SOB User Manual
Marine Navigation Software

Turn your Laptop and GPS into a ChartPlotter using C-Map charts, and

Software On Board

SOB is a Windows™ navigation program which gives real-time on-screen chart positioning and advanced navigation calculations, displayed in easily understood data panels - automating and simplifying the process of planning, piloting and navigation

With email onboard, SOB becomes a complete weather display and planning tool using GRIB files
The SOB program, and information in this manual, are offered as-is. Neither should be relied upon for the purposes of safe navigation. Please send any comments or corrections for this SOB User Manual to help@digiboat.com.au

Digital Charts and Electronic Navigation are not considered, by most countries, a replacement for traditional "manual" methods of navigating and use of Official Nautical paper charts.

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1 SOB and Computer Navigation

1.1 Introduction to SOB

At DigiBOAT, we believe that easy, affordable and accurate navigation should be readily available to everyone.

SOB has been purposely designed to be equally useful to both:

- a complete beginner computer user, a novice navigator and an unskilled boatie;
- or
- a power user with professional navigation skills and a life-time at sea.

It is important to note that SOB is not a conventional Windows™ software program. There is no reliance on Windows-style menus, all actions and operations are easily performed by mouse clicking (or with a finger in touchscreen systems). There are also no critical operations that must be performed with a mouse "drag". Multi-level menus and mouse dragging are difficult operations to perform on a desk, and close to impossible onboard a moving boat.

SOB’s entire interface has been designed for simplicity, and once it is understood conceptually, we are confident that you’ll find it extremely fast and intuitive.

1.2 The Modern Age of Navigation

Thirty-plus years ago, after the introduction of SatNav (positioning technology that preceded GPS) someone said “For the first time in history, the navigator knows where she IS, rather than where she WAS!” Modern navigation techniques and instruments offer an incredible wealth of information and assistance to the captain, crew and guests. All this information is accurate to incredible levels of precision and real-time accuracy measured in seconds and metres.

Further, newer technologies such as AIS, and of course the Internet and wireless communications are constantly expanding the way that navigational data is gathered, assimilated then dispersed. We really are navigating through a world of science fiction from the perspective of only a decade or two ago.

SOB aims to absorb all available technologies and simply make this detail available for any person onboard. SOB will gather data from virtually all electronic navigation instruments installed – GPS, AIS receivers/transponders, RADAR (with, or without ARPA), wind instruments, depth sounders, speed LOG devices, electronic compasses (fluxgate or gyro), autopilots, DSC VHF and more ...

Modern electronic navigation relies on four essential components:

1. **Navigation Program** "SoftwareOnBoard" is our contribution to easy navigation for everyone
2. **Electronic Charts** C-MAP widely & freely distribute CDs containing worldwide detailed charts. (Before specific charts can be used with SOB, a "Chart Licence" must be purchased from C-MAP Marine)
3. **GPS Positioning Device** Supplied by Garmin, Magellan et al, have become accurate, small, low power and affordable (in line with all modern electronics)
4. **Windows Computer** PCs and Laptops are also better, smaller and cheaper than ever before
*** WARNING ***

It is important to know and use traditional navigation methods and official nautical paper charts. In most countries, navigation by ANY electronic means is NOT considered a replacement for traditional methods of navigating.

Never rely completely on electronic navigation methods. Always keep a good look-out, acquire local knowledge, observe weather advice and keep updated your almanac and manual navigation skills and use your best judgement in all situations.

Whether navigating by traditional (paper) or electronic (computer) means, always ensure that you have enough charts of adequate detail for the safe navigating and piloting of your intended route and destinations.

1.2.1.1 **Electronic Navigation requires:**
   1. Software-On-Board navigation program
   2. C-MAP Electronic Charts
   3. A standard Windows™ PC (Win2000 or newer)
   4. A NMEA connected GPS

1.2.1.2 **Traditional Navigation methods will require:**
   5. Calibrated sextant
   6. Swung compass
   7. Chronometer calibrated to 1 second
   8. Separate LOG device (to determine boatspeed)
   9. Mathematical Tables (to help with the sight reduction calculations)
   10. Nautical Almanac (to supply celestial information, replaced annually)
   11. Sight reduction stationery
   12. Plotting graph paper
   13. Various Paper charts of different scales
   14. The latest "Sailing Directions" to apply chart corrections
   15. Dividers, ruler, protractor, pencil, pencil sharpener, eraser
   16. a higher degree in "something" that allows you to put all this together in rolling seas in a wet cabin at night

1.2.2 **Important Note about Latitude and Longitude Display**

To avoid potential for great confusion and possible danger to your ship, please read carefully this point. The various representation of coordinates can trick even highly experienced navigators (in fact there is a strong possibility that long-time navigators are perhaps most easily tricked as they are have become accustomed to reading lats and longs in a particular format for their entire life at sea).

The three representations of coordinates in common use (and in use throughout SOB) are:

<table>
<thead>
<tr>
<th>Description</th>
<th>Format</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Decimal degrees</td>
<td>DD.dddd°</td>
<td>33.508333°</td>
</tr>
<tr>
<td>2. Degrees, decimal minutes</td>
<td>DD°MM.mmm'</td>
<td>33°30.5'</td>
</tr>
<tr>
<td>3. Degrees, minutes, seconds</td>
<td>DD°MM'SS&quot;</td>
<td>33°30'30&quot;</td>
</tr>
</tbody>
</table>

The examples in the table above ARE ALL THE SAME VALUE !!!

Format 1 is a raw value representation and is used internally by SOB and various devices and is generally of no interest to the navigator or SOB user.

Format 2 is usually the default representation used by modern instruments such as GPS.

Format 3 is the more traditional method of displaying coordinates, and this is the format that experienced navigators are perhaps more accustomed to using.
Notes:

- SOB can be set to display latitudes and longitudes in any of these three formats. (The choice is made on the **ShipsForm>>CustomSettings** page). The chosen format is used consistently throughout SOB, including the format used when exporting Waypoint lists or Routes to an external file.
- A convenient conversion tool is built into SOB on the **ShipsForm>>Conversions** page.
- The symbol for "minutes" is the apostrophe ( ' ), and "seconds" is the quote mark ( " ). Strictly speaking, "seconds" are actually called "second-minutes" but termed seconds by common usage conventions.
- Minutes and seconds are "sexagesimal" numbers, which means they are numbers from 0 to 59 (so not "decimals" from 0 to 99)
- The degree symbol can be "typed" from a keyboard. Hold down the ALT key, type 0176 on the numeric numberpad (some keyboards want 0186, not 0176), then release the ALT key. (This can take some practice to begin with.)
- SOB will automatically detect what format is used when inputting coordinates - whether the inputs are made manually (eg on the Ship's Form, or Waypoint form, or Route Details form), or when importing lists of waypoints etc containing latitudes and longitudes.

For SOB's auto detection to work correctly, the coordinate must adhere to these basic rules:

1. A "space" or a colon ":" can be used in place of the degree symbol " ° ".
   eg 34°30.5 = 34:30.5
2. Two spaces can be used, to separate minutes from degrees and seconds, eg 34 30 30 = 34°30'30". If entering degrees-decimal-minutes, then ONLY ONE SPACE IS ALLOWED.
3. Include a "W,S,E,N" or "w,s,e,n" at the end, or "+,−" at the start. If no cardinal indicator is present, SOB will assume "+", so East Lngs, or North Lats.
4. For format 2: the final " is optional, but recommended
5. For format 3: the final " is optional, but recommended

### 1.3 First Use, Registering and Licensing SOB

The **About SOB** form is the central point for reporting information about your installation - SOB and C-Map charts and your Registration and License details.

#### SAMPLE ONLY

**Note:** If you ever have a need to contact DigiBOAT Support for assistance with resolving registration and licensing issues, or chart installation questions, then you should email the text contained in the **About SOB** form's window to help@digiboat.com.au

Details on this form pertaining to installed C-Map charts are covered in the C-Map chapter later in this User Manual – see page 10-1.

The date of installation, registration status and remaining trial time and various license details are displayed on this form.
1.3.1 Registration/License Status

For unlicensed SOB users, you can use this form to track the length of your remaining Trial Time using this software. Unlicensed users receive up to a total of 90 days Trial Time.

Licensed users can track remaining free Upgrade Time. Licensed users have 12 months from date of licensing where any SOB Upgrades are available free. The Digiboat Website will validate this and provide access to Product Keys etc.

1.3.2 Registering SOB

It is important to register your copy of the SOB program, whether or not you choose to license it. Apart from allowing us to notify you when updates and new versions become available, registered users can unlock certain additional features within the program, and receive free on-line support. Registration also extends the Trial period from 30 days to 90 days.

SOB is available on a try-before-you-buy basis. However for some users, the unlicensed version (LITE version) may be all they ever require. Our rule-of-thumb with this decision would be that if you ever plan to sail offshore from port-to-port with SOB, or contemplate buying C-Map charts then you would be better served with a licensed SOB version. Beyond the trial period, continued use of SOB with all advanced features and functions enabled requires the purchase of a SOB User License. However if a user license is not purchased, SOB will revert to the LITE version with certain features disabled or restricted, yet still suitable for basic real time navigation. Refer to the following webpage for feature differences between SOB LITE, Registered, Trial, Licensed etc:

http://www.digiboat.us/features3.asp#compare

You are free to use, copy and re-distribute the SOB program in either its "installed" or "installable" incarnations (yes, with SOB, you can install it on another PC either from the setup file, or by simply copying over its entire folder tree). You must include all installed files in the SOB folder if you re-distribute the program by copying it. We strongly encourage you and all you distribute to, to register the use of the program.

Advantages of Registering

- Registration is FREE, and updates or upgrades notifications will be emailed to you
- The Trial time (with most features enabled) is extended to 90 days.
- You can download the latest release of SOB
- Registered users can Unlock SOB on up to three different computers, which enables additional parts (extra tools, more routes and waypoints etc) of the software
- Registered users will receive free on-line support.
- You receive a 5% discount when ordering C-MAP charts on-line - Use Reseller Code R30-468 (when, and if, prompted)
- You can become a contributor of Wish Lists to add your feature idea to a future SOB version

1.3.3 SOB Licenses and Unlock Codes (PRODUCT KEYS)

Firstly, the SOB Product Key is a completely separate thing to the C-Map Chart License Keys that you receive after purchasing charts. More about the C-Map Charts later in the Manual – see page 10-1.

For private use, Registered or Licensed SOB users can request up to three SOB Product Keys for using SOB on multiple computers. Commercial licenses are valid on a single computer only.

Unlicensed Users will receive a Product Key for AccessLevel=1. This level of access will enable additional features in the program.

AccessLevel=2 is available by purchasing a SOB Standard User License and, in addition to enabling all of the Level 1 bonuses, it also enables additional features and functionality, such as autopilot output, and completely removes the trial period.

The SOB Pro User License provides AccessLevel=4. ALL SOB features are enabled, except Networking.

The SOB Network User License enables all Pro License features and all Networking abilities.
Commercial operators, Base Stations etc should enquire directly to our Sales team for information pertaining to the SOB Commercial version.

See [http://www.digiboat.us/features3.asp#compare](http://www.digiboat.us/features3.asp#compare) for full feature comparison lists.

### 1.3.4 SOB_SERIAL Number and the New Licensing System for SOBv10

The previously used PC_CODE was constructed from internal numbers that identify the computer's hardware, and thus is otherwise known as a HID (for Hardware ID). From Windows 7 and more so later Windows versions, these Operating Systems have a very unfriendly habit of automatically updating various elements of your computer, including your BIOS (which is the original IBM built-in stuff that provides the link between Windows and your hardware). The BIOS is considered a part of the hardware, so when Windows automatically changes this it usually invalidates your SOB license.

To circumvent this increasing issue, SOB’s HID is now based on an encryption of the serial number of the disk where SOB is installed, and it is now called the **SOB_SERIAL** (instead of the PC_CODE) and resembles a number such: **FJG-A642C8**.

An additional benefit of this new licensing system is that you can now install, and license, SOB to an external drive or disk – including a remote USB hard disk; a USB Thumbdrive; even an SD Card. Then simply move your external disk to another computer and maintain your licensed installation!

### 1.3.5 Online Automatic Licensing

For your SOB computers that have an Internet connection, you can automatically license them (get the Product Key) by simply inputting your SOB User License Password and email address. (You may have to adjust your Firewall settings to allow the SOB App to connect to the Internet).

Your running SOB App will retrieve the correct Product Key from the Internet and automatically install it to your computer. An email will also be sent to you so you have these details on file.

Note: Although this is the easiest way to unlock your installed SOB, it IS NOT necessary to license SOBv10 in this way. So for computers without Internet connection, or for any other reason, you can still use your Internet Browser and our website to retrieve your Product Key using any computer – with, or without, SOB installed.

**How to Unlock SOB with Internet Connection**

**STEP 1**

After installing the SOB program onto your computer open the **About SOB** form with the green-question-mark button on the main toolbar.

**STEP 2**

**OPTION A:**

If you have your **Product Key** already (note that it must have been issued for this computer, and this SOB version), then enter it in the textbox (shown at right) and press the **[>> Apply]** button.

**OPTION B:**

If you have not yet received a **Product Key** for this computer, but you have your **SOB User License Password**, then press the **[License automatically via Internet Connection >>>]** button to open the following form:
Enter your SOB User License Password into the textbox and press the [License >>>] button.

A connection will be made to the Internet and your License Password will be validated and your Product Key will automatically be returned and applied to your SOB installation.

The "Version" text at the top of the form will be updated appropriately.

Note that, as for OPTION A (above) you can also Enter and Apply a Product Key on this form.

There are also various links to our Website pages available here for your convenience, plus a quick link to the SOB PORTS companion App to set up your connections with a GPS and any other NMEA devices.

### How to Unlock SOB without an Internet Connection

**STEP 1**

After installing the SOB program onto your computer retrieve your unique SOB_SERIAL number from the About SOB form.

**STEP 2**

Complete the Send UnlockCode webform to have your unique Product Key emailed to you. [http://www.digiboat.us/unlock](http://www.digiboat.us/unlock)

Follow carefully the directions presented to you on the webpage.

**STEP 3**

Enter the Product Key emailed to you back into the About SOB form, then press the [Apply >>>] button.

### 1.4 General Usage Information

SOB is not a typical Windows™ software program, when using SOB it is best to regard it as a Navigator's Tool rather than a computer program. You should not have to "search" through level upon level of menus to find essential navigation data ... SOB presents this information graphically and intuitively directly on the chart surface.

It is important to notice that NO menus are required to use SOB. All features and functions are designed to be used with a touch-screen or mouse. You will rarely need to use the keyboard when navigating onboard. Access SOB’s features quickly through the Toolbar or by clicking directly on a chart symbol or tool. Panning and Zooming is a fast and easy one-click process with a wheel-mouse.

SOB is designed to be easily used either at home planning or dreaming, or on board in a real-life environment. If using at home, then we recommend you work through as much of this manual as possible while using the program in a simulation mode. To simulate real-time use, use either Dead Reckoning mode or Voyage Replay mode from a logfile. (A selection of logfiles for replay are included with the installation).
In a real-life navigating environment (plugged into a GPS while moving), SOB will work with no additional setup or configuration*. The Ship’s Target will immediately move around the chart display showing your exact position, and any navigation data from connected instruments will be displayed.

* Serial ports for GPS and other instruments may have to be manually set. Refer to page 14-1 for instructions.

### 1.4.1 Compatible Windows Versions

**Win2000** is the recommended minimum Windows Version that's suitable for mission critical computer use (such as real-time navigating). SOB will run without any issue on all Windows versions from W2K.

All newer Windows versions up to Win10 (as @ Nov 2105) have been well tested and deemed suitable. Although for onboard navigation, often an older laptop with an earlier Windows version is used - SOB runs very well with older (and slower) computers. Very little RAM is required, and only a few hundred megabytes of disk space.

SOB is also successfully used in Embedded XP hardware – OEMs: please contact DigiBOAT for information and licensing details for embedded use.

Many of our users have had success running SOB on Mac's and Linux (using dual-boot or emulators). We have not tested this in house, nor can we offer much in the way of Support for these operating systems.

### 1.4.2 Help for Sight-Impaired Users

Although the Talking Pilot feature has a variety of uses for many situations, it was built in consultation with a blind sailor, so it is a valuable navigation tool for sight-impaired users.

There are also many utilities built into Windows™ to assist with making your display more easily readable. These are generically referred to as the Accessibility Features. In addition, laptops often have further features and functions to assist the sight-impaired (review your laptop's User Manual for details).

Examples of the features included with Windows™ are a Magnifier and large-size Themes (large text, mouse cursors, controls and buttons). For Win versions prior to W7 - Enable the Magnifier from the Start menu:

**Start >> Programs >> Accessories >> Accessibility >> Magnifier**

A section of the screen will be set aside to show an enlarged version of wherever the mouse cursor is.

Microsoft also provides more magnification and other accessibility utilities and information at this weblink: [www.microsoft.com/enable](http://www.microsoft.com/enable)

For Windows™ Themes, select Display in Control Panel and open the Appearance page. Themes which include large fonts and large controls; and themes with high contrast can be selected from the list.

Note: SOB uses customised Themes for the Grey, Red and Black Night Mode settings, see page 10-22.

### 1.4.3 Multi-Monitors

For multi-monitor installations (highly recommended where space allows), SOB and the data panels will remember which monitor to appear on.

If SOB is shutdown while displayed on a monitor other than the Primary, and then restarted without the other monitor connected, then SOB will not be visible (as its window will be restored to the non-existent monitor).

To "find" SOB again, you can try holding SHIFT down while starting SOB which tries to force redraw to active monitor however this may not always be successful, in which case you can manually place the SOB window into "Restore" mode, then move it (blindly) to the Primary monitor, or delete the window placements settings in the Registry before restarting.

---

Moving a Window when it is Off-Screen
To move a window when it is not visible on your display monitor, ALT-TAB to make the desired window active, then ALT-Space, then [M] (for Move), now use the arrow keys or mouse to try to bring the window into view. Click or press [Enter] when done, or [Esc] to abort.

Manually resetting the SOB default window position

Use RegEdit to change these Registry settings (Start>>Run>>"RegEdit" Enter):

Navigate to this Registry key:

HKEY_CURRENT_USER\Software\SoftwareOnBoard\sob\Settings\Windows

..and delete these values: pos_bottom, pos_top, pos_left, pos_right and pos_minmax.

These methods are quite advanced, please email us for more instructions if required.

### 1.4.4 Notes on SOB’s User Interface

SOB uses the following conventions:

- any text enclosed in [ ] square brackets denotes a button or key in SOB.
- keys enclosed in {} braces denote “toggle” keys. These keys should be pressed and released prior to using the subsequent keystroke.
- all working files that SOB creates or uses begin with a “!” (exclamation mark). This is a useful trick to have the files appear at the top of an alphabetical listing.

A mouse with a middle-wheel is the best tool to use with SOB (ideally in combination with a touch-screen or Tablet PC), a keyboard is occasionally required, but usually can be stored out of the way. When text input is required (ie: to input the co-ordinates of a dead reckoning position, or to type a name for a Route or Waypoint) an onscreen keyboard can be used, (the virtual keyboard is automatically installed with Win2000 and newer). Of course, a regular keyboard can be used for inputting data, but generally speaking, put the keyboard in a drawer while navigating - there are no special keystrokes or keyboard commands that can't be performed without the mouse.

#### 1.4.5 Zooming and Panning the Chart

An optical (no ball) cordless mouse with a middle wheel is recommended to maximise SOB’s ease of use.

Panning and Zooming is conveniently performed with the middle-wheel. Spin the wheel for fast zooming (by changing chart level when possible); and pan the chart by clicking with the middle-wheel. Also use the middle-button to "drag" a resizing "zoom window" around an area of interest. (refer to the example on page 3-3)

The chart screen will be activated whenever the mouse cursor is moved over it. The SOB window size and position on shutdown will be remembered and restored when SOB is next started.

#### 1.4.5.1 Arrow Keys for panning chart:

Use the left/right/up/down arrow keys to pan the chart. Toggle super-pan mode with the {SHIFT} key. Super-pan will pan the chart 5 times further than normal pan mode.
1.4.5.2 **Note about Zoom Scale Terminology**

Although for some users it may seem counter-intuitive, we will use the following accepted terminology in relation to chart display scales:

- **Large Scale**: is when the chart is zoomed-in. In other words, locations appear "large" on the screen, even though the actual scale used, numerically, is small (ie: 1000:1)

- **Small Scale**: is the chart zoomed-out, so that continents (for example) appear small, although the numeric scale is large (ie: 10,000,000:1)

1.4.6 **StatusBar [2]**

The continuously changing data on the left side of the Status Bar relates to the latitude and longitude of the mouse pointer; followed by the distance and direction (true and magnetic and relative) from the Ship’s Target to the mouse position.

Next is **UTC** (which is the same as **GMT**), this is the current time along the Greenwich Meridian (0° longitude) as determined by your computer clock and time zone (as set by Windows™ Control Panel). If UTC is not set correctly, then use Control Panel to adjust your local time settings accordingly.

If incoming GPS data is valid, then UTC time on the status bar is derived from the GPS. "GMT" will display if using PC clock to calculate UTC, "UTC" is displayed if time from GPS is used.

The first **Scale** data field (Scale 1500000:1) displays the creation scale for the current chart displayed, followed by the current **Chart Level** ([B] in the picture) and scale considering the current zoom factor. The most right-hand text indicates whether the chart is being displayed at or close to its creation scale (RealChart) or if it is zoomed in or out (OverZoom) or if it is greatly zoomed-in (VirtualChart).

**NOTE**: OverZoom or VirtualChart displays will not necessarily show all chart features in their precise geographic locations. SOB should NOT be relied upon for close-up real-time navigation while in either of these chart states.

Finally, the **COM** indicator will show **NoCOM** if communication has been disabled (via the Raw NMEA Data form, or because no Serial Ports where found), or **COMx** will be displayed (where "x" is a number from 1 to 255) if SOB has opened an available and compatible Serial Port.

1.4.7 **Cursor Box pop-up [C]**

Move the mouse over the far left side of the statusbar (approx one inch off the left hand side of the StatusBar – depending on your monitor resolution), or use the [C] key to display a pop-up box for easier viewing of the cursor position and range and bearing from the ship to the cursor.

1.4.7.1 **Rel**

This is the "Relative" bearing from either (1) the ships heading when not drawing an RBL, or (2) the relative bearing difference between the previous RBL line and the one you’re currently drawing.

For example, if the second "leg" of your RBL line is an angle of 90 degrees to the previous one then the **Rel** reading will be 90° Port or Stbd depending on which side the second extension is being drawn.
1.4.7.2  **RBL Mode**
While in RBL mode, the first extension drawn is simply the range and bearing from ship. Subsequent extensions are displayed in the RBL section as range and bearing from the end of the previous RBL.

1.4.8  **Tool Bars**
SOB contains the following toolbars, the Main SOB Tools [1], Chart Toggles [F3], Chart Levels [F2], Perspective View [F12], Routing toolbar [Ctrl-R] and Tracks toolbar. The Routing and Tracks toolbars are automatically displayed when entering in Routing and Pastrack modes, respectively.

All Toolbars can be "undocked" from their default positions along the edges of the screen or "re-docked" to any edge. They can also be reshaped (drag an edge to snap the toolbar into a different shape) and placed anywhere that's convenient.

Note: In a dual monitor installation, when restarting SOB after closing down while SOB was running on the slave monitor, the Main SOB Toolbar may appear half/half on each monitor. This is to allow you to "find" the main toolbar in the event that the slave monitor is not connected when SOB restarts. If the Main Toolbar seems to have "disappeared" when the second monitor is not connected, press [1] key twice which should return it to the default location.

1.5  **Making SOB "Come Alive"**
SOB is still a highly interactive program even when not connected to a moving GPS. Many hours (or days and weeks) can be spent using SOB at your desk! Whether simply using SOB in an educational situation as a study of geography or planning or dreaming about your next cruise or fishing trip or any other virtual use you devise, will be a rewarding exercise with SOB at your fingertips. Information about nearby facilities, navigable rivers and channels and various other chart objects can be identified and closely examined, and of course when it comes to the point of planning your voyage, SOB's Route creation and planning tools will easily consume much of your "virtual sailing" hours.

In addition to just playing with the included charts, several of SOB's features provide you with the ability to "bring SOB to life" even when used ashore with no instruments connected:

1.5.1  **Dead Reckoning Mode**
Click the Ship's Target (or press the [F9] function key) to display the Ship's Form, then check Dead Reckoning, enter your estimated (or measured) course and speed to "animate" SOB into movement. See SectionDead Reckoning mode [D] 2.2.1.2

Any Route can be loaded (or drawn), then "dry-runned" while in DR mode. The Route can be Activated and course and speed manually changed as necessary to simulate this voyage. The Destination ViewPanel will display data based upon the DR settings.

1.5.2  **Voyage Replay Mode**
Double-click the chart surface to display the Raw NMEA Data form. Press the button to replay a pre-recorded NMEA log file.

1.5.3  **Real-Time Navigation**
Just plug any NMEA compatible positioning device (typically a GPS) into your computer's serial port, and watch the Ship's Target move around the chart with pinpoint accuracy.

1.5.4  **WAN Connect**
(The Pro User License and AccessLevel 4 is required to enable WAN features)
Connected WAN ships will be displayed in SOB, either as the primary ship, if selected, or as simulated Targets.

See The WAN Target List Form, page 17-2
2 Ship's Target

Throughout this document, Ship's Target and OwnShip are used interchangeably.

This picture displays many of the tools and indicators that can be displayed at the Ship's Position:

- Red arrow: Apparent Wind vector (red indicates Port-tack)
- Large Blue pointer: True Wind vector
- Hatch pattern: Wind shadow – in this use, indicates No-Sail zone of the "wind circle"
- Crimson text box: Ship’s Label
- Ship’s shape: Set as "hollow" and is aligned to HDG from the electronic compass
- Large black arrow: COG/SOG vector from GPS data
- Thin blue arrow: HDG/SPD vector from connected LOG and electronic compass
- Dotted line: "look-ahead" line for COG/SOG vector

The exact Ship's Position on the chart is indicated by the black circle inside the ship shape (this is the location of the GPS antenna).

Press the [Centre Ship] toolbar button or use the [space] key to redraw the chart display with the Ship in the centre of the screen.

2.1.1 Auto Centre Ship's Target

Press the [Info] button, followed by the [Centre Ship] button to invoke auto-centring mode. Keystrokes [Enter]+[space] will also enable centre-ship mode.

Auto Centring mode won’t allow the Ship to sail off the screen.

The display will automatically re-position the chart to keep the Ship's Target visible at all times. Disable Auto Centre mode by pressing the [Centre Ship] button on its own, or the [space] key.

For settings, see Auto-Centre Mode, page 2-3
2.2 Ship’s Form [F9]

To open the Ship’s Form, click the Ship’s Target or {Shift}+double-click anywhere on the chart, or press [F9].

All settings will be saved when SOB exits and retrieved when SOB next starts.

Whenever the Ships Form is opened, the Ship’s Lat/Lng and the GPS time/date are automatically copied to the clipboard in a suitable BLOG-style format for Pasting into your email, or app, or logbook etc:

07:48.48N 098:17.68E
1330z 27/01

2.2.1 Page 1: Ship’s Position

2.2.1.1 Manually move the Ship

When a GPS is not connected, the ship can be located anywhere on the chart. You could "sail" it to the desired position using DeadReckoning mode; or precisely position the ship with either of these methods: (1) centre the chart at the desired location, then open the Ship’s Form and press the [Set] button; or (2) open the Ship’s Form and enter the coordinates of the new position, then press the [Set] button.

2.2.1.2 Dead Reckoning mode [D]

When DR is active, the ship can be turned in 1° or 10° increments using [L] for left turn, and [R] for right. Toggle the step size between 1° & 10° increments with the {SHIFT} key.

The [+] and [-] keys on the numeric keypad will increase or decrease the DR speed in 2.5 knot amounts.

2.2.1.3 Past Track

See PastTrack Management page 8-9

2.2.1.4 Ship’s Position Label

The label holds the ship’s data values until the next screen refresh. This allows easy transcription of these primary navigation values to a log book or paper chart.

The label can be turned off or there are a variety of display options.

The label will always attempt to position itself behind the ship’s direction of motion, however it could still be obstructing important chart detail. Whenever the mouse is moved over the label, it will temporarily disappear. It will be redisplayed the next time the chart is refreshed.

2.2.1.5 Range Rings

Selectively show/hide range rings to be drawn around the ship. First select whether to draw as a fixed distance around the ship, or the distance that the ship will travel in a specified time. Enter the value for nautical miles, or minutes.

When range rings are ON, the radius size is printed in the Ship’s Label.

2.2.1.6 Chart Orientation

Rotates the chart according to your selection. "Destination Up" will only be available if a N2D scenario is active. If "Heading Up" is selected, the chart display will refresh more
frequently, and a refresh will be forced whenever there is a course change in ship's direction exceeding 5°. For all selections other than North Up, a north-indicator will appear at the top-right corner of the screen.

### 2.2.1.7 Auto-Centre Mode
Enable auto centre mode by ticking the box, or using the key or button combination described above.

**Edge Limit** Enter a value which determines how close the ship will sail to the edge of the screen before being repositioned.

**Centre Position** This value determines how close to the centre of the screen the ship will be repositioned to.

The values entered are a percentage of the screen resolution measured from the centre to the edge of the screen that the ship is "aiming" at. For example, values of Edge=5% and Centre=80% will reposition the ship near the edge of the screen ("behind" it) after sailing only a short distance from the centre. In other words these settings will keep a maximum amount of screen space in front of the ship.

### 2.2.1.8 Quick Navigation Line
... connects the Ship to the Quick Nav Box

### 2.2.1.9 Race Start – start line
Refer to Race Start [S] page 5-18

### 2.2.2 Page 2: Ship Tools
Various objects drawn at the ship's position can be displayed or hidden, using the interactive form shown.

#### 2.2.2.1 Display at Ship

**Hollow Target** the Ship’s Target is best against a white background - such as C-MAP charts display along most navigable waters. At times, the target displays more clearly when hollow, with heavier rings drawn.

When drawn solid, and if a Wind instrument is connected, then the outer ring will be RED or GREEN indicating whether the yacht is sailing on Port or Starboard tack. Generally, the best display for real-time navigating is with **Hollow Ship's Target** set to ON.

**Look-Ahead lines** are dotted lines through the centre of the ship and extending along the exact heading or course. Optionally show either or both: **HDG** (actual direction ship is pointing) and/or **COG** (actual direction ship is moving).

**Course Line** if a N2D scenario is active, a dashed line is drawn from the ship to the destination point.
2.2.2.2 Ship Shape

The ship will be drawn to a scaled "ship-shape" when zoomed below the pre-set chart scale in the drop-down box (1:50000, 1:20000, 1:15000, etc).

The ship's dimensions as entered on the AIS Static Data page are used (Figure 2). If the dimensions are not entered then a fixed-size generic ship icon will be used (Figure 1).

The Ship Shape can be selected to align to either the HDG or the COG. The COG is supplied with data from the GPS, and the HDG data is supplied separately by a connected electronic compass (fluxgate, gyro etc). If no electronic compass is connected, then the ship will always be aligned to the COG, however it is more natural for the ship to be aligned to its heading, although this can be overridden by ticking the Align to COG option.

2.2.2.3 Ship's Vector

- **Hide**  Don't draw the vector. The ship's target symbol will still be displayed.
- **Short** The vector will be drawn at a fixed length. This is best when moving at speeds under 2 knots or when the speed is fluctuating wildly (ie: anchored in variable sea conditions).
- **Stretchy** The length of the vector will vary in proportion to the speed.
- **Super-size** Draws the ownship target and vector greatly enlarged - this is useful for viewing from the cockpit, or for large screen sizes set at high resolutions (ie: bigger than 1024x768). This is best used with Hollow Ship's Target set on Ship Tools page. Pasttrack points and AIS targets can be independently shown large or small via settings on their forms.

2.2.2.4 Speed and Heading Vector

The GPS provides speed and course OVER GROUND information. An electronic compass and LOG device provide speed and course OVER WATER information.

A separate electronic compass and speed "LOG" device† must be connected to SOB or this option is ignored.

A vector combination of these two sets of data can be used to calculate your ship's Leeway or the current's Set & Drift.

The calculated values for Leeway (or Set & Drift) are
Mathematically, this is:

\[ \mathbf{R} = \mathbf{V} + \mathbf{L} \]

Where \( \mathbf{R} \), \( \mathbf{V} \) & \( \mathbf{L} \) are the vectors:

\[ \mathbf{R} \Rightarrow \text{SOG & COG} \quad \mathbf{V} \Rightarrow \text{SPD & HDG} \quad \mathbf{L} \Rightarrow \text{Set & Drift}^* \]

*Set & Drift terms are used here, leeway would also apply to this vector. Note that it is not possible to separate the effects of set & drift from leeway.

† Data from an electronic compass is usually supplied by an additional output from the autopilot – refer to your autopilot's manual. Alternately, a stand-alone NMEA compatible electronic compass can be installed separately.

The Speed "LOG" device is typically a paddlewheel, or ultrasound sensor, protruding through a skin fitting underneath the hull.

If data from these devices is not available via integrated navigation systems (such as Raymarine, B&G et al) then most major marine instrument manufacturers make stand-alone electronic compasses and LOG senders with direct NMEA 0183 output.

**Example: Ship’s Target indicators explained**

This screen shot shows the target drawn small size and not hollow, both the COG (heavy black arrow) and HDG (lighter blue arrow) vectors are displayed. The lubber line (look-ahead line) is enabled for the HDG value from the fluxgate compass.

Both the wind arrows are drawn (true wind is blue with large stretchy size option selected). The dashed lines on either side of the true wind arrow are the wind laylines.

Note the green apparent wind vector and green circle around the ship’s position showing the yacht is on starboard tack.

The Ship’s Label is enabled in transparent mode.

### 2.2.2.5 Wind Tools

See Wind Tools page 5-1

### 2.2.3 Page 3 - Custom Settings

Customise the display of SOB’s chart objects and personalise the display of speed, distances, depths and coordinate units used.

#### 2.2.3.1 Chart Toggles

Depth settings are also available with the [F5] function key to toggle **spot soundings** ON/OFF, and the button on the [F3] toolbar for toggling both spot soundings and **depth contour labels**.

**Boundary Boxes** and **Tide & Current**, **Sea Bed** and **Graticule** (lines of Latitude and Longitude) display symbols can also be dynamically changed with the [F3] toolbar.

**Restricted Areas** and **Restricted Zones** are region dependent, for instance Australia’s Great Barrier Reef
is tightly regulated with various Marine Park zones. When displayed, the shaded zones can severally clutter the chart display. Other restricted areas could be Navy anchorages, Port areas etc, and these are marked on the chart with arrays of danger symbols or other relevant chart marks. See C-Map’s chart symbol document for details, page 10-13

**Text, Airport** symbols and **Roads** can be hidden to reduce chart clutter.

Assigned **Buoy Names** can be displayed beside the symbol to assist with navigation and pilotage. The size and readability of the text labels used is highly dependent on your **Monitor Width** setting.

**Submerged Objects Depths** will print the depth (in the chosen **Depth Units**) for underwater chart objects such as wrecks, submerged rocks etc. Note: whether a depth is available and displayed for such objects is dependent on imbedded C-Map chart data.

**Multimedia Icons** are the camera symbols indicating that a photograph is available for this area. Right-click the camera icon to display the imbedded photo. Future versions of C-Map charts will include more multimedia options.

**Perspective View** see Perspective View, page 10-17

**Light Animation** see Animate Lights, page 10-17

### 2.2.3.2 Width of Monitor

To correctly set the text size used for best viewing on your display size and resolution, you can alter this value. SOB will need to be restarted for the new setting to take effect. The measurement should be the physical diagonal size of your screen, although depending on your screen resolution (as set with Windows™ Display properties in Control Panel) you may need to experiment with different values for your personal requirements.

#### 2.2.4 Page 4 - AIS Static Data

Refer to OwnShip Static Data, page 9-15

#### 2.2.5 Page 5 & 6 – Calculators & Conversions

**2.2.5.1 Ship’s Form**

![Ship’s Form](image)

**2.2.5.2 Calculators**

Start typing your number in any box, the results will be dynamically updated in all corresponding text boxes.

**Speed / Distance / Time**

Use this calculator to find any of these values based on knowledge of the other two.

**Example 1:** How fast must I go to travel 18 nautical miles in 3 hours?
Type 18 and 3 in the appropriate boxes, Speed = 6kn, will automatically fill in as you type the distance and time.

**Example 2: What distance will I travel at 8.3 knots in 24 hours?**
Press the [Reset] button to clear the Example 1 entries, then enter 8.3 for speed and 24 for time for a result of 200 nautical miles (actually 199.2nm).

**Example 3: What is my ETA? ... or ... Finding arrival time**
I have 12.5 nm to the destination and currently doing 16 kn. Entering 12.5 and 16 into the correct boxes shows a TTG (time to go) of 46 minutes, with which an arrival time can be estimated.

Note that if you require a continuous update for a problem such as this, then an N2D Scenario may be useful. If it is a straight-line (ie, no land or obstacles or navigation hazards to avoid), then place a Waypoint at the destination and click the [Destination] button on the Wpt Settings form. See page 6-5

If you have to avoid land or other obstacles, then lay out a Route and "Activate" it. See page 7-10

**Height of Eye**

HOE calculator has many potential uses. This calculation will determine the distance to the visible horizon based upon the height above sea level, accounting for the curvature of the Earth.

If you use a sextant then the HOE is a well known variable that needs to be entered to produce your manual sight reduction, and a simple table exists in the Sight Reduction Tables to find this value. In other cases you may use this, for example to estimate the distance away that a ship, or land is sighted. If the object is just visible on the horizon, then you can find an estimate of its range based on your known height of eye above sea level.

VHF radio waves (and AIS too) is a "line of sight" technology, so use the height of your VHF (or AIS) antenna on top of the mast, or wherever it is installed to calculate the minimum range your VHF or AIS can potentially have. Of course this would need to be added to the same calculation as done from the other receiving or transmitting antenna at the other location. If the other antenna is part of a light house, or on a hill etc then its height above sea level should be available from the charted data.

A final example would be the distance at which you can see a Man Over-Board from the deck of your yacht – if your height of eye is 2 m above sea level, then a bobbing head would be visible only up to about 3 nm away and in perfect visibility conditions! Note that your victim’s visible range to the horizon, with a height of eye of only a few inches, is less than a mile.

**HOE Formula:**

\[
\text{Distance To Horizon} = 1.15 \times \sqrt{\text{HOE}}
\]

\[
\text{DTH in nautical miles, HOE in metres}
\]

**Wind Chill**

Use this calculator to understand why it is so cold the faster you move, and the stronger the wind is!

**Maximum Hull Speed**

This is a theoretical calculation which is widely used in the industry. Note that all boats are different though so use this as a rough guide only. The "theory" behind this calculation is, simply, that at speeds above the theoretical maximum your bow wave and stern wave would combine and effectively create a hole that you would sail into!

Max Hull Speed Formula (for displacement yachts):

\[
\text{Theoretical Max Speed} = 1.3 \times \sqrt{\text{Waterline Length}}
\]

\[
\text{Max Speed in knots, LWL in metres}
\]

Light displacement yachts and Multihulls use a different multiplier

**2.2.5.3 Conversions: Coordinates, Distances and True/Magnetic**

Enter any style of angle to convert between the three possible combinations:

- Decimal Degrees: **DD.dddd°**
- Degrees, Dec-minutes: **DD°MM.mmm'**
- Degrees, Minutes, Seconds: **DD° MM' SS"**
Notice that: entering a “sexagesimal” bigger than 59 will increment the higher order. eg: 95 minutes entered will be 1°35’ added to whatever Degrees are already entered.

Once a decimal point is entered into either the Degrees or Minutes boxes, other boxes will be disabled to prevent entering an invalid combination of Deg, Min and Sec.

Refer to the important discussion on page 1-2 about the various display formats for a coordinate.

To use the distance converter, simply enter your number in the correct "known" box, the other possibilities will be automatically filled. In the example, "1 Nautical Mile" was entered.

The Magnetic Variation is similarly easily determined at any point in the chart by first centring at that point, then [F9] to display this form, and select "Use Chart Centre" option. Either the known True, or Magnetic value can be entered, and SOB will display the other.

Page 7 - Fuel Calculations and Engine Parameters

2.2.5.4 Cruzpro Instruments

Most CruzPro Instruments output NMEA data, SOB includes support for data from instruments such as Tank monitors, Fuel Flow rate senders, RPM, Engine Oil Pressure, Engine Temperature and several others. (www.cruzpro.co.nz)

2.2.5.5 Fuel

This feature is automatic if Cruzpro Fuel Tank Monitor sensor(s) are connected.

For manual use, you must create a "Fuel Rate" calibration file (see below). Choose your volume units and currency as your personal preference. Once SOB "knows" your fuel consumption rate, your Range is displayed in the green box. This is updated at regular intervals.

The Burn Rate is the rate at which you are consuming your fuel. When used with Cruzpro Fuel Tank Monitor this is automatically calculated by the Cruzpro instrument based on the volume of fuel used as measured over time – Note it is not an instantaneous measurement of fuel flow rate to the engine, thus its accuracy improves the longer the measurement is being calculated (particularly with larger fuel tanks, it could be 30 minutes or longer before there is a measurable drop in your tank volume).

You must pre-enter your fuel tank(s) capacity using the [Settings...] form. Three separate tanks are supported. (Generally, this would be a "once-only" task). For manual use, you must also update your tank(s) current levels. This would be done on a regular basis to suit your needs. (See next points)
When the Fuel feature is used in manual mode (ie, without Cruzpro instruments), there are two options for calculating the Burn Rate, both are based upon the calibration table (described in point 2.2.5.7):

1) RPM To base the consumption rate on engine RPM, simply enter the engine's RPM into text box beneath the large black/white RPM box on the main Fuel form. Remember to update this value if you change engine speeds. This is a more accurate way to use SOB's Range calculation, but does require updating if you change the engine speed.

2) Speed SOB will automatically use the current speed if no RPM value has been manually entered. This is more automatic, yet not as accurate unless the boat is motoring in the same sea/wind conditions as were experienced while originally calibrating the consumption rates. (ie, the range will be reduced if the speed is slower due to a head wind).

2.2.5.6 Fuel Tank Settings

Pre-enter your tank capacities in the top section of the form and your preferred volume units for SOB to use. The example screenshot is setup with Tank 1 as the working tank and Tank 2 as the reserve tank.

Enter the optional Price per Litre and preferred currency if desired. Note that this is an information-only field and not directly used by SOB in any calculations. You can, however, easily use this data yourself to estimate, for example:

"Cost to refill":

\[ \text{Cost to refill} = (\text{Capacity} - \text{Volume Remain}) \times \text{Cost} \]

"Cost to Travel Remaining Distance on a Leg/Route":

\[ \text{Cost to Travel} = (\text{Distance Remain} / \text{Knots}) \times \text{BurnRate} \times \text{Cost} \]

Measured Values will need to be updated at regular intervals if Cruzpro Tank Monitor(s) are not in use. The more frequently these are updated, the more accurate will be the Range value on the main Fuel form.

The Consumption Rate value is updated regularly based upon your current speed or RPM as read from the Calibration table (see point 2.2.5.7). This is the value SOB uses to calculate your Range.

Volume Remaining. This is where you manually enter your fuel tank(s) current volume (as measured with dip-stick, or other mechanical or electronic tank volume device).

Note: If using the Cruzpro Tank Monitoring device, it is unnecessary to use these boxes. However, you may have a situation whereby Cruzpro Tank Monitor device is connected to your storage tank but not the day tank. In this case the day tank remaining volume would be manually entered as frequently as desired.

2.2.5.7 Manual Fuel Tank Calibration

To use SOB’s fuel feature without the Cruzpro Tank Monitoring device installed, you must first create a Fuel Consumption Rate calibration file.

An Excel spreadsheet is included to assist with this, but mostly it is a long tedious, dirty, manual process – yet it IS a worthwhile exercise – not just to allow SOB to use this function, but also for your own peace-of-mind as a boat owner/operator.
The spreadsheet can be found in the SOBvMAX folder and is called: !FuelRate.xls

There are three options available to most operators, listed in order of cleanliness and simplicity!

1. Use the consumption data as published by your engine manufacturer. This is typically in a graph format and you will have to read off the RPM vs. Rate values from the graph and enter them into the Excel spreadsheet. Next you will need to determine your speed for each RPM value by direct measurement during sea-trials while under motor in calm water without current.

2. Borrow or buy a flow rate monitoring device (actually you’ll need two), electronic or manual, and temporarily fit one inline in your fuel supply line and the other inline in your fuel return pipe. Next follow the procedure below. Except use the difference between the input rate and return rate as your consumption value.

3. To imperically measure your data:
   Prepare a 5 or 10 litre fuel-safe container. The container should have clear marks for each litre of volume.
   Re-divert your fuel supply line to draw from this container, and the fuel return line must also be diverted back into this container to create a "closed" fuel circuit.
   Drive your boat at fixed RPM for a measured time until a known volume of fuel is used. For best results at least 5 minutes, and for slow reving diesel engines, then about 10-20 minutes is best.
   Time how long it takes to use, say 5 litres. And note what speed you achieve at this RPM.

   **Example: Manually calibrate your fuel consumption**
   
   At 1200 RPM, to use 5 ltrs of fuel took 8 minutes 20 seconds.
   Convert time 8min20sec to hours = \((8/60 + 20/3600)\) = 0.1389 hrs
   Consumption rate @ 1200 = 5 ltr / 0.1389 hrs = 36 litres/hour
   Make a note of this information, then redo for as many different RPM as you can.

