Map* menu and check the *Enable grid options* box. If you had some grid display options checked prior to this it may trigger the application to search for grid point containment.

Next open the *Sites...* dialog (select *Sites...* under the *Map* menu) and for each site supply the range cell specifications by clicking the *Grid...* button and entering the values for *# Range Cells*, *Dist to 1st RC*, *RC spacing*, and *Ref angle*. Or, if you have the *Header.txt* file available, check the box *Use the site's Header file*, and use the *Open...* to open the file.

Then, if you want to see the radial grid, you can check the box *Draw this radial grid* and select amongst the options below it (selecting only one option is recommended so you can see the effect of each option on the map). Then click the *OK* button. After you have supplied the range cell specifications for each site, proceed to the next step.

## 5.3 Create the total vector grid

In the *Vector grid...* dialog, define the x-axis of the grid by clicking the *Baseline (x-axis)...* button and selecting the sites that will be the end points of the x-axis.

Then, define the total vector grid by clicking the *Grid definition...* button and supply the grid spacing in Km, the minimum and maximum indexes of the columns and rows and the radius of the averaging circle in Km. Then select your grid display options by clicking the *Grid options...* button and checking the desired options. First, check the boxes *Draw the grid* and *Retain all grid points* so you can see the entire grid that was defined. You may want to adjust the column and row indexes, or the grid spacing.

After you have finished adjusting the grid, leave all of the grid options that you want turned on. But, turn off all of the *Draw this radial grid* check boxes in the *Sites...* dialog (*Grid...* button) and turn off the *Draw the grid* check box in the *Vector grid...* dialog (*Grid options...* button). Close all open dialog boxes by clicking their *OK* buttons and proceed to the next step.

## 5.4 Create and save the grid files

There are two sets of grid files that application SeaDisplaySetup can create after you have created the radial and total vector grids that you want. The first set of grid files (the full set) is the same set of files that application SeaDisplay creates and saves in its *Grid files* subfolder. Thus, if you want to further hand edit the grid, you can replace the files in the subfolder *Grid\_files* with this set of files and use application SeaDisplay to edit the grid.

The second set of grid files is the same set that application SeaDisplay creates for use with the combining software. Select *Save as...* from the *File* menu and check the box *Grid files* if you want the first set of grid files to be created and saved. Check the box *Installable grid files* if you want the second set to be created and saved. Part of the first set of files are the *Header.txt* files and the parameter files for each of the SeaSonde sites. If you had copies of these files and opened them when you were defining the radial grids then these files will be copied as part of the first set. But, if you merely supplied the range cell specification without the *Header.txt* file, then SeaDisplaySetup will create a short version of the *Header.txt* files and post a warning message that they cannot be used for any other purpose. The first set of grid files (the full set) is placed in a folder named *Grid\_files\_XXXX*, and the second set of files is placed in a folder named *Install files XXXX*, where *XXXX* is the 4-character name from the *SeaDisplay Site XXXX* file.

## **6.0 Other Items**

There are a few other features within SeaDisplay Setup that should be mentioned, including resizing windows, special key commands, and database references. The following section gives information on these topics.

### **6.1 Resizing Windows**

There is no “grow box” in the bottom right corner of the map window. Instead, the cursor arrow changes to a double arrow when it is in the grow box region (bottom right corner of the map window). You can then click and drag to resize the window. When you release the mouse button, the window will be resized to the closest size that maintains the aspect ratio of the original site map.

When the window is closed, it will remember its last location and size. Then when it is reopened, it will reappear in its last location and size.

Note: Maps look best at their default size because there is no distortion due to expanding or shrinking of the annotation and coastlines. If a map's default size is small, then expanding the map to a large size will cause the lines that draw the coastlines to thicken. The aspect ratio is maintained so that relative distances are correct. The plots will always look best when the map is its default (original) size.

### **6.2 Key Commands**

Special key combinations can be used in the following situations:

- <arrow> means to shift the window in the direction of the arrow key
- <shift><arrow> means to expand or contract the coastline area and increase or decrease the window size accordingly
- <control><arrow> means to expand or contract the window while maintaining the same coastline area
- <option><arrow> means to zoom-in or zoom-out while maintaining the window size

While using the GSHHS coastline database the access times are too great to allow panning, expanding, contracting and zooming of the displayed coastal area. Only the size of the map window can be adjusted, i.e. only the <control><arrow> key combination works while using the GSHHS database files.

#### *Drag and Drop*

These features are limited to opening either the site definition files or the MATLAB compatible text and JPEG files previously created by this application.

### 6.3 Identify land and Swap colors

When you open a new map window (select *New* from the *File* menu) you get a window with the outline of the coastline along Monterey Bay, California on a light blue background. The default coastline database (WVS) does not distinguish which part of the map window is sea and which part is land. That database only records where the coastline is located. The application, however, will attempt to determine which is which and color in the land portion when you select *Identify land* from the *Options* menu.

Sometimes the *Identify land* option fails and colors the sea as if it were the land. This can occur because the coastline points retrieved from the database consist only of coastline segments that fall within your defined coastal area; the application assumes the largest polygon will represent the sea. If the largest polygon is not the sea then the colors will be reversed. In this case select *Swap colors* from the *Options* menu to correct the problem.

### 6.4 Coastline Databases

The coastline database used in this application consists of three groups of data files:

- World Vector Shoreline files
- World Data Bank II files
- Global Self-consistent Hierarchical High-resolution Shoreline files

There is much information on the data bases used to create site maps in *SeaDisplaySetup*, however they are not contained in this manual. If you would like more information on the coastline database, you can search the Internet for “NOAA/NGDC-Global Relief Data”.