You will end up with a table similar to this example:

<table>
<thead>
<tr>
<th>RPM</th>
<th>SOG</th>
<th>BurnRate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>3.0</td>
<td>29.8</td>
</tr>
<tr>
<td>1100</td>
<td>3.1</td>
<td>32.6</td>
</tr>
<tr>
<td>...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2900</td>
<td>9.4</td>
<td>167.4</td>
</tr>
<tr>
<td>3000</td>
<td>9.7</td>
<td>186.5</td>
</tr>
</tbody>
</table>

Create/edit the file SOBvMAX/Logfiles/FuelRate.txt using the same row/column format as in the example above, separate the values with the [Tab] character. You can include a comment line at the top of the file – the comment line MUST begin with the hash "#" character.

If using the supplied spreadsheet, just copy the first three columns of data and paste into a new NotePad file then save it to the SOBvMAX/Logfiles/ folder with the name !FuelRate.txt.

Note: You can keep several calibration files and just load the one relevant to your current operation, for example the files may be:

FuelRate(calm).txt  FuelRate(rough).txt, FuelRate(twin eng).txt, FuelRate(single eng).txt, FuelRate(empty).txt, FuelRate(fully loaded).txt, etc, etc

Use the [Load File ...] button on the calibrate form to use a different set of data in SOB.
### 3 The SOB Main Toolbar

SOB Tools provides access to SOB's main functions, information and drawing modes.

<table>
<thead>
<tr>
<th>SOB Tools Function</th>
<th>Toolbar Button</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chart ZOOM In [I]</td>
<td>![Chart ZOOM In Button]</td>
</tr>
<tr>
<td><em>(zoom in on same level)</em></td>
<td>![Zoom In Button]</td>
</tr>
<tr>
<td>Centre Ship [Space]</td>
<td>![Centre Ship Button]</td>
</tr>
<tr>
<td><em>(auto centre)</em></td>
<td>![Auto-Centre Button]</td>
</tr>
<tr>
<td>([Ctrl]+double press to make Wpt at ship)</td>
<td>![Wpt Button]</td>
</tr>
<tr>
<td>Draw Waypoints, Edit Waypoints [Ctrl+W]</td>
<td>![Waypoints Button]</td>
</tr>
<tr>
<td><em>(Show AllWaypoints Form)</em></td>
<td>![Waypoints Form Button]</td>
</tr>
<tr>
<td>Range and Bearing Lines</td>
<td>![Range and Bearing Lines Button]</td>
</tr>
<tr>
<td>Man-Over-Board [Ctrl+M]</td>
<td>![Man-Over-Board Button]</td>
</tr>
<tr>
<td>*(Manual Target SOS Form [R])</td>
<td>![SOS Form Button]</td>
</tr>
<tr>
<td>Locate Ports and Services [F]</td>
<td>![Locate Ports and Services Button]</td>
</tr>
<tr>
<td>Declutter Chart Display [F8]</td>
<td>![Declutter Button]</td>
</tr>
<tr>
<td>Print chart [P]</td>
<td>![Print Button]</td>
</tr>
<tr>
<td>Quick Navigation Line</td>
<td>![Navigation Button]</td>
</tr>
<tr>
<td>SOB information, Registration and Unlocks</td>
<td>![Information Button]</td>
</tr>
<tr>
<td>C-MAP Charts installed and Run C-MAP Selector program</td>
<td>![C-MAP Button]</td>
</tr>
<tr>
<td>Chart ZOOM Out [O]</td>
<td>![Chart ZOOM Out Button]</td>
</tr>
<tr>
<td><em>(zoom out on same level)</em></td>
<td>![Zoom Out Button]</td>
</tr>
<tr>
<td>Auto-Pan</td>
<td>![Auto-Pan Button]</td>
</tr>
<tr>
<td>Show Tracks toolbar for working with PastTracks</td>
<td>![Tracks Button]</td>
</tr>
<tr>
<td><em>(Show AllTracks Form)</em></td>
<td>![Tracks Form Button]</td>
</tr>
<tr>
<td>Draw Routes, Edit Routes [Ctrl+R]</td>
<td>![Routes Button]</td>
</tr>
<tr>
<td><em>(Show AllRoutes Form)</em></td>
<td>![Routes Form Button]</td>
</tr>
<tr>
<td>Show RADAR Form [T]</td>
<td>![RADAR Button]</td>
</tr>
<tr>
<td><em>(Show Target Friends Form)</em></td>
<td>![Target Friends Form Button]</td>
</tr>
<tr>
<td>Show Alarms Form</td>
<td>![Alarms Button]</td>
</tr>
<tr>
<td>Control ViewPanel displays, [V]</td>
<td>![ViewPanel Button]</td>
</tr>
<tr>
<td>Show/Hide all ViewPanels</td>
<td>![ViewPanel Button]</td>
</tr>
<tr>
<td>Open GRIB Weather Overlays controls [G]</td>
<td>![Weather Button]</td>
</tr>
<tr>
<td>Quick Chart Information, [Enter]</td>
<td>![Information Button]</td>
</tr>
<tr>
<td>Right-Click Chart Info mode</td>
<td>![Info Button]</td>
</tr>
<tr>
<td><em>(Alt. button mode)</em></td>
<td>![Alt. Button Mode]</td>
</tr>
</tbody>
</table>

**NOTES:**

* Entries in braces "{}" are accessed by first pressing the Info button.

** In SOS Mode, this icon changes to the Target Input tool.

The main toolbar **SOB Tools** can be reshaped or closed when it's undocked. Click the cross in its top right corner to close it, or press the [1] key. Close the toolbar to "protect" the navigation display once setup and active, or to expose more screen space for chart use. Without the toolbar displayed, the current setup can't be inadvertently changed. Use the [1] key to redisplay the toolbar.

#### 3.1 Panning

##### 3.1.1 Pan to the Ship [Space]

Centre the display at the ship’s position.

Extra options with this toolbar button: Press the [Info] button first, then this [Centre Ship] button will centre the ship and enable auto-centre mode. Press the [Centre Ship] button to disable Auto Centre mode. **See Section 2.2.1.7 Auto-Centre Mode**

Pressing this button twice in succession, or [Space + Space], will drop a Waypoint at the Ship’s Position. Another way of thinking of this is, if the ship is in the centre of the screen, then pressing Centre Ship again will place a waypoint at this position. **See Section 6.1.1**
3.1.2 Pan by selecting a new chart centre [Left or Middle Click]

Move the chart freely and quickly around the screen by clicking a point on the chart to centre the display at that position. The StatusBar shows the Lat/Long at the mouse position that will become the new display centre. To Pan vast distances, first zoom out a few steps, then continuously click the appropriate side of the screen.

The new chart centre can be chosen by **left-clicking** any place, providing no other click condition receives priority (ie: left-clicking the Ship’s target gives priority to showing the Setup Ship’s Position form). The **middle-click** always centres the display at the point clicked on the chart, regardless of whatever tools may be active (Route drawing, Waypoint tool, etc ...).

3.1.3 Pan to Exact Position [Alt-G]

Press **ALT-G** to open the **Goto Absolute Position** form. Enter any correct values for your latitude and longitude. If entering decimal-degrees; or degrees, decimal-minutes (see page 1-2) then be sure to enter a "0" into the lower significant boxes. IE: to enter **33°30'** enter "33.5" in the "deg" box, then "0" for "min" and "sec"; OR "33" for "deg", "30" for "min", and "0" for "sec".

Optionally, you can also select desired chart level and/or actual display scale. SOB will attempt to zoom to the selected level/scale, however this will not always be possible so SOB will choose the best and closest level and scale for your selection.

3.1.4 Pan with the Keyboard [Arrow Keys]

Use the Arrow keys to pan the chart in nominated direction.

There are two different "step" sizes for the pan, press and release the [SHIFT] key to toggle between the step sizes.

3.1.5 AutoPan

When the AutoPan toolbar button is pressed, the chart will pan whenever the mouse pointer moves to within about an inch (2.5cm) of any edge of the displayed chart. To continue to pan the chart, continue to move the mouse pointer. Clicking in the autopan regions will override the default click – ie, if route editing, clicking to autopan will not place a new route mark. Clicking is also required for touchscreen users. Disable AutoPan mode by pressing the button again.

3.1.6 Pan to other Objects

Targets, Waypoints and found chart objects can also be centred on the display. [Pan to …] or [Centre] buttons appear on the Targets, Waypoint and Find Object forms where appropriate.

On the Routes and Tracks toolbars, use the [Zoom to All] button to Pan and Zoom to display the entire Route or Track.
3.2 **Zooming**

**Zoom** with the **Toolbar Buttons; Keystrokes; Mouse-Wheel;** or a **Zoom-Window...**

Use the buttons or keys [I] [O] (for **I**n & **O**ut) to step in or out of the chart in steps that approximately halve or double the current displayed scale. The zooming mechanism, by default, will avoid over-zooming a chart and will instead change to a more suitable chart level for the requested scale. The zoom buttons will allow zooming to a very large scale, beyond any available detailed levels, if VirtualChart mode is ON (see Section 10.6.1.4), and the chart background will be grey if no detailed chart is available for the area.

Over/Under Zooming within any particular chart level is possible when **Info Mode** ([Enter] key) is enabled. Any chart level can be over-zoomed up to 64x, or under-zoomed to a factor of 0.25. An additional zoom step beyond these limits will return the displayed chart to its digitised scale ("RealChart"). This is the equivalent of pressing the [0] (zero) key to reset the zooming mechanism. Also press the [0] if the zooming ever feels "locked-up" at any time.

3.2.1 **Mouse-Wheel**

The mouse-wheel will rapidly zoom the chart in or out. The size of the change of scale is dependent on the current scale. Large scale charts will zoom with smaller steps when using the wheel, and smaller scale charts will zoom with larger steps.

Zooming with the mouse-wheel is much faster than using the zoom buttons or [I/O] keys, at small and mid chart scales a single wheel step is equivalent to three steps using other methods.

3.2.2 **Zoom to a Window**

...by dragging a rectangle shape - press and hold the middle-mouse button (usually a wheel button) while moving the mouse from one corner to the diagonally opposite corner - surrounding the area of interest. It is usually possible to zoom from a continental scale overview, down to an individual harbour with two steps. Note that the rectangle will restart if the mouse dragging direction is reversed.

**Example using the Middle-Mouse-Button and a Zoom Window.**

From World Wide Overview Chart, to Sydney Harbour with two mouse clicks!

1. **Chart Level Z** (Scale: 5,000,000 : 1)

2. **Chart Level B** (Scale: 600,000 : 1)
3.2.3 **Zoom with the Chart Levels Toolbar**

Ensure the **Chart levels** toolbar is displayed ([F2] key), then, if there is a more detailed chart level available at the location of the centre of the screen, directly select the chart level by pressing the appropriate letter button on the toolbar.

*See Chart Levels Toolbar [F2], page 10-14*

3.3 **Range and Bearing Lines (RBL)**

This is a general purpose, quick measurement tool for distances and headings to/from your ship, or between any two points.

The RBL extension being drawn moves with the cursor and includes additional drawing aids: Range circle, look-ahead extension, perpendicular lines, and wind direction* indicators.

* Wind instruments must be connected to SOB; and "Display Wind Tools" must be ticked on the Ship’s Form.

Touch the chart to draw an RBL from Ship’s Target to the mouse position, consecutive Touches will extend the RBL. Up to five extensions can be drawn, then the RBL will restart.

To restart at any time hold down the [Shift] key before clicking the chart, the next RBL’s will no longer join back to the Ship but will start at the last clicked position.

Once the RBL is set (by clicking the chart) the "cross hair" formed by the look-ahead and perpendicular lines will remain on screen until the next chart refresh. These can serve as guides for the subsequent RBL’s if needed. (See example below)
While the RBL is being drawn, each new point will draw from the previous point AND to the Ship's Target. After the next chart refresh, only the start and end points of the RBL will connect back to the Ship's Target. Manually restart the Range & Bearing Line by pressing the RBL toolbar button twice (ie: Turn-Off RBL mode, then Turn-On RBL mode again).

The RBL's have a short life span, whenever the RBL button is depressed the current RBL is cleared and a new RBL is started. To remove the RBL from the chart: enter RBL mode (press button), then exit RBL mode.

The range and bearing of the RBL extension currently being drawn will be dynamically displayed on the Statusbar, and on the Cursor Box (press [C] to display the Cursor Box, or move the mouse over the left hand end of the Statusbar).

To clear an existing set of RBLs, click the RBL toolbar button, then without clicking the chart, "un-click" the RBL button. (ie: draw a "null" RBL).

**Example** Use the RBL to keep a safe clearance distance off a shallow rock or reef

Use the perpendicular lines that remain temporarily on screen to draw the next RBL as a perpendicular distance off a headland in front of your position. The first RBL from your ship to the clearance point will update as you advance forward on your track.

**Ahead, off the stbd bow is a shallow reef with depths charted at 1 metre!**

We want to clear this shallow area by about a half mile to be safe.

**First we use the RBL tool to measure a half mile (approx 900metres) from the rock perpendicular to our course:**

Using the perpendicular guides of the RBL tool, we align this with our course “look ahead” line. A good tip here is to use the middle mouse button to centre the chart at this position, we will use this position in the next step…
Next, restart the RBL by clicking the RBL button twice. Make the first line (Ship to closest point) by clicking in the screen centre determined in last step. Then Click at edge of shoal area to complete the RBL triangle.

As we advance on our course, the RBL will update to reflect our new position. The perpendicular “distance off” line will remain fixed.

3.4 Quick Navigation Box Tool

When SOB first starts, there will be a red line emanating from the Ship's Target. This is the Quick Nav Line which connects your Ship to the Quick NavBox. You can hide the line by using the tickbox on the ShipsForm >> ShipTools page.

The NavBox itself can’t be hidden (it defaults to a position in Siberia). This is a frequently used tool and most of the time it will be in your display area, when you don’t want it cluttering the chart, zoom out or pan and move it out of the way.

The NavBox displays brief navigation details from your Ship to that point. The "Time To Go" is calculated based on a straight line from your current Ship's Position to the marked point, at your current SOG or BoatSpeed.

When the difference between Great Circle and Rhumb line distances is less than 5nm, a generic "Distance" is displayed representing the Rhumb line value.

See page 7-4 for GC/RL example
4 Data Panels [V]

Press this "paper-clip" button, or the [V] key to control the display state of the ViewPanels (aka Data Panels) and the Menu Bar, Toolbars and Status Bar.

The Data Panels display pertinent data and information to simplify the navigation process. The toolbars provide quick access to most of SOB's features.

The visible state and window position of the Panels and Toolbars is retained between SOB sessions. SOB will display/hide some VPs of its own accord (eg: when an Alarm is triggered, the Messages View Panel will be displayed; and the N2D panel is automatically displayed whenever an N2D mode is enabled).

All Panels will be displayed in their default positions and sizes when the [Show All] button is pressed. Use this technique to reset the panel displays if any have been "lost" on a second (inactive) monitor, or otherwise dragged to a location from which they can't be retrieved.

Resize any of the Panels by dragging an edge (using standard Windows™ techniques) to customize the layout as you desire.

NOTES:
If an N2D scenario is active (MOB, Destination Waypoint, Active Route), the "Navigate to Destination" red panel CANNOT be hidden until the N2D is completed or cancelled.

4.1.1 Data Panels

- **Ship's Data**: vital navigation data – Heading, Speed and Depth.
- **Messages**: a variety of SOB or User created messages and notes. Also displayed here are any Alarm messages and device generated MOB situations.
- **Destination**: Navigation data when an N2D scenario is active.
- **Chart Objects**: When used with the Quick Object Info cursor, shows the chart data under cursor.
- **Wind**: A graphic "analogue" style display of wind data, and when used with a Polar file, optimum angles and target speeds for the conditions.
- **Targets**: list of Targets as they are acquired. Switch to [Detail] mode for information about a specific target.

4.1.2 Toolbars, Status Bar and Menu
Note the characters in square brackets after the button labels are the keyboard shortcuts for these items.
The Menu Bar is the typical Windows-style menu and provides access to all SOB’s features, tools, options etc. Using the menu is not the most efficient manner to interact with SOB, however it may aid the new user to know and access SOB’s abilities prior to learning the quick mouse and keyboard commands for these.

4.2 Ship’s Data Panel
The Ship’s Data ViewPanel displays important and immediate navigation data – Speed, Course, and Depth.

There are several different navigation modes possible in SOB. These are visibly reflected by the colour background of the Ship’s Data panel.

GPS Mode – Valid: **BLACK** Background
Valid GPS data is being received by SOB and this GPS data is being used.

GPS Mode – Invalid: **PINK** Background
GPS Mode is enabled, however the GPS data being received is not valid. Most likely the GPS is off, or has not yet acquired enough satellites for a fix, or the signal is being interrupted.

Dead Reckoning Mode: **BLUE** Background
see section 2.2.1.2

DR mode is enabled and the ship’s target is being controlled by SOB and you.

Voyage Replay Mode: **BLUE** Background
see section 13.5

An NMEA Log File is being replayed. The ship’s target is being controlled by the saved NMEA data being read from a logfile on your disk.

Network Mode: **GREY** Background
see Chapter 17

NMEA Data is being received over a network, or the Internet. The ship’s target is being controlled by NMEA data being received from a remote location. This could be either (1) your own ship’s data being sent by onboard instruments via Wifi, Cat 5, Bluetooth etc, or (2) if the networking client “ownship” mode is enabled then the ship’s target is being controlled by NMEA instruments from a different location.

Resize the panel by dragging an edge or corner until the size is suitable for your needs.
Hide the panel using the button on the ViewPanel menu. Choose what data you want displayed using the Settings Form (see below). If ever the panel becomes inaccessible (eg moves off screen or otherwise “disappears” from the display area), then reset it to its default size and position by pressing the [Show All] button on the Data Display button menu (see Page 4-2).

There are two buttons along the bottom edge of the panel. These will auto-hide but can still be clicked, even when not visible. The button on
the lower-left will open the **Ship's Form** (same as clicking on the ship's target or pressing [F9] key). The lower-right button will show the **Settings Form** for this data panel.

### 4.2.1 Panel Display Settings

The **Descriptor** is the fine text along the top that shows GPS Mode, GPS Invalid, Voyage Replay Mode etc. These modes are also indicated by the background colour of the panel, as described elsewhere in this section. Once you are familiar with the background colour meanings there would be little need to display the descriptor.

The **Data Labels** are the labels printed vertically along the left edge of the panel, ie COG, HDG, DPT etc. **SOG** and **COG** is data direct from the GPS, **COG Magnetic** is derived from the COG and Magnetic Variation based on data imbedded in the chart for your current position. Note the COG Mag would be the compass course you’re steering assuming no compass error or cross current.

**Boat Speed** and **Heading** is data from additional connected devices – typically a "paddle-wheel" type sender for the boat speed (also referred to as a LOG device) and the Heading data from a connected fluxgate or gyro compass.

**Depth** also requires an additional connected depth sounder. If no valid depth information is being received then "(no depth data)" is displayed. This could also be displayed as a result of your depth transducer going beyond its range, ie most depth transducers can’t read very deep depths beyond 100 – 200 feet, in this case it would return invalid depth and SOB would show the "(no depth data)" label.

### 4.2.2 Panel Background Colours

The **BLACK** panel indicates that valid GPS data is being received. These examples show COG and SOG from the GPS, the Magnetic Course is derived from the GPS True COG corrected with the Magnetic Variation for the ship’s position read from data imbedded in the chart.

The image to the left includes depth from a connected sounder, and to the right with no depth sounder connected (or could be connected but depth out of range).

Both images have boat speed and heading not displayed.

A **PINK** panel indicates that GPS data has been lost.

Use the **Raw NMEA Data** form to check or set the incoming GPS data. The GPS must have a clear view of the sky, generally speaking, a GPS signal can pass through fibreglass or timber, but not metal nor metal-film glass.

Note: SOB will display this pink panel if no valid position data has been received for 5 seconds.
Dead Reckoning Navigation & Voyage Replay Mode

BLUE panels are used to indicate a simulation mode of navigation, either replaying a saved NMEA log file, or when in Dead Reckoning mode. Note when in DR mode, emphasis is given to Magnetic heading as DR navigating is typically performed by steering to a compass course.

Networked OwnShip

Any remote TCP/IP connection can be designated as OwnShip data (ie: as if the GPS were directly connected).

The GREY panel indicates that Ship’s Data is being received from a remotely connected data source, either via a local network link (WiFi, LAN etc) or over the Internet.

See Chapter 17

4.3 Messages Panel

This is a general purpose notepad which can be used by the operator for note taking, logging navigation or ship information etc. (Normal Windows™ text editing keystrokes apply when using this panel – Ctrl-A, Ctrl-C, Ctrl-V etc for Selecting, Cutting & Pasting text).

SOB also uses this panel for posting a variety of running messages to the user: N2D Arrivals, Autopilot actions, Network & COM port connections, AIS Broadcast Messages etc. Some of these messages are informational only and require no further action, however some messages are ALARM conditions (and are signified with a pre-set alarm sound) and require attention by the navigator or helmsman.

The data contained in this panel will be saved to the SOBvMAX\Logfiles\messages.txt file when SOB exits and whenever the contained text reaches a few kilobytes in size. The text file can be opened in Notepad and reviewed, edited, printed, deleted etc, using regular Windows™ file manipulation techniques.

You can force a save of this data, or clear the text using the [Clear] button.

Use the [Stamp] button for inserting the following text into the panel:

UTC: 15-Feb-2007 10:47
LOCAL: (GMT+10:00) AUS Eastern Daylight Time
-33°34.044", 151°02.936"
SOG: 5.9 knots
COG: 013° True
TrueWind: 5.9 knots, 052°T (NE).

This "Stamp" text is also automatically copied to the Windows™ Clipboard and can be pasted into another program using its Edit|Paste menu or Ctrl-V keyboard shortcut.
4.4 Destination Panel

This panel is automatically enabled whenever one of SOB's **Navigate to Destination** (N2D) scenarios is activated. These are, in order of priority:

1. Man-Over-Board
2. Waypoint set as a Destination
3. Activated Route

The **N2D** panel supplies all the information required, at a glance, to assist you with arriving at your destination.

If using the AutoPilot to steer your boat, then a **N2D** scenario must be active to enable the outputting of AutoPilot commands.

**VMG** is "Velocity Made Good" and represents that component of your speed AND direction that is helping you get to the destination. If you are steering away from the destination, then VMG will be negative.

4.4.1 XTE

**XTE** is the Cross-Track Error value (required by the AutoPilot) and represents the perpendicular distance that you are displaced from your original intended course to the destination mark. Active routes in SOB measure the XTE from the route leg, if the XTE becomes excessive (most Autopilots will allow a XTE maximum of .3 nm), it can be reset using the button on the **Route Details** form. For destination waypoints your course origin is always measured as your present position when the waypoint is first marked as a destination. To reset the XTE for a Destination Wpt, simply cancel then restart the Destination option on the Wpt form.

**SOBv10 Note:** The **R|L** (for Right|Left) on the Red N2D Panel for the XTE has changed. The display shows XTE[?] where the "?" indicates if the ship is to the Right or Left of the track. (Previously it showed R/L indicating which way to turn to minimise XTE. The convention seems to be more to indicate which side of the track you are placed.)

4.5 Chart Objects Panel

When using the Info-Cursor to display details about imbedded chart objects, the data displayed in the QuickInfo window will only be visible while the mouse is hovering over the object of interest.

To "freeze" this information when you wish to refer back to it, copy and paste it to another application; or use it for comparison; etc, hold the [Shift] key down while hovering over the object to also place the object info into this **Chart Objects Panel**.
4.6 Navigation Panel

Select which extra information to display in the Navigation ViewPanel with the tick-boxes on the Data Display menu.

Information relating to Time can be displayed in this panel: Meridian time is based upon your current longitude (aka "Ship's Time" based on Local Apparent Noon, or GHA). This time zone is purely geographic and can be different to your cultural Time Zone as established by National governing bodies.

Wind information is available if an Apparent Wind Instrument (anemometer) is fitted to the boat and connected via NMEA to SOB. If only Wind is selected to display, then the text will be greatly enlarged making visibility (such as from the cockpit) much easier.

Route summary data is listed here. For detailed Route data refer to the Route Details form.

Leeway (or the boat's Set & Drift from current effects) can be calculated and displayed if a fluxgate (or other electronic heading compass), and a boatspeed LOG device is connected to SOB.

Note: Leeway is only calculated if Boat Speed is greater than 1 knot

4.6.1 Special Display for Wind-only

If only the Wind option is chosen for display in this panel, then the text is greatly enlarged for easier reference from a distance (ie, the cockpit if the screen is installed below). The panel will need to be resized by dragging a corner to create a best fit for the text.

4.6.2 Special Display for Wind and Leeway

If Wind and Leeway only are displayed, both use enlarged text for easier reference. Resize the panel for best fit.

4.7 Targets Panel

The default Target's Panel displays target IDs (MMSI numbers) as new targets are acquired. If the AIS message received includes ship static data, then the ship's name and destination are also shown. Additionally, if the new target acquired is in your "Target Friends" list, then its friendly name will be printed.

The other page displayed with the [Details/List] button in this panel is information about any particular target ship that has been selected as a "Tracked Target". Refer to Tracking Targets, page 9-9

The display will change as the collision threat becomes more imminent. Only pertinent details will be included and the more important collision avoidance data will be enlarged and bolded.
4.8 Wind Panel

This displays wind data in both an analogue-style graphic display and, if a Polar file is loaded, critical data for optimum upwind and downwind sailing performance.

The data is derived from the connected Wind Instruments (anemometer), GPS and electronic compass (if connected*), plus the data contained in your Wind Polars file. See Wind Polars Data, page 5-8

* To correctly calculate the True Wind speed and direction from your SOG (supplied by the GPS) and Apparent Wind data (from the anemometer), it is important to have your boat’s heading data as well – as supplied by an electronic compass (fluxgate or gyro). The reason for this being that the apparent wind direction is relative to your boat’s heading, not its course (as supplied by the GPS COG data). If no HDG data (from an electronic compass) is available, then SOB will use the COG which will, under most circumstances, provide inaccurate True Wind calculated data.

The following screen shots show various Wind Panel displays. Note that the window is resizable (by dragging an edge or corner of the window) so it can be enlarged for easy cockpit viewing, etc.

The data in the top half (red – for Port Tack – in the example on the left) is the apparent wind speed and relative angle, and the blue data below is the True Wind speed and its relative angle to the front of the boat.

Without Wind Polar data loaded, the text at the lower part shows your current, and some time-averaged, values for your VMG against the wind, ie your upwind, or downwind, progress.

When a Polar file is loaded, additional text is displayed which shows optimum sailing speeds and angles for the conditions.

If an N2D scenario is active then a "Dest" label with a small circle will appear on the outer rim of the gauge showing the relative heading to your destination.

The buttons (pictured) at the bottom edge of the Wind Panel will auto-hide. They can still be clicked even if not visible. The [Polars] button will open the Wind Polars form (see Section 5.5) and the [Hide] button will close the Wind Panel window. Redisplay it from the ViewPanel Menu as required.
5 Special Tools

5.1 QuickInfo [Enter]
Display brief information for any chart object by hovering the mouse cursor over the object when Object Info mode is enabled. Enable OI mode by hitting the [Enter] key or pressing the Info button.

This example screen shot is using the Object cursor to examine the lighthouse on Sydney Harbour's South Head.

Quick Light Info Example:
'Macquarie Lighthouse' is a White Tower 105 metres above sea level, with a white light which flashes twice every 10 seconds. In ideal conditions, the light is visible for 25 nautical miles.

5.1.1 Other actions possible from OI mode

Lock down the CentreShip button will keep the Ship's Target always visible on the display. If the ship is about to "sail off" the computer screen, the chart will re-position itself to keep the Ship's Target visible. The charts may change to a less detailed level when re-positioning if no detailed levels are available for this location.

Press the Route Tool button when in OI mode to display the AllRoutes form.

Press the Track Tool button when in OI mode to display the AllPastTracks form.

Press the Waypoint Tool button when in OI mode to display the AllWaypoints form.

Press the Targets button to display the Target Friends form.

Zooming will be constrained to changing the scale within the current chart level.

5.1.2 OI mode with PastTracks

When the PastTracks mode is active, the Tracks Toolbar also has an "i" button. This similar to the general Object Info mode except it only displays detailed information about the selected track point. Use this mode to ensure that you have the correct track point when performing trimming, etc operations on the PastTrack.

See Section 8.1
5.2 Navigating to a Destination (N2D)

SOB will automatically provide extra information in a ViewPanel whenever a Navigate to Destination scenario is active. If an autopilot is connected, control data is only sent to the autopilot when SOB is in N2D scenario (and the appropriate NMEA output is enabled on the Raw NMEA Data form).

There are three such N2D scenarios in SOB. In order of priority they are:

1. **Man-Over-Board**
   
   Enabled by pressing the MOB button.

2. **Navigate to Destination Waypoint**
   
   Any waypoint can be set as a destination, by pressing the "Navigate to..." button on its Waypoint Form. Also, for a destination waypoint, an "Arrival Zone Alarm" can be set. The arrival zone will appear on the chart as a red "hashed" circle, drawn to-scale, around the destination waypoint.

3. **Next Turn Mark on an Active Route**
   
   If neither (1) nor (2) apply, AND a Route is currently marked as active, then the "Navigate to..." panel will show details pertaining to the next turning point, or to the end of route.

   \[In N2D mode, a red "Destination" Data Panel will show all necessary data to help you navigate to your selected destination\]

5.2.1 Waypoints as Destinations

Waypoints nominated as a Destination create a "Navigate to Destination" (N2D) scenario in SOB. The red N2D ViewPanel will automatically display, providing constantly updated information to help you navigate to this location. The Waypoint label on the chart surface will also supply basic navigation information if enabled (from the Wpt form).

To nominate a Waypoint as a destination, press the [Navigate to Destination] button on the Waypoint Form, the FIRST waypoint found in the list that is set as a destination waypoint, will be the one used for on-screen navigation (the autopilot will steer to this waypoint). If this waypoint is consequently unset then the next one found in the list that is set as a destination will be used, etc.

The waypoint's status as a destination waypoint is reset once its ArrivalZone has been breached, or the [Navigate to...] button is reset.

A **Man-Over-Board** is a regular Waypoint pre-set as N2D. See Section 5.6

\[AutoPilot note: if autopilot control is enabled, SOB will disable it upon reaching the first N2D waypoint. You must re-enable autopilot output (on the Raw NMEA Form) to automatically steer to the next Waypoints nominated as a Destination.\]

5.2.2 Active Route

To activate a Route, it must first be drawn on the chart, or loaded from a file.

\[Then display either Route Form (the Details or AllRoutes form) and depress the [Activate... button, or depress the button on the Route Toolbar (pictured left). An Active route will be drawn as a thick red line, with any passed TurnMarks (TM) drawn as a large green dot, and the next TM along the route as a yellow dot. For details about when a TM has been considered "passed", see Section Error! Reference source not found.\]

Summary Route data will be written to the red **Navigation ViewPanel**
Complete up-to-date information about the current Route is available from the Route Details form. The Green, Yellow or Grey indicators in the list will match the drawing of the corresponding TurnMarks on the chart display. Green TMs have been passed, the Yellow TM is the next ahead (whose data is being displayed in the red panel), and the Grey TMs are further ahead.

If visible, the LegLabel is always more detailed for the active leg. The TTG and ETA on the label are based on an estimated speed pre-set (on the Route Details form) for that Route leg.

Once a leg has been completed, the LegLabel will display true time on leg and arrival time at the end of the leg.

AutoPilot note: it will usually require some experimentation to correctly calibrate SOB and your autopilot to "round" a TurnMark as you require. The final setting for your TM ArrivalRadius and autopilot dampening/responsiveness settings is determined by your boat length and characteristics, your boat's speed and autopilot's features.

5.3 AutoPilots

Refer to your AutoPilot manual to learn how to enable it for remote control. Refer to page 14-3 for wiring schematics to connect the AutoPilot to your computer (and SOB).

Autopilots can function in a number of different modes. How your autopilot operates is determined by your autopilot's manufacturer and its specifications, there is no industry standard.

One, or all, of these options may be possible with SOB and your particular AutoPilot:

1. Steer to Course
   - source: an electronic compass (typically built-in to the autopilot) or SOB
   - method: use a Destination Waypoint and move it to change course.
   - NMEA commands: APA, APB, BOD/XTE

2. Steer to Apparent Wind
   - Source: direct from Wind instrument to autopilot, or wind instrument to SOB to autopilot
   - method: select the Wind tickbox on the NMEA Output form to forward all wind sentences (received by SOB) to the AutoPilot. Note that SOB does not process any autopilot/wind functions, but simply repeats the incoming wind commands to the PC output for the pilot.
   - NMEA commands: usually VWR

3. Steer to Destination Waypoint
   - source: SOB, or a GPS, or some other NMEA "talker" devices
   - method: any of SOB's Navigate to Destination scenarios (MOB, Dest Wpt, Active Route)
   - NMEA commands: APB, APA, BWR/BWC

NOTES:

SOB will ONLY send the autopilot commands if a Navigate to Destination (N2D) scenario is active and the red N2D panel is displayed. (This doesn't include the Wind commands). And the NMEA command must be ticked on the NMEA Output form (pictured).

SOB must be Licensed and Unlocked for AccessLevel=2 or higher to enable the autopilot commands on the Raw NMEA Data form.
Example 1: Best Autopilot settings for Coursemaster

The CourseMaster Autopilot (pictured above, works best with "NMEA Group 3" selected (refer to the Pilot’s User Manual page 2-16 to change the group), and SOB configured to send the APA sentence. (This example assumes that the Autopilot is connected to SOB via a multiplexer on COM6)

Set SOB to output Autopilot commands

1. An active route, or destination waypoint, must be enabled. (ie the Red N2D form must be visible in SOB.)
2. Double-click chart to open Raw NMEA data form.
3. Check that the Primary Port is COM6 (multiplexer) and is Open.
4. Now select the NMEA Output tab.
5. Tick Autopilot and APA. All other commands* in the autopilot section should be un-ticked.
6. For the Autopilot output port, select Primary. (This is the MUX port and currently configured to COM6)

NOTE – for control to wind angle, an active route/destination should not be activated (Point 1). Follow rest of points above, except tick All Wind instead of APA in autopilot section.

Set Coursemaster Autopilot for Control from Computer

1. Hold down NAV key on pilot controller until NAV WAIT appears (top-right of controller screen). Shortly after, NAV "123" should appear - where "123" will be replaced by the same heading-to-next-mark shown on the SOB red N2D panel. This display will alternate with XT 0.00L which shows the current cross track error (distance from route line) appended with L or R (left/right).

NOTE: It may be desirable to reset the XTE prior to handing over control to the pilot. The current XTE is shown in black text towards the bottom of the red N2D panel.

- To reset XTE with Active Routes: press the Details button on the red N2D panel, then press the Reset XTE button (along the top).
- To reset XTE with Destination Waypoint: open the waypoint form for the destination wpt, unpress the Navigate to... button, then re-press the Navigate to... button.
- Confirm XTE has been zero’ed on the red N2D panel.

2. Press the PILOT key on the Coursemaster controller to enable autopilot control via commands from SOB.

NOTE – for control to wind angle, in step 1, hold down NAV key for longer until WV WAIT appears (top-right of controller screen). Shortly after, the "WAIT" will be replaced with the angle to steer. Press PILOT key when ready.

Example 2: Best Autopilot settings for TMQ Pilot AP55

During this discussion, and reading the AP55 Operator’s Manual, any references to “GPS control” is interchangeable with control from SOB and the computer.

Contrary to the User Manual for this device, the pilot is put into remote GPS control by starting with the H display, then press and hold the AUTO key and press the MODE key until the AUTO and GPS lights come on, then release the keys. Disable GPS control by pressing the AUTO key. If the GPS and AUTO lights flash, and a warning alarm sounds, then the AP55 is not receiving any, or valid, NMEA data. Check your SOB Autopilot Outputs settings, and all wiring and connections.
Prior to enabling GPS control on the AP55, you must, of course, set up SOB to output autopilot messages as described in previous example.

The TMQ AP55 pilot works best with only the **APB** sentence enabled in SOB.

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Note: The TMQ autopilot does not have a facility for "sail to wind angle". This is primarily a heavy duty commercial fishing boat pilot, but personal experience has confirmed this as an excellent pilot for large sailing yachts!

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**Example 3: Raymarine Autopilot settings**

Most Raymaries tested perform equally well using any of the NMEA sentence options from SOB. All things being equal, APA or APB should be chosen, but experimentation with your model is recommended.
## 5.4 Wind Tools

When a NMEA compatible Apparent Wind sensor (anemometer) is connected, several helpful indicators can be drawn on the chart, and Apparent wind and True wind values are displayed in the Navigation Panel.

### 5.4.1 Wind Vector Arrows

Open the Ship's Form (click the Ship's Target at any time) and check "Show Wind Tools", then check your choice of Apparent and/or True Wind Vectors for display.

The apparent Wind Vector is drawn as either a red or green arrow, dependent on whether you are sailing on port or starboard tack. The apparent vector is read directly from the Wind Instrument, and shows the relative wind direction as felt on the deck of the yacht (actually - from the masthead, or wherever the anemometer is fitted).

The True Wind is calculated based on the ship's "Speed Over Ground" (from GPS) and "Boat Heading" (from electronic compass) if available*, otherwise "Course Over Ground" (from GPS) is used; and the apparent wind speed and direction supplied by the Apparent Wind device. The true wind vector is displayed on the chart as a blue arrow.

Because apparent wind anemometers measure the relative angle of the wind on deck (or top of mast) to the yacht's heading, the True Wind calculated will be more accurate if a heading sensor is installed and connected to SOB (ie: an electronic compass – gyro, fluxgate etc). Otherwise the COG from the GPS will be used for the calculation. COG and HDG, particularly for a yacht, will rarely coincide.

NOTE: The apparent wind vector is ALWAYS closer to the bow of the boat than the true wind vector (when the boat is moving forward).

### 5.4.2 Ship's Wind Shadow

Ideally designed for assisting with optimum upwind sailing, select (from the Ship’s Form) either or both "Show Shadow" and "Show Laylines" and input your yacht's particular minimum angle that it can sail to the wind.

The shadow thus displayed, represents the sector of the "Wind Circle" that your yacht cannot sail. Sailing along the laylines, if the Wind ½ Angle is set correctly, represents the closest point of sail that your yacht can sail to the wind.

Laylines are drawn exactly to the ½ Angle, the shadow is drawn 2° narrower than the ½ Angle.

NOTE: Mostly we believe the display of only the laylines is more pleasing - uncheck the Wind Shadow box and utilise only the Wind Laylines. (As shown in the example screenshot image)
5.4.3 **Waypoint Wind Shadow**

The Waypoint shadow is best used when the Waypoint is positioned to represent your upwind destination, it will help you sail optimally to this windward destination point. On the **Waypoint Form**, check "Show Shadow" and/or "Show Laylines" and set the ½ Angle as described for the Ship's Wind Shadow. Generally speaking, the ½ Angle for the Waypoint shadow should be the same as for the Ship's ½ Angle, however in practice you may find that making the Waypoint angle slightly larger will ensure that you will clear the windward mark. Laylines are drawn exactly to the ½ Angle, the shadow is drawn 2° narrower than the ½ Angle.

The Waypoint shadow works slightly differently to the Ship's shadow. The ship's shadow represents the sector where your yacht (under sail) CANNOT go, the Waypoint shadow represents the region where your yacht SHOULD remain to optimise your upwind leg (ie: sailing outside the Waypoint shadow means that you will cover unnecessary ground whilst sailing upwind).

5.4.4 **Wind Data Panels**

Display either, or both, the following Data panels for additional aid whilst sailing:

**WIND Panel**

(See next section for details about Polar files)

**NAVIGATION Panel, with Wind option enabled**

T: 010°T N, 10.3kn
A: 354°T, 13.9kn
35° off Stbd Bow

Max Qst T10.3, A13.9
5.5 Wind Polar Data

Known simply as “Wind Polars”, or just “The Polars”, this is a complex collection of data that describes or predicts the yacht’s performance characteristics while under sail.

Motor boat owners can skip this section!

With newer yachts, and yachts that have a strong racing pedigree, the Polars are usually published by the yacht designer, or devised by the class associations or interested persons. For all other yachts this data must be acquired. SOB greatly simplifies, to the point of being essentially automatic, the collection of this data.

5.5.1 Why do I need the Polars?

Wind polar data allows you to optimally sail your yacht either upwind or downwind. This has obvious benefits for racing, and is also extremely useful for long passage making.

A button on the PastTrack form or the Wind Data Panel displays the Wind Polars interface.

Note: SOB uniquely uses separate data for port & starboard tacks. Other polar programs use a single set of data for both tacks - thereby presuming that yachts perform identically on both tacks!

The main screen shot (above) was created from published data and is therefore quite theoretical! The most accurate data is created from within SOB while sailing your yacht optimally. When SOB creates the Polar data, the graph may not be as “clean” looking as
above, but the data used will ultimately be more accurate. SOB’s Polar data improves with more sailing on the pasttrack prior to creating the Polar.

The image above is created from a SOB pasttrack file. It is apparent that more data needs to be collected, mostly on port-tack, while sailing into the wind. The grey points indicate that the statistical uncertainty for these points is too high to be considered accurate. This may be due to insufficient data points to create a stable "average", or widely varying values perhaps due to less than optimal sailing at this angle. Certainly the graph improves with more and more logged points while sailing as optimally as possible.

The text above the graph provides information about the data contained: 3,301 pasttrack points were used, the Standard Deviation while analysing and averaging the data was 57.6% (which is not very good, as indicated by the large numbers of grey points). The minimum recorded boat speed was 0kn, and the max was 8.5kn.

5.5.2 How do I create my Polar data?

SOB uses a custom format to save the data. It can be created simply in three different ways:

- Automatically created from your yacht’s own pasttrack data
- Imported from a Maxsea polar file
- Converted from published data

5.5.2.1 Automatically create from a SOB PastTrack file

A suitable PastTrack file must first be created. Naturally this PastTrack data needs to be created while sailing optimally (as if racing, or better still while racing!) and of course without using the engine.

Obviously you need wind instruments connected to your computer and SOB, and for best results you should have an electronic compass input (eg, fluxgate or gyro) and ideally a Boat Speed (ie, LOG device) connected. If electronic compass and boat speed data is not available then COG and SOG (from the GPS) will be used - this will not provide as accurate data for the Wind Polars.

Additionally, the track should be created in an area without current although SOB will filter out data that appears to be influenced by currents (by comparing BoatSpeed and SOG).
During the wind polar creation process, extra information is retained which indicates the statistical accuracy of the data created (standard deviation information). This is shown on the polar graph in different colours (ie, grey data points if the data is not too stable, red/green for good data for port/stbd tacks, black if too few points for a good statistical average).

5.5.2.2 Import from a Maxsea ".POL" file
Maxsea uses a simple row/column format for defining some key data for known points of sail and a selection of wind strengths. When SOB imports and converts these files data is interpolated between known points and extrapolated beyond the known data based on certain rules. (see also next point)

5.5.2.3 Create (using interpolation and extrapolation) from known data points
The Maxsea file format is simple enough to serve as a generic format for importing custom or published polar data. A sample spreadsheet is included in the SOBvMAX\PastTracks\Polars folder with example sheets showing how to convert published polar data for the Sydney 38 and Catalina 36 yachts into the simple Maxsea data table.

Or determine from measurements some of your yacht's data and create a simple table as shown on the first spreadsheet.

With the completed Maxsea data table, simply cut and paste the cells from Excel into Notepad and save in the SOBvMAX\PastTracks\Polars folder with a ".POL" extension.

For best results you should include a value for each column for 180 degrees (running square) and values for your optimum and/or minimum upwind sailing angle. Basically the more data included the better SOB can fill in the gaps.

SOB will not extrapolate beyond the highest wind speed included in the data, so SOB's data for all stronger winds will be zero.

All POL files imported remain untouched and SOB creates its own format file starting with "P_" then the original filename and finally a ".PLR" extension. The SOB polar files are about 1 Mb in size.

For example, "maxsea.pol" would remain and a new file "P_maxsea.plr" of around 1,000 Kb in size is created.

NOTES:

- SOB Polar files have a ".PLR" extension. These are simple text format easily interpreted upon inspection - however, DO NOT EDIT THESE FILES. Although it is permissible to insert comment lines in the file provided the first character on the line is a hash ".#".
- When the Wind Polar form is first displayed, SOB will load the default polar file, named "!polars.txt".
5.6 Man-Over-Board (aka MOB) [Ctrl-M]

A Man-Over-Board marker is a regular Waypoint placed at the Ship's Position with the following properties set:

- Name is "MOB"
- [Navigate to Destination] set to ON
- [Alarm] turned ON
- ArrivalZone circle radius set to 50 metres
- RNG/BRG and TTG/ETA label enabled
- Style set to: Lifer icon
- Notes: UTC at time of setting MOB mode
- In addition, on the ShipsForm >> ShipsTools form, the CourseLine is turned ON.

5.6.1 Supported (Tested) MOB Devices

Below are some MOB Devices that we have tested, or indeed used ourselves “in anger”, however most, and possibly all, MOB devices will work with SOB if they use DSC or AIS technology. For other unknown devices please contact our Support Dept for assistance.

5.6.1.1 Mobilarm V100 Personal Locator Beacon

The V100 is perhaps the most sophisticated, accurate and reliable MOB device available. Designed as a direct replacement for a personal EPIRB, it is a compact, lightweight, waterproof device which contains an integrated GPS and DSC/VHF radio.

Each V100 device is uniquely identifiable via a built-in MMSI number. When activated (manually triggered, or automatic water-activation), the V100 acquires a GPS fix, then uses a synthesised voice to send a MAYDAY call via VHF Channel 16, and sends a specially formatted DSC digital distress message containing the unique MMSI identifier, and the latitude and longitude. The lat/lng message is sent at a regular diminishing interval via DSC.

V100 distress messages via DSC are directly, and automatically, interpreted by SOB and a "Target" is drawn on the screen at the precise location of the victim. In addition, SOB will sound the MOB Alarm, and print detailed information about the event to the purple Messages Panel.

As new DSC messages are received, SOB will update the charted location and retain a track of all previous position fixes. SOB uses the Target list feature to list and track the V100 position(s). See Targets [T] (AIS, DSC, ARPA, RADAR, WAN) page 9-1.

Note: A compatible VHF/DSC Radio is required and must be connected to the onboard PC and the COM port enabled in SOB.

In recent tests off the west Australian coast, 20 "dummy" victims wearing V100’s were thrown in the water to simulate a helicopter crash while transferring staff to an offshore oil rig. There was a 100% recovery rate after 2 hrs delay before searching commenced. Even though one of the victims had drifted 2 miles away from the remainder of the closely grouped pack!

More information:

5.6.1.2 SafeLink R10 and SmartFind S10 Survivor Recovery Systems

These devices from Kannad Marine are functionally equivalent to the Mobilarm V100 device. However, instead of sending a DSC Distress message, they utilise the AIS frequency band and send a standard Class B AIS position fix message. In action, this difference could be significant as the AIS message from the SafeLink and SmartFind do not, on their own, necessarily identify a distress scenario, but rather just another AIS target.

SOB provides a useful work-around for this: whilst performing one of the SafeLink's or SmartFind's built-in tests, ensure that SOB is on and connected to your AIS Receiver. As soon as the SafeLink acquires its GPS fix during the test, it will send an AIS message which SOB will capture automatically. Now find this AIS Target in SOB – which should be easy as it'll be "on top of" your boat – then make this an AIS Friend. Refer to the Targets Chapter for instructions on performing each of these steps.

It is recommended, if using this device, on the Target’s Friends form, click the do not auto purge option, then if you do have a MOB scenario and while searching for the victim you haven’t received a signal for a while, then SOB will not automatically remove this Target thinking that it is now out of range.

More information: [http://www.kannadmarine.com](http://www.kannadmarine.com)

5.6.1.3 Raymarine Lifetag

SOB automatically supports the Raymarine LifeTAG man-overboard device.

The Lifetag outputs a specially formatted RMC NMEA sentence containing the lat and long at the time of signal loss.

If your Raymarine bus is connected to the PC, then a SOB MOB waypoint will automatically be created as soon as the LifeTAG system sets a Man-Over-Board scenario, and a brief message will be printed to the Messages Panel.

Use the red N2D Panel to return to the splash zone and recover your victim.

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Note: If multiple Lifetags are in use, and more than one is activated, SOB will only set a MOB waypoint for the first one that is triggered. Due to the functionality of these devices (ie, they don’t track the device but simply indicate the location of signal loss), it is likely that multiple activations would be within the same area as the first.

In addition to this, if a MOB scenario has been set manually in SOB and is still active, then a Lifetag MOB will not be acted upon.

5.6.1.4 AMEC MOB Dolphin device

AMEC MOB DOLPHIN system is a 2.4GHz wireless radio frequency transmission system comprising MOB controller, pendants, and repeaters. The MOB DOLPHIN system works through continuous signal links between the controller and the pendant. When the pendant is out of the signal coverage, disconnected, or manually activated, the MOB system will automatically alert other members aboard to provide immediate rescue actions.

SOB will display a variety of information in the Messages Panel as these pendants are switched ON or OFF etc, and in the event of a MOB situation latitude and longitude at time of splash are recorded and a SOB MOB event is triggered.
5.7 Printing [P]

Depress the printer button (or [P]) to initiate the printing feature. Four buttons will appear in the top left corner of the chart window. (You may need to move the Ship's Data Panel to reveal the Printing buttons).

Decide whether landscape or portrait printout will best suit your needs then press the appropriate button to enable the [Print Now] button.

All SOB chart manipulation commands work as normal with the print area boxes overlaid. Zoom and pan the chart until you have positioned the exact image that you want to print. When ready, press the printer button to show the print preview window. If OK, then press the [Print...] button to continue. The standard Window's Print Dialog box will be displayed where you may select a different printer and change other printing options (eg: colour or B&W printing, resolution, number of copies etc).

Turn off printing mode with either the red-cross button, or un-press the printer button on the toolbar.

5.8 Alarms [A]

Press the [Bell] button to display the Alarms form.

A variety of scenarios in SOB can have either, or both, associated Warning Messages or Alarms.

Previous SOB versions used the internal PC speaker for many of the warning and alarm tones. Newer laptop's internal speaker don’t seem to have the same frequency range as the original IBM PC "Beep" speaker. In response to this, all SOB's important audible feedback noises have been reprogrammed to use the computer’s audio features and now play via WAV files.

The sound files must be located in the \SOBvMAX\Media\Sounds folder. Certain alarms will use specific WAV file names, with alarms you can use WAV file names of your choice.

Although SOB must use specific WAV file names, you are welcome to change these to any sound bite you wish, just ensure your sound file is correctly named. These files and names are outlined below in their relevant sections.

If SOB can’t find the required WAV file, then the original noise will be played through the PC's Beep speaker – which may or may not be audible depending on your hardware.

5.8.1 Depth Alarms

Set the value for the minimum, or maximum, depth for which to trigger the alarm and tick the box to enable the alarm. If you boat moves beyond these values while the alarm is enabled then the default sound file will be played and a notice will be printed to the purple Messages Data Panel.

The default sound file for shallow depth is: \SOBvMAX\Media\Sounds\AL_shallow.wav
Ensure this sound file exists and is compatible with your computer’s playback system and your sound volume is set appropriately. Press the [...] button to hear the file played.

Note: you can use any sound file you wish, provided it is correctly named as above and in the SOBvMAX\Media\Sounds folder. If the WAV file is not found then SOB will play the original noise through the PC’s Beep speaker – which may, or may not, be audible on your machine.

You must have a connected NMEA depth sounder to use this feature. This Alarms feature in no way derives or uses depth values as supplied by the underlying chart data. Ensure your depth sounder is correctly installed and set up and any keel/level offsets have been entered as specified by the Depth Sounder’s User Manual.

5.8.2 Target Alarms

Both AIS and DSC technologies have a number of possible alarm and notification scenarios.

Calculated collision threats from other ships are accounted for in the options in the left-side column. New Target Acquired is just a soft "blip" sound and the target will be added to the List page of the Target Data Panel.

New Collision Potential targets are those that may enter your "Safe Zone" within the next two hours. A target is only considered a collision threat if it intersects with your Safe Zone over three consecutive refreshes. There are many situations whereby a target could drop in and out of this intersection zone and a continuously beeping alarm becomes annoying.

Safe Zone Breached is perhaps the most important of the Target Alarms indicating that a ship has just entered your Safe Zone.

The message options on the right-side list are printed to the purple Messages Data Panel as well as sounding a general "notice received" beep.

There are a large variety of message types provided for in the DSC and AIS specifications. In addition each hardware manufacturer can add their own messages which could relate to the condition and operating parameters of the AIS device, or DSC radio. Also, AIS does allow for station-to-station messaging and broadcast messaging.

All messages received by SOB from AIS or DSC devices are printed to the Messages Data Panel – it is up to the user to determine if these messages are important and need to be followed up, or ignored and deleted.

5.8.3 Waypoints & Route Alarms

5.8.3.1 Anchor Alarm

This is one of the most useful of SOB’s alarms, which can ensure a restful night’s sleep when at anchor with the knowledge that you will be woken quickly if your boat starts to drag anchor. Locate your anchor’s exact position and place a regular Waypoint at that location, go to the Waypoint Settings form and press the [Alarm ?] button and set the anchor zone circle radius.

When the Anchor Alarm is triggered, a message will be posted to the purple Messages ViewPanel, and this sound file will be played:

SOBvMAX\Media\Sounds\AL_anchorzone.wav

You can replace this sound file with any other WAV file, however ensure that any file you use has the EXACT same file name, and is correctly located in this folder. If you replace the file it is strongly suggested you test this before you drag anchor in the middle of the night! Possibly the best way to test this is to temporarily set your circle radius too small on the Waypoint Settings form to force the alarm to sound. It is recommended you adopt this practice every time you set an anchor alarm to be sure that your volume is appropriate and the sound file works etc.

The following example will help you understand the process and steps involved with using this feature ...
**Example: Marking your Anchor Position and Setting an Anchor Zone Alarm**

It is quite easy to exactly locate your anchor’s position on the chart – once you’ve been at anchor for a brief amount of time the past track points will start to carve out an arc on the chart – your anchor will be at the centre of the circle of points being drawn. (Note that if you’re anchored in a strong current, this arc could be distorted, but the longer you’re at anchor, the more obvious your swing circle becomes and the easier it is to locate the centre).

Particularly for larger boats, you should first ensure that your dimensions are correctly entered on the AIS Static Data form (see page 9-15) so that SOB “knows” your GPS position onboard.

![Image showing a past track after being at anchor for around 24 hours](image)

*This image shows the quite distinct circle plotted out by the past track after being at anchor for around 24 hours. You will observe that the boat spends most time on the East side and the South West side – this particular anchorage has a persistent current that changes with the tides and flows roughly east/west.*

After anchoring, display the **Chart Toggles** toolbar with the [F3] key and toggle the **VirtualCharts** option ON. Now you can zoom in to see individual track points – if you have approached up-wind, or into a current, to anchor, then the track points should be in a line which stops, then doubles back on itself. Your anchor should be on the bottom near to the end of the track points. But beware – this track point is the GPS position on your boat, thus if the GPS is 20m back from the bow then the anchor will be 20m ahead, near abouts, from the last track point. With the Waypoint tool selected, extend ahead...
20m (for this example) and place the Wpt. Observe the distance displayed on the left of the status bar to find the 20m position, accounting for the distance from the bow to the GPS as necessary. Once you’ve located the waypoint at your best estimate where the anchor lies, press the new Waypoint icon with the waypoint cursor to show the **Waypoint Settings** form. A good convention is to name the waypoint something like "Anchor 6m – Au Chalong".

Toggle on the [Alarm ?] button and set your radius in the box to include both the distance from the bow to the GPS, the depth and the scope of your warp.

IE, sticking with the 20m from above, you have anchored in 10m of water with a 3:1 scope.

If you’re that way inclined, get Pythagoras to help calculate the horizontal distance in front of you to the anchor as: $\sqrt{30^2 - 10^2} = 28m$ then add the 20m from GPS to bow for an anchor zone radius of, say, 50 metres. You should generally allow a little extra for warp stretching and tide changes.

Enter the 50m into the Waypoint Settings form and click Close. SOB will zoom and pan the chart to best display the red-hatched Anchor Zone circle.

It is likely that you will need to tweak both the size of the radius and the position of the anchor’s waypoint. The longer you spend at anchor the more pronounced your swing circle will become and the more accurately you can then reposition the anchor’s waypoint.

Hint: Use the Shift key with the Wpt tool to move the waypoint – see Section 6.2.2.2

### 5.8.3.2 Arrival Alarm and Route Turning

When a Waypoint is set as a Destination, or a Route is Activated, then the Waypoint or Route TurnMarks allow you to specify the size of their **Arrival Circles**. Refer to Section 6.2.4 for Destination Waypoints and Section 7.3.1.4 for Active Routes.

When your ship arrives inside the preset arrival zone, then a message will be printed to the purple Messages ViewPanel and a tone will sound through your speakers.

For an Active Route: if used with an Autopilot, this will signify that the autopilot is about to force a change of course, if under manual control then this signifies that the helmsman should prepare to change course.

### 5.8.3.3 XTE Alarms

The XTE (cross-track-error) signifies the perpendicular distance you are off a pre-established course. Refer to Section 4.4 for more details.

It is also possible to set port and starboard tolerances off each side of the leg of an Active Route. Regardless of this setting on the Alarms Form, if the XTE is enabled on the Route Form then the alarm will sound if you sail beyond the limits set. If no leg limits are set then the XTE Alarm will still sound if turned on from this form.

### 5.8.3.4 Off-Course Alarm

The Off-Course Alarm relates to your course to a Destination Waypoint or to the next Route TurnMark with an N2D scenario activated.

There are many useful and practical applications for this alarm, here are a few examples:

1. If under (electronic) autopilot control would indicate if the autopilot has failed (or stopped receiving data if SOB or GPS controlled) and you have now drifted off your intended course.
2. If steering with a wind-vane (manual) style autopilot then would indicate a wind shift and thus you are now probably sailing off-course.
3. A less skilled helmsman can practice with a beep-beep indicator when she has veered too far off the set heading.
4. An off-watch Captain can rest easy knowing this alarm will sound if current watch crew stop paying attention, perform an unauthorised course change or fall asleep while on watch, etc etc.
5.8.4 Miscellaneous Alarms

5.8.4.1 Ship's Bells [8]
The Ship's Bells can also be toggled on/off with the [8] key (for 8-bells).
Ship's Bells are a uniquely nautical feature from an era past. Every half hour the Ship's Bells are tolled so all members of the crew can keep track of the "watch" times (watch being the period during which you are "on watch" and not referring to a wristwatch). In fact this custom probably died-out once all crew members owned their own timepieces.

When enabled in SOB, the Ship's Bells are played through the default Windows Sound System every half-hour. At 12:30, one-bell is played, at 1:00 two-bells are played, then each half hour will be an additional bell up until eight-bells (4 hours later) when traditionally a "change of watch" occurred.

Each "bell" is contained in its own WAV file (eg: 1bells.wav, 2bells.wav, 3bells.wav etc). The bell files are located in this folder: \SOBvMAX\Media\Sounds\.

Tick the checkbox at the bottom of the Alarms form to enable/disable the Ship's Bells. When the bells are turned ON, two-bells will be played through the default Sound System, and when turned off (and if TTS is installed) the following sentence will be spoken "Ship's Bells have been disabled".

The [8] key also toggles the bells on/off. When toggled ON, four-bells will be played, and when toggled OFF a small blip will be played through the computer's internal speaker (which on some systems may be "mapped" to play through the default Sound System).

5.8.4.2 Mouse Clicks
Various keystrokes and mouse actions produce audible feedback. These can be enabled or disabled with this tickbox.

5.8.5 Timers
Two separate general purpose alarms are included. Use these as you might a regular alarm-clock. Be sure to enter the alarm time into the box in the correct format, as shown on the form.

These alarms will play the following WAV files (which can be replaced with any other sound file of your choice, providing the name is exactly the same):

SOBvMAX\Media\Sounds\AL_timer1.wav
SOBvMAX\Media\Sounds\AL_timer2.wav
### 5.9 Race Start [S]

An invaluable aid for the racing yachtsman (whether serious or casual), to achieve the Perfect Race Start. For best results you should have an electronic compass input (eg, fluxgate or gyro) and ideally a Boat Speed (ie, LOG device) connected. If electronic compass and boat speed data is not available then COG and SOG (from the GPS) will be used, and this will not provide as accurate data. The data input should also be correctly calibrated and dampened.

The use of the Race Start form should be mostly intuitive after a short "play", below are some tips to get started.

1. **Show/Hide the form:** Use "S" key to display/hide, and the [Close] button to hide.
2. **Show/Hide the [Settings...] section** by pressing this button.
3. **Make the Start Line:** You must make regular SOB wpts at each end of the start line - you should do this upon your first approach to the line (recommended you sail along the start line and "drop" wpts with the [Space]+[Space] shortcut keys at each end, unless the lat/lon of the startline are published by the Race Committee in which case manually create these wpts using regular SOB wpt creation methods).

   In the "Settings" section, select these wpts from the drop-down lists. SOB will try to pre-select these choices, firstly with the first two wpts found with "Start" in their name, otherwise the last two wpts created will be pre-selected.

   The length of the Start Line from the two chosen wpts will be displayed for your interest.

4. **Tick the "Draw Start Line" box** to show visual aids on the chart, including:
   - Solid black line for the Start Line;
   - Dot/Dash lines in red or green for a Port/Stbd-tack approach;
   - Dashed line for a perpendicular approach (closest point on Start Line from your present position).

   You should also enable some other regular SOB visual aids such as:
   - the "COG look-ahead line" (on Ships Form) and
   - if using a close-haul approach it may help to enable the wind laylines (on Ship Form).
5. Choose your "Starting Strategy" - this can be changed as required right up to the final start countdown. The chosen strategy will draw the approach line (listed in prev point) in bold.

6. Start the "Countdown Timer". Synchronise this timer to the time used by the Committee Boat, ie as "puffs of smoke" or hoisted start-flags are noticed the appropriate time-to-start button can be pressed.

Now use the displayed "Final Approach..." data to determine your optimum speed and heading to achieve the perfect start! A short two-tone alarm will play through your PC Speaker when the timer reaches zero.

Notes

- If wpts are added or deleted to SOB, the "Start Line" wpt lists will not be refreshed until the Race Start form is hidden then redisplayed. Any wpts that had been preselected for the Start Line may need to be re-selected.

- The "Final Approach" countdown is calculated and displayed every second, if there is less than a 5 second difference between this and the start time, the boxes will be WHITE. If you are early for the start, the boxes will be RED (ie, Red traffic light? Slow Down) and if you are slow to the start the boxes will be YELLOW (ie, Yellow traffic light? Speed Up!),

- The visual approach aids drawn on the chart are only refreshed when the chart is redrawn (about every 5-10 seconds, or when any pan/zoom/etc is performed). In other words, these aids are not dynamically updated with each change of speed/course. This is to prevent them "jumping around" too much as your incoming GPS and Wind data fluctuate. This is the reason why you may wish to enable the regular wind laylines (mentioned above in Pt 4) which will move around with each wind shift or change in boat heading.

If you want to force them to be redrawn, simple pan/etc the chart to force a normal screen refresh.

- You may need to use the Dampen & Calibrate feature to "smooth" the incoming wind and heading and speed data to reduce the jitteriness of the vectors drawn on the chart and the calculated values on the form from changing too wildly.

At a minimum we’d recommend dampening your COG with a 3 to 5 seconds setting. We recommend dampening your wind data at the instrument rather than SOB, or SOB and your Wind Indicator displays will differ, also these devices generally offer quite good internal dampening algorithms. It is rarely required to dampen the electronic compass data (boat heading) as these devices mostly send very stable data (if correctly mounted etc, and in particular gyroscopes but also great results from fluxgates, especially if corrected by a yaw/roll/pitch rate-gyro).

- For an upwind starting line, it may initially be confusing looking at the red/green colouring of the wind-approach lines drawn on the chart. IE, the Red line will be off to your Starboard side! Of course, when sailing along this line, you will be on Port tack.

- If the "closest point" approach vector appears the wrong way from the start line, then reverse the order of the two waypoints.

- If the ship's dimensions are entered on the AIS Static Data page, then the actual location used for all approach calculations is the bow of the boat. Otherwise the GPS position is used, which would result in early starts depending on the distance between the GPS and bow etc.
5.10 Isomagnetic Variation Graph [Ctrl-Shift-Y]

Press Ctrl-Shift-Y to overlay a graph of "isogones" linking lines of equal magnetic variation. When this isomagnetic graph is displayed, use the [J] & [K] keys to step through the year (as at Jul 07, imbedded variation data in the C-Map charts is from 2000 to 2007).

The QuickInfo cursor box will show the variation for any point when this graph is displayed.
Waypoints in SOB are a multi-purpose tool for placing a mark, event or notation directly on the chart surface. The waypoints can be grouped into separate files and loaded or unloaded in a SOB session at any time. Press the Waypoint Tool button on the Main toolbar to enable Waypoint Mode. Any licensed version of SOB can display an unlimited number of Waypoints.

Waypoints can be organised into groups for any purpose you require. SOB maintains a default waypoint list which is automatically re-loaded whenever SOB starts. Individual or groups of waypoints can be saved to their own file for grouping purposes. These waypoint files can be loaded or unloaded in SOB as necessary.

Note: A limit of 20 displayed waypoints is imposed for Unregistered SOB Users, the LITE version allows only 5 wpts to be on screen. Licensed Users can have unlimited waypoints displayed.

### 6.1.1 Create a new Waypoint

With the Waypoint tool selected, touch (left-click) on the chart to place a mark at that position. A confirmation form will pop-up. Set some basic features of the Waypoint and accept by pressing the [OK] button, or press the [More...] button to open the Waypoints form to configure the waypoint exactly as you wish.

A Waypoint can be placed at the current ship's position by: (1) Double tap the Space bar, or (2) Double-Click the Centre Ship toolbar button.

Of course, pressing the MOB button will place a wpt at Ship's Position, but this use should be reserved solely for a Man Overboard event as various other processes are started automatically when the MOB button is pressed.

### 6.1.2 Move Waypoint

An existing waypoint can be repositioned either manually or dynamically.

#### 6.1.2.1 Move with the Mouse (or touchscreen)

For moving with the mouse or touchscreen, first select the waypoint tool, then [Shift]+Click the existing Waypoint. (the Shift key does not need to be held down throughout the move). The next Mouse Click (or touch) will place the waypoint at the new location.

To cancel wpt-move-mode and leave the waypoint in its old position, simply [Shift]+Click anywhere on the chart, or cancel Waypoint mode by unpressing the waypoint button, or any other of the toolbar buttons.

Refer to Move Waypoint page 6-4

#### 6.1.2.2 Move by entering Latitude and Longitude

To relocate the waypoint precisely to a new (known) latitude and longitude, select the Waypoint-mode with the toolbar button, then with the wpt-cursor click on the waypoint to move. The Waypoint form will pop up, now enter the new lat/lng in the boxes and press the [Set] button. The lat/lng can be entered in any legal format, see page 1-2.
### 6.1.3 Copy a Waypoint with the Mouse

To copy a waypoint, select the Wpt tool, [Ctrl]+Click on the waypoint to "grab" it, the waypoint cursor will change slightly to include a [+] symbol which denotes a Windows' Copy function. Now simply click at the new position to place a new waypoint at this location which is almost an exact copy of the original – the only differences will be a plus "+" appended to the original name, and of course the latitude and longitude will be different.

### 6.1.4 Change Waypoint appearance and settings

With the Waypoint tool selected, simply click on the waypoint you wish to re-configure – the Waypoints form will be displayed (see Waypoints Form, page 6-2).

Hint: if the waypoint is "underneath" the Ship's Position, then use [Ctrl]+Click.

The Waypoint form can also be displayed by double-clicking the waypoint in the list on the AllWaypoints form (see All Waypoints Form [F10], page 6-9), or by pressing the [Details...] button on the red N2D panel for a Destination waypoint (see Destination Panel, page 4-6).

### 6.2 Waypoints Form

The Waypoints Form shows detailed Waypoint information and the waypoint’s settings can be changed. This form also provides access to the Anchor/Arrival Alarms and the Navigate to Destination feature (aka "Goto Wpt").
6.2.1 Toolbar Buttons

6.2.1.1 Centre Chart at Waypoint
Press this button to pan the chart so that this waypoint is in the centre. Generally this form is opened by clicking on the waypoint symbol, thus its position in known, however it is also possible to open this form by double clicking on the waypoint in the list on the All Waypoints Form, in which case the waypoint may not be in the visible chart area, so this tool will be well utilised.

6.2.1.2 Delete Waypoint(s)
Open the Waypoints form, then press this button, and [OK] the warning box. Individual or multiple Wpts can be deleted from the All Waypoints form (see page 6-10).
If the waypoint is not marked as Save Wpt in "!default.wpt" file then it effectively is deleted when SOB exits.

6.2.1.3 Hide the Waypoint
Toggle the [Show/Hide] button. The waypoint will still be visible on the chart when "hidden", but only as a small dashed circle (compare the images below). This is also the manner in which the Waypoint will be displayed if Autoload is unticked. "Hidden" waypoints can still be selected with the waypoint tool, and re-shown etc.

6.2.1.4 Show All Waypoints
Display the All Waypoints Form, refer to page 6-9

6.2.1.5 Un-Alarm All…
This button will reset the alarms for all loaded waypoints (AnchorZone and ArrivalZone Alarms). This is very useful if a waypoint has triggered an alarm condition, but you're not sure which waypoint, or the waypoint is not currently visible. The alarm can be cancelled from the Waypoint form regardless of which waypoint is used to open the form.

6.2.1.6 Un-Destinate All…
In a similar manner to the [UnAlarm...] button, this button resets all waypoints that are set as Destinations.

6.2.1.7 Default Waypoint Settings
Use this button to change the default style and settings for any new waypoints to match the settings on the form.

6.2.1.8 Apply Changes
Apply any changes to the waypoint, and update the chart display. You may need to reposition the chart and this form so the wpt on the chart is visible so you can see the applied changes.
6.2.2 **Waypoint Settings and Display Options**

6.2.2.1 **Waypoint Name**

Change the name of the Waypoint at any time, be sure to save this change either by pressing the 'Apply' toolbar button, or by exiting the form with the [Close] button.

Any name is suitable for use with SOB, however it's worth being aware that if transferring Waypoints between different systems (eg: the GPS, C-MAP User Card, other Nav Programs) there may be limitations as to what characters are allowed, and how many characters are possible. For instance, most GPS units will only accept 6 letter names for waypoints.

6.2.2.2 **Move Waypoint**

**Manually move** the Waypoint to a precise location with the keyboard, by entering the Latitude and Longitude directly on the Waypoint form, then press the [Set] button.

The coordinates can be entered in any format (refer to page 1-2).

The lat/lng are displayed in these boxes in Decimal-Degrees format, after entering new coordinates and pressing the [Set] button, the labels for these boxes will display the values in a more recognisable format.

Waypoints can also be **dynamically moved** (using the mouse, or finger on a touchscreen) by selecting Waypoint mode, then SHIFT-Click the waypoint and click the chart at the new position. To cancel dynamic moving, SHIFT-Click anywhere on the chart, or cancel waypoint mode. See Section 6.1.2.1.

6.2.2.3 **Wind Shadow**

See *Wind Tools* on page 5-6

6.2.2.4 **Label & Style**

If the label is visible, certain text items will be displayed automatically by SOB, other data and information can be displayed selectively using the settings on the form.

The size of the Waypoint's label text will change along with the Small, Medium, Large settings for the Waypoint style, and on the Scale setting.

If Scale is selected, then the wpt will draw as a small red dot when zoomed out to a chart scale below 1:500,000 and/or when chart level A or lower is displayed.

The basic geometric shaped symbols (circle, square, triangle) can be resized and drawn hollow or solid. The rest of the collection of waypoint icons are always drawn the same as on the Waypoint Shape form (Unless Scale is ticked and chart is zoomed out).

**NOTE:** If you have any particular symbols that you would like us to include in SOB, please send us the bitmap capture of your icon for consideration. This must be your own original image or a non copy-written image from the Public Domain. Email help@digiboat.com.au for more details, or instructions on how to capture an existing image.

6.2.3 **Storage – Waypoint Files**

Temporary waypoints are created if the **Save Wpt in "!default.wpt" file** checkbox is not ticked, ie: the Waypoint will exist only while SOB is running. To keep this waypoint...
in the \!default.wpt file to automatically load when SOB starts, ensure that this box is ticked.

All waypoints in the \!default.wpt file will be automatically loaded when SOB starts. Waypoints can also be saved to their own files for organising and grouping. Refer to next section AllWaypoints form for details.

If the waypoint is not marked as Autoload Wpt when SOB next starts, then the waypoint will still be loaded, however, it will be drawn semi-hidden (and the [Show/Hide] button will be "up") and appear as a small dashed circle on the display. This waypoint can be selected in the normal way (use the Waypoint Tool) and its setting changed if you desire.

See Hide the Waypoint, above ...

6.2.4 [Navigate to Destination] button

See also Navigating to a Destination (N2D) on page 5-2

Press this button to set the Waypoint as a Destination waypoint. Only one waypoint will be a nominated Destination at one time, although other Waypoints can have this button pressed.

SOB will set THE FIRST SEQUENTIAL WPT as the Destination. Once this waypoint has been arrived at, its status as a Destination will be automatically reset. If any other waypoints are nominated as Destinations then the next sequentially created Wpt will become the new active Destination.

The Waypoint sequence is determined by the order in which they were created. This order can be seen in the Loaded Waypoints listing on the AllWaypoints form.

Note: SOB will automatically use the next, and any subsequent, Destination waypoints as each previous destination Waypoint is passed. Be aware that if using an autopilot, it will be disabled after the first waypoint is reached and will not automatically steer to any subsequent waypoints. To automatically steer to a sequence of points, use an Active Route (see page Error! Bookmark not defined.).

Destination Waypoints have additional text in the Waypoint Label and a [Details...] button will appear on the red N2D panel. This provides a convenient way to open the Waypoint form for the active waypoint.

6.2.5 Arrival/Anchor Zones

The [Alarm] button and Radius serve a dual purpose:

1. they define an ArrivalZone circle when the Wpt is used as a Destination.
   The alarm condition is triggered when the circle is ENTERED.

2. if the waypoint is not set as a Destination, then the [Alarm] button will set an AnchorZone alarm to the size nominated in the radius box.
   The alarm condition is set when the circle is EXITED.

   See Section 5.8.3.1 for detailed instructions on using the Anchor Zone

A hashed circle is drawn around the Waypoint marker when either of these modes are selected, and additional text is included in the Wpt label on screen. When the ship breaches the ArrivalZone or AnchorZone, SOB will sound an alarm and log the alarm event to the purple Messages panel. To turn off the alarm, unpress the [Alarm ?] button.
When a waypoint is set as an Anchor Alarm, SOB will automatically resize the screen to the size of the alarm zone circle, centre the display on the waypoint, and adjust the Chart Display toggles turning VirtualCharts to ON and ChartLock to OFF (see Chart Toggles Toolbar [F3] page 10-15).

6.2.6 Distance, Heading and Time Data

The data displayed on the form’s fly-out provides detailed information about the location of the waypoint relative to the Ship's Position.

The "Heading to Wpt", and "Bearing from Wpt" are reciprocals (ie: same course but opposite directions). And these angles are given as True compass values.

The SOG is Speed-Over-Ground supplied by the GPS.

SPD is the Boat-Speed across the water as supplied by a speed LOG device (if connected).

Velocity-Made-Good (or VMG) is that component of your speed that is actually helping you make ground towards the waypoint.

VMG Note:

- If heading directly to the Waypoint, then VMG = 100% of SOG.
- If heading away from the Waypoint, then VMG will be ZERO or have a negative value. According to Pythagoras and trigonometry, the VMG for other headings will be calculated appropriately.

TTG = Time To Go

ETA = Estimated Time of Arrival

6.3 Waypoint Attachments

New with SOB version 10 is the ability to attach any file to a waypoint.

Although conceptually simple, this is a powerful feature with many uses. Attach photos, videos or notes to your favourite anchorage or dive or fishing spot; or attach your Clearance documents, crew lists etc to a waypoint at your Entry Port; or attach navigational notes/photos about a tricky harbour entrance or reef channel passage for easy future reference.

All attachment files are copied to SOB’s attachment folder: SOBvMAX\Waypoints\Attachments

Note the original file is not changed or deleted when attached to a waypoint. A copy of the file is made and placed in SOB’s attachment folder.

Waypoints with attachments have a "link" symbol displayed with the waypoint icon drawn on the chart. Note that it is an option to display the 'link' symbol, if this is currently set to not display, then waypoints with attached files can be identified thus: (1) on the title bar of the Waypoint Form, after the Lat/Lng display will be shown "(Files attached)", (2) hover over the wpt on the chart with the QuickInfo cursor and the waypoint's brief info will display with "{ This Wpt has attached files }" at the end.
6.3.1 Attaching Files to a Waypoint

There are three ways to attach a file to a waypoint:

1. Drag and Drop a file directly onto the waypoint on the chart. The Drag icon will change to include the link symbol when the cursor is correctly positioned on the chart’s Wpt symbol.
2. Drag and Drop a file into the Waypoint Attachments List (see next section)
3. Press the [Add...] button in the Waypoint Attachment List and browse your folders to find the file to attach (see next point)

6.3.2 Displaying Files Attached to a Waypoint

The screen shot at right shows SOB’s Waypoint Attachment List.

To display this list, open the Waypoint form and press the "Attachments" toolbar button.

For any wpts that already have attached files, simply right-click the wpt on the chart to immediately open this list.

To open the file, select it in the list and press the [View...] button, or simply double-click it in the list.

To add more files to the attachments list, press the [Add...] button and browse for the file, or Drag and Drop it directly onto the list.

Use [Rename...] if desired, note this will not rename the original file, only the copy of it attached to the waypoint.

The [Delete] and [Delete All...] buttons work similarly. They will only delete the attachment file(s), not the original(s).

All files attached to all waypoints are located in SOB's own folder here:

SOBvMAX\Waypoints\Attachments

To browse this folder with Windows™ File Explorer, press the [Open Attachments Folder...] button.

You can choose to not display the wpt's link icon with the wpt symbol by clearing the tick box at the bottom of the form. Although this may make it more difficult to recognise which of your waypoints have attached files.

6.3.3 Share a Waypoint and Attachment via Email

SOB provides a built-in tool to email a waypoint, with or without an attachment included. Press the email button on the Waypoint Attachment List form to open a simple email form for you to fill in. If any file in the list is selected, it will be attached to the email.

Fill in the "To: " and "From: " with your email and the recipient's email addresses, change the "Subject: " and "Body: " text if required. Once ready, press the [Send to Outbox >>>] button to place the email into your default mail client's OutBox (ie MS Outlook et al). The email will actually be sent after your next "Send/Receive" operation in your email program. Note that additional changes can be made by editing the email in your OutBox before performing the Send/Receive.

The two images below show the blank SOB email form on the left after pressing the Email button, The image on the right after adding the email addresses and editing the Subject and Body.
6.4 All Waypoints Form [F10]

Manage individual or groups of waypoints, and transfer, import and export waypoints to/from other compatible devices or waypoint sources.

Open the All Waypoints form by typing the [F10] key, or pressing the Info button followed by the Wpt button, or press the [Show All...] button on the Waypoints Form.

- The right-hand list contains waypoints that are currently loaded in SOB. Double-click any waypoint in this list to show the Waypoints form and adjust the properties for that waypoint. Untick the "Save in Default..." to make the waypoint temporary – it will not be kept when SOB next exits. A waypoint, or group of waypoints can also be deleted or moved or copied as described below …

- The left-hand list contains waypoint data from remote sources – a compatible GPS or the C-Map UserCard.

- The central blue list displays all waypoint files found in the SOBvMAX\Waypoints folder. These can be SOB format waypoint files (*.WPT); any correctly formatted raw list of waypoint data (*.TXT or *.CSV); or XML waypoint format files (*.XML or *.GPX) for importing and converting to SOB format.

Press the button above the right-hand list to identify waypoints that are contained within SOB’s default file, or the waypoints contained within the particular file that’s selected in the blue list.

SOB waypoints are saved to a default file unless the Save in Default Waypoint File option is not checked. In this case the waypoint will be temporary and will no longer exist after you exit SOB. (This is the same setting as the tick-box on the Waypoints form).

The default file is automatically loaded when SOB starts. Any other waypoint files must be manually loaded – simply select the file in the central blue list, then press the [Load...] button at the bottom of this list, or Double-Click the file name in the blue list. Unload a file by selecting the file to unload, then press the button below the list (the button caption will change to [Unload ...]).

When a waypoint file is loaded, the number of waypoints and the file status will be included in the blue list, and if the file has been loaded, the right-hand list will display the waypoints for that file. If a CSV or TXT file listing of waypoints is clicked, SOB will...
automatically convert it to a SOB *.WPT format file ready for loading. The original "raw" file will be moved to the SOBvMAX\Waypoints\archived folder.

NOTE: SOB will read any previous file format (SOBv60 “X.1” and SOBv66 “sob.2” etc) and automatically convert them to the latest format when SOB exits. Any old format waypoint files will be copied to \SOB\Waypoints\archived folder before being converted to the new format. Be aware that files are not backward compatible, so SOBv66 will not read a SOBvMAX waypoint file.

### 6.4.1 Delete Multiple Waypoints

Waypoints can be deleted in groups by holding down the CTRL key while clicking on the waypoints in the list that you want to delete. After the first waypoint is highlighted, the [Delete Waypoint] button will be enabled. CTRL-Click OR SHIFT-Click additional waypoints then press this button.

Note: this will PERMANENTLY delete the waypoints, whether they are in the SOB default file, or in their own loaded waypoint file.

### 6.4.2 Copying/Moving Waypoints to a different file

Individual, or groups of waypoints can be moved to their own file for enhanced management and organisation. This is easily done by selecting all the waypoints in the right-hand list that you want to keep in a group, then press the [Save to File...] button and enter a filename appropriate for the waypoints chosen.

To Move the waypoints to the new file, untick the **Save with Default Waypoints** box, leaving this box ticked will **Copy** the waypoints, leaving them to also autoload from the default file.

Note: to select multiple waypoints to delete or move to a different file, use the normal Windows™ selection commands – ie: [SHIFT]-click will select contiguous items from the last selection, [CTRL] click will select distinct items.

### 6.4.3 [Export to Route]

This button will convert the waypoints in the selected file into a Route. The route created will use the waypoints in the same order that they are listed in the wpt file (ie: the order in which they were created, and the order that they appear in the waypoint list on the right-hand side of this form). The new route file will have the same base name as the waypoint file, but with SOB's " .RTE" file extension, and will be placed in SOB's Routes folder.

NOTE: The order of waypoints converted to Route TurnMarks cannot be changed during the export operation, however once the route has been created (and then loaded in SOB via the AllRoutes form) regular route editing techniques can be used to correct the order of the TurnMarks if needed. Alternatively, with care, the order of the waypoints in the waypoint file can be manually adjusted. Keep a backup copy of the original file in case you mistakenly corrupt the file format to the point where SOB can no longer interpret it.

### 6.4.4 [Export Wpt List]

Select the waypoint file from the blue list, then press the [Export Wpt List] button to save the waypoint file to a new text file with a simple row/column text listing – ideal for
opening in Excel for further processing such as trip planning, or as a generic list format for transferring between programs, although some formatting/editing would likely be required in this case.

The new txt file will be saved to the SOBvMAX\Waypoints folder. Lat and Long format used for the exported positions is dependent on the Custom Settings chosen on the Ship’s Form.

### 6.4.5 [Export to XML]

This button will export the selected Waypoint file to an XML format file (with a GPX extension).

In the last few years, XML has become a standard file format for transferring Waypoints between various applications.

The new XML (GPX) file will be saved to the SOBvMAX\Waypoints folder. Lat and Long format used for the exported positions is dependent on the Custom Settings chosen on the Ship’s Form.

### 6.4.6 Importing XML Waypoint files

XML Format Waypoint files should be placed in the SOBvMAX\Waypoints folder. When the AllWaypoints form is next opened these files will appear in the blue list and clicking on them will automatically convert them to a regular SOB *.wpt file and load them into SOB. The original file will be moved to the SOBvMAX\Waypoints\Archived folder.

### 6.4.7 Importing CSV files

SOB is quite good at importing waypoint lists and converting them automatically to SOB’s own ".WPT" file format. Simply copy your correctly formatted CSV waypoint file into SOB’s \Waypoints folder and they will appear in the blue file list and will be marked as "raw" files. The filenames must have a ".CSV" or ".TXT" file-extension.

Click on these raw files and SOB will automatically convert them to a SOB ".WPT" file and move the original file into the \Waypoints\archived folder. Now you can load/unload the SOB format file in the normal way with the button at the bottom of the blue list.

The new WPT file will have the same base name as the original, with a three digit number added... eg: "testfile.csv" would become "testfile001.wpt", the "testfile.csv" will be moved to the \Waypoints\archived folder.

For a successful file import, the following file format description must be adhered to ...  

**Sample CSV text file excerpt:**

<table>
<thead>
<tr>
<th>NAME</th>
<th>LAT</th>
<th>Lng</th>
</tr>
</thead>
<tbody>
<tr>
<td>SINGAPR</td>
<td>04°11.020</td>
<td>134°55.885</td>
</tr>
<tr>
<td>TEST</td>
<td>04°11.020</td>
<td>134.93142</td>
</tr>
<tr>
<td>BOATKEY</td>
<td>04°11.020</td>
<td>134 55'53&quot;</td>
</tr>
<tr>
<td>SAVE011</td>
<td>00°48.734</td>
<td>124 11.743</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTES on File format:**

- The first line of the list must contain the column headings, the order doesn't matter, SOB will figure it out so long as the headings contain a recognisable word (eg: longitude, lng or long are all recognised).
- Each "field" should be separated by commas or Tabs or semi-colons.
- The coordinates can be in any format: DD.ddd°, or DD°MM.mmm', or DD°MM'SS". A [space] can be used instead of the degree ( ° ) symbol. No other spaces should be in the coordinates. ( ’ ) and ( " ) should appear when appropriate. S & W hemispheres should contain either a leading minus (-) sign, or trailing cardinal characters ( S ) or ( W ) as appropriate.
- The coordinates format used can even differ from one waypoint to the next (see excerpt - SINGAPR, TEST & BOATKEY obviously all have the same latitude, BUT THEY ALSO HAVE THE SAME LONGITUDE)
A NOTES field will be imported with each waypoint if the Notes field is the last column in each line (including the "Header Line") and it can't contain any "newline" characters (aka CarriageReturn/LineFeed pairs).

A SHAPE column can be added to the raw list. The entries in this column must be numbers which indicate the SOB waypoint shape as listed in Point 6.3.9, on page 6-11.

### 6.4.7.1 Extra Waypoint Importing Information

SOB can import some additional information with waypoints, this is mostly done automatically when it's available. But as there is no "standard" for waypoint data, it is hard for SOB to import all information correctly, all the time. For best chances of success you may need to do some manipulation with some lists in Excel.

However, some fairly standardised settings are SHAPE & COLOR & NOTES, although there's no universal way these are stored/represented amongst all the different programs and devices that use waypoints.

SOB can import the shape, colour and notes from some known sources (e.g., the C-Map UserCard, most Magellan GPS) and in fact, SOB will try to match even more waypoint shapes that are exported by the sending data source. A similar story for colours, each other device or program store their code for colours differently.

Currently the XML format is leading the charge to be a universal transfer format (sometimes also referred to as GPX format). SOB can read and write waypoint lists from/to the standard XML format.

### 6.4.8 Capturing Waypoints from a GPS

SOB can automatically capture waypoints from a Magellan GPS. Other GPS units will need to be manually configured to transmit their waypoint lists. Please refer to the device's User Manual for directions.

#### 6.4.8.1 Magellan

Works simply through the normal NMEA connection. Some devices also send colour, shape and notes. SOB imports these waypoints easily via the "Capture" section of the AllWaypoints form.

#### 6.4.8.2 Garmin

... use their own proprietary communication protocols and SOB is not capable of directly importing waypoints from any Garmin GPS. However there are two ways you can import Garmin waypoints to SOB:

1. Place your wpts into a route, which the Garmin exports in the conventional NMEA manner when the route is activated in the GPS and captured in SOB's AllRoutes form. This route can then be exported to a SOB Waypoint file if required. See Section Error! Reference source not found.
2. Use a third party program to capture a list of wpts from the Garmin - then format/reformat this list to be compatible with SOB's CSV or XML importing.

#### 6.4.8.3 Furuno

Most Furuno devices send a proprietary NMEA sentence through the normal connection. SOB can directly capture these waypoints on the AllWaypoints form. You may have to manually trigger the GPS to send its wpt list (refer to the Furuno User Manual).

#### 6.4.8.4 Other GPS Models

If they can be set up to transmit the RTE or WPL NMEA sentences, then SOB can capture them - refer to the User Manual that came with the device for instructions. Otherwise use a third-party waypoint program to produce a CSV list or XML file for SOB to directly import.

GPSU is one common such 3rd Party application, see [http://www.gpsu.co.uk](http://www.gpsu.co.uk)

We also have a few macros and 3rd party programs that our users have created to help with importing Waypoints, Routes and Tracks created in other navigation programs.
Please email help@digiboat.com.au for more information.

### 6.4.9 Sending Waypoints to a GPS

#### 6.4.9.1 CSV File

Check your GPS manual for compatibility with importing lists from text files. Typically you would first export a SOB waypoint file to a text list (on the All Waypoints form), then use Excel to adjust this text list to the row/column format required by your GPS, then use HyperTerminal to send this file to the GPS.

Note that for reasons known only to Microsoft executives, newer versions of Windows no longer include the very useful HyperTerminal application. There are a variety of similar applications available throughout the Internet for free download.

#### 6.4.9.2 NMEA WPL Command

**CAUTION:**

Some GPS/Plotters may DELETE ALL WAYPOINTS currently in the device's memory when importing a new waypoint list. Please check your GPS or Plotter's User Manual carefully before importing WPL waypoints from SOB for the first time. (Or first output all waypoints from the GPS or Plotter to SOB or HyperTerminal etc so you have a complete backup of them.)

Your GPS must be able to import waypoint data via NMEA using the WPL sentence. Select a waypoint file on the All Waypoints form [F10], press the [==] button and SOB automatically starts sending the waypoints to the nominated Output port for the GPS. Tick the GPS Output option on NMEA form, selecting the correct port with your GPS attached.

Either an entire file, selected in the blue list will be uploaded, or any selected waypoints in the right-hand list will be uploaded. If one or no waypoints are highlighted, and a filename is selected, then the waypoints in the file will be sent.

As per NMEA standards, a single WPL sentence is sent every two seconds. A running count is kept in the caption, and if you widen the fourth column in the list (which is shrunk and hidden by default), you can see "Tx" is inserted as the wpt is sent.

Waypoint names are truncated to 8 characters when uploaded and converted to uppercase. Some GPS models only allow 6 characters for the name and will not accept any wpts with the same name as any already in the GPS, so for example if you have these in SOB: 'Wpt 010' and 'Wpt 011' then the first 6 characters are the same, so the GPS may not import 'Wpt 011' if it sees them both as 'Wpt 01'.

### 6.4.10 C-Map UserCards

The AllWaypoints form serves as the interface for the C-Map UserCard route, mark, event and track transfers between compatible products. A C-Map Card Reader for the PC, a UserCard and external C-Map compatible plotter device are all required to make use of this feature.

The C-Map UserCard is the same style of memory chip as the cartridge charts and acts in a manner similar to a floppy disk for transferring routes, waypoints and tracks between SOB and a ChartPlotter, or vice-versa.

See C-Map Cartridges & USB Card Reader page 10-4

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Note: SOB can only read and write to the older style C-Map C-Cards. SOB can not read/write to an SD Card with the Orange C-Map Readers. (Although SOB can read and display charts on SD Cards with these Card Readers).
6.4.11 SOB Waypoint File format

Line 1: sOb.x current wpt file format. "sOb.3" supports different shapes.
   sOb.3 is the SOBv90 and SOBvMAX format.
   sOb.4 is the latest file format for SOBv10

Line 2: Name
   eg: Sea Mount

Line 3: Flags
   eg: 1010000000500 (see below)

Line 4: Latitude
   Degrees decimal format eg: 39.440000

Line 5: Longitude
   Degrees decimal format eg: -88.800000

Line 6: UTC_created
   Number of seconds since Midnight, Dec 31st, 1970.

Line 7: UTC
   Date imported to SOB or created by SOB
   Will usually be the same as "utc_created" unless utc_created
   is imported from another wpt source

Line 8: Size
   0=small, 1=medium, 2=large

Line 9: Label
   0=off, 1=name, 2=lat/lng, 4=RNG/BRG, 8=TTG/ETA
   Use the logical "AND" to have combinations.
   (eg: 3=name and lat/lng)

Line 10: CLR-fore
   RGB colour code (ie: Red = 0xFF0000) Applies only to circle,
   square, triangle, diamond shapes

Line 11: CLR-back
   RGB colour code (ie: Red = 0xFF0000) Applies only to circle,
   square, triangle, diamond shapes

Line 12: Wind Half Angle
   Number from 1 to 90

Line 13: Arrival Zone Radius
   Size of arrival circle drawn when Destination,
   or Anchor zone is set (in Metres)

Line 14: attachments
   Semi-Colon (;) delimited file list (\Waypoints\Attachments folder).

Line 15: notes
   Standard text note. No CR or LF allowed
   ---
   End of this waypoint marker

Flags: (digits counted left to right)

digit 1: 0 or 1 Draw filled or not filled, applies only to circle, square, triangle, diamond shapes.
digit 2: 0 or 1 Draw cross over wpt
digit 3: 0 or 1 Autoload (if 0 then wpt drawn as thin dashed circle)
digit 4: 0 or 1 Destination (1 if "Navigate to" mode set for this wpt)
digit 5: 0 or 1 Show wind laylines
digit 6: 0 or 1 Show wind shadow
digit 7: 0 or 1 Arrival/anchor zone alarm set
digit 8: 0 or 1 Moving (dynamic waypoint) not currently implemented
digit 9-11: 000 to 999 Waypoint shape (see table below)
digit 12: 0 or 1 (ver sob.3+) Scale wpt with zooming (small red circle when zoomed out)
digit 13: 0 or 1 (ver sob.4+) 1=Use Local Time. 0=Use UTC.

Waypoint shapes:

<table>
<thead>
<tr>
<th>Shape Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>000</td>
<td>SOB DEFAULT</td>
</tr>
<tr>
<td>001</td>
<td>CIRCLE</td>
</tr>
<tr>
<td>002</td>
<td>CIRCLE_SOLID</td>
</tr>
<tr>
<td>003</td>
<td>CROSS</td>
</tr>
<tr>
<td>004</td>
<td>TRIANGLE</td>
</tr>
<tr>
<td>005</td>
<td>ARROW</td>
</tr>
<tr>
<td>006</td>
<td>SQUARE</td>
</tr>
<tr>
<td>007</td>
<td>TENT</td>
</tr>
<tr>
<td>008</td>
<td>FLAG</td>
</tr>
<tr>
<td>009</td>
<td>ANCHOR</td>
</tr>
<tr>
<td>010</td>
<td>HOUSE</td>
</tr>
<tr>
<td>011</td>
<td>BUOY</td>
</tr>
<tr>
<td>012</td>
<td>FISH</td>
</tr>
<tr>
<td>013</td>
<td>DANGER</td>
</tr>
<tr>
<td>014</td>
<td>BELL</td>
</tr>
<tr>
<td>015</td>
<td>DIAMOND</td>
</tr>
<tr>
<td>016</td>
<td>LIGHTHOUSE</td>
</tr>
<tr>
<td>017</td>
<td>WRECK</td>
</tr>
<tr>
<td>018</td>
<td>MEDIC</td>
</tr>
<tr>
<td>019</td>
<td>BUOY_RED</td>
</tr>
<tr>
<td>020</td>
<td>BUOY_GREEN</td>
</tr>
<tr>
<td>021</td>
<td>SQUARE_RED</td>
</tr>
<tr>
<td>022</td>
<td>SQUARE_GREEN</td>
</tr>
<tr>
<td>023</td>
<td>SCUBA</td>
</tr>
<tr>
<td>024</td>
<td>SCUBA_FLAG1</td>
</tr>
<tr>
<td>025</td>
<td>SCUBA_FLAG2</td>
</tr>
<tr>
<td>026</td>
<td>CAR</td>
</tr>
<tr>
<td>027</td>
<td>BOAT</td>
</tr>
<tr>
<td>028</td>
<td>PLANE</td>
</tr>
<tr>
<td>029</td>
<td>LIGHT</td>
</tr>
<tr>
<td>030</td>
<td>ARROW_LEFT</td>
</tr>
<tr>
<td>031</td>
<td>ARROW_RIGHT</td>
</tr>
<tr>
<td>032</td>
<td>MOB</td>
</tr>
<tr>
<td>033</td>
<td>INFO</td>
</tr>
<tr>
<td>034</td>
<td>CLOCK</td>
</tr>
<tr>
<td>035</td>
<td>CARDINAL_NORTH</td>
</tr>
<tr>
<td>036</td>
<td>CARDINAL_SOUTH</td>
</tr>
<tr>
<td>037</td>
<td>CARDINAL_WEST</td>
</tr>
<tr>
<td>038</td>
<td>CARDINAL_EAST</td>
</tr>
<tr>
<td>039</td>
<td>ISOLATED_DANGER</td>
</tr>
<tr>
<td>040</td>
<td>CELL_TOWER</td>
</tr>
<tr>
<td>041</td>
<td>WIFI_SIGNAL</td>
</tr>
<tr>
<td>042</td>
<td>MRNSW_LOGO</td>
</tr>
</tbody>
</table>
7 Routes [Ctrl-R]

SOB’s Routes are quick and easy to create and edit, yet this is a very powerful tool with many levels of details and control. When a route has been activated, it will send commands to an attached autopilot and steer the boat to the path laid out by the route.

When a route is active, the red N2D panel will appear with up-to-the-second data for approaching the next TurnMark, and distance and time data for the entire route.

Each Route corresponds to its own file. The file name used is the same as the name applied to the route. Route files are loaded and unloaded in SOB using the All Routes form.

7.1 Drawing, Editing and Following a Route

A route can be drawn (created), selected and/or edited using the Routing Toolbar that appears when the Route Tool button is pressed.

Any loaded Routes (via the All Routes form – see next section) will be present in the drop-down list on the toolbar.

Most functions on the toolbar require that a Route is first selected. Either select the route by clicking on one of its TurnMarks, or selecting it from the drop down list.

- **The Zoom to Route(s) button** will re-size and reposition the chart to display either (A) all loaded routes if known are selected, or (B) the extents of the selected route.

- **New Route** will pop-up a box asking for the new route name, then instruct you to continue “drawing” the route by clicking on the chart to create subsequent TurnMarks.

- **Export Route** will open the Route Export form to provide many options and formats for converting the SOB Route for other uses.

- **Delete TurnMarks** delete one or several TurnMarks by enabling this button then clicking on the TurnMarks to be deleted.

- **Insert TurnMarks**, insert one or several TurnMarks into your Route by first selecting the TurnMark BEFORE the one(s) to be inserted, then clicking on the chart in (or near) the location for the new mark.

- **Toggle a leg as Great Circle or RhumbLine**. Select the TurnMark at the start of the leg to convert, then press this button to toggle it.

- **Join** two Routes into one Route. Select the TurnMark for the end of the first route, then press this button and select the TurnMark for the second route.

- **Split** one Route into two Routes. Select the TurnMark of the route to split, press this button to split at that TurnMark.

- **Activate Current Route** makes the selected route Active, which means it is now being transited so the N2D Panel will appear and show information on progress and output will be sent to control an Autopilot if your system is setup for this.

- **Unload** the route. It is removed from the chart, but the route file is not deleted from the disk.

- **Show Route Details** for the selected route, the details form will pop-up.

- **Auto Routes** Opens the AutoRoute Form.
Show AllRoutes form display the AllRoutes form for loading/unloading Route files from SOB.

Toggle prompt Screens ON/OFF. Show/hide the yellow help screens.

Close this Toolbar and exit Routing mode.

### 7.1.1 Create a new Route

Start Route mode, then consecutively Touching or Clicking the chart will place the Starting-Mark, Turning-Marks and Destination positions.

When adding TurnMarks, clicking an existing Waypoint will pop-up a message box asking to "Add Wpt to Route". To avoid showing this message box, hold down [Ctrl] or [Shift] key when clicking the Waypoint.

SOB's Routes do not consider the Starting Mark created with the first click as the route's first mark. Rather, the first TurnMark created (with the second mouse click) will always be the first point that SOB will steer to once the route is activated.

It is your responsibility to place the ship at the start mark (or, move the start mark to the ship - see below). From then on, you can pass control over to the autopilot.

To begin with, this may not seem right, as SOB will not automatically steer you to the route's start. However, if you look at the example screenshot above, the reason why SOB acts in this way should be clear. There is a land mass between the ship and the Start Mark!

However, if you want your current position to be the starting mark for your route, then simply move the Start Mark to the Ship's Position (hint: use SHIFT-Click when setting the Start Mark at the ship to prevent the Ship's Form from appearing).

### 7.1.2 Select a Route

Touch any route TurnMark to select the entire route, or select the route from the drop-down box on the Route Toolbar. The route will change colour to red to show it is selected. The currently selected TurnMark (if any), will become a large solid dot, the next mark along the route will be a large hollow dot.
7.1.3 **Edit a Route**

Panning and Zooming is available while in route-edit mode – use the Middle-Button and Middle-Wheel to pan and zoom when route mode is selected.

To add/delete TurnMarks; for GreatCircle/Rhumbline drawing; and access to the Route Details form is available from either the Route button menu (pictured below) or the Route Toolbar.

![Route Details Form](image)

*Touch the same Route TurnMark twice to pop-up this Quick-Button Menu.*

7.1.4 **Move a TurnMark**

A Route mark must first be selected, then Touch the new location to move the mark. Or Touch any other mark to select it ready for moving. Hint: if the old mark is in the way when moving, first move to a different location, then move back.

A TurnMark's position can be precisely entered on the Route Details form.

7.1.5 **Insert Route TurnMark(s)**

To insert a single TurnMark: Touch a mark twice, pressing the [Insert a TurnMark] button will place a new mark after the selected one. Click to place the new mark in its desired location.

To insert multiple TurnMarks: Select the TurnMark which will precede the new inserted marks, then press the 'Insert marks' button on the Routes Toolbar. Now click to insert consecutive marks after the preselected one. Click the toolbar button to de-select it when finished inserting.

7.1.6 **Delete Route TurnMark(s)**

To delete a single TurnMark: Touch the mark twice, then press the [Delete a TurnMark] button on the pop-up menu.

To delete multiple TurnMarks: ensure the route is first selected, then press the 'Delete marks' button on the Routes Toolbar and click any turnmarks on the selected route to delete them. Click the toolbar button to de-select it when finished deleting.

7.1.7 **Route Joining**

*This is a Trial or Licensed User feature. It is disabled for LITE users.*

Join any section of one route to a section of any second route. It is possible to join the entire routes together – ie first mark of the second route follows on from the last mark of your first route; or any section of them, in which case the chosen mark of your second route will immediately follow the chosen mark of your first route.

There are two ways to join two routes together:

**Method 1**

Select a TurnMark and route by clicking on the mark while the Route Toolbar is on; or select the Route from the drop-down list on the toolbar, then select the TurnMark.

The selected TurnMark will become the FINAL mark of the first part of the new joined route about to be created.
Now press the Join toolbar button, then click on the TurnMark of the second route. This will become the TurnMark that'll immediately follow your FINAL mark (above) for the new route created.

**Method 2**

With no routes selected, press the Join button. Now click on the FINAL mark of the first route, then the mark of the second route that you wish to immediately follow the FINAL mark just selected previously.

### 7.1.8 Route Splitting

This is a Trial or Licensed User feature. It is disabled for LITE users.

Press the Split button, then click on the TurnMark where you wish to split the route.

Two new routes will be created:

"{original route name}_A" and

"{original route name}_B"

The original route will not be changed.

### 7.1.9 Display Route Details Form

See Route Details Form, page 7-10.

There are four convenient methods available to display the route details:

1. Touch a route mark to select it, then Touch it again and press [Route Details] on the button menu.
2. Select the route, then press the 'Details' button on the Routes Toolbar. (Pictured at right)
3. Select the route on the AllRoutes form, then press the [Details...] button.
4. Press the [Details...] button on the red Destination panel for an active route.

### 7.1.10 Activate a Route

**Activating** a route will set it as the one currently being navigated. The red N2D panel will appear for the active route, and if connected, commands will be sent to the autopilot.

When a route has previously been active, then a pop-up will appear asking if you want to continue the route, or restart it. Obviously, if you are back at the starting point and are retracing a route then you would choose to restart it. However if you have stopped navigating the route mid-way for any reason (eg: overnight anchorage, or short term pause to reel in the tuna!) then you would choose to continue the current route when asked.

If a long period of time has elapsed between stopping and continuing the route, then the elapsed data displayed on the Route Details form, and on the N2D panel will be misleading as the time spent stopped is included in the calculations for average speed and time enroute etc.

---

**Note:** if your ship is already positioned some distance along the route when it is set as activated for the first time or if it is restarted; and if "Use Aft-a-Beam" is selected, then SOB may automatically step through each prior TurnMark in sequence and mark them as passed until the passed legs have "caught-up" with your current position. If this doesn't occur automatically, you can use the [Pass Next] button to set passed marks correctly.

### 7.1.11 GreatCircles (GC) and Rhumblines (RL)

Note: the following discussion about Great Circles and Rhumblines is relevant to the Mercator Chart Projection (as used by C-Map and SOB). Other chart projections represent GCs and RLs quite differently (eg: "gnomic" chart projections represent GCs as straight lines and RLs as curves!)
Any route leg in SOB can be converted to a Great Circle course. A GC represents the shortest distance between two points on a sphere, however a GC course does not follow a constant compass heading so GC legs are usually made up of a collection of short Rhumbline legs. Rhumblines follow a constant compass heading.

Because lines of longitude are great circles, there is usually little advantage in creating a GC leg from a predominantly North/South heading. The Equator is also a great circle, so again little advantage in converting an East/West leg near the Equator to a GC.

For other legs, great circles can be as much as 10% shorter than the equivalent Rhumbline course (with increased savings for legs directly east/west and closer to the poles). So, for practical purposes in navigation, distances less than 200nm and courses North or South gain little benefit from using great circle courses.

When a SOB leg is converted to a great circle, SOB will remember which TurnMarks have been inserted. Select any of these marks and the pop-up Route Button Menu will show a different button [Convert GC to Rhumbline]. Selecting this button will delete all GC marks from the current selected one to the last in the current GC leg.

Note: Great Circles are defined as the intersection of a sphere and a plane passing through its centre. Mathematically, great circles are known as “orthodromes” and Rhumb Lines are “loxodromes”. By definition, all longitudes and the Equator are great circles. All other latitudes are “small circles”.

**Composite** Routes are a combination of Rhumb Line and Great Circle legs. Typically created to avoid land masses or iceberg regions on great circle courses. In the Composite Route example that follows, a Rhumb Line course is used to avoid sailing further north than 48° latitude in the Great Circle leg.
Example: Great Circles, Rhumb Lines and Composite Routes

The following example demonstrates how to convert a Route leg to a Great Circle, then back to a Rhumb Line. The result being creation of a Composite course:

**Step 1: Create the start and end points of the route:**

Start point: Japan; end point: USA West Coast

**Step 2: Convert the Rhumb Line Route leg to a Great Circle course:**

Use the GC button on the Routes Toolbar, or the Route button pop-up to toggle a leg between RL and GC.

EG: Using the pop-up Route Menu, click the start point twice to display the Route tool button bar. Because the Route point selected is part of a Rhumb Line leg (by default), the middle button displays: [Next Leg to Great Circle]

Press this button [Next Leg to Great Circle] to convert the Rhumb Line leg into a series of shorter linked Rhumb Lines that overall will represent a Great Circle:

**Step 3: Convert part of the leg north of 48° back to a Rhumb Line:**

The second part of this example states that we don’t want to sail north of 48° latitude. So select the first TurnMark just north of this border (in our example the 7th turn mark).
Then click the same mark again to display the button menu, notice that this time the centre button has changed to [GC Leg to Rhumb Line]. SOB knows that this turn mark is part of a Great Circle leg, so the button menu provides the choice to convert the great circle leg from this point onwards back into a Rhumb Line, automatically deleting each GC turn mark that was created in Step 1, up to, but not including the final point.

However, for this example it is easiest to just delete the single turn mark lying north of the 48th parallel.

The resultant **Composite** Route is pictured here:

If you work this example yourself, you will find that the total Rhumb Line leg length was 4,551 Nm and became 4,322 Nm for the GreatCircle/Composite equivalent. A saving of 229 nautical miles or 424 kilometres.
7.2 Route Export

A large variety of Route export formats are available in SOB.

Select your Route to export on the chart, or from the drop-down list on the Routes Toolbar, then press the 'Export' button on the toolbar to display the Route Export form (pictured).

Note various export options will be enabled/disabled depending on your SOB User License level.

If no C-Map UserCard is detected, then this export option in the list will automatically disable itself.

7.2.1 Export to SOB Route

This is essentially a Route copying function. Enter a new name for the route in the textbox at the top, then press the [Go] button.

7.2.2 Export to Text List

This option will basically recreate the information as seen in the Route Details form in a format suitable for a plain text file.

This text file can, for example, be imported into Excel for further study or manipulation; it is also of a format that can be imported back into SOB as a waypoint list.

See Section 7.3.1.12

7.2.3 Export to Waypoint File

Each TurnMark in route will be converted to a waypoint and written to a standard SOB Waypoint file. The file will have the name specified in the textbox with SOB's ".WPT" extension. The waypoint file will be saved to the SOBvMAX\Waypoints folder.

7.2.4 Export to XML File

This is a Trial or Licensed User feature. It is disabled for LITE users.

An XML format route file will be created and saved to the SOBvMAX\Routes folder. XML is the emerging file format for universal storage and transfer of waypoint information.

7.2.5 Export to KML (Google Earth) File

This is a Trial or Licensed User feature. It is disabled for LITE users.

The KML format is used by Google Earth to draw a route on the Google map. Note that the Google Earth App usually needs to be installed on your PC. If correct file associations have been created then double-clicking the "*.KML" filename in Windows™ File Explorer should launch the Google Earth program with this route loaded.

The KML file will be saved to the SOBvMAX\Routes folder.
7.2.6 **Export to GPSU File**

This is a Trial or Licensed User feature. It is disabled for LITE users.

GPS Utility is a very useful utility for converting Tracks, Waypoints and Routes between various Nav App file formats, and interfacing with GPS and Plotter devices. Chances are, if you need to convert a SOB Route to a proprietary route format then GPSU will be able to do this. Export the SOB Route to the GPSU format, then use the GPSU app to create the desired file format.

Link: [http://www.gpsu.co.uk](http://www.gpsu.co.uk)

7.2.7 **Export to a GPS**

This is a Trial or Licensed User feature. It is disabled for LITE users.

All TurnMarks in the route will be first listed in this form (at left).

- One TurnMark will be sent to the GPS every 2 seconds (as specified by NMEA requirements).
- TurnMark names will be truncated to 6 characters as required (most – particularly older model – GPS allow max 6 characters for a waypoint name).
- As each mark is sent, a "Y" will be placed in the "Tx" column and the Wpts count label above the list will be updated.

Notes:

- SOB sends route information to the COM port using the NMEA standard RTE and WPL sentences.
- Not all GPS may be capable of receiving the Route data, refer to your GPS Manual for further information.
- If you don’t have an attached GPS, or your NMEA Output is not set for GPS then various message boxes will pop-up informing you.

7.2.8 **Export to NMEA File**

This is a Trial or Licensed User feature. It is disabled for LITE users.

SOB writes the route information to a standard text file using the NMEA-0183 sentences **RTE** and **WPL**. The new file is saved to the **SOBvMAX\Logfiles** folder. This file can be moved to another location and uploaded to a compatible GPS or Plotter, or sent via a serial connection to a compatible device.

Please refer to your device’s User Manual for information and instruction for using this upload method.

7.2.9 **Export to C-Map UserCard**

This is a Trial or Licensed User feature. It is disabled for LITE users.

Convert and Export a loaded SOB route to the C-Map UserCard for transferring to a compatible plotter.

*See C-MAP UserCard page 10-4.*
7.3 **Route Details Form**

The **Route Details** form is the main interface for setting and tracking any existing SOB Route. Each route in SOB has its own Route Details form. Display the form by clicking any route mark twice (this is not a double-click, rather, click a mark once to select it, then click again for the pop-up menu).

The form can also be displayed with the pictured **Route Toolbar** button; or from the **All Routes** form (discussed in the next section); or with the dedicated button on the red N2D panel when a route is active.

### 7.3.1 Show LT (Local Time)

Use this tickbox to change the form to use either UTC or Local Time (as set in your Windows Control Panel).

A rule-of-thumb would be to use UTC if your Route crosses time zones, or for longer passages. Use LT for short local routes.

### 7.3.2 [View All…]

Will display the **All Routes** form (discussed in next section)

### 7.3.3 [Load…]

Any route file can be individually loaded in SOB without opening the **All Routes** form.

### 7.3.4 [Activate]

See section 7.1.10

### 7.3.5 [Un-Pass Last]

This option is used to "undo" a situation where SOB mistakenly believes that a TurnMark has been passed. SOB has three methods for considering a mark as passed: (1) Arrival Zone entered; (2) the mark is "aft-a-beam"; and (3) bearing angle bisected.

The **Arrival Zone** size is set on the **All Routes** form. A single value is used for each mark of the route. This value is best determined according to your boat's turning characteristics and the dampening and turn-rate settings of your autopilot. Some experimentation is usually required to discover the most appropriate value for your boat.

The amount of time inside the arrival zone or after an aft-a-beam situation, and before the autopilot changes to the new course is about 15-20 seconds. This should be considered when setting the size of the Arrival Circle. An interim message is sent to the...
Messages panel warning: "Prepare for course change ... " before the final message is posted: "Turning now ...

7.3.1.6 **[Pass Next]**

Similar to the Unpass Last, this button forces the next TurnMark to be set as passed. Note that the current time will be "stamped" on the TurnMark now nominated as passed, this may or may not be the actual time that the mark was technically passed. 

[Pass Next] button will pop-up a form allowing you to set the time that the mark was actually passed. 

This is a Trial or Licensed User feature. It is disabled for LITE users. 

When you desire to use the Force Pass Next feature, it is often long after the route mark was really passed, so use the Info button and hover on a track point near the mark to get your actual time it was passed, then enter this time into the "Time at Turn Mark" pop-up when you press the "Pass Next" button.

7.3.1.7 **[Reset XTE]**

This button will reset the XTE to Ship's Position. This is often used by sailing craft under Autopilot Control that may end up a fair distance from their original intended course. The autopilot will try to steer the yacht back to the original course line, rather than continue to the destination from the yacht's current position. 

This button, effectively resets the intended course to: the "boat's current position" to "the destination". 

In the diagram, the original course is the blue line between the waypoints. The XTE is measured as the perpendicular distance off this intended course (dashed blue line). 

Most autopilots will act erratically, unpredictably or even fail completely, if the XTE exceeds 0.3 nm (about 500 metres). Pressing the [Reset XTE] button will reset the intended course to the pink line (from ship to destination). It follows that the XTE will be ZERO immediately following the pressing of this button. 

An alarm will sound (4 beeps) on the PC speaker, and a message will be posted to the Messages panel if the ship's XTE exceeds the value set in the Alarms form, while traversing an active route. To cancel the alarm condition, sail back to less than the set value as a perpendicular distance from the leg, or press the [Reset XTE] button. 

A motor boat may need to use this button if they detour off an intended track for any reason, and do NOT need to return to the initial track line before resuming the leg. 

**WARNING**

In either case (sail or motor) care would need to be paid to the safety of NOT resuming the original intended track, as it may have been plotted to avoid submerged objects, or land-masses etc.

7.3.1.8 **[Reverse]**

This will reverse the order of the turn marks and its use allows the same route to be used to retrace your course and return to the original start point. 

An active route will be reset when reverse is used.
7.3.1.9 [Delete]
Will unload the route from the SOB session. The route file can be reloaded. To completely delete a route, use Windows™ File Explorer to delete the route file.

7.3.1.10 Route Settings
The route colour, leg width, leg labels, leg direction arrows, XTE display and the display of TurnMark names are simply set with these controls. Experimentation is the best method to understand how these settings influence the on-screen route display.

7.3.1.11 TurnMark & Leg Settings

**Rename** the TurnMarks by clicking on the name in the list. Type the new name, then press [TAB], [Enter] or click somewhere else on the form to refresh.

Hint: To rename the Start Mark (which is displayed in the Title Bar and doesn't appear in the list) use the pop-up Route Menu, see section 7.1.3

**Estimated speed** for any particular leg can be individually set, for example a leg through controlled waterways may be pre-set to 4kn (or whatever speed limit is imposed for the waterway). The total route times (ETA etc) will be calculated assuming that these legs are traversed at the manually entered speed. The current leg is calculated based upon your present speed, and the remaining future legs without nominated speeds will be assumed to be traversed at the estimated or default speed entered for the form.

Pre-set leg speeds are shown in list enclosed in square brackets "[]"

The **Latitude/Longitude** of each TurnMark can be manually set. Any format can be used for entering the precise coordinates, refer to page 1-2.

**Max XTE**, in effect this sets the size of the arrival circle around this TurnMark. Each turnmark can have a different size arrival circle and the XTE guides for the legs will stretch from the perpendicular extents of these arrival circles for consecutive marks.

7.3.1.12 [To Text List]

This will create a .TXT file opened in Windows™ NotePad with a listing of Route legs, in a very similar format to the listbox on the form.

This route text file can be used to print-out the route details, or for importing into Excel, or can be used to convert the route into a SOB waypoints file.

To convert to waypoints, save the NotePad file into the SOBvMAX\Waypoints folder, ensuring it has a ".txt" file extension, then use the AllWaypoints form and click on this filename to be automatically converted to a SOB ".wpt" file format. ... see page 6-11

Export the Route Details to a plain text file. This file is created for NotePad and can be used to print the list of turn marks or opened in Excel etc.

The text file is placed in the SOBvMAX\Waypoints folder and can be imported back into SOB as a waypoint file. Use this technique to convert the route marks to waypoint lists.

**See also** Error! Reference source not found. section 7.2.3 and Export Route to Text List 7.2.2.

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**NOTE:** for successful WPT conversions, ensure that the "#" (hash) character is the first character on any line not used for waypoint importing (these lines are ignored). The original route text file that SOB creates, clearly demonstrates which lines should not have the hash character. Although the start waypoint will be overlooked with the text file format, if you would like to include this start mark in the waypoint list, then copy its details from the header to the list.
7.4 Route Planning

SOB includes rudimentary route planning features for determining starting and arrival times and average speed. The ETD (Estimated Time of Departure) and ETA (Estimated Time of Arrival) settings on the Route Details form become the "Actual" departure time and "Planned" arrival time once underway and the route has been Activated. The "Default" speed setting applies to all legs unless overridden by the value for "Est. Speed" as calculated by setting Departure and Arrival times, or a leg speed setting as set for any particular leg.

Use a combination of any two of ETD, ETA or Estimated Speed for setting the third. "Lock-in" a setting by ticking the checkbox and the setting will be greyed-out. Note that the ETD will be fixed by SOB to current time once the route has been activated.

When traversing an active route, the Estimated Speed is continuously adjusted and represents the speed required to be maintained to arrive at the Planned ETA. The Estimated Speed takes into consideration any fixed leg speeds which have been individually set on the Route Details form.

To use the planned departure/arrival settings, the checkboxes must be ticked. Note the ETD can't be changed once the route has commenced (been activated).

For an active route, a dampening value is used for the Planned arrival speed and Planned TTG, to stabilise the value. The dampening will average the previous 10 values of the "required speed for planned ETA". The dampening value can be changed, if required. This is an advanced user setting – contact help@digiboat.com.au for details.

Use the two-state button: [Show Leg] or [Show Route] to switch between displaying data for navigating the current route-leg, or information for the entire route.

The Route Details form has a button [Un-Pass Last] which can be used to "wind back" the passed TurnMarks in the event that SOB incorrectly believes that a TurnMark has been reached/passed. This can occur if your ship "turns away" from the destination mark, and SOB then sees the mark "aft-a-beam" and considers it as passed (when "Use Aft-a-Beam" is enabled). Similarly, the [Pass Next] button will mark the next turnmark as having been passed, in case it was missed due to the boat not passing within the arrival circle setting when aft-a-beam is not used.
7.5 All Routes Form [F11]

The All Routes form is the central location for managing the routes loaded in SOB. Open the All Routes form with the [F11] key or the [View All…] button on the Route Details form or press the [Info]>>[Route] toolbar button combination.

Each route is contained in its own file, by default SOB stores route files in the SOBvMAX\Routes folder. There is a limit to the total number of routes that can be loaded in a SOB session, however SOB imposes no limits on the number of route files you can have (limited only by hard disk size).

7.5.1 Load/Unload a Route

The centre blue panel is a list of all routes currently loaded in SOB. Select a route in the "Route Files" left hand window then press the [==>>] button to load it into SOB. Or simply double-click the route file in the top-left list. Change folders if you have SOB route files stored in other locations. Subfolders are shown in the list enclosed in square brackets "[ ]" – single click a subfolder entry to show its files and folders.

If the route file is XML format, SOB will attempt to load this and convert it to a SOB Route format in the process. The XML format can be either a Waypoint list (which is a more common type of XML file); or a Route format XML file.

The original XML file will be moved, unchanged, to the SOB\Routes\Archived folder. To unload a route, highlight its name in the blue panel and press the Unload button.

7.5.2 Save a Route

All routes used during a SOB session are automatically saved when the program exits, the route name is used for the file name. To save the route at any time, select the route in the blue list and press the [<<<==] button.

Routes are always saved to the SOBvMAX\Routes folder. And old route files will be saved to the \SOBvMAX\Routes\archived folder before being over-written.
7.5.3 Delete a Route

To delete one of these routes, first ensure it is not loaded in SOB, then simply delete the file name from the SOBvMAX\Routes folder, using Windows™ File Explorer.

7.5.4 Route Properties

7.5.4.1 Label & Leg Properties

Make route-wide adjustments to a loaded route by using these controls on the AllRoutes form. Most of these settings can also be changed on the Route Details form.

7.5.4.2 Reverse

See [Reverse] page 7-11

7.5.4.3 Activate

See [Activate] page 7-10

7.5.4.4 Details

See Route Details Form page 7-10

7.5.4.5 ArrivalCircle Radius

Enter the distance away from the TurnMark that SOB should command the autopilot to start the turn. Please review the discussion on page 7-10.

7.5.4.6 Auto TurnMark Passing

This setting is most particular to sail craft under autopilot control while following an Active Route. A motor boat is more likely to steam direct from mark-to-mark and thus the autopilot will advance the route as the boat enters the Arrival Circle, however a yacht under sail, being more influenced by wind direction and sea state, will often not enter the Arrival Circle before entering the next route leg.

So we need methods other than hitting an arrival location to determine if a leg has finished. SOB uses two algorithms which can indicate if the new leg has started:

1. "Bisect the Angle" method: the mark is considered passed if your relative bearing to the previous and next TurnMarks becomes equal.

Exception (to account for being wildly off-course, or backtracking etc):

\[
\text{If } (\text{Dist to Previous Mark}) + (\text{Dist to Next Mark}) > (\text{Dist to Next Mark}) ,
\]

\[
\text{unless } (\text{Dist to Next}) > (\text{the leg Dist from Last to Next marks})
\]

2. "Aft-A-Beam": if your craft turns away from your destination point for about ten seconds (ie, the bearing to the mark is aft of the beam), the destination point may be considered as been "passed", and the following route TurnMark then becomes the destination mark.

New logic with SOBv10 and "Aft-A-Beam" method: will only consider the next mark as passed if you have completed 90% of leg, OR if the XTE is larger than half leg length (which accounts for if you’re not strictly following the leg too precisely – such as tacking up-wind).

Note that this is subtly different from the previously used logic which considered aft-a-beam as true only if 10% of the leg remained. This logic didn’t account for being a little over the allowed XTE on a short leg.

Although craft under motor are obviously much better at following a precise course under autopilot (and some human) control. And are thus better able to “hit” a small arrival circle at the destination mark. However, a motoring ship can still deviate from the course, and may trigger an "aft-a-beam" situation (eg: an increasing strong cross-current, changing course to avoid a collision, turning around to reel in a fish, deviating to check an echo while side-scanning a course, investigating an object seen floating a way off your track, etc). It is generally best to not enable Auto Passing for motor boats.
### 7.6 Converting, Importing and Exporting Routes

All Route exporting options are now (with SOBv10) encompassed by the Route Export feature available from the 'Export' button on the Route Toolbar. Refer to section 7.2

Additional routines are outlined here...

#### 7.6.1 PastTracks to Routes

The displayed PastTrack can be saved to a route at anytime using the button. This is useful if you wish to "back track" along your path.

The date format used for past track route file names is year, month, day, ie (YYYY-MM-DD).

See Section 8.1.1

#### 7.6.2 Capture Route from GPS

The GPS must output RTE and WPL NMEA Sentences. SOB will only import one route at a time. If your GPS is transmitting multiple routes then reconfigure it to send one route only.

![GPS Routes](image)

Consult your GPS manual for creating a route and activating it to output the RTE & WPL sentences. SOB will identify the route being sent and the number of waypoints to expect. The counter will show how many of the required waypoints have been received. When the entire route has been received by SOB, the "Capture" indicator will stop. Typically, one waypoint will be received in SOB about every two seconds.

You may need to manually stop/restart the capture to help SOB synchronise with the incoming Waypoint list.

To send a route to a GPS, see Section 7.2.7

#### 7.6.3 Importing Route files

SOB can directly load a Route (or Waypoint list to a route) from XML format files, see section 7.5.1.

SOB can't import routes from other programs. However, we know of some 3rd party programs, such as GPSU (http://www.gpsu.co.uk), and we have a few macros that we and our users have created to help with importing Waypoints and Routes from a variety of sources.

Email help@digiboat.com.au for more information.

#### 7.6.4 Copy Route to another Computer

SOB routes are easily transferred between computers (either email as an attachment, or save to disk), just place the file in the destination computer's Routes folder, then load it as described above.

Routes can also be sent via text-only email services such as SailMail or INMARSAT, the SOB route files are standard text format, so if attachments are not permitted, then the contents of the Route file can be copied and pasted into the email body, then extracted and saved to a file at the receiving end.
7.7 Auto-Search Routes

Pro License required to use AutoRoutes, although the form is functional for all licenses, but "Create" button is disabled if not a Pro Licence.

The [Auto Routes] button on the Routes Toolbar will open the Create Search Routes form. A selection of different search route patterns are possible. The best pattern for the search is based on knowledge about the splash time, accuracy of splash position, wind/sea/tide/current conditions, search craft type and number, and a variety of other factors. Knowledge and training are required to make best choice, but in a situation where a search is required and no officially trained search coordinator is available, then this Search Route feature can greatly assist in creating a suitable search route for best recovery probability.

Enter the search area in square miles (nautical) and the required leg separation. Adjacent legs will attempt to be drawn no more than this distance apart. In most instances this would be twice the distance that your lookout (or side-scan sonar) can see.

The number of Rows and TurnMarks are only approximate values. These estimates will be most accurate on the Equator, and least accurate as your route centre moves to higher latitudes.

After the route has been created, exact details are available from the Route Details form.

Choose the search pattern then choose the leg direction by clicking one of the pictures. A further 4 variations are possible by reversing any of these four route shapes after creating them.

The centre of the search area (for Grid and Circular) defaults to your ship’s position, but any value for latitude and longitude can be entered (decimal-degrees format). Also apply a time elapsed and current information to improve the calculation of the centre of the search area.

Once the auto-route is created, it can be used as is any other route: Loaded, Unloaded, Activated, Analysed etc.
8 Past Tracks (Bksp)

The functionality of SOB's PastTrack features are severely restricted if SOB has not been Licensed

About every 5 seconds, SOB will drop a dot on the chart display at your position, every 10 of these markers (sometimes known as the fabled "bread crumb") will be double-sized.

SOB will always have at least one loaded track, this is the **ActiveTrack** and is appended to every 5 seconds (or so) with the latest available data. Other tracks can be re-loaded and displayed on the chart. These other tracks will always remain distinct and separate from each other and from the ActiveTrack.

Each track point "remembers" the UTC and all of your ship's data such as lat/lng, depth, wind data, AIS targets etc (depending on what instruments are connected). The tracks are stored to disk as plain text files permitting extensive data analysis of your voyage using Excel's powerful tools.

Two primary files are used by SOB to control the ActiveTrack data: **!LastTrack.trk** and **!PastTrack.txt**. The LastTrack file is a backup of the track currently displayed. This track file is automatically reloaded when SOB starts. The PastTrack file is an accumulation of all track data. When SOB exits, any new track points will be appended to this file.

Additional track files are created for each journey depending on various settings as outlined in this chapter.

When displaying tracks on the chart:
- If the display scale is larger than 3,500,000:1 then every 50th track point is drawn, and if the scale is larger than 750,000:1 then every 8th point is drawn.
- Query any past position with the Info cursor [Enter] key or "Info" button.

Summary past track information is displayed in the header line of the PastTrack Settings form. Detailed track information is available from the PastTrack Toolbar.

If SOB is opened and closed regularly, or run continuously on a long voyage, you will accumulate a long list of past track files. Use Windows™ File Explorer to backup (rename or copy) or delete these files as you wish.

### 8.1 PastTrack Toolbar

- **Zoom**
- **Split**
- **Unload a Track**
- **All Tracks**
- **Info**
- **Track Properties**
- **List of Loaded Tracks**
- **Delete one Point**
- **Trim**
- **Export a Segment**
- **Help**
- **Delete a Segment**
- **Exit Track Editing**

#### 8.1.1 Track List

The ActiveTrack, plus a list of any and all loaded tracks will be in this drop down list. Select any track from the list, or press the Info button and click on a track to select it.

#### 8.1.2 Zoom to Track(s)

Pan and zoom the chart display to best show the entire selected track.

If no track is selected, then this button will zoom and pan to show all available tracks. Note that if the tracks span a large sector of the Earth’s longitudes, then the zoom and pan function can be misguided and unexpected results may be experienced.
8.1.3 Split a Track into Segments

It is common for a track to end up being a collection of shorter, or segmented, tracks. Select the desired Track on the chart then press the Split button to display the **Track Segments** form:

You can choose any time period to use to define how to split the track. For example if you are cruising and anchoring overnight with your laptop off, then you might choose a Gap size of 10 hours (600 min) to split an extended track into daily sections.

The details provided for each segment should allow you to determine if a segment is worth keeping, or rubbish that can be deleted. In the example above, segment #3 of nearly 2 hrs and 9 miles is the only one to keep (this was a yacht race), so the remaining segments can all be deleted using the [Delete Selected] button on the form.

If the details displayed are not quite enough to be sure, then double-click on any entry and that segment of track will be coloured differently on the chart (continuous double-clicking on an item will rotate the colours through a pre-set range).

Highlight any segment in the list and press the [Properties] button to display more detail. See the example screen at right for segment #1 in the list.

The [Refresh] button will unselect any selected segments in the list, and un-colour them, returning them to their default colouring.

The [>>Re-Split] button will use the entered "Gap Size" and analyse the track again creating segments as appropriate.

The [Save] button uses the Track Export menu form as described in Section 8.2.

8.1.4 Delete a Track Point

Press this button on the PastTracks toolbar and click on any track point to delete it. This tool is best used with the Help button down (the Yellow Question Mark) and the chart zoomed in as far as possible. Switch the chart display to VirtualChart to zoom in beyond the available chart scales. The display will go grey and allow you to zoom in to separate individual track points. Refer to Section 10.6.1.4

Detailed track information is displayed in the yellow QuickHelp window if enabled which will assist to identify the track point(s) to delete.
8.1.5 Trim Track

The Track Trim feature allows you to either clean up a PastTrack by deleting unwanted sections, or to select any portion of the track for saving or exporting.

For example you have an entire day’s Racing track data from the dock back to the dock, but you want to trim out just the track data from the Race. Use the Trim feature to select the track from the Start Line to the Finish Line and save it as its own Track file, or export it to any of several other formats.

Run through the following example to learn how SOB’s track trimming works...

**Example: Trimming a PastTrack**

Select a Track from the drop-down list (the Active Track has been selected in this example)

Now press the Trim button – the selected Track will be coloured yellow and the Trim Start cursor will appear.

The trimmed section of the track is coloured yellow, initially the entire selected track is the trimmed section, the cursor will change from Trim Start, to Trim End, style so you can narrow your trimmed selection. Switch between Trim Start and Trim End cursors by clicking the Right-Mouse button.

With the Track Help button pressed (the yellow question-mark), useful details about the selected Track point are displayed which will help you to choose the exact start and end points for the trimmed section. The normal Pan and Zoom functions are active while trimming (hint: you can use the middle-mouse wheel button for panning).
Once you have chosen the point to start your trimmed section, click the left-mouse button. The cursor will change to the Trim End version.

Now select the point for the end of the trimmed section and left-click. If you want to start over, just right-click the mouse and the cursor will revert to the Trim Start cursor and the track’s selected trim section will reset.

In the final screen shot below, we have finished selecting our trimmed track section, now click the [Export Track] toolbar button for saving options, or the [Delete a Section] button to remove the selection (see the Delete description below as there are some restrictions with this).
8.1.6  Delete a Track Segment

Once you have selected a Trim Start, OR a Trim End point, you can use this button to delete that section. Note that this won’t work for deleting a section from the middle of a track – but only from the ends. In other words the Trim Start must be the Track Start – OR – the Trim End must be the Track End. The next two sub-points demonstrate deleting from the start or end of a track.

Note that this button will only be enabled when there is a valid segment of the track selected for deleting.

8.1.6.1  Delete a Section off the beginning of a Track:
Select the Trim tool button. Press the mouse right-click button to switch to selecting the Trim End and select the point for the end of your new section, then press the [Delete a Section] button.

8.1.6.2  Delete a Section off the end of a Track:
Just select the trim-from point using the trim tool as described above. Now press the [Delete a Section] button.

8.1.7  Export Track or Track Segment

See next Section 8.2

8.1.8  Unload a Track

Select the track to unload then press this button. The track will be removed from the chart display, but the track file will not be deleted from the hard disk.

8.1.9  Show Track Properties and Data

Select any track, either from the drop-down list on the toolbar, or use the TrackInfo cursor and select it with the mouse, then press this Properties button.

The example screen-shot at right will display.

Included in this track information is:

A **count** of the total number of pasttrack points in this track.

The **boundaries** of the track, showing the lat/lng of the NW corner and the SE corner.

The **start** and **end** time and the **total** elapsed time. Note the start/end times are displayed as UTC.

The **Straight Line distance** is the "as the crow flies" distance between the first and last points in the track; and the **Total Travelled distance** which is the accumulated distance between each point in the track.

Average and Max **Speed** while en-route. Notice in this example the fastest speed was 8.0 kn, yet the average speed is well below this, in this case it is due to a fair amount of the track being recorded whilst at anchor at the destination. The track could be trimmed (as described previously) and the time at anchor deleted from the track which would provide a more meaningful value for the average speed.

The **TrueWind** and **Depth** data should be self-explanatory. Of course an apparent wind instrument and depth sounder must be installed onboard and connected to SOB via NMEA.
As stated at the bottom of the form, all this information has been placed on the Windows™ Clipboard. If you want to store/show this data elsewhere (such as a logbook, or email to a friend etc) then just open the other application and press Ctrl-V to paste this info into the app.

8.1.10 **Show List of All Track Files**

This button will open the AllTracks form where you can load other tracks, change track settings, schedule automatic backups etc.

*See Section 8.3*

8.1.11 **Track Info Cursor**

When used, this cursor will show detailed track point information when you hover over a track. The track under the cursor will also become the selected track, and the item in the drop-down track list will change to reflect this. Also the selected track will be coloured red.

8.1.12 **Track Quick Help Windows**

The Quick-Help yellow pop-up window will provide useful guides to using the Track tools. The help text will change as required to provide context sensitive notes to help while trimming a track, deleting track points etc.

8.1.13 **Exit Track Edit Mode**

End track editing and close the track toolbar with this button. Note you can also end track editing mode by un-pressing the track button on the main SOB Toolbar.
8.2 Convert, Save, or Export a Track or Track Segment

There are restrictions on access to the track Exporting options depending on your Licensing level, or Trial User status:

- **LITE**: Trim Active Track only
- **TRIAL**: Save to Track and Save to Route only
- **PAID**: All other export options

The available export formats and options are described on the following form. Experimentation is perhaps the best method to use to familiarize yourself with each format. Note that all files created (except the C-Map UserCard format) can be opened in a plain text editor – such as Windows Notepad.

*Also refer to Route Export for more information about the file formats: from Page 7-8*

---

**Notes:**

- The “Create NMEA Log File” option will not necessarily reproduce the exact NMEA data originally received by SOB. The most common NMEA sentence(s) will be used to encode the track data to NMEA data. This can then be replayed on any compatible system that allows replaying of NMEA files.
- The “Write to C-Map User Card” option will only be enabled for Licensed SOB Users and only if a C-Map UserCard and Card Reader have been identified.
- Use the “Create/Append Wind Polar Data” to increase the amount of valid sailing data for building your Polars database. Ideally trim your track to only include points of sail while racing, or sailing with the intent for best sailing efficiency.
- When saving Track Segments, you are likely to notice a discrepancy between the average speed shown on the Track Segments list, and that written to the comment at the end of the saved track file. The Segment List averages each speed from each track point, the saved track file averages the speed as the result of the calculation (trip dist) / (elapsed time).
- If being changed by the save/export option, then the Active Track is first Archived to the following filename: "BU_trackname.*"
8.2.1 Convert SOB Track to a Route

At any time you can convert your displayed PastTrack to a Route, only the large dots (every tenth point) are used when converting to a route.

SOB also automatically converts any unlogged TurnMarks to a Route (named PastTrack00x.rte) and saves it to the Routes folder when SOB exits. This PastTrack Route will NOT be created if there is less than 20 minutes of data (running time).

Reverse the PastTrack route created to use it as a "Track Back" possibility. Or load this route as normal for future trips that you want to follow the precise path as last time.

The Track-to-Route option will pop-up a "Resolution" settings form for choosing a balance between excessive route marks, and accurate track alignment.

8.2.2 Track Export Filters

Licensing details:

This form is not enabled for LITE Users
For Registered Users, only Recreate Trip and Save Every .. options are enabled
For Trial and Paid Users, all options are available

Use the top section of this form to save a subset of your selected, or trimmed, track. Note that SOB saves track points about every 4-5 seconds, so if you want to create a new track file with points saved every 15 minutes, then set to save every 180 points –

15 minutes x 60 seconds/minute = 900 seconds
900 seconds / 5 seconds per point = 180 points

IE, to convert minutes to points, multiply by 12.
(Assuming 5 seconds between points. If 4 seconds, then multiply by 15 – Use the Info cursor to check your track spacing if you require high accuracy.)

Re-create the trip log, with an optional starting value, this will be required for most track trimming operations.

Skip Duplicates is recommended for all tracks, however beware that very large tracks may take a long time to save with this option enabled.

Skip if Fix Bad. It is not unknown for a GPS to occasionally send wildly wrong data to SOB. In normal use this typically goes unnoticed – possibly your display may glitch and the ship disappears for 1-2 seconds then reappears as the next GPS sentence places your Ships Symbol back in the correct position. This could be due to a dodgy wiring connection, random interference, initial position fix errors, obstructed view of the sky etc. Use the Skip if Fix Bad to filter such erroneous position fixes from the saved/exported track.
8.3 PastTrack Management

Use this form to manage the display of the ActiveTrack, load tracks, restart the ActiveTrack, change autosave settings, and provide access to various other track tools as described in this section.

Show the form using any of these methods:
- Press the Info+Track button combination pictured
- The All Tracks button on the Track Toolbar
- [Backspace] key
- Click the track colour scale if visible
- Use the button on Ship’s Form

Single, or multiple tracks can be selected in the list to re-load. Use the standard Windows™ keyboard combinations {Shift, and Ctrl} to select contiguous, or discrete, lists of files.

Study this section for information about all options available from this form.

8.3.1 Load a Track File, or Multiple Track Files...

Load any previous PastTrack by selecting it in the list and pressing the [Load...] button, or by double-clicking the file name in the list. You have a choice to replace the current track or to add this one to the track already displayed.

Load multiple track files by using the standard Windows Shift/Ctrl key combinations for selecting multiple files, then press the [Load...] button.

When loading a track, the pictured Load PastTrack(s) options form will appear:

8.3.1.1 Replace Displayed Track

The displayed track will first be saved to a default track name, then removed from the display and the loading track will become the Active Track.

8.3.1.2 Append to Displayed Track

The loading track will be added to the end of the Active Track.

8.3.1.3 Prepend to Displayed Track

The loading track will be added to the beginning of the Active Track.

8.3.1.4 Add as separate Track

The loading track will remain distinct from the current, or Active Track and can be manipulated separately.
8.3.1.5 Load Filters

When reloading old tracks for review, use these options to help to manage the reloaded tracks.

If the track file is exceptionally large, set the Load Every value to a high number so that not every point is loaded. For example, to load a point every 15 minutes of track time, set this to 180 as each track point is 5 seconds apart, so 180 of them will be 15 minutes apart.

Ignore if SOG> is used to force-filter erroneous data from the track file. For example, if your vessel is incapable of doing in excess of 15kn, then pre-set this value to 15 and all bad speed data will be filtered.

SOB does some automatic filtering of reloaded data, ie values of true and apparent wind are compared, values of Hdg and COG are compared, and if these are too wildly differing to be correct, then these data points are filtered out.

Ignore Duplicates should always be enabled. Although this slows down the reloading of the track file, it is common for duplicate track points to exist in a file – eg, you may be at anchor or on a berth and have many identical position fixes, or you may be loading multiple track files with overlapping data.

Recreate Trip Log will measure and accumulate the distance between each track point as it is loading and display the total distance at the top of the PastTrack form for the loaded track.

8.3.1.6 Notes on Loading Track(s)

- When loading multiple tracks, it may appear as if SOB has frozen, and newer Windows versions may show a "Not Responding" in the title bar. If you are loading many large tracks it can be a very long process – especially so if "Ignore Duplicates" is selected. You can be confident that SOB has not frozen, just be patient and wait for the loading to complete.

- An "Abort loading ..." form pops-up which allows you to quit the loading of a track at any time. There may be a delay when choosing to quit loading a track and when control is returned to you.

- When loading multiple tracks, they are ALWAYS loaded as separate tracks, coloured black and not automatically saved as the Active Track is, ie with QuickSave, Backup Save, or SOB Exit etc.

8.3.2 Rename a Track File

Rename any PastTrack in the list by clicking on the name of a highlighted item to make an in-place edit box. Type in the new name and press [Enter], you do not need to type the file extension, SOB will append ".txt" to your file name.

You can also rename (or copy, move, delete, etc) with Windows™ File Explorer in the \SOBvMAX\PastTracks folder.

8.3.3 Edit a Track File with NotePad/Excel

Past track files can be readily opened and manipulated using Window's NotePad. Highlight any filename and press the [Open in NotePad...] button. The PastTracks are saved in regular text format which is ideal for viewing/editing in NotePad or importing to Excel.

NotePad Note: Windows™ NotePad application is not too efficient when working with large files (as a track file usually is). There could be long delays when first showing the track data in NotePad, and for any further editing of the file while in NotePad.

Excel Note: Older Versions of Excel allowed only 65,000 (or so) rows of data. As each track point uses a row, and there are 12 rows needed per minute of track data, then only a few days of track data can be opened in these older Excel programs. Newer Excel versions do not have this limitation.
# Software-On-Board User Manual

## Past Tracks (Bksp)

**8.3.4 Track Properties**

A variety of display options can be customised with SOB's PastTrack:

### 8.3.4.1 Show/Hide Track

Hide the display of the ship's past track by clearing this box.

### 8.3.4.2 Show/Hide Wind Tails

A NMEA capable Apparent Wind Instrument (anemometer) must be installed and connected to SOB. Each past track point records both Apparent and True wind speed and direction.

The Wind Tails, also called "Hedgehog View" show TRUE WIND direction vectors for each past track point. Note each pointer is the same size, and is not dependent on wind strength recorded. Best used in conjunction with wind speed colour shading which shows the wind speed alongside shifts etc.

The wind arrows will show smaller and a lighter shade of blue for the lines if true wind speed is less than 3kn.

### 8.3.4.3 Show Date/Time/Depths

If selected, these options will display a label at regular intervals along the track with the chosen data displayed.

### 8.3.5 Show Colour Scale

Check this option to display the colour legend on the chart screen. Be aware that the colour used for each point is relative to the "range" of values between the recorded max and min values (of speed, depth, strength). As the min and max values change, the PastTrack shading colours drawn will be adjusted to any change in the range.

When the colour scale is visible, click on it to show/hide the PastTrack Settings form.

The default colour of the PastTrack markers depends upon the navigation mode. **log file replay** mode will show a red PastTrack, while **dead reckoning** mode will show a grey coloured PastTrack, and **real-time navigating** mode with an active GPS will show black dots and the double-sized points highlighted.

The other choices will represent Water Depth, Boat Speed or Wind Strength as changing colours depending on their relative values, and the maximums and minimums of the range of active values. The title and low/high names on the colour scale will change dependent on which data is chosen for shading display.

### 8.3.5.1 Scale Range

The minimum and maximum values will start at 0 and 100 respectively. As new data accumulates, these values will change to show the full range of values for the current track. The actual colour used will be relative to the max and min values, so the colour chosen for each point will change if the maximum or minimum values change significantly.

In other words, a range of, say, 10 to 20 knots will show a 15 knot gust as green, however if later a maximum gust of 40 knots is recorded, then the 15 knot point will now be a blue colour!

Whenever the [Save & Restart] button is pressed (and even if the next message box is cancelled), the maximum and minimum values will be reset (0 and 100). This is useful in the event that many PastTrack files are loaded and unloaded, as this can cause the
maximum and minimum values to be out-of-synch with the currently displayed PastTrack. So now, for the next PastTrack that is created (either loaded from file, or measured in real-time) the maximum and minimum values will again correlate to the current range of values.

The Depth shading option for track points changes from a linear to a logarithmic scale if the depth range is larger than 40m. This is to avoid "bunching up" of the colour range if there is a large difference between shallow and deep water on the track.

### 8.3.6 [Quick Save]

Press this to immediately save the entire displayed PastTrack to the !LastTrack.trk file, use the Autosave settings to have SOB perform this backup at pre-defined times.

The LastTrack file contains the track that is reloaded automatically by SOB the next time that SOB is started. This file is automatically saved when SOB exits.

Saving the LastTrack data is normally only done when SOB exits. However, in the event that your computer or installation is known to be unstable and likely to reset or crash at random (eg: battery failing, generator switching, Windows crashing, COM port freezing etc) it is good practice to periodically save this data. If SOB is prematurely ended, the current track since the last save may be lost. So you can save this on demand with the [Quick Save] button, or tell SOB to save it periodically. Then if you have SOB running for several days of a journey, you won’t lose the track if SOB or Windows crashes. Of course, you can reload the track from a PastTrack file if set for auto restarting.

### 8.3.7 [Start New Track]

Press [Start New Track] to save and/or clear the displayed track.

Enter a relevant Voyage Name in this box. All Routes, Tracks, NMEA Logs created will now be based on this voyage name. This helps to identify all data files relevant for your passages and cruising and makes file replay, reload and general management far easier.

If you choose [Yes] from the form (pictured), then all displayed pasttrack points will first be logged to a new track file which is auto named as:

(depending on the settings for the Voyage name)

**Track (YYYY-MM-DD) xxx.txt**

or

**{voyage name} (YYY-MM-DD) xxx.txt**

then all track points will be cleared from the chart, and the !PastTrack.txt file will be restarted.

Select [No] on this confirmation txt form to clear the track displayed on the chart. No track data will be saved, and no files deleted.

### 8.3.8 Save and Restart Settings

When Restart every X hours is not zero, then the equivalent of the [Save & Restart] + [Yes] action is periodically performed every "X" hours. When this time period elapses, the entire displayed track is saved to the new "Track (YYYY-MM-DD) xxx.txt" file, but only the oldest HALF of the track is removed from the screen.

Disable periodic auto restarting by setting to 0 or a ridiculously high number.

**Auto Restart at Midnight** will save a daily voyage track data file.

The "Restart at Midnight" setting works independently of the "Restart" setting.

You can combine these two settings for fine control over the size and times of your track data. Refer to the examples below.
Rename  SOB’s automatic filename created for the track file can be changed using the method described above (point 8.3.2), or with Windows™ File Explorer.

Example 1: Track: "Restart at Midnight" plus "Restart every 6 hours"

SOB will save 4 track files per 24 hours, the first for each day will be midnight, then 0600, 1200, 1800.

However the files saved on the first day of the journey will be timed relative to the time you made this setting. For instance, if you start this regime at 5:30pm, then the first file will be saved 6 hours later – at 11:30pm. But the “Restart at Midnight” is set, so the next file saved at midnight will contain only half an hour of data, then from the next day the file saves will be synced to every 6 hours.

Example 2: Track: "Restart at Midnight" only

If only the "Restart at Midnight" is used ("Restart every" must be set to zero) then one track file will be saved per day and it will have a time stamp (on the Windows file properties) of 12:00am.

8.3.9  [Export…] a Track

This button will open the Track Export form. Only the ActiveTrack will be exported with this method. To export (or convert) any other track file in the list, then first open it in SOB and use the Track Toolbar to Select and Export it.

See Section 8.2

8.4  PastTrack Logfiles

When SOB exits, the current on-screen PastTrack is automatically logged to two different files. If SOB has not been Unlocked, then PastTracks will not be logged to file.

The two primary files used by SOB to control the track data are !LastTrack.trk and !PastTrack.txt. The LastTrack file is a backup of the track currently displayed. This track file is automatically reloaded when SOB starts. The PastTrack file is an accumulation of all pasttrack data. When SOB exits, any new pasttrack points will be appended to this file.

All track files log the same data fields and use the same row/column file format.

8.4.1  !LastTrack.trk

This is a temporary file created to hold the current displayed PastTrack when SOB exits, this track will be redisplayed in SOB when next started. The LastTrack file is designed for SOB’s internal use. The PastTrack files (below) should be used for your purposes.

8.4.2  !PastTrack.txt

SOB will automatically create a Log File: LogFiles\!PastTrack.txt which will be appended with any unlogged (new) points from the current session.
The data in this file is designed to be thoroughly analysed and graphed in Excel. This file will continue to grow dependent on the settings chosen on the PastTrack Settings form. The file will grow at about the rate of 1Mb per 24 hours of recording. You can break this file into user controlled "chunks" of your travel time. To prevent the "!PastTrack.txt" file from growing indefinitely, you can use the settings to force it to be restarted either (1) each new day (Restart at Midnight); and/or (2) every XX.X hours.

Use the settings to have SOB perform regular automatic restarts of the PastTrack to prevent the track file from growing too large. When the preset "restart" time has passed, the track will be logged to a file, then half the track cleared from the chart.

SOB will warn you if the PastTrack file is growing large via a note on the Messages panel. The auto filename that is created has the format Track (yyyy-mm-dd) 00X.txt. Where "00X" is a sequential number for the track files created that day.

As many of these files may accumulate through a long voyage, this file naming convention has been designed to logically and chronologically list the files when sorted by filename.

### 8.5 Analysing your Voyage

SOB logs a lot of data about the ship every few seconds to a standard "row/column" format for direct importing into a spreadsheet for archival purposes or voyage analysis.

A typical use would be to import the log file into a spreadsheet every day or so, or at the conclusion of a passage, or to identify a storm etc.

The pasttrack data logged by SOB is:

<table>
<thead>
<tr>
<th>Heading</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIME</td>
<td>UTC time for this row of data</td>
</tr>
<tr>
<td>LAT/LNG</td>
<td>Latitude and Longitude</td>
</tr>
<tr>
<td>MODE</td>
<td>Real-time, Dead Reckoning or Voyage Replay</td>
</tr>
<tr>
<td>COG</td>
<td>Course (Over Ground)</td>
</tr>
<tr>
<td>SOG</td>
<td>Speed (Over Ground)</td>
</tr>
<tr>
<td>DEPTH</td>
<td>Depth of Water</td>
</tr>
<tr>
<td>AWD</td>
<td>Apparent Wind Direction</td>
</tr>
<tr>
<td>AWS</td>
<td>Apparent Wind Speed</td>
</tr>
<tr>
<td>TWD</td>
<td>True Wind Direction</td>
</tr>
<tr>
<td>TWS</td>
<td>True Wind Speed</td>
</tr>
<tr>
<td>TEMP</td>
<td>Water Temperature</td>
</tr>
<tr>
<td>ALT</td>
<td>Altitude (Height above MSL)</td>
</tr>
<tr>
<td>TRIP</td>
<td>Accumulated Distance</td>
</tr>
<tr>
<td>SPD</td>
<td>Speed (Over Water)</td>
</tr>
<tr>
<td>HDG</td>
<td>Heading (Over Water)</td>
</tr>
</tbody>
</table>

Note: if a past track from a different time-zone is re-loaded into SOB, and saved again. Then the time stamp for each point will no longer be UTC of the original position. Be sure to keep a backup of the original past track file if you are reloading and resaving old track files in SOB.

When imported into Excel, the resulting data will appear as: (after some simple formatting)
Now use Excel's powerful tools to analyse or present this data in a multitude of different ways.

For example, a graph of the apparent wind speed for the voyage can reveal much interesting and useful information:

Zoomed-in from the example chart (pictured above), the entire voyage, or any part of the voyage can be visually analysed with Excel's powerful charting tool.

To create this chart in Excel, simply highlight the **Time** column and the **AWS** column (for this example), then press the **Chart Wizard** button on the Excel toolbar, select a "Line Graph" option from the choices provided and press [Finish]. Excel power-users can further format the graph as desired.
9 Targets [T] (AIS, DSC, ARPA, RADAR, WAN)

9.1 Introduction

SOB's Target feature is a powerful tool for tracking other vessels on your computer display. Various remote-vessel acquisition technologies are combined by SOB into a single interface – which we generically call "Targets".

WARNING – IMPORTANT INFORMATION

Limitations on the number of simultaneous targets that can be displayed are built into SOB's Licensing. A Standard User License will display up to 50 targets, and the Pro User License will show up to 2,000. Registered SOB shows 50, and unregistered (LITE) will show NO targets. Once the Target limit has been reached, a notice will be posted to the purple Messages Panel. The only way to reset it and acquire further targets, is to exit and restart SOB (the limit will not be reset if you simply clear the targets from the screen).

SOB will automatically pick up and display AIS and ARPA and DSC targets (with appropriate devices connected). SOB's Target feature is also used for the display of EBL/VRM user marks from compatible RADAR devices, and ships connected via the Internet (using SOB's WAN feature) are displayed as WAN Targets.
9.2 Target acquisition systems used by SOB

### 9.2.1 AIS

AIS stands for Automatic Identification System (sometimes UAIS for Universal AIS), and is basically a VHF device which sends (and/or receives) details about your vessel and your journey. If you look at the "AIS Static Data" page on the Ship's Data form [F9] you will get an idea of the type of data that is sent between ships. Also dynamic data is sent - speed, course, lat, lng, rate of turn. ALL commercial ships over 300t - tankers, liners, ferries, etc - must have AIS transmitters fitted. And as of 2007, many more classes of ships will be required to send AIS data (all new ships, all ships over 60t, all passenger ships ...). The internet contains a vast amount of information about AIS, a good starting point is [www.uais.org](http://www.uais.org), also worth a look is [www.aislive.com](http://www.aislive.com).

AIS is currently available in two forms: **Class A** and **Class B**. Class A transponders are quite expensive and primarily designed for commercial vessels, the newly specified Class B transponders are aimed to be lower cost alternatives for recreational boat users. The technology is the same with each class, but Class B transponders are not required to send all of the Static Data.

According to the official AIS specifications, the following tables give an idea as to the frequency and types of data being transmitted. These should be used as a guide only, as real-life tests have shown that not all AIS transponders rigidly adhere to these standards...

Excerpt from ITU-1371 - Technical Characteristics for UAIS

### Section: 4.2.1 Reporting rate

The different information types are valid for a different time period and thus need a different update rate:

| Static information: | Every 6 min or, when data has been amended, on request. |
| Dynamic information: | Dependent on speed and course alteration (see tables). |
| Safety related message: | Every 6 min or, when data has been amended, on request. |

- **Class A shipborne mobile equipment reporting intervals**

<table>
<thead>
<tr>
<th>Ship's dynamic conditions</th>
<th>Nominal reporting interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ship at anchor or moored and not moving faster than 3 knots</td>
<td>3 min *</td>
</tr>
<tr>
<td>Ship at anchor or moored and moving faster than 3 knots</td>
<td>10 sec *</td>
</tr>
<tr>
<td>Ship 0-14 knots</td>
<td>10 sec *</td>
</tr>
<tr>
<td>Ship 0-14 knots and changing course</td>
<td>3 sec *</td>
</tr>
<tr>
<td>Ship 14-23 knots</td>
<td>6 sec *</td>
</tr>
<tr>
<td>Ship 14-23 knots and changing course</td>
<td>2 sec</td>
</tr>
<tr>
<td>Ship &gt; 23 knots</td>
<td>2 sec</td>
</tr>
<tr>
<td>Ship &gt; 23 knots and changing course</td>
<td>2 sec *</td>
</tr>
</tbody>
</table>

* When a mobile station determines that it is the semaphore (see ITU-1371 § 3.1.1.4, Annex 2), the reporting rate should increase to once per 2 s (see § 3.1.3.3.2, Annex 2).

- **Reporting intervals for equipment other than Class A shipborne mobile equipment**

<table>
<thead>
<tr>
<th>Platform's condition</th>
<th>Nominal reporting interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class B shipborne mobile equipment not moving faster than 2 knots</td>
<td>3 min</td>
</tr>
<tr>
<td>Class B shipborne mobile equipment moving 2-14 knots</td>
<td>30 sec</td>
</tr>
<tr>
<td>Class B shipborne mobile equipment moving 14-23 knots</td>
<td>15 sec</td>
</tr>
<tr>
<td>Class B shipborne mobile equipment moving &gt; 23 knots</td>
<td>5 sec</td>
</tr>
<tr>
<td>Search and rescue aircraft (airborne mobile equipment)</td>
<td>10 sec</td>
</tr>
<tr>
<td>Aids to navigation</td>
<td>3 min</td>
</tr>
<tr>
<td>AIS base station *</td>
<td>10 sec</td>
</tr>
</tbody>
</table>

* The base station rate should increase to once per 3 sec. seconds after the station detects that one or more stations are synchronizing to the base station (see ITU-1371 § 3.1.3.3.1, Annex 2).

For individual small boat users, it's not compulsory to be sending AIS information (well not yet, anyway), but it is very handy to be able to receive it, and display it on the chart! Fortunately, AIS receive-only devices are available, and are very affordable (when...
compared to transceivers). See our 'Shop' webpage for an example. Of course there is no real need for them for harbour or local sailing (except if near/in a major commercial port area), but for long coastal cruising, or ocean crossings, or cruising in high density commercial shipping areas, they are a great boost to safety. And they will quickly become a "must have" item for any boat with a computer onboard.

For a demo of this technology, and the way SOB implements it, AIS sample log files are included in the SOB installation (or we can email additional sample files to anyone interested). Also, if you have purchased a SOB Pro User License, there are a couple of IP Addresses that are included on SOB's WAN List that you can connect to via SOB and an Internet connection. Both of these addresses display LIVE AIS TRAFFIC direct on your SOB screen. One of them is the ENTIRE Norwegian coastline, with 800+ simultaneous targets received, and the other is AIS traffic captured from a boat moored in Seattle (USA) with a GPRS Internet connection. This data stream usually shows about 60+ visible targets.

... see also ITU-1371 messages decoded by SOB, page 9-13

### 9.2.2 DSC VHF

Position Polling reports from DSC VHF radios appear as targets in SOB.

Developed in consultation with Sea Rescue Tasmania Inc, SOB's DSC position tracking works similarly to AIS target tracking (although not quite as much detail is transmitted with DSC). All modern DSC/VHF Radios have the ability to send a digital "packet" of data to another DSC/VHF. The sending radio must have a GPS connected, and the sending and receiving radios must have their unique MMSI numbers programmed in - then the sending/receiving of position data can usually be set to automatic (although with some radios you may need enable the "Routine Position Reporting" function). For Ship-to-Shore, the sending radio has a connection to a GPS but does not need to be connected to a computer - the receiving radio requires the computer connected so the remote ship can be plotted in SOB.

Refer to: http://digiboat.us/downloads/DSC-VHF_Ship-to-Shore.pdf for list of requirements and schematic diagrams.

If SOB receives a DSC Distress message, an alarm will sound and details printed to the purple Messages panel.

**Hint:** The DSC "Buddy Tracking" option built into most DSC Radios is an easy way to highlight if your friends are near, and is also a very useful tool for Tender Tracking if your tender has a DSC/VHF Radio. Note that each DSC radio requires an MMSI number as issued by your Nation's Comms Department (AMSA in Australia, OFCOM in the UK, etc)

**Note:** DSC targets are NOT automatically purged from the Target list. This is due to some Personal MOB devices now using DSC (eg the Mobalarm V100). IE, A real MOB situation would not want the target deleted from the screen just because no signal has been received from it in the last 10 minutes.

### 9.2.3 ARPA / MARPA

In SOB, ARPA targets are functionally equivalent to AIS targets.

SOB reads the **TTM**, **TLB** and **TTL** NMEA sentences, sent from compatible RADAR units, and displays ARPA (or MARPA) targets in the same way as the AIS targets. However ARPA targets don't transmit the same amount of detail about themselves (so no Ship Type, Destination, dimensions ... ie: none of the AIS Static Data at all).

SOB creates a unique MMSI number to associate to each received ARPA target. A user-defined name for any targets will be used by SOB (the target's name is typically keyed in at your RADAR device's console).

SOB names these targets as **ARPAx-TGT xx** - the "xx" numbers that SOB assigns for these names are used by the RADAR/APRA device. There is allowance for 99 such targets, although each RADAR device may impose its own limitations on the number of simultaneous targets that it will acquire.

SOB assigns an arbitrary MMSI number "9999999xx" which has no relevance to the ARPA system and is used internally by SOB to identify this target.
9.2.4 RADAR Tools and EBL/VRM Marks

If your RADAR outputs the RSD NMEA sentence (check the product's documentation), then SOB can re-display the following objects received from the RADAR:

9.2.4.1 RADAR cursor

This will move around the SOB chart window in time (sometimes with a second or two delay) with the cursor movement on the RADAR screen. Use the settings on the Acquired Targets form to show/hide the cursor, and to get the exact lat/lng of its position.

9.2.4.2 Range rings based on the scale setting

The outer range-ring displayed in SOB will match the scale setting of your RADAR display. Display of these rings is enabled on the Acquired Targets form and are different to the configurable ship’s range-rings that can be displayed via the Ship’s Form.

9.2.4.3 Two VRM/EBL positions selected by the RADAR operator

This function is dependent on each RADAR device, consult your manual for instructions in the use of VRM/EBL. SOB will re-display the position of the VRM as a circular target on the chart display.

These two positions are treated by SOB as if they are acquired targets and are named "RADAR-1" and "RADAR-2". Further information about these "targets" is available on the Acquired Targets form, as for AIS targets. However no velocity (course and speed) information is known for these positions, so CPA and other calculations don’t exist or are meaningless for them.

This screen shot shows the green RADAR scale rings which are synched with the display scale of the RADAR unit. The two yellow marks are the VRM/EBL markers entered onto the RADAR unit's console, and the large green cross follows the position of the RADAR’s cursor.

NOTES: SOB will not re-display the raster image that the RADAR builds from the returned echoes of its magnetron.

An arbitrary MMSI number "9999999xx" is assigned to the "target" which has no relevance to the VRM/EBL system and is used internally by SOB to identify this target.

9.2.5 Online Tracking with GpsGate

SOB seamlessly integrates with GpsGate Online, uploading your position to the GpsGate server while simultaneously downloading position fixes from your GpsGate "Buddy List" and displaying them on the chart using the Targets feature. Now, anyone with an Internet connection can track your progress using either SOB Pro, or the GpsGate Online map. Refer to: http://www.gpsgate.com/ for further information about this real-time online tracking service.

Step-by-step "How To" guide for using SOB with GpsGate:
and the Networking chapter, page 17-2.

9.2.6 WAN - Remote Connected Ships

...see SOB Networking: Client Mode, page 17-2
9.3 Targets List [T]

Detailed information and customisable **Closest Point of Approach (CPA)** settings are to be found on the **Targets Form** – use the [AIS ARPA - RADAR] button on SOB’s main toolbar or type the letter [T] to display this form.

The AIS examples from the English Channel used in this section are from the NMEA sample AIS logfile installed with SOB. You can replay this log file as you work through this Targets chapter.

Click the column headings on the **Target Acquisition** form to sort the data on that column, clicking it again will reverse-sort on that column.

The right-hand panel displays all data that has been received by SOB from the target ship. And included are the CPA calculations done by SOB and updated every second (assuming new data has been received), and notice the age related data in the lower section, including time that the first message was received (or first acquisition of target), and the time of the most recently received message. The age is the time since the last message.

You can use Windows™ resize methods to lengthen the list if you have a high resolution display and many targets.

Looking at this data (in the screenshot above) of the highlighted target tells us that *Seafrance Renior* is a 135 metre long Passenger ship bound for Calais. However if you run the logfile, you can watch this ship LEAVING Calais, so we suggest that the Ship’s Communications Officer (or Officer of the Watch) has not updated the “destination” yet.

There are often errors noticeable in the “Ship’s Static Data” that must be entered by the operator in their AIS transponder.

### 9.3.1.1 Remember AIS Target Names

When a new target is acquired, it can often be several minutes until the Static Data message is received. The name of the ship is not known until this static data is received.

Tick this box and SOB will maintain its own look-up list of MMSI numbers and Ship Names. Whenever SOB receives the static data for a new target, its Ship Name will be saved to disk and used in future SOB sessions to help identify targets prior to receipt of the Static Data message.

These "remembered" ship names are stored in the "IFRIENDS_List.txt" file which can be manually edited or imported to Excel (for instance) for further storage or analysis. Be aware however that these remembered ships will not appear in the **Friends List** form when displayed in SOB.

### 9.3.2 Target List Columns

#### 9.3.2.1 MMSI

MMSI (Maritime Mobile Service Identity) numbers are issued to each ship by the ITU and National authorities. The MMSI number uniquely identifies all ships around the World.

Every AIS message sent or received by an AIS transponder/receiver contains the ship's MMSI number.

You can use this weblink to search for details about any ship, based on its Name, MMSI or Callsign (there are over 400,000 ship's particulars contained in the database): http://www.itu.int/cgi-bin/htsh/mars/ship_search.sh

9.3.2.2 Name
This is the ship's name as entered in the AIS transponder by the operator. SOB will only know the ship's name if the static data message has been received.

9.3.2.3 Rng & Brg
The range and bearing from your ship to the target vessel.

9.3.2.4 Show
Received targets can be hidden from SOB's display. If a target is included in the Target Friends list, and selected to not be displayed, then it will be hidden. However you can override the "Friends" setting with the [Hide Target] button.

Apart from targets automatically hidden, other targets may also benefit from being hidden – ie a row of super-tankers moored outside a port and cluttering the chart display. And if you are using your own AIS received data about your own ship as your primary input, then you will need to hide your ownship target to prevent it from drawing over the top of your ship's symbol. (This should be pre-set in your Friend's List)

...see OwnShip as a Target, page 9-15 and Target Friend’s List, page 9-14

And similarly, if using the WAN feature to connect to ownship, then hide the target (either manually with this button, or automatically via the Friend’s list) when the remote connected ship is set as Primary Ship.

9.3.2.5 Type
Allowed types are:
- A or B for Class A & B vessels with UAIS transponders
- N for Navaid
- P for Base Stations
- S for SAR craft (Search & Rescue – SAR planes may be transponding marine-band AIS inf)
- G for GpsGate Buddy
- D for DSC target

9.3.2.6 Age & Alive
These columns quickly reveal how current the data received from targets is. The Age column shows the time, in minutes, since the last message was received from the target. The Alive column will show a "Y" if a message has been received within the time set by the Time to Inactive slider control, and an "N" if the target is grey and ready for purging from the list.

9.3.2.7 Crash, TCPA & DCPA
The last three columns allow you to organise the list according to their collision threat priority. The Crash column contains a "-" if the target poses NO collision threat, "L" for LOW threat, "H" for HIGH threat and "V" for VERY HIGH chance of collision.

The TCPA (in minutes) and DCPA (in nautical miles) allow you to sort the list to find and highlight the targets with the highest chance of collision.
9.3.3 Target List Buttons

9.3.3.1 [Clear All Targets] & [Delete Target]

The Clear All will immediately delete all targets acquired by SOB and clear the target list. There is no confirmation after pressing either of these buttons.

The Delete Target button will remove only the currently selected target from SOB. Note that if this target is still in range and still transponding AIS data, then it will be re-acquired and re-appear in the list.

If Log AIS Data is selected (see point 9.3.4 below), then the targets will be logged to the !AIS_DATA.txt file before deleting.

9.3.3.2 [Hide Target]

Any target can be hidden from the display. There are a number of reasons why this may be required. See point 9.3.2.4 (above) for a discussion of some possible reasons.

9.3.3.3 [Pan to Target]

Use to centre the display at the highlighted target's position. The cross-hairs that always mark the centre of the SOB screen (unless in de-clutter mode) will make it easy to identify the Target chosen. If many targets have been acquired, and the display is dense with them all overlapping, you may have to zoom in to a larger scale, or filter the display of less important targets by changing the display settings – see page 9-10.

9.3.3.4 [Pan to CPA]

This button is only enabled if the target poses a collision threat. Then it will centre the screen at the predicted location where your ship will be at time of CPA.

9.3.3.5 [Show Tracked Target Vectors]

... see Tracking Targets, page 9-9

9.3.3.6 [Friends...] & [Add to Friends]

... see below, page 9-14

9.3.3.7 [Make NMEA Log]

This will create and save the Target’s track to NMEA log file. AIS NMEA sentences are not used here (the actual AIS sentences can be logged directly with the tickbox on this form), but appropriate NMEA sentences will be used to create a NMEA logfile from the Targets position fix data (RMC contains most of the data, other NMEA sentences are used depending on what additional data is received from the AIS target). The NMEA logfile formed can replayed in SOB, or any other compatible application or device.

The folder and filename for the saved file will be:

...\LogFiles\Targets\{Targets MMSI} (date).log

Or, if the Ship Name is known, then the file will be:

...\LogFiles\Targets\{ShipName} [MMSI] (date).log

9.3.3.8 [Make SOB Track]

This will convert and save the selected Target’s track to a SOB PastTrack format file. The track file can be loaded in SOB and edited, manipulated as for any other Track file. The target’s track is saved to a file with the folder and file name as:

...\PastTracks\Targets\{Targets MMSI} (date).txt
9.3.4 Log AIS Data

When the Log AIS Data control box is ticked, SOB will write target details to a standard row/column format text file for archiving or reporting or analysing the information with Excel.

The file used is SOBvMAX\Logfiles\AIS_DATA.txt. Note that this file IS NOT AVAILABLE for viewing or editing while SOB is running - ie: file copy, rename, delete etc will produce an error if SOB is running. You must exit SOB before this file can be accessed.

Target details are logged at the time the target is deleted - either manually with the [Delete Target] or [Clear All] buttons, or when manually or auto-purged, or when SOB exits.

Sample file data after opened in MS Excel:

The following table shows the fields used in the AIS log file:

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Example</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MMSI</td>
<td>227092000</td>
<td>Ship's universal identifier</td>
</tr>
<tr>
<td>NAME</td>
<td>SEAFRANCE RENOIR</td>
<td>Ship's name *</td>
</tr>
<tr>
<td>CALLSIGN</td>
<td>FNWH</td>
<td>IMO issued radio call sign</td>
</tr>
<tr>
<td>UTC ACQUIRED</td>
<td>06/24/06 04:48:14</td>
<td>Date/time of first acquisition of target ship</td>
</tr>
<tr>
<td>LAT ACQUIRED</td>
<td>50°58.3750'</td>
<td>Position of ship when first acquired</td>
</tr>
<tr>
<td>LNG ACQUIRED</td>
<td>001°49.5820'</td>
<td>=</td>
</tr>
<tr>
<td>UTC LOST</td>
<td>06/24/06 04:49:26</td>
<td>Date/time when last message received from target ship</td>
</tr>
<tr>
<td>LAT LOST</td>
<td>50°58.3470'</td>
<td>Position of ship when lost</td>
</tr>
<tr>
<td>LNG LOST</td>
<td>001°49.2310'</td>
<td>=</td>
</tr>
<tr>
<td>AVG SOG</td>
<td>11.14</td>
<td>Ship's average speed between first and lost position (knots)</td>
</tr>
<tr>
<td>AVG COG</td>
<td>262.8</td>
<td>Bearing of lost position from first position (*True)</td>
</tr>
<tr>
<td>DESTINATION</td>
<td>CALAIS</td>
<td>Ship's stated destination for this voyage *</td>
</tr>
<tr>
<td>SHIPTYPE</td>
<td>Passenger ship</td>
<td>ITU-1371 defined Ship Type *</td>
</tr>
</tbody>
</table>

* for these fields to be valid, the static data message must have been received by SOB, and the data correctly entered into the transponder by the Ship's Communications Officer.
9.4 Viewing Target Details & Information

Summary information about Targets is also displayed in the Quick Info Box, press the [Info] button or [Enter] key and hover the pointer over the Target’s head point.

9.4.1 Quick Info [Enter]

Click the [Info] button (or press the [Enter] key) and hover the green “i” pointer over a target to get quick summary detail about it.

This selected target becomes the Active Target for tracking. See next..

Note, the “hotspot” for each target is the tip, not the centre. Or if the target is displayed as a scaled ship shape (static data info must have been received, and the chart zoomed to a large scale), then the “hotspot” is the GPS position marked within the shipshape.

9.4.2 Tracking Targets

With Info mode active, the last target that the info cursor hovers over will display detail in the Targets Panel. We refer to these as the Tracked Target. The tracked target will have a red circle around its chart symbol, and if it poses a collision threat, then guide lines for the CPA projections for both the target and ownship are drawn on the screen.

When a tracked target with VERY HIGH crash potential (ie, if DCPA less than half of the set safe zone), or if the TCPA is less than 15min away, then the Targets Panel uses large abbreviated display for the pertinent data. See section 4.7

9.4.2.1 Selecting the Tracked Target

1. If the Target Panel is visible, left-click on a target to set it as the Tracked target.
2. In the Target List, double-click on a target in the list to make it the Tracked Target.
3. If no targets are currently selected, then hover the Info Cursor over a target to select it. The Target Panel must be visible.

9.4.2.2 [Show Tracked Target Vectors]

Any target nominated as the Tracked Target will have a dark-red coloured circle drawn around it to provide an easy visual indicator as to which target is being tracked. Full details, updated every two seconds, are printed to the Targets panel.
In addition, use this button on the **Acquired Targets** form to enable/disable the drawing of dynamic markers (vectors) to display the calculated CPA with the Tracked Target. The guidelines drawn onscreen are a thin dashed red line from the target to its position at CPA, and a thick solid red line with arrows at each end which represents the minimum separation distance at CPA (abbreviated as DCPA for "Distance at CPA"). As the calculated CPA varies (as would occur if either ship changes course or speed), then the CPA vectors will be re-drawn every 2 seconds to indicate the new prediction. The tracked target vectors and lines will not be drawn on screen if the TCPA is greater than 2 hours.

With only a small amount of practice, it becomes obvious by looking at the DCPA line as to whether your OwnShip, or the target, will "cross in front".

The example scenario (above), shows a collision threat with the red target in the lower-right of the image ("Seafrance Renoir" MMSI 227092000), which is marked as a Tracked Target, with received data and CPA calculations in the white **Targets Panel**. The thick dark-red line with arrows, shows the future position of both ships, at the point where your ship passes closest to the Tracked ship (considering no change of direction or speed of either ship, then this will be the CPA location of the two ships). And you could display the OwnShip's "look-ahead line" [F9] to draw a line from your ship's current position to its position at CPA.

### 9.5 Targets - Display Settings

**RED** targets pose a collision threat according to the settings defined – **CPA Safe Time**, and **CPA Safe Distance**.

**YELLOW** targets are still "alive" in accordance with the **Time to Inactive** setting.

**GREY** targets indicate that a message has not been received from the target for the time set by **Time to Inactive**. If **Auto purge if Inactive** is selected, or the [Purge Now] button pressed, then all the GREY targets will be removed.

Targets may also be drawn transparent (outlined only) when **Declutter** mode is enabled (see **Declutter**, page 10-27).

The Target's MMSI, CallSign and Name can be displayed on screen alongside the target icon. And if the Target is marked as a "Friend" then the friendly name used will be displayed.

Press the [More >>] button on the **Acquired Targets** form to show the display settings options.

#### 9.5.1 Setup Checkbox Controls

##### 9.5.1.1 Large Size

Draw the targets enlarged. Should be used when not many targets are in range, for easy cockpit viewing. Beware: in large chart scales if the targets are being draw "to scale", these will not be drawn oversized and may not be too distinct on the chart amongst any drawn as the oversized triangle.

##### 9.5.1.2 Show Targets

Show/hide the display of all acquired targets in SOB.
9.5.1.3 **Show Dangerous Only**
Hide all targets that don't have a collision potential. Only the red targets will be shown.
If a target's collision threat changes, then SOB will automatically unhide it and it will be drawn red on-screen.

9.5.1.4 **Show Tracks & Join**
Shows a dot on screen for each received position of the target. Use the "Track Length" slider to set how long the tracks are before being purged.
If Join is selected, then each point will be joined by a thin line.

9.5.1.5 **Hide if Inactive**
Don’t display any targets where a transmission hasn’t been received for the time set by the **Time to Inactive** slider.

9.5.1.6 **Auto Purge if Inactive**
When targets age beyond the time set, they are automatically deleted.
There are exceptions to this for:
- *DSC Targets*: section 9.2.2
- *Friend Targets*: section 9.6
- *MOB Targets*: section 9.6 and section 5.6.1.2

9.5.1.7 **Purge Now**
The [Purge Now] button will delete all targets immediately that are no longer **alive**.

9.5.1.8 **Show Pointers & Only use COG**
The pointer is the short arrow displayed ahead of the target triangle which always indicates the target's COG (as provided by the target's GPS). The direction that the target symbol is facing is the target's heading (HDG – as supplied by an onboard electronic compass – fluxgate, gyro etc).
AIS ships will not always transmit HDG data, in which case the COG will be used for both the target symbol and the pointer. If you want to force both the pointer and symbol to reflect COG then tick the **Only use COG (not HDG)** checkbox.
Why the difference? There are many situations that can result in wildly different COG and HDG values, for instance: a hovercraft will rarely be heading in the same direction that it is travelling; a tug boat (or other towing vessel) may be in reverse while towing/pushing a cargo ship; any ship operating in a cross-current will be vectoring in a direction different to its actual course; and a large container vessel will change its heading some distance before the ship actually starts to change direction.

9.5.1.9 **Target Label Display**
Use the checkboxes: **Show Label**, **Show Name** and **Show MMSI** to customise the amount of information shown on the chart for each target.
Note: The target's Name will not always be known. Only the static sentence transmitted contain this data. If the target name is not known, the Name Label will not be displayed.
You can set SOB to save all acquired target names in a look-up list and use the saved name (if previously recorded) until the static data message is received.
9.5.2 Setup Slider Controls

9.5.2.1 Track Length
SOB will purge old acquisitions for each target according to this setting.
Setting to ZERO will disable all track purging.

9.5.2.2 Time to Inactive
Sets the Age of the target. Targets where SOB has not received any transmissions for this length of time are Inactive. Setting this scale to ZERO will disable all "age" related calculations. Targets older than this set time are considered lost. If a target's age is less than the "Time to Inactive" setting, then the target is said to be Alive.

9.5.2.3 Ignore Stationary
When moored, or operating close to a port or anchorage etc, there will often be targets which are known to be stationary, yet are displaying as targets posing a collision threat (coloured red). This is because the target, at a future time, is calculated to be within your "safe zone" as set with the CPA Safe Time and Distance controls. IE: You may be moored within a 100 metres of their berth, and your CPA Safe Distance is set at 2nm; or you may be passing up a harbour channel which is narrower than your CPA Safe Distance setting – so every ship within the channel will be red.
To reduce the "collision threat" red clutter in anchorages, change this slider control to set a speed of 0 to 2 knots to indicate to SOB that the targets are to be considered stationary below this speed.
Note that this setting also applies to your ownship’s speed.

9.5.2.4 CPA Safe Time & Safe Distance
These settings are used to determine the safe/danger circle zone surrounding your ship.
If any Target is calculated to enter this "safe zone" then it will be considered a Collision Potential. SOB will indicate dangerous targets by colouring their on-screen symbol to RED, and assigning them a LOW, HIGH or VERY HIGH collision potential status.
The Collision Threat will be cancelled when the target ship and ownship are "aft-a-beam".
A HIGH target threat will invade your safe zone at some future time. A VERY HIGH threat will be within 50% of your safe parameter settings.
If the CPA lies outside of your safe zone, then the target has a LOW potential. It may be that your paths wont converge for hours, or days – but if they WILL converge then they are marked as a low threat. This feature can be used to intercept a vessel – even days in the future across an ocean (although out of VHF range, for such an example we assume you can receive the other ship's data from "some" source – SOB can create a target from a WAN connection for instance, refer to the Networking chapter).

9.5.3 Notes and Miscellaneous Questions

9.5.3.1 Target is not being drawn as a scaled ship shape
A true-to-scale shape of the Target ship will be drawn on the chart for chart scales larger than 1:20,000 (or the scale setting on the Ships Form, see page 2-3). The ship-shape will only be drawn if the Static Data sentence has been received from the target (which includes data about the ship's dimensions).
9.5.3.2 **ITU-1371 messages decoded by SOB**

The International Telecommunication Union (ITU) controls the standards used by AIS devices. All AIS messages and details are published in the ITU-1371 document.

Various message numbers (or "Types") are defined, the messages decoded and used by SOB are the following:

- **Class A position report** (msgs 1,2,3)
- **Class A Static & Voyage related data** (msg 5)
- **Base Station Report** (msg 4)
- **Base Station UTC Response** (msg 11)
- **Binary Addressed Message** (msg 6)
- **Binary Broadcast Message** (msg 8)
  
  Received messages will be printed to the purple **Messages** panel
  
  No messages will be initiated by SOB (no acknowledgments sent)
- **Standard SAR aircraft position report** (msg 9)
- **Standard Class B equipment position report** (msg 18)
- **Extended Class B equipment position report** (msg 19, 24)
  
  NOTE: Not all AIS Receivers process and forward Class B messages to SOB
- **Aids-to-Navigation report** (msg 21)
  
  Acquired NavAids print as a circle. Coloured Red if Off Position (or a collision threat). QuickInfo box can be used to display summary details about the NavAid

9.5.3.3 **Replaying AIS Log files**

If the NMEA logfile contains only AIS data, you will find that it replays very fast. AIS data contains no time coding like a GPS sentence includes, so the playback speed can't be auto calibrated to real-time. See Replay a LOG File, page 13-7.

9.5.3.4 **Retaining AIS data on screen**

Move the **Track Length** slider to zero to stop the target tracks from being automatically removed, and move the **Time to Inactive** slider to zero to disable target ageing and purging. (Targets won't auto purge if inactive time is set to Disable).

9.5.3.5 **NASA.AIS Receiver**

This is a very popular low cost AIS receive-only device. Due to its popularity, SOB has included functions to easily change its settings on the NMEA Output page.

... see AIS, page 13-7

When the NASA is first powered up, it sends an identification in the form of an AIS Static Data message. If SOB is on, and the NASA is powered up then SOB will receive its ID message and create a "target" for it. This is a convenient way to determine that the AIS is working and correctly connected to SOB.

9.5.3.6 **AIS N/A data**

Due to the quantity of data transmitted over the AIS system, it will often be seen that various elements are apparently incorrect or not available. Of course, no static data will be available until a static data message has been received, but even then, static and dynamic data may be unavailable (ie: the transmitting ship may not have a rate-of-turn indicator, or separate electronic compass, installed; or the GPS is turned off). SOB will follow these rules when dealing with incomplete or unavailable data:

- If SOG is not available it will have the value 102.3kn, and SOB will display "N/A" for target speed. Collision Potential calculations for these targets will be invalid.
- If COG or HDG received data is invalid, SOB will show the target or pointer with a heading of 360°True (due-North). In other cases, a correct Northerly heading is shown as 0°True.
- If LAT/LNG data received is invalid, target will be set to (0,0) – The Gulf of Guinea
- Static data is displayed as **{unknown}** or **{not received}** until the static data message has been transmitted and acquired by SOB.
9.6 Target Friend’s List

Display the Target Friend’s list using the [Info]>>[Target] button combination, or press the [Friend's...] button on the Acquired Targets form.

This is quite a free-form feature, with no particular use specified. You may use it as a fleet manager to highlight your own vessels, or a social sailor to keep track of your fleet of friends, or a border patrol to highlight for future easy identification any suspicious vessels. Your own requirements will dictate how you might best make use of this feature.

A customised list of known targets can be maintained which allow you to highlight these targets with different colouring and custom names. The Friend’s List can also be used to exclude particular targets from the display.

By default, MMSI=0 is in the list and set for hidden. This MMSI number can appear quite frequently in SOB, it is always from either corrupt incoming transmission via the AIS system, or a result of SOB’s WAN connect feature.

Use the [Add to Friends] button on the Acquired Targets form to quickly include the current highlighted target into your list of target friends.

Acquired Targets that are found in the Friend’s List will be drawn on the chart display using the colour chosen for the Friend and any previous points, and joining track lines (if selected) will be drawn in the same colour. The Nickname is displayed as a label beside the Target on the chart surface.

Any entry in the list can be excluded from the display by ticking the Hide box.

Excluded targets will still display in the Target List, and can be redisplayed with the [Show Target] button if hidden on the Friend’s list.

Note: the Target Friend’s feature does not work without some extra information for WAN and ARPA Targets, as their unique numbers (which SOB uses to simulate an MMSI number) is unknown before reception. Once a new WAN or ARPA target is acquired, the new unique MMSI number for it can be used when adding it to the Friend’s List and then named and coloured as you wish. Press the [Add to Friends List] button to simplify these steps.

The list of friends is maintained in a simple text file in the LogFiles folder: !FRIENDS_List.txt. This file can be manually edited, or created from a spreadsheet list etc. Be sure to include the data delimiters "~" after each field, and at the end of each line.

If Remember Target Names is selected on the Targets Form, then these targets are also saved to the Friends file. These targets can be displayed on the Target Friends form, by ticking the Show Auto Saved Names.

Don’t Auto Purge Friends when ticked will over-ride the "Purge" settings on the Targets Form and will not auto-purge any targets that are nominated as friends.

The new breed of Man-Over-Board devices use either AIS or DSC technology to send their positions. (Generically, these devices are usually called a PLB – for Personal Locator Beacon). SOB, mostly, interprets this as normal Target information. Some devices do send an identifier indicating it as a MOB, in which case SOB will perform additional steps relevant for a MOB. Either way, it is good practice to add any MMSI numbers for these devices you have on board into the Friend’s List. Be sure to select a
nice bright colour, for easy identification if/when they appear on the chart, and also tick the Don't Auto Purge Friends box – as you would want these targets to stay visible on screen long after you may lose reception by sailing out of range! In the sample screenshot (above) EO MOB 1 & EO MOB 2 are two SafeLink PLB’s, and EO MOB CHRIS is a different brand of MOB Device. All three have been pre-entered into the Friend’s List.

9.7 **AIS Transponders**

If you are equipped with an AIS transmitter/transponder, then SOB makes it easy for you to "set" your AIS details in compatible devices (your AIS transponder must be capable of receiving static ship’s data via the SSD and/or VSD NMEA sentences).

9.7.1 **OwnShip Static Data**

If a compatible AIS transponder is connected, then the ITU-1371 Static Ship’s Data can be entered in this form and uploaded to the transponder.

For installations with AIS transponders (as opposed to a "receiver" only), information about your own ship needs to be entered in the transponder so that your AIS transmissions will contain the required "static" data for other receiving ship's information. Use the Ship's Form >> AIS Static Data page to easily enter this Static Data.

Certain details in the Static Data need to be refreshed prior to each voyage (Destination, ETA, Draught – if changed, etc), use the [Upload OwnShip Static Data to VHF] button on the AIS page of the Ship's Form to upload this information to your AIS radio transponder.

Your Transponder must be capable and enabled to receive remote setup data via the NMEA SSD and/or VSD sentences.

After all the static data is correctly filled-in on the form:

1. ensure AIS NMEA Output is ticked and the correct port is selected on the Raw NMEA Data form
2. set your device to receive the data (check your device's manual, although most devices do not require any user interaction)
3. press the [Upload Static Data to VHF...] button

SOB will send this data every few seconds to the COM port selected in step 1, for a total of 10 times.

Note: some VHF/DSC radios can also accept data via the SSD/VSD sentences. Although not all the data will be applicable to non-AIS devices, the MMSI and some other fields can be uploaded. (Check your DSC device's manual for further information).

9.7.2 **OwnShip as a Target**

Many AIS Transponders will receive their own transmissions as an acquired target. In SOB, there are two distinctly different ways you can handle your received data:

9.7.2.1 **Using AIS Data as OwnShip Data**

SOB can interpret and use this OwnShip target as the primary OwnShip positional data. This means that if the AIS Transponder is wired into the PC running SOB (via serial or
USB or LAN etc), then separate connections for GPS, ROT indicator and Gyro/Fluxgate etc are NOT required. SOB will use the AIS Dynamic data in place of these devices.

In other words, for ships that receive themselves as a target from their AIS transmission, they do not need to have a GPS connected (in fact, if using target as OwnShip, you should not connect a GPS) directly to SOB as well.

To use this function, the OwnShip MMSI must be correctly entered on the:
Ship's Form >> AIS Static Data page.

9.7.2.2 Hiding OwnShip AIS Target Received

Alternatively, if it is not desired to use the received AIS data for OwnShip data then it will be necessary to hide your received AIS target, otherwise the target symbol will overlay your OwnShip symbol.

Ensure your MMSI is correctly entered into the AIS Static Data page on the Ship's Form; now enter the MMSI number also on to the Target Friends and select the Hide option.
10 C-MAP Charts

10.1 Introduction

SOB uses EXCLUSIVELY C-Map Electronic Charts. C-Map vector cartography sets the standard for digital charting. They are a multiple winner of the prestigious NMEA Award for Navigational Excellence, and draw from a database of over 50,000 official charts.

Note: around 2010 C-Map was acquired by C-Map Marine. www.c-map.com

C-Map charts are guiding over a million users worldwide, and are installed in the majority of the world’s hardware ChartPlotters and commercial ECDIS systems.

The C-Map Charts are available on DVD, downloadable from C-Map, or various Cartridges styles (depending on chartplotter and/or card reader used).

Any compatible C-Map types can be used with SOB in combination with any others, so MAXonPC can be used simultaneously with NT+ C-Cards (a C-Map proprietary Card Reader is required). SOB installs with 15 full detail demonstration C-Map Charts for your evaluation and familiarisation purposes. Use these charts to trial both SOB and the C-Map digital chart system for your own needs. To use other specific C-Map charts for your area, you will have to purchase the Chart License Code from C-Map's MAX/PC Chart Selector program (installed from the C-Map CD-ROM).

The various C-Map Card Readers connected and correctly installed will be identified and listed in the text window of the About SOB form - pictured. (eg: USBCC, USBMM and USBFP).

10.2 Compatible Chart Types

The C-Map Electronic Charts are available as Windows™ chart files or on plug-in Cartridges (SD Chips, or "C-Cards"). Either of these chart formats, indeed both in combination, are suitable for use in SOB.

The newer MAX cartography represents a significant leap in coverage, clarity and features. SOB seamlessly integrates the new MAX features such as Perspective View, Animated Navigation Lights, Tidal Stream & Current Indicators and imbedded photographs of key locations and points of interest.

These charts are issued in the same way as the NT+ charts (on DVD or C-Card or SD card).

See also C-Map's dedicated website for MAX-Specific information: www.maxnavigator.com Specifically, SOB is compatible with any of these C-Map format charts:

10.2.1 Chart Files

The C-Map Chart Selector disks containing all the World’s C-Map charts are given away freely by C-Map (they can be ordered direct from your nearest C-Map office at any time). They are also now available for download from the C-Map website.

Specific charts on the disks must be selected and licensed prior to use. A simple program - Chart Selector – will install from the C-Map disk, or download, which allows easy "point and click" chart selection and immediate on-line or call-centre ordering. C-Map then only supplies you with a Chart Licence Code which will instantly register the purchased chart, allowing SOB immediate full access to it.
10.2.1 NT/NT+ Charts
Although outdated now, SOB maintains compatibility with these previous versions of C-Map charts

10.2.2 MAX Charts
These are the latest version of the C-Map charts, and represent a significant leap in vector chart technology.

10.2.2.1 C-Map Chart Cartridges (C-Cards, FP, SD, PCMCIA)
Commonly used in chart-plotters from a variety of manufacturers, the charts on these cartridges can also be used by SOB on your computer. An accessory, supplied by C-Map, is the Card Reader which connects to your computer via a USB port, and will permit use of any C-Map Cartridge within SOB.

Most Card Readers can take two C-Map cards at one time, and further chart cards can be "hot-swapped" without the need to close or re-start SOB.

The USB Card Reader is supplied with the C-Map NT Planner program, or can be purchased separately from your local C-Map Office - www.c-map.com, or C-Map Marine Retailer outlet, or via our DigiBOAT Online Web-Shop.

The following cartridge charts are all compatible with SOB (C-Map Card Reader required, see section 10.3):

* IMPORTANT NOTE about SD-Cards: Although these cards are standard "camera-types", they are not compatible with standard PC card readers. They can only be used with C-Map's USBMM Card Reader.

10.2.2.1 CM93 & CF85 Charts
SOB is not compatible with the older CF85 and CM93 chart formats. Owners of licensed versions of these chart-types should inquire with their local C-Map Dealer or C-Map Office for upgrade pricing for the new chart versions.
10.2.3 Digital Charts from other Cartographic Companies

SOB is only compatible with C-Map charts.

So, other PC chart formats can not be used with SOB, for example:
S57: Navionics, NOAA, Tsunami etc
RASTER: BSB, ARCS, Seafarer etc
Additionally, the more basic quality GPS proprietary formats are not suitable for SOB:
MapSource, Bluechart, Softchart, BlueNav etc etc
10.3 C-Map Cartridges & USB Card Readers

SOB supports the USBMM SD & NT Card Reader, the FP Card Reader and the more common USBCC Card Reader, any or all of these Card Readers can be used, even multiple readers used simultaneously.

<table>
<thead>
<tr>
<th>USBCC Card Reader</th>
<th>USBMM Card Reader</th>
<th>USBFP Card Reader</th>
</tr>
</thead>
<tbody>
<tr>
<td>• NT/NT+ C-Cards</td>
<td>• NT/NT+ C-Cards</td>
<td>• FP C-Card (Furuno plotters)</td>
</tr>
<tr>
<td>• MAX, MAX Pro C-Cards</td>
<td>• MAX, MAX Pro C-Cards</td>
<td></td>
</tr>
<tr>
<td>• UserCard</td>
<td>• MAX, MAX Pro SD Cards</td>
<td></td>
</tr>
<tr>
<td>• UserCard</td>
<td>• UserCard</td>
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</tbody>
</table>

The latest Drivers for these devices are available from C-Map Marine or from the DigiBOAT website's 'Download' page. For your convenience, the driver files are also included in a folder on the SOB Install CD-ROM.

![Driver Details](image1.png)

To check for a successful Card Reader driver installation, the About SOB form will display the type(s) of Card Readers found. Device Manager can also be used to determine if the Card Reader was detected by Windows™ "Plug & Play" technology and its driver loaded.

For Card Reader installation troubleshooting, refer to the SOB Online User Manual:


10.3.1 C-Map UserCard

To utilise the C-Map UserCard features, the following are required:

- C-Map UserCard (supplied by C-Map or their resellers)
- Compatible C-Map ChartPlotter (as supplied by a variety of hardware manufacturers eg: NAVMAN, SEIWA, FURUNO etc)
- Card Reader connected to the SOB PC (supplied by C-Map or their resellers)

Any UserCard files formatted to C-Map's standard for saving marks, events, routes and tracks, can be read and/or written by SOB.

![UserCard Features](image2.png)

The AllWaypoints form [F10] serves as the primary interface for the C-Map UserCard route, mark, event and track transfers between compatible products.

The C-Map UserCard is a digital memory storage device (or cartridge) sold by C-Map. The cartridge is the same type used for distribution of C-Card Charts for use in Chartplotters, however the UserCards are blank, and designed to be used in a manner similar to floppy disks.

They were originally designed for the backup or transfer of any user marks, events, routes and tracks that have been drawn on the chartplotter.
It should be possible to transfer waypoints, routes and tracks between SOB, PC Planner and any C-MAP compatible chartplotters.

10.3.1.1 Transferring Files with the UserCard

Select the C-MAP User Card option at the top of the All Waypoints form to show a list of all files on the UserCard.

The Usercard can be in either slot of the Card Reader, SOB will auto detect any UserCard and the appropriate [Left] or [Right] button will be enabled.

A variety of conversion possibilities exist for the C-Map UserCard and SOB data transferring:

**From UserCard to SOB:**
- MARK files \(\rightarrow\) Waypoint file or Text list or backup\(^1\) to hard disk
- EVENT files \(\rightarrow\) Waypoint file or Text list or backup\(^1\) to hard disk
- ROUTE files \(\rightarrow\) Route file or PastTrack file or backup\(^1\) to hard disk
- TRACK files \(\rightarrow\) Route file or PastTrack file or backup\(^1\) to hard disk

**From SOB to UserCard:**
- Loaded Route \(\rightarrow\) ROUTE file\(^2\)
- Waypoint File \(\rightarrow\) MARK file

1- If the [Backup to SOB\(\backslash\)Usercard] is chosen, SOB will automatically create the \(\backslash\)SOB\(\backslash\)Usercard folder (if it doesn't exist) and do a byte-for-byte copy of the Usercard file. SOB currently can't copy this file back to the Usercard, however this bi-directional support will be included in a future SOB version.

2- This conversion is accessed via the AllRoutes form

10.3.1.2 UserCard limitations in SOB

- SOB does not currently copy the backed up UserCard files from \(\backslash\)SOB\(\backslash\)Usercard back to the UserCard. This capability will exist in the future.
- SOB does not have any means to Format the UserCard, Rename or Delete files on the UserCard. Use your Plotter or PC Planner for these operations. These operations will possibly be included in future SOB versions.
- SOB supports both, or either, slots for UserCard reading and writing on the AllWaypoints form, however currently not supported is copying files from one slot to the other. This can be effected by converting a UserCard file to SOB, then inserting another UserCard into a slot and converting the SOB file back to the new UserCard. Copying files from slot to slot will be supported in future SOB versions.
- A SOB Route, via the AllRoutes form, can be saved to either UserCard slot, however if both slots contain UserCards, then SOB will use the Left Slot.

**Example 1: Load a route from a UserCard into SOB**

This is a two-step process. The first converts the UserCard route to a SOB route file. The next is to load the route into SOB.

**Step 1: Copy and Convert Route from UserCard to SOB**

Use the C-Map UserCard option on the AllWaypoints form [F10], click any ROUTE-type, then the [\(\Rightarrow\)] button to convert it to a SOB route (via an intermediary pop-up menu). SOB will tell you that it was successful and how many turn marks it contained.

**Step 2: Load the Route in SOB**

Close the AllWaypoints form and open the AllRoutes form [F11] for route management. The route just converted will have the same name as the route had on the UserCard, but it will have a '.rte' extension (and perhaps an extra three digit number if the name already existed).

Select it in the left-hand list on the AllRoutes form and load it into SOB with the [\(\Rightarrow\)] button.

**NOTE:** you don't have to convert it from the UserCard each time (unless it has changed). Once that is done, it then becomes part of SOB's route collection and is always available for loading/unloading from the AllRoutes form.
Example 2: Transfer a Route from SOB to a UserCard

Use this method to create/edit a route on your PC with SOB, then transfer the route to your compatible Chartplotter onboard:

Step 1: Create or Load a SOB Route

The route that you wish to transfer to the UserCard must be first displayed on the SOB screen. You can import the route from your plotter using the Example above; or load an existing SOB route from a file; or create a new route in SOB.

Step 2: Copy the SOB Route to the UserCard

Display the All Routes form using the [F11] key or Info>>Route toolbar button.

Highlight the route to transfer in the centre blue list. The button on the lower left-side of the form will be enabled if a UserCard is detected, and the slot where the UserCard is found is displayed on the button's caption. If no UserCard is detected, this button will be disabled (see example pictures, right):

Step 3: Transfer the SOB Route to the Chartplotter

The SOB route is now saved to the UserCard, a Route Name is created from its name as used in SOB. This name may be truncated to fit the naming requirements of the UserCard.

Now simply remove the UserCard from the USB Card Reader, and insert into your Chartplotter's card slot. Consult your plotter's User Manual for instructions to load the route into the plotter.
10.4 Purchasing & Installing C-Map Charts

Using the cartridge-style C-Map charts (C-Cards) with SOB is as easy as plugging in the Card Reader, installing its (supplied) driver, inserting a C-Card and starting SOB. There are no additional steps, installations or setups required for SOB to use the cartridge charts.

The remainder of this section refers to installing and using C-Map chart FILES supplied on the NT+/PC or MAX/PC Chart Selector disks.

The screen shots, following, may be for an older version of the C-Map NT/PC Chart Selector application than you have, there should be enough similarity between these examples and your program version to follow these directions.

10.4.1 C-Map's "Chart Selector" program

The Chart Selector program is supplied by C-Map on their chart DVDs, or downloaded from C-Map. Different DVDs are available which cover different world regions, eg: Oceania, Middle East, Europe, Americas, Africa etc.

The Chart Selector DVD is sent out free-of-charge by C-Map, or downloaded from their website, and contains all available charts for the regions covered. The charts are encrypted files, and must be purchased, registered and installed prior to being used. The Chart Selector program is automatically installed from the DVD and allows you to select your region then continue to immediate online purchase (with an Internet connection), or you can complete the purchase by phoning your details through to a “call centre” – the available phone numbers will be presented to you during the purchasing process.

The Chart Selector program provides simple tools for performing each of these steps, plus additional features allow you to examine details about your current licensed and installed charts, and backup/restore abilities for your Chart License Codes.

During the purchasing process, you will be presented with the cost(s) of the chart(s) you have selected, in your choice of currency. You can also purchase a C-Map Smartkey/Dongle via the Chart Selector program.

Sample screens from the PC Chart Selector program supplied on the C-MAP Chart CD-ROM disks as an auto-installing application.

10.4.2 C-Map USB Smartkey (Dongle)

The C-Map USB SmartKey (otherwise called the Dongle) allows your purchased C-Map Charts to be used on any computer that has this Dongle plugged in.

To use your Licensed Chart(s) on other computers, the supplied Dongle driver must first be installed on each computer, then the chart file(s) and license code(s) must be transferred over.

Refer to Example 3, below...
10.4.3 Examples

The following examples step you through the process of selecting and purchasing NT or MAX on PC chart files as distributed on the C-Map Chart Selector CD-ROM(s) …

Important Notes:

1. For the examples that follow, there are slight differences depending on whether you have a C-Map Dongle (which allows you to use your licensed charts on multiple computers); or without a dongle your chart is licensed only for the computer on which you are running PC Selector when purchasing the chart license - an important consequence of this is that, without a dongle, YOU MUST BE USING SELECTOR ON THE COMPUTER THAT YOU WANT TO USE THE LICENSED CHART.

2. Any significant upgrade you perform to a HID licensed computer may invalidate your chart license. Contact C-Map in this event for an Emergency Recovery Code.

3. Ensure that you have the most recent version of the PC Selector application. C-Map updates charts approximately every 6 months. During the Selecting & Purchasing process, you may be advised that you do not have the most recent chart versions. In which case you should quit the process and acquire the latest PC Selector setup file from C-Map. Phone your local C-Map office and request the PC Selector disk to be posted to you, or download it from the C-Map website.

Example 1: Purchase and Install A New Chart Region

Step 1: Install & Run C-Map Chart Selector program

Insert the Chart Selector disk into your DVD drive, the Installation Wizard will auto-start. Simply follow the Wizard and reboot your PC after installation completes. The Wizard will also install a driver for the C-Map Dongle – this is a useful step to complete even if you don't currently use a dongle.

Once installed, Selector can be run from its link on the Start Menu, or Desktop, as are other Windows™ programs. However, SOB contains a couple of buttons (About SOB form and the Installed Charts form) from which Selector can be conveniently started. If Selector is not correctly installed, SOB will show a warning pop-up after pressing the button on the About SOB form.

When starting, Selector will show several pop-ups warning if the chart disk is not inserted and Eutron (or Smartkey) Dongle information and start a "collect" process – which you can safely cancel. The next picture is an example of the Chart Selector screen:

Step 2: Select the Chart Region(s) to Purchase

This picture shows several useful pieces of information:

1. The grey-hatched area along Australia's East Coast shows that this chart region is already licensed to this computer.

2. The red-bounded area around New Zealand is a region of interest that has been clicked. The red-area shows the extent of coverage for this chart.

3. The chart name is listed in the lower-left window – Charts selected from Map. This NZ chart name is M-AU-C206.06. Which is an Australasian area chart, number C206, version 06. MAX charts have an "M" in place of the "C".

4. The chart-size code is printed alongside the chart name - CDW+. This relates to a CD-ROM chart, Wide-plus coverage. C-Map's chart prices are based upon the size of the region covered. Other choices are SuperWide, SuperWide+ etc.

5. Importantly, the small super-script number alongside the CD icon, indicates what number CD or DVD contains this chart.

Ensure you have this disk in your possession before continuing with a purchase.
6. Along the status bar, the notification **C-MAP HID** (Hardware Identifier) indicates that a Dongle is not in use, so the chart will be licensed for use ONLY ON THIS PC. If a dongle were inserted and correctly installed, then this notification would be **Eutron SmartKey C-MAP**.

   **If you own a C-Map Dongle, DO NOT continue unless 'Eutron SmartKey' appears on the status line.**

Press the arrow buttons along the top, or use the scroll bars to position the chart to your area. The display can be centred to a place by **right-clicking** and selecting “Center” from the menu.

**Left-click** anywhere to show the charts that are available for that location. The lower-left window will list all charts that cover the location that was clicked. Select any other charts that are listed here to fine-tune the chart you need to purchase. You may find that another in the list has better coverage for your areas of interest. Alternately, you may find that a different selection grants you FAR MORE coverage at only a small additional cost – and might be worth considering. We advise you to select only the NTMAX charts wherever possible.

You can also graphically and textually browse all charts in the C-Map catalogue using the lists in the upper-left window – **Chart Catalogue**.

Once you have highlighted the chart region you wish to purchase, then right-click it on the chart display, or on the chart name in either list, and choose **Buy Chart**. Repeat this process to purchase additional charts in the same purchase-order.

### Step 3: Complete the Purchase

**Shopping Cart**

When all charts have been identified, selected and added to the Shopping Basket with the **Buy Now** choice, then select the **Shopping Cart** button to switch to the Purchasing screen. The top list of the example screen (pictured left) shows that many chart licenses are already installed, the lower list shows the charts that are to be purchased with this order (M-EW-M002.02 North East UK).

**Important Note:** DO NOT continue if (1) you do not have in your possession the disk containing the chosen chart; (2) if you have a dongle, but ‘Eutron SmartKey’ is not shown in the **Shopping Cart** window; and (3) you do not have a dongle AND this computer IS NOT the one you wish to license the charts for.

**Pay for the chart**

- If the computer is connected to the Internet, then press the [**Shopping Online**] button – and have your credit-card ready. You will also have an opportunity to enter our Dealer Code R30-468 to receive a 5% discount.
- If your computer is not Internet connected, then press the [**Call Centre**] button and proceed with the purchase via the telephone (Quote our Dealer Code to the operator for your discount).

**Register the chart license**

After purchase, you receive a **Chart License Code**. Press the [**Insert Chart License**] button and enter this code in the text box that appears at the bottom of the screen. Be sure that your chart disk is inserted in the CD/DVD Drive and press the [Register] button. The newly licensed chart will be copied from the disk to your hard disk and the license code will be saved to the Windows™ Registry. You will have to restart SOB to allow access to this just-purchased chart.

### Step 4: Confirm SOB can 'see' your New Charts

Unfortunately, completing the previous steps is not necessarily a guarantee that SOB will be able to 'see' the licensed chart(s). There are a few reasons where this process
can go wrong which prevents SOB’s access. Without doubt, the most common causes of problems have been highlighted already: With dongle – ensure that the chart is licensed only if the dongle is inserted and Selector recognises it is installed; and without a dongle, the computer you wish to run SOB and the licensed chart on is the one used for selecting and purchasing the chart.

Other problems can arise if incorrect Chart License Codes are entered. Although rare, it is possible for Selector to apparently accept a Chart License Code mistakenly entered, and continue with the registration process, however SOB will not be able to use charts installed in this case.

There are several methods within SOB to help determine which charts are installed. The most direct, and obvious, is to pan to the area and start zooming in. You will quickly know if detailed charts (below Level B) are available.

A detailed list of installed charts, and registered chart license codes are itemised on the Installed Charts form. To display this form, press the blue C-MAP button on the About SOB form:

The top half of this list (above the {unknown} entry) show all charts that SOB can ‘see’. The list is conveniently separated into the various chart-type and formats that are available from C-Map. If your licensed chart appears in the top part of the list, then it is DEFINITELY installed correctly and ready for SOB to zoom.

SOB will ALWAYS have the Background Charts available – SOB’s startup will abort if these charts are not found. Any charts or licenses that SOB can not recognise, or have other unidentified problems, will be added to the {unknown} section.

The Chart License Codes (C-Map Registry) section shows the actual chart licenses that have been registered with this computer. If a chart appears here, IT IS NO GUARANTEE that it is available for SOB to use – it only indicates that a license code has been entered into the Registry area.

Similarly, in the window of the About SOB form, all chart license codes entered in C-Map’s Registry area are listed. This is a useful preliminary check when diagnosing unavailable charts.

Chart Borders & Bounding Boxes [B]

On SOB’s main chart screen, areas covered by installed charts can be visually determined with the display of Bounding Boxes. The [B] key will open the Coverage Borders form.

For normal SOB use, these borders can be hidden, or set to Automatic and 1 level. Automatic will display the bounding boxes for only the available charts for the number of levels more detailed than the current displayed. So if Level B is displayed, and Automatic and 2-L evels is selected, then Level-C and Level-D bounding boxes will be displayed if these detailed charts are available.

When first exploring your new licensed chart areas, it is ideal (although cluttered) to set to Manual and tick all levels from C to G (a worldwide level-B is installed by default, so it is unnecessary to show this). The picture at right shows two areas covered by more detailed charts – the harbour entrance, and the northern arm have Level F charts available.

Once familiar with the detailed coverage areas you have in your portfolio, then chart border display is probably best disabled to reduce unnecessary screen clutter.
Step 5: Backup your Chart License(s)

This step is optional – but HIGHLY recommended.

Whenever a new chart license is registered with PC Chart Selector, you are advised to use the [Backup Registration Information] button on the 'Settings' screen:

We recommend you call the backup file cmap_licenses.txt (or similar) and save the file to your SOBvMAX\Charts folder.

If the file is saved to SOB's chart folder, then SOB can re-install your chart codes with the [Restore Chart Licenses to Registry] button on the Installed Charts form (see Step 4, above).

If you have a C-Map Dongle for your licensed charts, you can use this backup file for transferring charts for use on additional computers (see Example 3, below).

Example 2: Re-Install Previously Licensed Charts

Step 1: Uninstall All Chart Licenses

Run PC Selector, change to the Shopping Cart screen, then select each Purchased chart entry in the list, and press the [Delete] button.

Advanced users:
To ensure that all traces of the chart licenses have been completely removed, you should also check the Registry, and manually delete any remaining license codes: On the Start menu, select Run... then type regedit and Enter.

Navigate to HKEY_CURRENT_USER\Software\C-MAP\safe\codes in the left-side window, to reveal the chart license codes. Highlight each item in the right-side window, and press the delete key.

Step 2: Re-Select Previously Purchased Charts

Carefully add your previously licensed charts to the Shopping Basket, as outlined in Example 1. Ensure that you choose the exact same chart file(s) as you purchased, rather than just choosing the same region on the chart.

You must also be using the same version of the Selector CD when re-installing. Using a newer or older Selector version will result in a corrupt installation, and the licensed charts will not be accessible to SOB.

Step 3: Re-Enter Chart License Code(s)

Follow the process in Example 1, Step 3 - Shopping Cart and Register the chart license (see page 10-9).
Example 3: Copy Licensed Charts onto an Additional Computer

The C-Map Dongle is required to use licensed charts on other computers.

There are two distinct methods you can follow to copy your charts and licenses to another computer:

Using the C-Map Chart Selector program
This method is not discussed here. Just repeat the above instructions on each computer.

Advanced Users
This is a quick method for those who are comfortable copying files with Windows™ File Explorer.

With this method, **PC Selector** does not need to be installed on the other computers (unless, of course, you will be purchasing additional charts from those computers).

Ideally, you would keep a USB Thumbdrive with your C-Map Dongle.

1. The charts must be first installed and licenses registered on one computer following the examples above.

2. On the USB Drive, prepare these files:
   - **SOBv360_Setup.exe** The full SOB self-installing file (also keep your waypoints, routes and track files copied here for backup and/or easy transfer)
   - **cmap_license.txt** The license backup file created in Example 1, Step 5
   - **ASC20206.MCP, ENM00202.MCP** examples of the files of licensed charts
     By default, Selector will install the chart files to –
     - C:\Program Files\C-MAP Selector\Charts\*.MCP
     Note: SOB can use chart files in either this C-Map folder, or SOB's Charts folder.
   - **Setup.exe** From the Eutron folder on the Chart Selector CD-ROM.
     This is the driver for the dongle. It will be necessary to install this on each computer before the dongle will be functional.
     For clarity, you are advised to rename this file on your USB Drive, to:
     - cmap_dongle_install.exe (or similar)
   - Any other files necessary for your installation, eg: USB/Bluetooth GPS drivers.

3. On other computer(s), using only the USB Drive and Dongle:
   - Install SOB and the dongle driver
   - Copy **cmap_license.txt** and all *.MCP chart files to:
     - C:\SOBv360\Charts
   - Run SOB, press the blue [C-MAP] button on the About SOB form. On the Installed Charts form, there is a [Restore Chart Licenses to Registry] button which searches the SOBv360|Charts folder for a valid C-Map license backup file, then writes the licenses into the Registry.
   - Insert the dongle and restart SOB.
   - Refer to Example 1, Step 3 to confirm your charts are working.
10.5 **C-Map Chart Details**

### 10.5.1 C-Map Cartography - Detailed C-MAP Information


This file contains general information about C-Map Electronic Charts and specific detail about chart coverage types and C-Map media, etc. Although none of this information is necessary to use SOB, it nevertheless is relevant and interesting.

This is a very detailed, single page, colour PDF file. Suited best to be printed at A3 size, it can also be printed across two A4 pages, however your print driver or PDF program must support this feature.

### 10.5.2 C-Map Chart Legend - List of all Chart Symbols


The following pictures are excerpts from the C-Map Chart Legend PDF file:

<table>
<thead>
<tr>
<th>LANDMARKS</th>
<th>SEABED TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buildings</td>
<td>Wd Ash Volcanic ash</td>
</tr>
<tr>
<td>Church</td>
<td>Kelly</td>
</tr>
<tr>
<td>Cemetery</td>
<td>Su Gras</td>
</tr>
<tr>
<td>Tower</td>
<td>Sg Sedge thistle</td>
</tr>
<tr>
<td>Lighthouse</td>
<td>Sp Spindles</td>
</tr>
<tr>
<td>Chimney</td>
<td>Cc Compositae</td>
</tr>
<tr>
<td>Reef stack</td>
<td>Fa Fucus</td>
</tr>
<tr>
<td>Monument</td>
<td>M Ma Wates</td>
</tr>
<tr>
<td>Hospital</td>
<td>S Co Sabellaria</td>
</tr>
<tr>
<td>Wharf</td>
<td>S Bl Sandbank</td>
</tr>
</tbody>
</table>

This is another very useful reference source for chart information specific to C-Map Electronic Charts. Use the hyperlink above to download this file.

All symbols, features, marine and ports detail displayed on the charts are listed on this C-Map Legend sheet.

We recommend that you print out this PDF file and keep it near the chart table. This single page file can be tricky to print, ideally your printer should be able to print to A3 size, or print a single page tiled across 2x A4 pages.

### 10.5.3 Chart Datum

All C-Map charts are recorded in the **WGS-84** datum. This is a mathematical approximation of the Earth’s imperfect ellipsoid, based on the World Geodetic Survey 1984. It is important that ALL navigation equipment and devices onboard that are used to locate, or display, your geographic position are ALL set to the same Datum (WGS84).

This mostly applies to your GPS (or Chartplotter), but also importantly includes your official paper Nautical Chart(s). As with digital charts, paper charts are also overlaid with the datum graticule (lines of latitude and longitude). The chart is drawn to a particular datum. On most maps and charts, and certainly on all official nautical charts there will be a notation stating the datum used.

GPS and chartplotter devices should be factory set for WGS84, otherwise refer to the device’s User Manual to determine how to check/set the device for WGS84.
If your position sending device (typically a GPS) is set for a different datum, you will see that the plotted position on the SOB chart is always offset the same distance and direction from your true position, as determined by direct observation.

### 10.5.4 C-Map Chart Levels

C-Map Charts are built of different Levels (A-G and W-Z) each level is a different scale range. Levels A-D for coastal navigating and E-G for harbour-level chart detail. SOB will always be installed with four Worldwide background level charts, C-Map Level W, Z, A & B. If other detail chart levels are available they will appear as grey bounding boxes (as shown around Seattle, Hawaii, Florida, Panama in the image).

Levels-within-levels will also be shown as bounding boxes when zooming in and out through the levels. (Refer to Example 1, step 4 – page 10-9).

The Levels equate to the following scale ranges:

<table>
<thead>
<tr>
<th>Background Levels</th>
<th>Levels for Navigating</th>
<th>Virtual Levels (grey charts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>W 26,400,000</td>
<td>B 500,000 : 1,500,000</td>
<td>H 500 : 1,500</td>
</tr>
<tr>
<td>X 13,200,000</td>
<td>C 150,000 : 500,000</td>
<td>I 150 : 500</td>
</tr>
<tr>
<td>Y 8,800,000</td>
<td>D 50,000 : 150,000</td>
<td>J 50 : 150</td>
</tr>
<tr>
<td>Z 6,600,000</td>
<td>E 15,000 : 50,000</td>
<td></td>
</tr>
</tbody>
</table>
| A 1,500,000 : 5,000,000 | F 5,000 : 15,000  | "grey" charts may also be displayed at smaller scales when charts with sufficient detail are not available.
| G 1,500 : 5,000   |                        |                             |

### 10.5.4.1 Chart Levels Toolbar [F2]

A particular chart level can be quickly selected using these toggle buttons. They also will automatically toggle while SOB is being zoomed using any other methods to indicate the current displayed chart level. (This will always be the same as the chart level reported on the Status Bar - see page 1-9).

Using the [F2] Level toolbar or [Alt-Space] Goto form (point 3.1.3, page 3-2), any level can be directly selected.

If a chosen level is not available, then SOB will always display the nearest available level at a smaller scale. If no additional charts are installed for your area, then level B will be the most detailed available level. This level is the most detailed of the included Worldwide background charts.
10.6 Chart Toggles Toolbar  [F3]

10.6.1 Chart panning/zooming buttons

For most situations, these settings typically work the best:

- ChartLock = ON
- OverZoom = ON
- SkipEmpty = ON
- Virtual = OFF
- MixLevels = OFF*

* Note on MixLevels:

- For real-time navigating, it IS HIGHLY RECOMMENDED that you do not use MixLevels. This setting merges less detailed charts with your better coverage areas. We do not consider this a safe display for navigating as it may not always be clear when the chart is displayed with full detail, or less detail from a smaller-scale level.
- If NT+ and MAX charts are mixed in a region, then chart alignment may be quite poor near the boundaries.
- Use of MixLevels should be confined to normal chart browsing and planning/dreaming functions.
- Quickly toggle between MixLevels ON/OFF with the [F6] key.

SOB’s zooming mechanism works in this manner: each zoom request first tries to over (or under) zoom the current level by a pre-set factor. If the over/under zoom creates a chart of poor scale, then the next available level is chosen.

If your chart portfolio contains detailed charts for all your areas of interest, then these settings will work perfectly for you in all circumstances. Otherwise you will notice more "grey" chart areas where there is no coverage for your chosen chart level. This can be partly overcome by zooming out, turning ChartLock ON then zooming back down, panning away from the current chart coverage level may be unreliable in this mode, if so, disable ChartLock again at the first opportunity. Remember that if you have full chart coverage for your area then this issue is dramatically reduced.

10.6.1.1 ChartLock

Allows panning and zooming only to an existing chart. With ChartLock enabled, SOB will not display grey charts, the display will be zoomed to a less detailed level if necessary until a level with coverage is found.

Note: If you experience display errors with the PastTrack when navigating near the edge of a detailed chart region, then turn ON ChartLock will solve the display discrepancy.

10.6.1.2 OverZoom

will allow over/under zooming of each chart level - should be ON for most chart configurations and chart usage.

Note: In Perspective View, OverZoom is automatically disabled. Perspective View will only show charts at the scale they were digitised.

10.6.1.3 SkipEmptyLevels

will display only levels that exist when zooming - should also be ON for most usage.
10.6.1.4 VirtualCharts

will allow unlimited zooming – but to "course scale" charts at times (ie: heavily over-zoomed), typically useful for accurate calculations and measurements at extreme zoom levels (very large scales).

The display will be "greyed" when zoomed beyond available chart coverage depths. The graticule is still visible and all measurements and tools are valid etc. These virtual levels can be used for extreme close-up work. The scale can be zoomed to the magnitude $10^2:1$ suitable for surveying operations for instance.

10.6.1.5 MixLevels [F6]

Mix level mode is used to fill in the regions beyond the detailed chart levels with chart data from a less detailed level. This may slow down the chart drawing on weaker computers, however aesthetically useful for drawing a complete chart and avoiding the "grey" areas when there is no detailed coverage.

The less detailed mixed levels are shown with a dotted pattern, as pictured...

WARNING: We recommend disabling MixLevel mode for real-time navigation. This is to avoid the possibility of using a chart of insufficient scale in a critical situation.

While in MixLevel view, charts of different creation scales will be side-by-side, the larger scale chart will be less accurate and not always line-up precisely with the more detailed chart.

In addition, the chances of badly aligned adjacent non-matching levels is dramatically increased if you have a combination of NT+ and MAX C-Map charts installed.

10.6.2 Chart Information Display Buttons

10.6.2.1 Tides & Currents [Ctrl-T]

Show/hide the tide and current symbols on the chart - see page 10-19.

10.6.2.2 Sea Bed

Displays abbreviated codes for type of Sea Bed (eg: Mud, Clay, Silt, Sand etc) Refer to a marine cartography reference book (eg: Bowditch), or C-Map's Chart Legend, (page 10-13) for symbols used on nautical charts.

10.6.2.3 Depth Soundings [F5]

Show/hide display of depth labels for contour lines, and inter-use with the [F5] key to toggle display of Spot Soundings (where charted).

10.6.2.4 Bounding Boxes [B]

Show a grey-outline around areas where more detailed charts are available – page 10-10.

10.6.2.5 NightMode Form [F7]

Display the form for NightMode settings – page 10-22
10.6.3 Chart Symbols Display Buttons

10.6.3.1 Text Labels
Toggle the display of all text labels on the chart.

10.6.3.2 Roads
Toggle display of Roads (where present in the cartography).

10.6.3.3 Animate Lights [Ctrl-A]
Toggle light animation mode – page 10-25.

10.6.3.4 Land & Sea Shading [F4]
Show/hide extended colour shading of the land elevations and water depths, and change the function of the Depth Area Highlighting, page 10-23.

The C-Map MAX charts include far more detail about depths and land heights than previous chart formats and shows this with extra shades of colour.

For most purposes this enhances the chart display. However SOB's drawing tools are best shown on a white background, and certain colours can be reversed or disappear completely if drawn on a coloured background. When navigating, and particularly when displaying Wind Tools or AIS/ARPA Targets, you should disable the Shading using the button on the [F3] toolbar, or directly with the [F4].

10.6.3.5 Perspective View
Perspective View ... [F12] or [3] or [F3] toolbar toggle button or tickbox on ShipsForm>CustomPage gives a configurable elevated view rather than the typical overhead view.

Over/Under zooming is not permitted in perspective view. Only available chart levels shown at their digitised scales will be allowed, so MixLevels and OverZoom are automatically disabled in this view. Consequently a lot more "grey area" may appear in Perspective View. All usual chart functions and navigation tools are available, although some may be found to be unsuitable with some configurations.

The viewing position can be moved to give a different "shape" to your chart. You may want to hide the display of certain objects, or choose de-clutter mode to speed the chart drawing time (on slower machines) and/or to make the view more "readable".

In Perspective View a new toolbar appears with Up/Down Left/Right On/Off controls. The Up/Down and Left/Right can be changed to move in small or large steps with the {Shift} key - used as a toggle (don't hold it down – each press will toggle small/large steps).
10.7 Chart Data, Information, Services & Tides

There is a vast amount of data imbedded into the C-Map charts. Cartographic, nautical or POI (Points of Interest) symbols drawn on the chart are the "gateway" to the imbedded data. SOB provides two methods to investigate this data.

- Use the QuickInfo cursor to display summary information from any chart symbol.
- The same **Found Objects** form displays Chart Object details, imbedded photographs, the Currents & Tidal Stream data and the daily Tide Prediction graph.

**Right-click** on any chart object or symbol to display the data for that area. This data includes information pertaining to, for example: navigation lights, piloting info, yacht clubs and marinas, current streams, depths, hazard/warning areas, marine parks or fishing grounds or general points-of-interest etc etc.

10.7.1 Port Areas and Marina Information

- Hover the QuickInfo cursor over any marina symbol to show a list of marinas in the local "Port Area". (QuickInfo box pictured - right)
- Full Port/Marina details are displayed by using **right-click** when any SOB cursor is hovering over the chart symbol. Alternately, if the QuickInfo cursor is active, then **left-click** the symbol.

Touch-screen users can use Info>>Click as a quasi right-click for displaying the details form. To enter true-right-click mode, you will use a utility installed with your touch-screen driver.

The following screenshots show a sampling of the data contained "under" the Royal Prince Alfred Yacht Club chart symbol:
10.7.2 Imbedded Photographs

The Camera Icons show points on the chart containing photographs of the area. To reduce chart clutter, these icons can be hidden with a tickbox on the ShipsForm>>CustomSettings page.

Note: future MAX chart versions (and SOB) will include information about the direction and elevation of the camera when the shot was taken.

Right-click a camera icon to show the photograph on the Found Objects form...

---

10.7.3 Tides, Tidal-Streams and Currents

10.7.3.1 Tide Predictions

Numerous tide stations are located on the C-Map charts. Chart Level C or D must usually be visible for the tide symbols to appear. You must have detailed charts available in your portfolio for the location you are interested in. The tide symbol may be hidden, enable drawing of this icon with the [Tides & Currents] button on the F3 toolbar.
Zoom to C or D level and the tide symbol will appear in specific datum locations (as determined by C-Map's cartography division), then right-click (or Info>>Click) for comprehensive tide prediction information and graphs.

By default, all times used on the Tide form are UTC (as is common practice on tide tables). Use the tickboxes to change the data to relate to STD - Local Standard Time; or DST - Local Daylight Savings (Summer) Time. UTC time is taken from a connected GPS with valid data, however if no GPS is present, then UTC will be calculated from the PC's date/time/offset settings (in Control Panel). The UTC timezone offset in use is printed on the form.

The units of measurement used are customisable (feet or metres) and set on the ShipsForm>>CustomSettings page.

A tide prediction graph and highs/lows for the current day will initially be displayed, select a different prediction date using either the 'New Prediction' drop-down boxes, or the quick date-picker window.

Set the cross hairs by moving the mouse pointer around the graph window. The time, tide height and rate-of-change will be updated in the 'Pointer' frame.

The daylight & twilight times are also listed, plus the dark-blue, light-blue and grey areas of the graph will correctly represent, (respectively) night, day and twilight times.

Today's current time marker is drawn as a yellow vertical line from top to bottom of the day graph.

Press the [Tide Table] button to create a regular text-based table of tides for the currently selected day. A NotePad window will open with the tide-table data. Print or save this file if required.

**NOTE:** All stated or inferred tide times and heights are ESTIMATES. Tide information is SOB is calculated to each quarter hour, so at best will be accurate to within 15 minutes of any stated or predicted times. Additionally, local weather and atmospheric conditions can significantly alter actual tide heights and times from those predicted on this form.

You should consult additional sources to confirm the accuracy of SOB's tide data is suitable for your requirements.

### 10.7.3.2 Currents & Tidal Streams

Tidal streams and current stations are included on MAX charts. These are shown in SOB as colour-coded and proportionately-sized arrows. Hover the Info cursor over these arrows will give speed/direction of current flow. The value is for the current time - UTC from a connected GPS is used, or if no GPS is connected, then the PC's time is used.

**Info>>Click, or Right-Click,** a **current** arrow (or the small yellow square if the rate is presently zero) to show a daily prediction graph on the **Found Objects** form:
A choice of three methods for viewing the current data: a text-table of time, set and rate; a line-graph (see below); or the polar graph (pictured right).

**Currents as a Polar Graph**

The polar-graph shows the current prediction for a 24 hour period. The current set for a particular time is read off the graph like a compass, the distance out from the centre indicates the rate (a scale is printed along the vertical axis). The graph is shown brown coloured for the morning, and red for the afternoon values to aid in the visual interpretation. Use the [<<<] and [>>] buttons to view the predictions for different days. When today's prediction is displayed the blue indicator line and present time is drawn to indicate NOW tidal-stream (ie: this direction will align with the arrow drawn on the chart surface.

Labels are placed along the curve at 6 hourly intervals, and hovering the mouse pointer anywhere on the curve will display the time, set and rate of the current for that point. The blue line shows the current's "set and rate" for the present time.

Certain data sets are not very distinct with this style of visual display (polar-graph), in which case the line-graph or text-table should be used.

The display on the right is an example of a data-set not really suitable for representation with a polar graph. Select the table or line graph for best interpreting or visualising this type of data. Although this representation does clearly indicate that the current for this location is always SSW or NNW.

**Currents Displayed as Line Graph**

New with SOBv10 is an option to view the current data for a day as a line graph. The thick-white "line" part shows the current strength measured against the y-axis on the left-side, and drawn over the line are small graphical "arrows" indicating the direction of the current, displayed as a compass needle style where north is "up".

**Currents as a Text List**

To save or print a table of tidal stream values for the selected day, press the [Export to NotePad] button to open Windows™ NotePad with the table automatically inserted with the values in 10 minute intervals. The cardinal direction is also shown for each value for easy reference. Note that SOB will overwrite this file next time the [View Table] button is pressed, so if you wish to save this table for future use, you must rename it using File>>Save As... menu command in NotePad. The file is created in the SOBvMAX folder by default.
Dynamic On-Screen Current Display (Shift-T)

It is possible to view the Tidal Stream arrows on the chart for future (or past) times. This is a very handy tool for checking slack water, or max current for certain situations, whether that be for easier docking, better fishing, or faster passage making, etc etc.

Press [Shift-T] to open the Tidal Stream Predictions Form (pictured).

The usage of this form is self-explanatory – step through different time periods as stated on each arrow-button’s tooltip. Press the [Now] button to return to present time, close the form with the [Hide] button. When the form is closed, the tidal stream arrow displays on the chart will return to reflect present time.

Notes on C-Map Currents

Strictly speaking the current data imbedded in the C-Map charts is "Theoretical Tidal Stream Strength and Direction". The tidal stream data is mathematically created from tide predictions at nearby points and indicate the expected water flow from point-to-point. It is unclear as to whether these data results are corrected against known current data for the area (as the tide stations are corrected based on the measured harmonic constants for the point).

It would appear that for most areas checked, the tidal stream data aligns well in regard to time and relative strength, although the current strength is generally noticed to be greater than that predicted from the tidal stream.

10.8 Night Modes  [F7]

Setting-up the best possible display for night use may involve several steps. (1) SOB provides a means to change the luminescence of the chart. Nine shades are possible ensuring that there is an ideal setting for any conditions. (2) The second process for setting night mode involves adjusting all the Windows™ display components such as borders, buttons, toolbars, scroll bars etc. Supplied internally in SOB are three different custom Windows™ display options of grey, red and black. (3) WinXP and newer users may have to change a setting in Control Panel's Display option so the SOB night mode changes will also be applied to the main title-bar of each window. Win 2000 uses the "classic theme" for title-bar display and will not require this step. (4) A final method (applies to both LCD and CRT) to optimise your monitor for night use is to physically adjust the brightness and contrast controls to reduce the screen's luminescence. The buttons for these adjustments are usually on the monitor's frame, or in the Menu of the monitor's OSD (On-Screen Display). Laptops may have these built into Function-keys.
10.8.1 Chart Brightness

Click a picture, or its accompanying radio button to select the setting. The background chart will be redrawn in this shade. Press [Cancel] to close the form and return to your previous setting, or [OK] to accept the new brightness setting.

10.8.2 Windows™ Elements

Click an image to select one of the preset Windows™ Themes - GREY, RED or BLACK. "Normal" will return to the colour scheme in use when SOB was started.

Note for WinXP: If the default WinXP theme is in use, then the main title-bar of each window will be blue or silver (depending on the theme setting) and SOB's preset Themes will not change the colour of the titlebar. The Windows™ Classic theme must be separately selected (ControlPanel>> Display>> Themes) for SOB's night-mode settings to also change the titlebars. To make it easier to load this Properties page, SOB is installed with a generic ".theme" file in the SOBvMAX folder (SOB Night Mode.Theme). Press the [Custom...] button to load this theme file into the Windows Display Properties utility, it is then possible to create your own Night Modes Theme. Save any successful themes you create, then simply double-click any such files (from File Explorer) to reload the chosen theme at any time.

10.9 Depth Area Highlighting  [F4]

You have the option to show extended colour shading of the land elevations and water depths. The C-Map MAX charts include detail about depths and land heights and can show this with extra shades of colour.

The [F4] key is a dual function key for toggling the display of depth and land elevation graduated colour shading ON and OFF. And when shading is enabled, the {Shift} key is used to change [F4] to toggle ON/OFF a user defined depth highlight band.

Note: the {Shift} key is used as a toggle button, similar in method to the CapsLock and NumLock keys.

For most purposes, using shading visually enhances the chart display. However SOB's drawing tools are best shown on a white background, and certain colours can be reversed or disappear completely if drawn on a coloured background. When navigating, and particularly when displaying Wind Tools or AIS/ARPA Targets, you should disable the Shading using the button on the [F3] toolbar, or directly with the [F4] key.

Custom shading settings are possible. How these work depend upon the shading mode ...

10.9.1.1 Depth Shading Form  [4]

Use the [4] key to display the Depth Shading form. This form indicates the current settings for the max and min values for the depth highlight band when shading is ON, and the max depth value for the blue colouring when shading is OFF.

Click in the white areas to the left and right of the blue bands to move the min or the max values (respectively), and drag the slider-bar to adjust the min/max values together while keeping the same relative difference (or range).
The [Highlight ON] button enables/disables the display of the green highlight band (same as the {SHIFT}+[F4] combination). The [Reset] button will revert to the default values when the form was opened, and the [Apply] button will update the chart display with the current settings. The slider's scale will adjust according to the min/max settings to display an appropriate range for the values selected.

10.9.1.2 Depth Level Shading OFF

When shading is off, the water is coloured a single shade of blue, to a depth contour based upon your chosen settings.

The maximum depth limit that is displayed as blue can be set using the [PgUp] & [PgDn] keys. With each press of the [PgUp] key, the high depth setting is increased by about 40% of the current setting. IE: if the chart is showing blue to the 10m depth contour, the next press of [PgUp] will increase this value to 14m; and the next press will increase it again to 20m. Press the [PgDn] key to reduce the max depth shading limit.

The following examples show the water shading, coloured blue, to the deeper depth-contour lines after successively pressing the [PgUp] key:

- Max Depth Limit = 2m
- Max Depth Limit = 5m
- Max Depth Limit = 10m
- Max Depth Limit = 15m
- Max Depth Limit = 20m
- Max Depth Limit = 30m

10.9.1.3 Depth Level Shading ON

When depth shading is enabled, all shallow water areas (to 200m) will be coloured blue, and depending on the current chart level and zoom scale, additional depths will be coloured based on C-Map's internal "ClearView" shading algorithms. The colours used, and the shaded depths limits, can't be controlled by SOB.

However, SOB can display a bright-green depth highlight band based upon minimum and maximum limit values that you set.

Showing/hiding the highlight-band is toggled with the [F4] key. But to prevent [F4] from toggling shading on/off, first press the {SHIFT} key, which changes the action of [F4].
To set the min/max values for the highlight band, use the [Home] & [End] keys to set the minimum value, and [PgUp] & [PgDn] to set the maximum value.

The following screen shots demonstrate how the depth highlight band can be used:

<table>
<thead>
<tr>
<th>Highlight band: 0m – 15m</th>
<th>Highlight band: 2m – 5m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highlight band: 5m – 10m</td>
<td>Highlight band: 20m – 30m</td>
</tr>
</tbody>
</table>

Notes:
If using the [Home] key would move the min value above the max value, then the max value will be reset higher first. Similarly, using [PgDn] to set the max value below the min value, will first reduce the min value appropriately.

Each value step of max & min are 40% greater/less than the previous values. Depending on your chart display, you may need to press these keys a few times until the next visible depth contour is reached.

10.10 **Animated Navigation Lights [Ctrl-A]**

Turns on a real-time flashing; always-on; or occulting representation of lights on the chart. All characteristics of the light are correctly represented:

- **visible**: if your ship is outside of the nominal range setting then it will not illuminate.
- **flash characteristic**: if the light spec is occulting, three every ten seconds, then that is the precise sequence and timing displayed by the animation of the light symbol in SOB.
- **colours**: are correctly displayed, including for your ship's position within sectored light limits.
**Notes:** the normal sectored light display (the coloured arcs) is disabled when light animation is on. The animate feature is especially impressive when you darken the chart colours using the [F7] key for night display.

The following sequence shows – first, the regular display with the light sectors visible (right).

And the remaining images show these lights with animation enabled and their colours as the ship moves in and out of the sectored zones:

One green transit light is visible (the back one, top right of picture). The red flashing light on Henry Head (lower-right) is currently flashing ON, and the green channel marker (left-middle) is currently flashing OFF.

Both green transit lights are now visible from the Ship’s position.

The ship is now beyond the forward transit light’s sector, so it is no longer visible. Henry Head is still in the red sector and the green channel marker is also still visible.

The ship has now entered Henry Head’s yellow sector.

*These images are from a MAX demo chart for the north headland of Botany Bay, on Australia’s south-east coast.*
10.11 Declutter Mode [F8]

Declutter mode is used to remove non-essential chart elements such as text, tools and symbols, from the chart surface. This displays a clear chart, maximising its faculty for real-time navigation.

C-Map’s inbuilt “ClearView” technology is responsible for determining which cartographic objects and navigation aids on the chart are displayed or hidden in Declutter mode.

The remainder of SOB’s tools and objects are either hidden or displayed more simply. For example, the

- Ship’s Label will become transparent
- Route and RBL labels will be simplified
- Wind Tools will be hidden
- AIS Targets will have the target tracks and the MMSI and Name labels hidden. And non-dangerous targets and inactive target symbols will be displayed transparent (a hollow triangle).
- Waypoint display will be simplified

When Declutter mode is enabled, the display of most objects can be fine-tuned. Elements hidden by Declutter can be re-displayed using its usual setup method. For example, redisplay

- Depth Soundings with the F5 key
- Wind Tools with the tick-box on the ShipsForm

The two example images above, show the difference with Declutter on and off:

- Target tracks, pointers and labels are hidden, and all non-threatening targets are drawn with outline only. Notice that the targets that remain coloured are the red target with a collision potential, and the green target which is a member of the Target Friends list (the Race Officials’ Boat in this example).
- All chart text and non-essential symbols are hidden. Depth labels are hidden
- Wind Tools are hidden, Ship and Waypoint Labels are simplified
This image is the same as the previous, with fine-tuning done after Declutter mode was enabled - chart orientation set to the upwind waypoint; and all the Wind Tools redisplayed:
11 The "Talking Pilot"

This feature was introduced in SOBvMAX v7 at the request of a blind sailor (vision-impaired, not drunk!), however the feature has great application for the helmsman, navigator/tactician and any other crew member with an interest in the ship’s data.

SOB must be licensed for full access to this feature. Unlicensed users will have access only to saying the Time.

The Talking Pilot utilises the built-in Windows™ Speech system (also known as "TTS" for text-to-speech) to narrate selected ship’s data via the Windows™ Sound sub-system. Thus enabling SOB’s Talking Pilot requires setting up and configuring the Windows™ Speech and Sound systems, then configuring SOB to narrate your choice of relevant ship’s data.

![Talking Pilot Interface]

The image above is SOB’s interface for controlling what is spoken. This form is quite self-explanatory, but will be considered in detail later in this chapter, first it is necessary to correctly configure Windows™ systems to enable this feature.

NOTE: The Windows screenshots that follow are from Windows 2000. Newer Windows users will notice several discrepancies with their forms compared with those shown here, however the basic functionality is identical so just find the equivalent page, property or setting, and continue with the instructions given:
11.1.1 Configure (and install) Windows™ Speech System

Required elements for TTS should be installed by default on WinXP and newer computers. Win2000 computers will probably not have these elements installed. Microsoft also supplies some additional "voices" for use with TTS – these are typically not present on either WinXP or Win2000 installation, but can be freely downloaded from Microsoft.

11.1.1.1 Install Speech Components

First, check if the required components are pre-installed: Open Control Panel, if TTS is installed, then a Speech applet will be listed as shown in this picture:

![Control Panel](image)

If no speech icon is visible, then the Speech components must be installed. For WinXP and newer, re-run the Windows installation ("Add/Remove Programs", in Control Panel, and choose "Windows Programs") and be sure to tick the Speech components to install.

Alternately, for Win2000 or if Speech is not an option with WinXP install, then download the "SpeechSDK Installer" from the Microsoft website:


and search for "Speech Software Development Kit 5.1" (which is a 68Mb download).

Even if Speech is installed on your XP computer, you may still wish to download and install this SpeechSDK as it includes two additional "voices" (Mike & Mary) that are not installed by default with WinXP.

11.1.1.2 Configure Microsoft Speech

Once the Speech applet is installed in Control Panel, double-click the icon to open the Speech Properties dialog box:

![Speech Properties](image)

This screenshot is displayed with the Voice Selection combo box opened to show the list of voices installed. The Sample TTS voice option is installed by default and is a sample only with limited vocabulary and should NOT be selected. Sam is the default Microsoft voice which sounds very synthesized and is not particularly good. Mike & Mary voices are installed with the SpeechSDK (described in the previous point) and are quite sophisticated synthesized voices which most SOB users should be very satisfied with.

After selecting a new voice from the drop-down list, Windows will narrate the sample sentence so you can immediately hear this voice.

A wide variety of additional voices can be purchased online from various websites for around USD$30 each. These commercial voices are VERY good synthesized voices. Some links to websites offering voices for download are listed later in this chapter.
11.1.3 Select Audio Output device for MS Speech

Your PC may have multiple Audio/Sound sub-systems installed, for example the internal speakers, external connected speakers, connected Bluetooth headphones, or even a Bluetooth mobile-phone acting as a remote audio device! SOB can also play a WAV sound file to simulate narration of a data value (this is described later in the chapter), so BOTH Sound (for TTS) and Audio (for playing WAV files) output devices must be configured according to your requirements.

Press the [Audio Output...] button on the Speech Properties form (circled red in the image above), to open this simple TTS Settings form:

You can choose a specific installed sound system for narrating (Bluetooth Audio in the example), or choose the "preferred device" to use the default Windows™ sound system.

SOB will display the Sound System in use on the Titlebar of the SOB Talking Pilot form:

11.1.4 Configure Windows™ Sound System

Double-click Sounds & Multimedia applet in Control Panel to open the Properties window:

Now simply set a default Audio device to be used for both your Audio and Speech output:

This form will appear differently in other Windows versions, and may include a separate Speech page, however the settings and functions described here will apply to both Windows 2000 and newer Windows installations.
11.2 Talking Pilot form [Ctrl-Space]

Open the Talking Pilot form with the [Ctrl-Space] key combination. These keys have been chosen to allow sight-impaired users to find them easily.

This is a paid SOB License feature. Its functionality will be limited to saying the Time only if using an unlicensed SOB version.

11.2.1 [Test] button

Press the [Test] button at the bottom of the form to narrate a general sentence followed by the current time. Use this to test that the Speech system is working as you are expecting. Otherwise, return to the Windows™ Settings topics in the first half of this chapter to correctly configure the Windows Speech and Sound systems.

11.2.2 Time & Timer

11.2.2.1 Time

Simply instruct SOB to speak the time at an interval of your choosing. Depending on your requirements, you may need the time spoken every few seconds, or every half-hour for example. Configure these requirements as necessary. When SOB is set to speak time in intervals less than 1 minute, then the short format will be used, the hour will not be narrated, only the minutes and seconds.

In long format mode, when saying the time in frequencies greater than a minute, then the hours and minutes are spoken (but not the seconds).

If speaking the Time is enabled, then the time will also always be spoken on the hour.

11.2.2.2 Timer

A countdown Timer is included in the Talking Pilot which may be of benefit for instance for the start of a yacht race, or simply keeping tabs on a significant future point in time.

Set the countdown time interval in the Set timer textbox, select the appropriate unit (seconds or minutes) then press the red Timer button to begin the countdown.

SOB will control the frequency of the spoken remaining time according to these rules:

- Longer that 5 minutes to go – every 60 seconds
- Longer than 1 minute to go – every 30 seconds
- 30 seconds to 60 seconds to go – every 10 seconds
- 6 seconds to 30 seconds to go – every 5 seconds
- 5 seconds to go – countdown every second (eg: five-four-three-two-one-GO!)

Notes

1. The Say after text will not be used when the time remaining is less than 30 seconds.
2. A WAV file will be played at zero seconds. This file is: SOBvMAX\Media\Sounds\AL_tada.wav and may be customised by the user by substituting any other wav file. Use a pre-recorded sound, or use Windows audio tools to record your own sound or command. Ensure the substituted file is named correctly.
3. The time remaining will also be printed on the green enable button.
4. Be aware that the countdown of the final 5 seconds can be delayed if other speech commands are waiting in the narrator queue. (Refer to point 11.2.6.1 below)
11.2.3 Ship’s Data

11.2.3.1 Common Settings

Each of the ship's data values that can be spoken is presented on its own page on the Talking Pilot form. Each page has a large red or green button on the left side to enable/disable the speaking of this value:

The Time option, and each of the ship's data options, contain the basic settings to control how often, and how many times, the data is spoken. In addition, the ship's data options contain two toggles: Say before and Say after.

Directly type the values, or use the "spin" controls to set the number of times to Repeat saying a value, and to set the delay before narrating the value again (every). Choose seconds or minutes to suit your requirements.

You can prefix and/or postfix any narrated value with a custom word or phrase. This is free-form and is up to each user's personal preference. Often one of these is a necessity to differentiate the value being spoken from any others that may be enabled.

For example, if Depth and Speed are both enabled, then "four-decimal-three ... five-decimal-two" can not be correctly interpreted as either the speed and depth, or the depth and speed. Now if Say before is set to "Depth" (for depth) and Say after is set to "knots" (for speed), then the following becomes unambiguous:
"Depth four-decimal-three ... five-decimal-two knots"

11.2.3.2 Heading Data

Heading specific settings allow you to select whether the COG (from a GPS), or the boat heading (from an electronic compass) is spoken.

Tick the checkbox to force SOB to speak numbers in the nautical convention of three individual digits. For example, on a heading of 35°, say "zero-three-five" rather than "thirty-five".

Instead of simply speaking the current ship's heading, you can set it to speak a relative direction to a fixed course that you nominate – either input manually in the Steer to course textbox, or tick the Auto (use N2D) box. When auto is ticked, any active navigate to destination (MOB, Goto Waypoint, Active route) scenario will be used to supply the course to steer, and thus the course deviation that is spoken:
Eg: "steer 20 degrees to starboard" or "on course"

11.2.3.3 Speed Data

The Speed settings are similar to those for Heading.

Use the Speed alert to speak the speed value only if the speed drops below the set speed. Change the function of this setting to speak only faster speeds by ticking the If faster checkbox.
Tick the **Say decimals...** checkbox to include saying the fraction parts of the speed for slow speeds (less than 10 knots).

For example, if the speed is 9.6 knots, then say "nine-point-six knots" rather than "ten knots" (rounded to nearest integer value).

### 11.2.3.4 Depth Data

Similar to the optional settings for speaking the Speed, the Talking Pilot’s Depth can be restricted to speaking only shallow depths below a fixed user-setting (tick **Depth alert**), or deep water values above the preset value (also tick the **if Deeper** checkbox).

The **Say decimals...** setting works in the same manner as for narrating the Speed value.

### 11.2.3.5 AIS Targets

Enable the Targets button to speak the range and bearing to any target that has just presented as a collision potential (is predicted to have a CPA within your "safe zone" – refer to the Targets chapter for details).

Eg: "new target 4 nm bearing zero-three-two degrees"

### 11.2.3.6 N2D Data

Use this page to configure the narration of approaches to the next TurnMark in a Route. By ticking the **Next Course Change**, **Range** and **Time to Destinations** boxes. XTE warnings will be announced according to the settings.

### 11.2.4 Punctuation Characters

Most of the "voices" that are used contain sophisticated rules for changing the tone and emphasis of the spoken word based on its surrounding punctuation. We are unaware of any hard and fast rules implemented across all voices, however simple experimentation will quickly determine if the quality of the spoken sentence is improved.

In particular a full-stop or exclamation mark at the end of a sentence will improve the manner in which the final word is pronounced, and including a comma, semi-comma or space(s) can improve the way that multiple words are strung together.

For example, you should include a full-stop or exclamation mark after the **Say after** text. And even if you choose not to say anything after the data value, then try using only a full-stop or exclamation mark in the **Say after** box which should improve the way that the data value is narrated.

### 11.2.5 Using Pre-Recorded WAV Files

Standard Windows™ WAV files can be used in place of, or in combination with, the TTS Speech feature.

WAV files used by the SOB Talking Pilot are located in this folder: `SOBvMAX\Media\Sounds\TTS` and must follow a specific file naming convention.

The file names must be in this format:

```
CODE_VOICENAME_VALUE.WAV
```

Each value that you wish to have spoken must have its own WAV file. For example, "heading" files would be thus:

```
COG_PAUL_5.WAV, COG_PAUL_10.WAV, COG_PAUL_15.WAV, etc etc
```

You can choose the "resolution" of the spoken values by including enough WAV files to cover each number. This example shows heading data in 5° increments. It is VERY IMPORTANT for consistent and complete values to be represented by WAV files for each data you wish spoken. So for the heading example, there must be a WAV file for all these values:

```
0,5,10,15,20,25,30 ... 340,345,350,355,360
```
SOB will choose the WAV file that is closest to the true value for playing. IE, if the true value is 333° and your file "resolution" is in 5° increments, then the \texttt{COG\_PAUL\_335.WAV} file will be played.

Of course you can have one degree resolution by recording 360 separate WAV files and naming them as \texttt{COG\_PAUL\_1.WAV}, \texttt{COG\_PAUL\_2.WAV}, \texttt{COG\_PAUL\_3.WAV} etc

Or 10° resolution files would be \texttt{COG\_PAUL\_10.WAV}, \texttt{COG\_PAUL\_20.WAV}, etc

WAV files must use the following \texttt{CODE}s:

- Heading Data – use \texttt{COG}
- Speed data – use \texttt{SPEED}
- Depth data – use \texttt{DEPTH}

The \texttt{VOICENAME} part of the filename can be anything that you wish to use to describe the voice, for example PAUL, KATE, SHOUTING, WHISPER, BARTSIMPSON.

This name will appear in the Select Voice drop-down box. The example screenshot (below at right) shows two separate sets of additional WAV files installed with SOB.

And the screenshot (below left) shows a snip from Windows File Explorer of the SOBv360\Media\Sounds\TTS folder and demonstrates the Kate and Paul files used.

11.2.6 Caveats

11.2.6.1 Overloading the speaking queue

As commands are triggered for speaking, they are sent to a speak-queue, and narrated on a first-in-first-out basis. The length of this queue ("length" being the amount of time required to say the values and any pre/postfix text included) may exceed the delay/frequency interval set for speaking one of the commands.

If many data values are enabled for speaking with high frequencies (every 10 to 15 seconds, or so), then you will likely experience overlaps with what is currently being spoken and the next value that’s queued and ready for speaking. Your computer may appear to freeze while waiting for the queue of commands to be narrated, and if more commands are added to this queue before it is emptied, then the computer may appear permanently frozen.

Firstly, you should determine (generally by trial and error) what interval and quantity of information is spoken so that overlaps are rare, and plenty of time exists between intervals for the queue to empty. If you do have a condition that is overloading the speaking queue, then click any of the green enable buttons that are visible. It is unlikely under these conditions that the button will immediately return to red (disabled), however you should avoid continuously clicking this button, just click it once then wait patiently until Windows gets a chance to process this request and in time it will disable it and turn the button to red.
11.2.6.2 Combining WAV files and TTS synthesized text
If WAV files are used for narrating any of the Talking Pilot's data values (see point 11.2.5 above) in addition to the TTS method, then you will occasionally hear overlapping voices (depending on the various frequency settings). These two Windows™ sub-systems (Audio/Sound and Speech) operate independently of each other, and thus can run simultaneously. If an overlap occurs too frequently, then adjust the frequency of one or other of the spoken values to get them "out-of-synch" of each other.

As these are different Windows operations (playing WAV files, and speaking with the TTS engine) they can also use separate Windows installed Sound systems – for example speaking pre-recorded WAV files could be sent to the PC's speakers, while synthesized speech can be sent to a connected headset. Adjust the Audio/Sound and Speech devices in use using the Control Panel windows described in the beginning of this chapter.

Note that the Say before/after will always use the TTS synthesized voices. So if the Select voice is set to play a WAV file, and both Say before/after are turned on, then what occurs is this:

- Say before is played through the TTS engine synthesizer
- Then the relevant WAV file is played by the Windows Sound system
- Finally, Say after is played through the TTS engine synthesizer

11.2.6.3 Refreshing values on the form
Not all changes to values typed on the Talking Pilot form are instantly set. In particular changing the values in the textboxes will not immediately be used by SOB as new settings. These changes have to be "applied" before they will take effect. Pressing the enable button (the red/green button); or clicking any checkbox or spin control buttons; or changing seconds/minutes will then apply all current settings on the form.

11.3 Ship's Bells [7]
Not a part of SOB's Talking Pilot feature, but controlled via a checkbox at the bottom of the Talking Pilot form, or toggled on/off with the [7] key.

Ship's Bells are a uniquely nautical feature from an era past. Every half hour the Ship's Bells are tolled so all members of the crew can keep track of the "watch" times (watch being the period during which you are "on watch" and not referring to a wristwatch). Infact this custom probably died-out once all crew members owned their own timepieces.

When enabled in SOB, the Ship's Bells are played through the default Windows Sound System every half-hour. At 12:30, one-bell is played, at 1:00 two-bells are played, then each half hour will be an additional bell up until eight-bells (4 hours later) when traditionally a "change of watch" occurred.

Each "bell" is contained in its own WAV file (eg: 1bells.wav, 2bells.wav, 3bells.wav etc). The bell files are located in this folder: SOBvMAX\Media\Sounds

Tick the checkbox at the bottom of the Talking Pilot form to enable/disable the Ship's Bells. When the bells are turned ON, two-bells will be played through the default Sound System, and when turned off (and if TTS is installed) the following sentence will be spoken "Ship's Bells have been disabled".

The [7] key also toggles the bells on/off. When toggled ON, four-bells will be played, and when toggled OFF a small blip will be played through the computer's internal speaker (which on some systems may be "mapped" to play through the default Sound System).
11.4 Voice Recognition & Spoken Commands

Voice recognition is built into Windows XP, refer to your Windows™ User Manual for instructions on how to enable and use this feature.

Voice (or speech) recognition can function in two different ways:

(1) Commands, or (2) Transcription.

With adequate "training" of the speech recognition engine, and a disciplined "dictation" voice, it is not unreasonable to expect better than 95% recognition accuracy during transcription.

However SOB does not have a use for the dictation properties of speech recognition, rather, SOB would use Spoken Commands to activate Macros that are linked to SOB's features. Each user must set-up these macros for their own use (using techniques as described in the Windows™ voice recognition help pages).

The design of SOB should allow any feature to be accessed with a two or three word command. Organise and plan your tasks thoroughly before beginning to create the voice command macros.

Examples:

<table>
<thead>
<tr>
<th>SOB Voice Command</th>
<th>Configure Macro to Perform These Actions...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centre-Ship</td>
<td>press [Centre-Ship] button on SOB Toolbar or [space] key</td>
</tr>
<tr>
<td>Autocentre-Ship-Mode</td>
<td>press [Info] then [Centre Ship] buttons</td>
</tr>
<tr>
<td>Show-Ships-Form</td>
<td>press [F9] key</td>
</tr>
<tr>
<td>Show-AllRoutes-form</td>
<td>press [F11] key</td>
</tr>
<tr>
<td>Show-Perspective-View</td>
<td>press [F12] key</td>
</tr>
<tr>
<td>Close-Form</td>
<td>close any open form (a default command)</td>
</tr>
<tr>
<td>Select-Waypoint-Tool</td>
<td>click Waypoint button on SOB Toolbar</td>
</tr>
<tr>
<td>Select-Routing-Tool</td>
<td>click Route button on SOB Toolbar</td>
</tr>
<tr>
<td>Pan-East</td>
<td>click to right of display centre</td>
</tr>
<tr>
<td>Pan-Far-East</td>
<td>click on right edge of screen</td>
</tr>
</tbody>
</table>

In addition, many of the standard command macros created by the speech engine will be suitable for using with SOB. ie: Maximise, Minimise, Tab, Go-Down, Go-Up, Page-Down, Enter etc....
12 GRIB Weather Overlays [G]

12.1 GRIB Data and Sources

SOB includes default values for a few different suppliers of free GRIB weather data. The actual data will be compiled by a relevant national weather agency depending on the geographic location included in the request. These providers are a “gateway” that collects and issues this data by return email following a correctly formatted emailed request.

Refer to section 12.5 below for detail about the request format.

For further information about the free services built into SOB, visit www.saildocs.com or www.mailasail.com.

12.2 Data Types

The weather data can be displayed in a number of ways, some data types lend themselves to certain visualisation methods, for instance pressure data is regularly seen as a contour map – on the TV weather forecasts and newspaper's synoptic map. Other weather data available from GRIBs are not commonly viewed from other mediums, such as wave heights and geo-potential heights. SOB displays this data as colour-dithered density graphs.
The example image of Australia shows the Temperature at Sea Level as a density graph, overlayed with the Atmospheric Pressure as a contour map.

A full understanding of weather data and its interpretation is far beyond the scope of a "Software User Manual", however we will endeavour to outline at a very basic level what the data is and how to use it. Please note WE ARE NOT METEOROLOGISTS and make no claims that our knowledge is complete, or even correct! A good starting place for learning more about the weather is any of the websites from national weather offices - for example the Hong Kong and Australian Meteorological Bureau's sites contain extremely good and accessible data in the form of info pages and tutorials. Bowditch's "American Practical Navigator" (download from our website or included on the SOB CD) contains detailed information about weather systems and patterns as they relate to the mariner.

### 12.2.1 Compatible Data Types

<table>
<thead>
<tr>
<th>Msg #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Air Pressure</td>
</tr>
<tr>
<td>7</td>
<td>Geopotential Height</td>
</tr>
<tr>
<td>11</td>
<td>Water Temperature</td>
</tr>
<tr>
<td>33 &amp; 34</td>
<td>Surface Wind (vector)</td>
</tr>
<tr>
<td>49 &amp; 50</td>
<td>Surface Currents (vector)</td>
</tr>
<tr>
<td>59</td>
<td>Precipitation Rate</td>
</tr>
<tr>
<td>61</td>
<td>Total Precipitation</td>
</tr>
<tr>
<td>80</td>
<td>Water temperature</td>
</tr>
<tr>
<td>82</td>
<td>Water level deviation from mean height</td>
</tr>
<tr>
<td>91</td>
<td>Ice Cover</td>
</tr>
<tr>
<td>100</td>
<td>Wave Height</td>
</tr>
<tr>
<td>101</td>
<td>Wave Direction</td>
</tr>
<tr>
<td>103</td>
<td>Wave Period</td>
</tr>
<tr>
<td>160</td>
<td>Mean Sea Surface Temperature</td>
</tr>
<tr>
<td>164</td>
<td>Mean Wave Direction</td>
</tr>
<tr>
<td>165</td>
<td>Mean Wave Height</td>
</tr>
<tr>
<td>166</td>
<td>Mean Wave Period</td>
</tr>
<tr>
<td>168 &amp; 169</td>
<td>Mean Wind Speed and Direction</td>
</tr>
<tr>
<td>205</td>
<td>Visual Wave Height</td>
</tr>
<tr>
<td>238</td>
<td>Snow Cover</td>
</tr>
</tbody>
</table>

A description of the more common data types that SOB can display follows (acronyms in brackets are the codes used in the request data email) ...

### 12.2.2 Pressure (PRMSL)

This is standard atmospheric pressure measured at mean sea level, units are millibars. SOB can display the pressure as either a contour map or a colour density graph. Generally speaking, the contour map display imparts more information visually than the colour graph, although the colour graph may be help to determine high/low pressure systems.

Note about pressure data: when pressure data maps are generated by weather authorities some additional information is interpreted by the meteorologists and drawn on top of the contour map. This extra information includes high and low pressure areas, cold fronts, warm fronts etc. This extra info is interpreted from the data by "human" experts, and is not duplicated in the SOB display. Be aware that "high" pressure systems are simply a relative comparison of the surrounding pressure values rather
than an empirical determination. This is also true of cold fronts, which are interpreted based on the pressure and temperature data surrounding the pressure systems.

This example image is clipped from the lower-left corner of the overview image of Australia on the previous page. The colours have been manually adjusted to increase the contrast in temperature change along the ridge at the low-pressure's leading edge. A suitably qualified meteorologist would determine that this is a cold-front and would draw the appropriate line and symbols for the published synoptic map (the blue curve has been manually drawn on the image to demonstrate this).

Use the [Settings...] form to choose to display the data as a colour-mapped solid dither, or a contour map. From a visual inspection only of the contour map, it is rarely obvious whether a weather system is a high or low pressure system (as highs/lows are determined only by the relative values surrounding the system – ie: in one circumstance, a LOW pressure may be, say, 998mb if the surrounding pressure values are larger than 998, however if another pressure system has 998mb as its centre value, and all surrounding values are smaller than 998, then this is a HIGH pressure system!)

If in doubt then display the pressure data as a coloured density graph – the blue/red shades displayed will make it easy to determine the highs from the lows. Underlaying the temperature or 500mb data under the pressure contours will also usually help determine the relative high/low pressure systems.

As a contour map, the lines are separated by either 1 or 2 mb depending on the display scale and the requested resolution (1°x1° etc). At very high zooms, text information will be drawn to the display at each data point contained in the GRIB data.

### 12.2.3 Wind (WIND)

Wind prediction data is for 2 metres above sea level as knots and direction measured from true north. This is the weather data usually of most interest to the mariner. SOB provides many options for the display of wind data: primarily as coloured density graph or wind barbs. The wind barbs resemble feathers on an arrow. The arrow "flies" in the direction of the wind, and the flags indicate the wind speed – each long flag equates to 10 knots, and half flags are 5kn increments. IE Two long flags and one short flag would indicate a wind speed of 20-25kn. The wind barbs can also be displayed as arrows (either coloured to indicate relative speed, or black). At low zooms (small scale chart) the flags or arrows will not be drawn to reduce the screen clutter, and at very high zooms (large scales) the values for each data point will be printed as text on the chart.

The following example images display the various ways that SOB can display wind data:
12.2.4 Temperature (TMP)

This is (atmospheric) air temperature measured at 2 metres above sea level. Units are user-selectable as Celsius or Fahrenheit.

Apart from the obvious benefit to "player comfort" of knowing the temperature at a future place and time, the greatest benefit is to aid in interpreting the overall weather systems and patterns – ie location of cold fronts and direction of wind flow etc.

Refer to the "Pressure" example above.
12.2.5  Geo Potential Height (HGT500)

Geo Potential Height is the energy potential of the atmosphere measured at a height where the pressure is equal to 500 hecto-Pascals – this generally coincides with an actual height of about 5600 metres. The units used for GPH data are Geopotential Metres (gpm). This data is often mistakenly referred to as the "wind at 500 metres"; it has been perhaps best described to us as "the steering winds for pressure systems".

The following description of GPH has been lifted from the Hong Kong weather site (http://www.weather.gov.hk/nwp/nwp_backgroundinfo_e.htm)

Geopotential, or gravitational potential relative to mean sea level, is the energy an air parcel may potentially acquire by virtue of its position in the gravitational field of the earth. In the atmosphere, geopotential varies with altitudes and across latitudes. On an isobaric surface, higher geopotential implies higher potential energy and vice versa. Just like streams flow according to the layout of terrain, air will flow from high to low geopotential regions. Usually, areas of relatively high or low geopotential correspond with areas of high pressure or low pressure respectively.

For the sake of atmospheric analysis, geopotential is commonly converted (namely, divided by the standard acceleration due to gravity) to geopotential height and expressed in units of geopotential metre. To a good approximation, geopotential height of, say, an isobaric surface is equal to the altitude of the surface.

From 500-hPa geopotential height maps, one can depict important weather systems on the large scale, e.g. subtropical ridge or long-wave troughs in the westerlies. These large scale systems not only dictate how cold or warm air intrusion proceeds, but also steer the movements of tropical cyclones and other upper-air disturbances.

This example image below is the same forecast data as the image at the beginning of the chapter, however this image has the pressure contour map overlayed on the GPH data rather than on the TEMP data. The relationship between GPH and PRMSL should be apparent:

12.2.6  Precipitation (Rate & Total)

Precipitation Rate is the predicted rainfall (or snow, hail) at ground/sea level in raw units of kilogram per square metre per second (kg/m²/s). This is equivalent to millimetres per hour (mm/hr) which are the units used for this data in SOB. Note that most weather agencies express rainfall in "points" which is a measure of the number of millimetres per day (divide by 25.4 for inches per day). So to convert the GRIB data to points, multiply the precipitation value by 24 (as 24 hours = 1 day).

In SOB, precipitation is displayed only as a coloured density graph, however values of 0 are ignored. The image, at left, shows precipitation overlayed with the pressure contour map. Notice the typical situation of rainfall predicted along the leading edge of low pressure systems (in the Southern Hemisphere, low pressure systems rotate clockwise!).
12.2.7 Wave Height, Period and Direction

Wave height is height above mean sea level measured in metres. The predicted wave heights are calculated from a number of meteorological and geographic factors (wind and fetch) and various measurement instruments and techniques (buoys and satellite based technologies).

The following screen shot shows wave and current data for the English Channel as provided by TideTech.

Following is information about wave predictions from the Hong Kong meteorological agency.

Ocean-wave forecasting

Ten-day global forecasts of ocean-wave conditions are produced daily using a wave model driven by the surface winds from the atmospheric-model forecast. The wave model is the third-generation WAM model. It predicts the two dimensional wave spectrum and is based on an explicit description of the physical processes governing wave evolution, which include wind input, dissipation by white-capping and bottom friction, and non-linear wave-wave interactions. The initial wave analysis is based on observations from the altimeter on the European Space Agency’s ERS-2 satellite and on background wave information produced by the wave model using winds from the background forecast of the atmospheric data assimilation. The method of optimum interpolation is used to adjust the background state towards observed values.

The move to the VPP700 enabled a significant increase in the spatial resolution of the wave model. Currently, the predicted wave spectrum has 12 directions and 25 frequencies so there are 300 degrees of freedom per grid-point. The grid is an irregular latitude-longitude grid, which has a constant latitudinal increment but adjusts the size of the longitudinal increment in such a way that the distance between grid-points is almost constant, much as in the atmospheric model. The resolution is about 55 km and involves about 120,000 grid-points.

An excellent source for more theory (including the formulas used) for calculating wave heights from fetch and wind can be found in Bowditch's "American Practical Navigator" (included on the SOB CD, or download from our website).
12.3 The GRIB Viewer Panel

This is the primary interface for controlling what GRIB data is displayed in SOB.

A typical session would entail:
1. Use the [Request New Data] button to retrieve new forecasts from the SailDocs Server.
2. Use [Load GRIB Files] to decide which data on the hard disk to load in SOB. Or Drag & Drop a GRIB file directly onto the chart.
3. Use [Display Settings] to customise how the data will be shown on-screen.
4. Highlight which Data Types to display, select the Issue Date and Forecast to visualise the choose data.

So, these three lists will be automatically filled while selecting which GRIB data to load (step 2). Then select the issue date and make selections in the first list according to the specific combinations of data to display, loaded and available forecasts will appear in the lower list. Only one forecast period can be viewed at a time.

When selecting data types and forecast dates and times from the Viewer lists, the other lists will change to show available matching information loaded for your selection(s).

SOB will only show data from a single Issue Date and Forecast period at any one time. Most of the Data Types can be displayed simultaneously, although some will overlap (for instance, temperature colour graph will conceal the GPH data displayed similarly). At higher zoom levels, all selected data types will be shown textually at the correct point on the chart.

12.3.1.1 Unloading Data

GRIB messages can only be unloaded from the File Manager - press [Load GRIB Files] button to show the GRIB File Manager. See next section...

12.3.1.2 Data Types List

Most GRIB weather sessions you experience in SOB would contain, at minimum, Pressure and Wind data and perhaps all available types. (The types you've requested from the provider(s) is generally a function of your email technology - see below).

Multiple types can be selected, use the standard Windows list commands for selecting multiple items (to extended selections, use ctrl or shift-click with mouse, or shift+arrows with keyboard).

Click on a selected item to deselect it.

As additional items in the list are selected, the Issue Dates list will change so its items remain synchronised to the data types being selected.

12.3.1.3 Issue Dates List

Dates in the list will be only those available for the selected data types, according to what GRIB data has been loaded (via the Load... button).

On an extended cruise, you may load two or three different Issue Dates for comparison purposes, although really only the latest data you have received should be used with all earlier issued forecasts considered obsolete.

Of course, any number of issue dates may be loaded if using old or archived data.

12.3.1.4 Available Forecasts List

This list will be updated as selections are made in the top two lists to only show forecasts periods that are loaded for the selected issued date and data type(s). SOB will
only allow you to display a single forecast period at one time, to eliminate any confusion as to the forecast data being viewed.

Loaded forecasts can be quickly stepped through, either automatically with the animate tickbox, or manually with the mouse wheel (if the list doesn’t have focus) or the up/down arrow keys (if the list does have focus). The delay period for the animate option can be changed on the [Settings...] form.

12.4 GRIB File Manager

This is perhaps the most difficult of the GRIB components to learn and understand. However it can be completely bypassed if your needs are straight-forward, in which case you just drag a GRIB file from a file folder, or email attachment, and drop it onto the SOB chart display. Or use Ctrl-O for "File/Open" and load a GRIB file from disk.

Use the GRIB File Manager for fine control of displaying and grouping your stored GRIB files:

To load and view any GRIB file in SOB, it must be in the SOBvMAX\GRIBS\Inbox folder. These files will mostly originate from a received email attachment, or the folder from some other GRIB manager/viewer program (such as Airmail).

When the GRIB File Manager is first displayed, or when the [Refresh Tree] button is pressed, SOB partially decodes every GRIB file found in the GRIBS\Inbox folder and organises the messages into a convenient tree list format.

Each GRIB file email may contain many "data sets", or "messages". The data sets could be different data types (pressure, wind etc) and/or different forecast periods (12 hour, 24 hour etc).

The tree starts with two primary groupings for your GRIB data: CURRENT and PAST. The current section is simply a convenient way to keep the latest data separated from the rest, so it can be quickly found in this list. Set the number of hours a forecast is to be considered "current" on the Viewer-Settings form. The "hours for current" setting should correspond to the normal delay between downloading your GRIB data (e.g. 24, 48 etc).

Example "hours for current" settings, you may have a schedule of either downloading the data daily, or getting 72 hrs of forecasts every three days. For the former, a setting of 1 day (24 hrs) is appropriate, but for the latter, 3 days (72 hrs) would be ideal, however 4 days would keep the previous forecasts handy for another day in case you wish to quickly refer back to the info you've just been using for three days!

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This screen shot shows a GRIB file for south-eastern Australia (the Sydney to Hobart race course) issued on 22 September 2004 at 6 pm. This particular file contains 6 messages - Pressure & Wind forecasts for 6, 30 and 54 hours. (Note that, being a vector quantity, each wind forecast requires two messages).

Data messages are further grouped in the tree by the geographic grid area covered and the data’s issue date. The tree is not grouped according to GRIB file name, although usually a single "Bounds" and "Issue date" branch of the tree will contain messages...
contained in a single file, but this is not necessarily so. For example, you may request GRIB data for a specific area for forecasts of 6 and 12 hours for pressure and wind. After examining this data in SOB, you may decide you also want data for temperature and also pressure and wind for 24 and 48 hours. When SOB processes this second GRIB file, then providing the bounds and issue date are identical with the previous file requested, SOB will decode the new messages from the file to this same branch of the tree.

### 12.4.1.1 Load a GRIB Message

GRIB files in the tree list have been partially decoded to retrieve bounds, issue date, forecast period, message type, resolution etc so they can be organised in the tree. However the actually data contained in the messages is not decoded and SOB can't display it until it is specifically "Loaded". To load an individual forecast and data type, double-click the item in the tree. This will immediately decode the data and add items to the Viewer panel lists. Alternately, mark the item as ticked and it will be decoded at the first attempt to view it on the chart. To load all the messages for a chosen issue date and area, then double-click the "Bounds: ..." item will decode all the sub-items, ie all contained messages.

The items in the tree are colour-coded to indicate their status:

- **Darker-blue items** have been decoded and are loaded in SOB.
- **Grey-text** indicates either: second part of loaded wind message, or data that has been ticked for loading but not yet decoded (it will be decoded prior to first viewing).
- The yellow shaded item is the current highlighted message, for conducting [Rename], [Archive], [Delete] or [GRIB Info] operations. The text will be blue if it is also decoded/loaded, or black otherwise.
- **Cyan coloured "Bounds..." items** indicate that loaded messages are contained in this branch. If every contained message is loaded, then the item will also be ticked.

The following diagram shows how the File Manager tree items and the Viewer panel lists are related:

#### 12.4.1.2 [Refresh Tree] Button

This will unload all loaded GRIB messages, clear the Viewer lists, re-read all files in the GRIBS\ Inbox folder, and rebuild the tree.

- **Note:** If not specifically unloaded, all loaded GRIB data will remain present in SOB until SOB exits. If display of GRIB data is not enabled, then there is no noticeable disadvantage to keeping the data loaded, however it does use computer memory (RAM). With several large data files loaded and decoded, SOB may use an extra 20-30 megabytes of RAM which will about double SOB's normal RAM usage. You may only
experience a slow-down with your computer if it has less than 128Mb total RAM and several other programs also running.

12.4.1.3 [GRIB Info...] Button
Select any GRIB data set and press this button to view extra information about the GRIB data. The Issuer, Model, Geometry and Parameter are contained in the text files in the SOBvMAX\GRIBS\Tables folder. The GRIB data includes a code which SOB uses to extract the correct name/description from the Table files.

It may be of interest to some users to look at the tables with Notepad to see the data types and sources which are potentially available. Be careful not to change the format of these files or you may have to re-install them.

The data "Issuer" detail is also printed to the chart in the text at the top-left of the grid's bounding box.

12.4.1.4 [Rename] Button
This command will rename the GRIB file. All loaded messages in this file will be unloaded. Then the GRIB file is renamed and decoded and the messages are re-added to the list.

The filename format will be similar to YYYYMMDD_5PRTVW_06_12_24.GRB
Where YYYY is the year, MM & DD the month and day. The next group of characters are 5=HGT500, P=Pressure, R=Precipitation, T=Temperature, V=Wave height and W=Wind. The final collection of numbers indicate the forecast periods contained in the file.

You can also rename the GRIB files using normal Windows file management methods. You should do this while SOB is not running, or else remember to press the [Refresh Tree] button to re-process the files with their new names.

12.4.1.5 [Archive] Button
This will move the file to the SOBvMAX\GRIBS\Inbox\archived folder. The file moved is that which contains the selected message. All other messages contained in this file will first be unloaded from SOB if they are loaded.

12.4.1.6 [Delete] Button
This button will permanently delete the entire file for the selected message from your hard disk, and unload any of its loaded messages from SOB.

12.4.2 Capture a GRIB file attachment to SOB
The lower-left list Files in Inbox will show any emails with GRIB attachments that are found in your Inbox. This list is compatible only with MAPI email clients. MAPI is the messaging interface to email programs such as Outlook and Outlook Express. SOB should be compatible with any MAPI program's Inbox – able to send email GRIB requests, and find received GRIB attachments.

12.4.2.1 [Refresh...] Button
Re-scan the Inbox to determine if any new GRIB emails have been received from SailDocs or MailASail etc.

12.4.2.2 [Request New...] Button
Open the Request GRIB File form to prepare and send a request for GRIB data email to the most suitable Provider depending on the data types you require.

12.4.2.3 [Load...] Button
If any GRIB emails were found in the Inbox following the last Inbox scan, then this button will be enabled. Press this button to save all GRIB attachments currently in the Inbox to the SOBvMAX\GRIB\Inbox folder. The messages contained in the attachments will be partially decoded and located in the main tree list.
It is not possible to save only a single chosen attachment, EVERY attachment in the list will be added to the tree when the [Load...] button is pressed.

12.4.3 Copy a GRIB file to use with SOB

The lower-right list on the GRIB File Manager form provides easy access to any folder on your hard disk where GRIB files may be located. By default, this is set to Airmail’s usual location for downloaded files. This allows for an easy transfer of the GRIB data to SOB if you use Airmail as your onboard email system. Simply retrieve your SailMail emails, including GRIBs, in your usual manner, then select the newly downloaded GRIB file from the SOB File in Folder list and load it to SOB and place the messages into the tree.

12.4.3.1 [Change Folder...] Button

You can choose any other folder as the source for external GRIB files. The use of this will depend on your particular requirements.

12.4.3.2 [Load...] Button

Select one of more files stored external to SOB, then use the [Load...] button to move the file to the SOB\vMAX\GRIB\Inbox folder and decode the messages and add them to the main tree list.
12.5 Request/Receive GRIB Data

GRIB data is received as an email attachment following a valid "Request" to the data provider. The Request is sent as a simple email with the email body or subject line containing the request command.

This **Request a GRIB File** form makes it easy to construct the request command, and if you have a MAPI compatible email program, then the [Send Request] button will construct a new email, insert the email addresses and the request command and place it in the Outbox of your email program.

As you select the options and construct the request command, the predicted file size that will be email returned to you is printed to the [Send Request] button. Use this as a guide if you have limited email capabilities onboard, such as satellite or PACTOR based email systems. (see below)

12.5.1 Use MAPI or Simple MAPI or Other

SOB will interface seamlessly with a MAPI compatible email program such as MS Outlook. When the "request command" is complete, simply press the [Send Request] button to place a new email in the Outbox ready for sending.

MAPI is the ideal choice to use for MS Outlook. Simple MAPI should be compatible with Outlook Express, Eudora, Netscape Mail and any other email client that adheres to the MAPI protocol.

For Airmail, or other non-MAPI email users, you can still use this form to construct the request command. However you should first select the **Use Other** option which will change the function of the [Send Request] button to [Copy to Clipboard]. When the command is complete, then copy to clipboard and simply paste into the body of your email, then send to query@saildocs.com (or the Provider's address as listed on the form), be sure to have entered your correct "reply" email address. Within minutes the requested GRIB data will be returned to the reply email address.

12.5.2 Request Command

For complete details about acceptable request commands, send a blank email to query@saildocs.com or weather@mailasail.com and a return email will contain further details about the systems and formats that they use.

This **Request** form allows you to quickly select a fairly extensive subset of the total commands possible with a GRIB request. The following points describe these options:

12.5.2.1 Boundaries

These latitudes and longitudes define the area for which the GRIB data is required. You can manually enter the boundaries, or use the mouse to pre-select the area prior to opening the Request form. Zoom the chart out until the entire area you desire is visible, now drag the middle-mouse button (sometimes a wheel) from top-left to lower-right of the area – a tracking rectangle will show your progress. The chart will zoom to the chosen window, and the edges of this window will be used to pre-fill the GRIB request boundaries.

If you plan to retrieve data for a particular area across two or more emails, then you’re advised to use the identical boundary values which will allow the messages to be positioned in the tree list more efficiently.
12.5.2.2 Types
Select any type of weather data you wish. Multiple selections can be made with each request.

12.5.2.3 Resolution
Select the spacing between data points. Most data is available as 1, 2 or 5° resolution but not ½° resolution. The SailDocs server will return a resolution of data as close to the requested as possible, so usually leave this at ½° or 1°. You may wish to decrease the resolution in order to decrease the GRIB file size due to limited email capacity.

12.5.2.4 Forecasts
Use the Number of Days and Frequency drop-down lists to choose how much data to receive. Note that forecasts beyond 3 days are not considered accurate enough to be of much value to the navigator.

These lists include parameters that are most often used for requesting weather data.
EG: get three-hourly forecasts for the next 2 days; or get six-hourly forecasts for the next 3 days.
Any extra forecast periods can be requested, and are simply typed into the command string, maintain the same precise format as used by any pre-selected values. Usually use forecast times that are multiples of 3 or 6, or 12 or 24 hr multiples (eg: 96, 144 etc). If no GRIB data is available for the exact forecast period you enter, the server will return data for the nearest available.

12.5.2.5 Schedule
Enter the number of days, then press the [Schedule] button to set up a "subscription" for this data to be sent each day for the specified number of days.

Each email you receive as a result of this subscription will include details about how to cancel the subscription if necessary. Otherwise, you'll continue to receive this GRIB email each day containing the specified data.

SOB does not track your subscription GRIB requests and cannot cancel them.

12.5.2.6 Size of Requested Data File
If using a very low capacity email system such as Iridium email connections, or SailMail with SSB PACTOR modem, then you may need to be very selective about the amount of data you retrieve in a session. However if using any normal email connection speeds such as broadband, wireless, cell, etc then you will find no practical limitations on the quantity of data you can request. For example, requesting all data for the whole world at ½° resolution in 6 hourly forecasts for 3 days results in a received email attachment under 3Mb size.

Note that the actual file size received may be as much as one-third this predicted size depending on what compression techniques are used by your system. Experimentation will best determine if this file size prediction is applicable for you.
12.6 Customise Display of GRIB Data

Use this form to change the display of the GRIB data to better suit your individual requirements. Make changes to settings then press the [Preview] button to apply them to the displayed data on the chart.

The various display methods are mostly described in context throughout this chapter. Most other options can be learnt best with experimentation.

12.6.1 Draw Future Ship position

As you step through the GRIB forecast times in the GRIB Viewer list, a second (red) Ship’s Symbol will be placed on the chart at the predicted position for the forecast time selected.

This position will be directly ahead based on your current COG and SOG.
12.7 Questions

12.7.1.1 Are GRIB files truly free?
Yes. The data is made available from various Met Bureaus worldwide and compiled and distributed by MailASail, SailDocs (et al) using a simple exchange of emails. Some providers charge a subscription to use their data – examples TideTech, OCENS and C-Meteo. These providers offer additional weather data and in some cases higher resolution of the standard data you can retrieve from the free providers.

12.7.1.2 How accurate is GRIB data?
The prediction models are created by super-computers based on the cutting edge of our knowledge of weather patterns, influences and movements. The models are generally quite accurate in the short-term (12, 24, 36 hours) but forecast periods of more than two days should be considered very doubtful. Certainly some locations worldwide lend themselves to more accurate long-term forecasts, but generally speaking it is wise to avoid using GRIB data for predictions beyond a day or two.

12.7.1.3 My email program isn't compatible with SOB.
In this case, still use SOB to create the Data Request (using the middle-mouse drag and then the Request form for creating the request command). Select the "Use Other" option on the Request form to change the Send button to a Copy-to-Clipboard button.
Now create a new email using your regular email client program, enter query@saildocs.com or weather@mailasail.com in the "To" field, for SailDocs type anything you wish in the "Subject" field, and paste the command from SOB into the email body. For MailASail enter the command in the Subject line and leave the Body empty.
When the GRIB email is received containing the GRIB data as an attachment, either drag the attachment directly and drop it onto the SOB chart; or save the attachment to the SOBvMAX\GRIBS\Inbox folder, or any other folder of your choice (and use the [Change Folder] button on the GRIB File Manager form to set this folder).
Now the whole GRIB file, or any part of it, can be easily loaded into SOB via the GRIB File Tree, or Drag & Drop as described in the Chapter

12.7.1.4 Using GRIB data from a different viewer program.
Use a similar method as just described to save the GRIB data file to either SOB's GRIBS\Inbox folder, or any other folder of your choice.
Or, if the source of the file is compatible, drag & drop the file from the other program directly onto the SOB chart.
13 Raw NMEA Data Form [N]

See also What is NMEA?, page 14-1.

The Raw NMEA Data form is SOB’s central location for handling all incoming and outgoing data. To display the form, double-click anywhere on the chart, or press the [N] key when the chart window is active.

Data can be received from directly connected serial devices (eg: GPS, multiplexer, depth sounder, AIS, RADAR etc); or receive NMEA data via a network TCP/IP connection (either a local computer, or remote device or SOB computer connected via the Internet). SOB can also replay previous voyages if the NMEA data is contained in a standard text file. All these options and operations are accessible on the Raw NMEA Data form.

The left-hand side of the form displays the actual raw data as it is extracted from the received NMEA sentences. The lower-right quarter of the form shows the stream or a Summary listing of NMEA sentences received from all input sources (serial, WAN, file etc), only sentences that are recognised and decoded by SOB are printed here; and the top-right quarter contains pages of settings to control the input sources and output options.

Be aware that the raw LAT/LNG data on the top-left of the form is in decimal degrees format and is highly unlikely that it will “look the same” as the reading on your GPS or elsewhere in SOB. Please refer to Important Note about Latitude and Longitude Display, page 1-2 for a better understanding.

13.1 Raw Data Section

13.1.1 [Dampen & Calibrate] button [Tab]

This is a Trial or Licensed feature only. It is disabled for the LITE version.

Open a simple form for enabling dampening of the received data (applies to lat, lng, SOG, COG, HDG or SPD). The dampening settings configure SOB to average the received data values according to your choices.

Use dampening if your instruments change values wildly or too quickly. This could be either a function of the instrument itself, or required as a result of the installation.

For example: many modern GPS are highly accurate and refresh very frequently. As a sailing yacht is being bounced around in a chop, the accurate COG value from the GPS closely tracks the yacht’s varying course. It is usually more desirable for the boat's
heading to remain fairly consistent and not be influenced by every small shift of the boat's heading.

Use the calibrate options to overcome short-comings with certain devices or their installation. For example, correct for a speed log (propeller/paddlewheel-type) which over or under reads; or a wind direction vane that is not aligned correctly.

13.1.1.1 **Position Correction used for Datum adjustments**

Use calibration of GPS data to correctly locate your ship in some C-Map chart areas where the datum is incorrect.

Apply the required offsets on the D&C Form to the lat and long as metres.

Ideally, position yourself in a location with clear sets of transits as close as perpendicular as possible, then change the lat/long on the D&C form until your OwnShip position correctly lies on your sighted transits.

A good hint is to place a waypoint at this location and name it with your lat/long offsets so you can correctly re-adjust your calibration when next you enter this region.

13.1.1.2 **Apparent Wind Calibration**

With SOBv10, separate calibrations are now possible for Port and Stbd Tacks for your apparent wind instrument.

We have included a spreadsheet that makes it easier to identify calibration settings required to correctly adjust these values using an Excel graph of your PastTracks data. This is an advanced use calibration method, please contact Support for assistance.

13.1.2 **[Sync PC clock to GPS time]**

If valid NMEA UTC data is being received, then use this button to synchronise the PC clock to UTC time from the GPS.

There must be more than a 5 second difference between the PC and GPS times for this function to be enabled. SOB will show the difference between the PC and GPS times including the UTC offset as set in Control Panel. However when synchronising, SOB will retain the local PC time zone settings.

13.1.3 **Ship Data, Wind Data, Misc, GPS Route Data**

These fields are continuously updated with any incoming NMEA data. The data window will show streaming data like in the example image. The values extracted from the received sentences are shown in these fields and used throughout SOB.

**NOTE:** A connected Wind Anemometer will usually only send Apparent wind data ("windA" on the form). The True wind values displayed here ("windT") are calculated by SOB using apparent wind and GPS course and speed over ground. However, if available from a connected electronic compass, the ship's heading data (rather than the GPS COG data) is used with SOG to calculate the true wind – this is because the wind angle reported by the anemometer is relative to the ship's heading, not the ship's course. So if heading data is not available and thus the COG is used, the true wind calculation may not be exact.

13.1.4 **Next Waypoint Data**

When a connected GPS is set to "Goto" or "Navigate" mode, it will transmit this data to SOB. Cycling sequentially through the wpts as set in the GPS. (Review your GPS User Manual for instructions to enable it for Goto/Navigate mode)

Use the [Show GOTO NMEA Wpt on Chart] button to create a waypoint in SOB using this information. If more than one wpt is being transmitted, then you should temporarily close the data source with [Close COMx] for a serial connection, or [Pause] for a replay file, before capturing the waypoint data, otherwise the captured wpt may have a combination of data from different waypoints.
Note: use this to quickly "capture" a single waypoint from a GPS. To import a number of waypoints from the GPS. *See Currently the XML format is leading the charge to be a universal transfer format* (sometimes also referred to as GPX format). SOB can read and write waypoint lists from/to the standard XML format.

Capturing Waypoints from a GPS, page 6-12

### 13.1.5 FIX: Feet -> Metres

Some depth devices send incorrect data, notably DataLine and VDO Logic instruments. Use this tick box to apply a manual correction if your displayed depth data is obviously incorrect.

### 13.1.6 Fix: NEXUS

For NEXUS Wind Instruments, which are otherwise very good devices send a regular sentence with all zero values, which confuses and can corrupt SOB’s display and calculations that are based on wind data. Tick the “Fix NEXUS” box on the form to correct this.

### 13.1.7 Other NMEA Data Autofixes

As we continue to discover devices that do not adhere accurately to the NMEA0183 standard, we add fixes and options as possible to assist users with such devices from having a solution that will still work for them. Here are a few more tweaks, fixes and options we’ve added to SOBv10:

- **AMEC MOB device, and various others, including some AIS transponders**
  Many devices that have a GPS pass-thru option - ie they can allow a connected GPS and will forward the GPS data with their own data – will not necessarily have a GPS connected. Often such devices still pass through GPS data, even though it’ll all be ZERO’ED. This will interfere with correct GPS data being received by SOB from a valid connected GPS device. To allow for this, and to filter out, or ignore, such unwanted data two new tickboxes have been added to the SOB PORTS COM setup app: GPS_MASTER, and GPS_IGNORE.

- **NEXUS Wind Instruments**
  *(See above)*

- **Electronic Compasses**
  If a fluxgate compass (or similar device which sends Ship’s Heading data to SOB) is sending bad data, then this will affect many of SOB’s calculations (such as True wind) and the display of the Ownship symbol (which wants to align to the Heading data). If you are receiving bad data then press the button on the Raw NMEA Data form alongside the HDG field to disable this data. *(Note: this setting is not saved between SOB sessions, so you will need to open the Raw NMEA form and disable HDG each time you start SOB until you fix the bad data issue.)*

- **Simrad Autopilots**
  ...for the RSA NMEA sentence incorrectly send a negative Port value as the Starboard rudder movement, when the rudder is moved to port. *(The RSA sentence has separate port and a starboard fields). SOBv10 will account for this automatically.*

- **SAAB R4 Class A AIS Transponder**
  This device will not accept any of the regular NMEA sentences for GPS data from a remote connection (which is used as backup GPS data if its own internal GPS fails). We have added support for transmitting the OSD NMEA sentence from SOB to support this device.
- **RMC NMEA sentence**
  The RMC NMEA sentence seems to have a loose interpretation by some devices, and a very strict requirement by others. SOB now sends this in both of the known formats that are in use which should please all devices.

- **ZDA NMEA sentence**
  The ZDA NMEA sentence is incorrectly used, or created, by some devices with the date in the wrong format. Use the button on the Raw NMEA Data form to switch between DD,MM or MM,DD format for this sentence as required.

### 13.1.8 NMEA Data Source
Shows the current source of the streaming NMEA data. The options are: **COM** from a connected device through a serial port (or "virtual" port from a USB connected device); **FILE** when a NMEA data file is being replayed; or **WAN** when connected to a remote data source via the internet or LAN connection and the connection is nominated as "OwnShip".

### 13.1.9 Data received counts
- **Sentences** counts the total number of sentences received by SOB.
- **Bytes read** and **Total bytes** accumulate the amount of received data.
- **A.I.S. Rx**: counts the dedicated sentences received from a connected AIS Receiver or Transponder.
- **Skipped**: is a count of sentences that SOB did not process. They are either NMEA sentences that SOB does not recognise, or are incomplete or corrupted sentences that SOB will not process.

### 13.2 General NMEA Form Buttons

#### 13.2.1 [Setup COM Ports]
Use the [Identify Ports] button to run SOB_PORTS.EXE utility program for detecting and setting the COM ports for SOB to use.

See "Step 2: Identify the port number assigned to the Virtual COM port", page 14-4

The About SOB form also includes a list of available, and in-use, COM Serial Ports printed at the end of the Text Window as a diagnostic aid.

#### 13.2.2 [Network Connections]
Refer to The WAN Target List Form, page 17-2

#### 13.2.3 [Device Manager]
This is a Windows™ utility program used to determine the devices attached to your computer. Device Manager can be run from Control Panel, but it is buried beneath many pages and mouse-clicks and can be difficult to locate. We have provided this short cut button to run Device Manager because it is a very useful utility for checking your connected serial ports (whether built-in COM ports, or Virtual COM ports).

If necessary to remove a potential port conflict, the pre-assigned COM port numbers for any device can be re-assigned using the [Advanced] button on the "Settings" page of the port's "Properties" window in Device Manager.

#### 13.2.4 [Refresh]
This button doesn't really do anything as the form updates itself a couple of times a second, or whenever new data is received. But please press it if you want to...
13.3 COM Page

This is the central controlling page for your device connections to SOB via the serial COM ports installed in your computer. All IBM compatible Windows™ computers have the first four COM ports (COM1 to COM4) reserved for built-in COM ports. Traditionally computers included two 9-pin serial connectors built into the box which provided easy connections for COM1 and COM2. The other standard ports (COM3 and COM4) are generally reserved for use by a modem.

However in recent years, computers (particularly laptops) no longer have the physical 9-pin connectors built into the computer. In this case, either USB devices, or serial devices via a Serial to USB Converter must be used which create a Virtual COM Port. For all intents and purposes SOB will use virtual COM ports as if they are native built in COM ports. In fact, SOB cannot determine the difference between a physically present COM port or a virtual port created by a USB or Bluetooth driver.

SOB can connect to any of the built-in ports and/or virtual serial ports numbered from COM5 to COM255. Typically, USB virtual ports are numbered from COM5 to COM10, and Bluetooth virtual ports are numbered from COM10 to COM20. However these designations are not an industry standard, and each virtual port device manufacturer is free to determine their own default numbering system.

Note: to reduce the chance of problems, we recommend that you never assign a virtual device to COM1,2,3 or 4.

13.3.1 Open Serial COM Port Connections

SOB can receive data on four COM ports simultaneously. Use the [Setup COM Ports] utility to aid with determining what devices are connected and which COM ports are actually present in your system.

When SOB is started, it will automatically attempt to open these ports according to their settings. Be sure to connect the devices and turn them on before running SOB to help SOB to correctly identify and open these pre-configured ports. If the devices are connected after SOB starts, then you will probably need to open this page and manually start the communication (by pressing the appropriate "Open" button) – this is particular to virtual ports created by USB or Bluetooth devices.

SOB will try to identify the make/model of GPS attached whenever a COM port is opened, if successful this info will be printed to the Messages panel. It is not possible to identify all types of GPS, however this doesn't in any way reduce SOB's ability to read the NMEA data from the GPS.

SOB can communicate with NMEA devices at 4800, 9600, 19200, 57600, 38400 or 115,200 baud rates (sometimes called "bps" for bits-per-second).

The SOB PORTS Utility allows the user to pre-select COM ports to open. If either port is unavailable for SOB's use (eg: doesn't exist, or already in use etc) SOB will display a reason in the Messages panel (if it can be determined) why this port can't be used.

If a port is set to "Auto" then SOB will automatically open the next numerically available COM number. Note that this will not always be a port with a connected device. For instance, many computers have COM3 installed (usually an internal modem), and if no other software is currently using this modem, then SOB will actually be able to open COM3, even though it is unable to communicate with a modem (it is not a NMEA navigational device!). Anyway, this example demonstrates that SOB's auto-open feature may not always perform as expected.

If the port is set to "Disabled" then this port is disabled and SOB will not attempt to open this port upon start-up.
13.3.2 Log NMEA Data / Insert UTC in logfile (ZDA)

Tick this box to enable NMEA data logging. All incoming data will be logged to the file `SOB_NMEA_DATA.log` and can be replayed at a future time.

See "SOB NMEA DATA.log", page 13-7

The Insert UTC in logfile (ZDA) option will place the NMEA ZDA sentence into the log file every two seconds. This sentence contains UTC date and time information (and in a human readable format). Use this sentence to "Time Stamp" your logfiles for instance if using SOB for Vessel Traffic Monitoring via AIS as the AIS data may not contain UTC data. The ZDA data that SOB creates and stamps in the file is based on your computer's clock settings. If a GPS is connected, there is no benefit to enabling SOB to use the ZDA option.

Note: replaying a NMEA Logfile with AIS data.

AIS data does not include UTC information. On receiving an AIS message, SOB used to attach the PC’s time to it, which worked fine while in active use. But if this data is logged to a file and replayed at a later date then the UTC will be wrong as SOB would attach the CURRENT time to the message again. To fix this, the GPS time is now used to log with the AIS data. So if no valid GPS is available then this data will be missing from any logged AIS data.

13.3.3 Serial In/Out buffers

The size of the communication buffers used for receiving and transmitting NMEA data are 1200 bytes. This should be sufficient for the vast majority of installations. SOB will post a message to the purple Messages panel about buffer overruns, or similar. These are non critical errors which usually indicate that a faster baud rate or larger buffer size is required.

For systems connected to high-volume data providers (eg: multiplexers, or network sources) at high baud rates, there is a provision for user-configuring of the Rx/Tx Buffer sizes, contact help@digiboat.com.au for more details.

13.4 NMEA Output Page

This page contains the settings to control what data and which ports SOB will use to send NMEA commands to various connected devices.

13.4.1 Multiplex Output

This will combine ALL incoming NMEA data and re-send it on the chosen port. The output can be to either of SOB's COM ports, and/or over a network or the Internet.

Multiplexer Serial Output is only enabled for Licensed Users.

Multiplexer TCP/IP Output is only enabled for Network Licensed Users. Refer to the Networking chapter, page 13-1.

13.4.2 GPS Output

Any specific GPS commands will be sent to this port, for example, commands used for initialising waypoint data transfers – waypoints, routes etc being uploaded from SOB to the GPS.

13.4.3 Autopilot Output

Autopilot Output is only enabled for Trial and Licensed Users.

The specific NMEA sentences (APA, APB, BOD/XTE, BWR/BWC) can be selected for output to control an Autopilot. Different makes/models of autopilots work with different sentences.
Consult your autopilot manual, or experiment, to find the most appropriate sentences for best control. Most newer autopilots will be best with either the APA or APB sentences.

The RMC and RMB sentences are sometimes used by autopilots for maintaining a course, but these are more general purpose output commands which can be used for redisplaying navigation data on other instruments, eg: RADAR, or other PC terminals.

Select the **All Wind** checkbox to relay all received NMEA messages concerning wind data out of the nominated port. Wind commands are typically sent to an autopilot - which must be capable of "sailing to the wind" for this command to have any effect. Refer to your autopilot manual for further details.

The **All Wind** output doesn't require Autopilot to be ticked, however, the selected Autopilot Output port will be used for sending Wind data.

---

### 13.4.4 AIS Output

NMEA commands for communicating with a connected AIS device will be output to this chosen port. These commands include uploading of the AIS Static Data, and configuration settings for the NASA AIS Receiver.

**NASA AIS Receiver Notes**

This is a very popular low cost AIS receive-only device which allows some configuration options: **Channel** and **Threshold**. These can be set within SOB and sent to the NASA Receiver the next time the AIS COM port is closed then opened (or when SOB first starts).

The newer versions of the NASA AIS Receiver (manufactured after June 2005) have included a "Channel Swap" ability for alternating to monitoring both AIS channels "A" and "B".

If using the NASA with the GPS pass-through connection then most of the NMEA data is stripped off and only the single RMC NMEA sentence is passed on to SOB. Of course if you don't wish to have two serial connections to your computer, and don't need to connect any other NMEA devices, or aren't interested in the extra GPS details (satellite displays, waypoint transfers etc) then use the pass-through facility. No loss of critical GPS navigational data is experienced when using the pass-thru.

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### 13.5 Replay Logs Page

Any standard ASCII text logfile containing NMEA sentences can be replayed in SOB. This file can be saved from any NMEA source external to SOB, or the **SOB_NMEA_DATA.log** file saved by SOB can, after renaming, be later used as the source file to replay the voyage.

#### 13.5.1 Replay a LOG File

Select any previously saved NMEA logfile for replay. Use the [Pause], [Stop], [<<] & [>>] buttons to control the replay action.

SOB has intelligent algorithms that will synchronise the playback speed to real-time. Progressive pressing of the [>>] fast-forward button will temporarily speed up the playback rate, however SOB's synchronising ability will eventually return the speed to real-time playback.

**NOTE**: The "SOB_NMEA_DATA.log" file can't be opened for replay. This is SOB's default file for writing NMEA data to. SOB will ignore any attempt to run this file. To replay this file, first quit SOB, then rename the file before restarting SOB. The renamed file can now be replayed.

This logfile is ONLY AVAILABLE after SOB exits. If you try any file operation on it from outside SOB (eg Windows™ File Explorer) while SOB is running you get a "File Open Error" reported by Windows.

#### 13.5.2 "SOB NMEA DATA.log"

The NMEA data log file is used to replay a voyage in SOB.
The data written to the file will resemble the text in this example, each line as known as an "NMEA Sentence":

$GPGGA,144535,1228.777,N,06959.976,W,1,10,1.6,3,M,,M
$GPAPB,A,A,0.16,L,N,A,V,290.0,T,0004,269.3,T,,T
!AIVDO,1,1,,,15A0V`5000JwTKT793EewI;80000,0*75
$GPRMC,144535,A,122.8777,N,06959.976,W,0.0,358.1,190406,9.9,W*74
$GPVTG,358.1,T,8.0,M,0.0,N,0.0,K
$GPWPL,1228.772,N,07000.438,W,0004

The !SOB_NMEA_DATA.log file is saved to the \SOBvMAX\Logfiles folder.

If "log to file" is enabled (see Log NMEA Data, page 13-6), all received NMEA sentences will be appended to this file. We recommend you rename this file to a name of your choosing to represent the voyage it relates to (be sure to keep the ".log" extension when renaming it so that SOB can easily find and replay it).

The "log to file" setting is maintained between SOB sessions, remember to un-check this option when SOB re-starts to disable logging if necessary.

These log files can be archived as a true simulation-log of your voyage and replayed in SOB at any time.

Regularly throughout a long voyage, or at the completion of your voyage, use Windows™ File Explorer to save this data to an appropriately named file and place it in the \LogFiles folder for easy replay using the buttons on this form page.

13.5.3 Auto-replay a logfile when SOB starts

For in-store demonstration purposes (or any other reason you may wish) SOB can be set to automatically play a log file when it starts:

Copy and rename the desired log file to !autoplay.log and be sure it is located in the \SOB\LogFiles folder. When SOB starts it searches for this auto-play file. and if found it closes any open COM port and automatically begins replaying the log file.

The !autoplay.log file can be deleted at will (however be sure you have renamed a copy of it if you want to keep this log file). Any valid NMEA data file can be used as a log file (whether captured by SOB, HyperTerminal or any other program).

13.6 Satellites Page

Graphically view the satellites available for GPS reception and position fixing. Your GPS must output the GSA and GSV NMEA sentences which contain this satellite data.

The GPS needs (mathematically) only three satellites with good geometry (spread out evenly across the sky) to calculate an accurate position fix. Modern 12 and 20 channel GPS receivers frequently have 6 to 10 or more satellites to use in this calculation, providing highly accurate fixes.
### 13.7 Supported NMEA Sentences

#### Wind
- **VPW**: Speed with/against wind (VMG) in knots
- **VWR**: Apparent Wind Direction and velocity
- **VWT**: True wind direction and velocity
- **MWV**: Wind Speed and Angle
- **MWD**: Wind Direction

#### AutoPilot
- **APA**: Autopilot format A
- **APB**: Autopilot format B
- **BWR**: Bearing and Distance to Waypoint (Rhumb Line)
- **BWC**: Bearing and Distance to Waypoint (Great Circle)
- **XTE**: Cross track error

#### Ship & Nav
- **GLL**: GPS Position (Global Latitude & Longitude)
- **GLP**: Time and Position
- **RMB**: Rec minimum navigation information
- **RMC**: Rec minimum specific GPS/Transit data
- **VTG**: Course/Speed over Ground
- **VHW**: Course/Speed over Water
- **HDM**: Compass Heading
- **HDT**: Heading True - Gyro Course True
- **HDG**: Heading, with Deviation and Variation
- **ZDA**: Time and Date
- **OSD**: Own Ship Data

#### GPS Data
- **GGA**: GPS Fix data (not all fields supported)
- **GSA**: GPS dilution of precision and active satellites
- **GSV**: Satellites in view
- **SGD**: Accuracy

#### Depth, Temps & Misc
- **DBK**: Depth below keel
- **DBT**: Depth below Transducer
- **DPT**: Depth & Transducer offset
- **DBS**: Depth Below Surface
- **MTW**: Water Temperature
- **VLW**: Distance Logs
- **RSA**: Rudder sensor angle

#### Proprietary Sentences
- **PSOBI**: SOB "Inquiry" sentence
- **PSOBA**: SOB "Alarm Module" settings
- **PSTOB**: Data line : Battery Volts
- **PFEC**: Furuno : for sending Waypoints to SOB
- **PGRMZ**: Garmin : Altitude
- **PNMLS**: Received message threshold
- **PNMLV**: Channel set
- **PNMLT**: Threshold set
- **GPSGate Online**: Session ID
- **FRSES**: Single "buddy" position report
- **FRRMC**: Multiple buddies' position report
- **PMGNVER**: Make/model/version information
- **PMGNCMD**: Command message
- **PMGNWPL**: Waypoint transfer
- **PMGNTRK**: Track transfer
- **PMGNRTE**: Route transfer

#### Text, Alarms and Messages
- **TXT**: Text message
- **ALM**: Alarm message
- **ALR**: Alarm state
- **AAM**: Waypoint arrival alarm

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**Notes:**

1. Not yet implemented for uploading to Magellan GPS
2. Checksums are always used with these sentences
3. Used to upload AIS static data to the AIS radio. And for some DSC VHF radios (ie ICOM) can be used to upload MMSI, etc to the radio
4. This sentence includes a manually set "offset" from the transducer to either the surface or bottom of keel. If this value is not present, SOB will print a warning to the Messages Panel.
14 Connecting NMEA Navigation Devices

14.1 What is NMEA?

NMEA is an acronym for the "National Marine Electronics Association" which devise, control and publish a set of universal standards for navigation instruments' communication. These standards are available in a few different versions, NMEA-0183 is the most prevalent, and any marine instrument manufactured after about 1990 should be compatible with NMEA-0183.

In addition to the examples and diagrams presented in this chapter, many more schematics and diagnostic procedures are available on our website:

www.digiboat.us/support/schematics.asp

14.1.1 NMEA-2000

NMEA-2000 is a newer version of this standard that has simplified the interconnectivity requirements for instruments, and provides a stable high-speed communication protocol (over Cat-5 network cable) especially designed for the marine environment. To date very few NMEA-2000 devices, in comparison with NMEA-0183 devices, exist. Of course over the ensuing years, NMEA-2000 will eventually replace NMEA-0183, although existing NMEA-0183 devices will remain installed and in-use for decades to come!

SOB is not yet compatible with NMEA-2000 instruments.

14.1.1.2 NMEA Devices compatible with SOB

Any navigation instrument that is NMEA 0183 compatible can connect to SOB. The majority of NMEA devices communicate via the Serial Communication standard (RS-232 or RS-422) at 4800 baud. Many newer devices, and others, can communicate at higher baud rates, and via new interface technologies (USB, Bluetooth, WAN etc). For example, AIS Receivers connect at 38400 baud, and NMEA multiplexers usually use 9600 baud connections.

SOB is compatible with all such devices and examples. SOB can connect to two simultaneous serial ports at speeds of 4800, 9600, 19200 or 38400. In addition, SOB can connect to infinite (depending on available computer resources – memory, CPU speed etc) LAN or WAN network connections serving NMEA data using TCP/IP communication protocols (see the SOB Networking chapter for details).

Following is an example list of NMEA capable navigation instruments compatible with SOB: GPS, Autopilot, AIS Receiver/Transponder, RADAR, DSC VHF Radios, Apparent Wind Instruments, SONAR (Echo Sounder) for Depth, Boat Speed LOG, Electronic Compass (fluxgate, gyro), Rudder/Turn Indicators, Temperature Senders, Volt Meters.

Most NMEA devices will be automatically set up with the proper settings for interfacing with SOB. If you are experiencing communication problems, check the following settings are correct...

Configure your NMEA devices for:

- **NMEA-0183** compatible protocol (Version 2.x or any lower version)
- **4800 baud** rate (bps)
- **WGS 84** Datum Standard (for GPS devices)
- Consult the GPS manual to enable the device for Data Output or NMEA Output (or similar) – this applies in particular to Garmin GPS which default to their own proprietary language. Generally, find the Setup>>Interface menu, and change "Garmin" format to "NMEA In/Out" and 4800.

Here is a sample of NMEA Sentences, as received by SOB from connected instruments:

```plaintext
$GPGGA,144535,1228.777,N,06959.976,W,1,10,1.6,3,M,,M
$GPAPB,A,A,0.16,L,N,A,V,290.0,T,0004,269.3,T,,T
!AIVDO,1,1,,15A0`5000JwTKT793EewI;80000,0*75
$GPRMC,144535,A,1228.777,N,06959.976,W,0.0,358.1,190406,9.9,W*74
```
14.2 Device to Computer Connections

For the first twenty years of the life of the IBM Personal Computer (and clones), two remote device connection options were prevalent – Serial and Parallel Interfaces. Parallel is (was) primarily used by Printers and Scanners. The Serial standard is a simple general-purpose interface that all other peripheral devices used (eg: modems, cameras, Palm Pilots etc). Collectively, these are referred to as Communication Ports – "COM" for serial and "LPT" for parallel. Other standards for interfacing also exist, for example SCSI for devices that require vast data transferring abilities (hard disks, large format scanners); and "1394" or "Firewire" which found prevalence on earlier Macintosh computers to allow real-time video transfers etc.

14.2.1.1 Typical (Past) Laptop Connections

Additional COM ports can be created with a USB/Serial Converter, and extra USB plugs are simply and cheaply added with a USB Hub.

14.2.1.2 RS-232 vs. RS-422 Serial

The serial standard has been the most widely adopted throughout the life of the Personal Computer. On IBM-style computers, this standard is "RS-232" and on Macintosh is "RS-422". Most NMEA devices are actually RS-422 serial devices. In a technical sense, RS-422 has different electrical characteristics than RS-232; but in a practical sense, the RS-422 NMEA devices will interface directly with the PC’s RS-232 connection. It is extremely uncommon for incompatibilities to exist for this reason.

Legacy COM ports are almost obsolete, replaced by the USB communication standard. Although Desktop computers generally are supplied with one or two serial ports included, most laptop’s sold no longer include the formerly ubiquitous "9-pin" serial connector.

14.2.1.3 USB Serial Communication (Virtual COM Ports)

With the introduction of Win98SE, "USB" was available as an upgraded alternative to the decades-old RS-232 standard for connecting peripheral devices. USB is compatible with the modern Windows "Plug & Play" technologies, greatly simplifying the process of connecting peripheral devices, and installing their drivers. The USB standard also supports far higher speeds than was possible for legacy serial connections.

USB has now essentially replaced the former communication interfaces – serial and parallel.

However, existing serial-standard devices, and accompanying software (such as SOB), still require an RS-232 COM Serial Port for connecting. USB devices overcome this by installing a driver software program that runs in the "background" of Windows™ creating a Virtual COM Port. For application software (such as SOB), for all intents and purposes, these virtual COM ports work identical to a true inbuilt COM port, and in fact, when SOB "opens" a COM port and establishes communication with the connected device, it is unaware whether the COM port used is built-in or virtual!
14.2.1.4 Bluetooth and other Wireless technologies

These new "wireless" technologies are essentially USB connections whereby a radio transmitter/receiver is used in place of a cable. A USB Bluetooth Radio Dongle is connected to the computer (or built-in), and any Bluetooth device (GPS, multiplexer, cellular phone, mouse etc) can communicate with the PC via the radio dongle.

Bluetooth Radio dongles include a driver installation (a driver disk is supplied with the dongle), which sets-up the computer with Bluetooth connectivity. The Bluetooth management allows you to enable a Bluetooth Service to connect to paired Bluetooth devices via standard serial communication protocols.

This is the service required to use Bluetooth navigation instruments with SOB.

14.2.1.5 Networking communications (TCP/IP)

The modern computer world is now overrun by the TCP/IP communication protocol. This is the "language" of the Internet, and also the language used by many other connected devices (wireless "WiFi" computer connections, Bluetooth connections between a PDA and a desktop, etc etc).

SOB has very advanced abilities in relation to TCP/IP – please refer to the SOB Networking chapter: page 15-1.

14.3 Example Simple Connection Scenarios

Example 1: Connect to a Serial GPS and COM1

This is a typical situation prior to about the year 2000, when built-in SERIAL (RS-232) COM ports where phased out of laptop designs, and the proliferation of USB connected devices. Most desktop computers still have built-in COM ports, and many GPS still use RS-232 (or RS-422) serial communication protocols.

These diagrams show the standard "9-pin Serial D-plug", the "male" plug (left) is the connection built into the computer.

This configuration should be performed automatically. SOB should detect that COM1 is available and configure it to open without any interaction from the user.

However, if another serial device is using COM1, and the GPS is connected to COM2 – SOB will only setup correctly automatically if the device that usually uses COM1 is connected, turned-on, enabled etc. Otherwise, SOB may mistakenly use COM1, expecting a GPS to be later connected.

Use the NMEA form (double-click the chart), to select a different COM port (Close COM1, select a "2" with the [>>] button, then press the [Open COM2] button).

A stream of data similar to the sample image (left) will be flowing in the window when the correct port is opened.

Example 2: Connect to a Serial GPS via USB

This scenario occurs when you don't have a COM port available on your computer to connect a serial GPS (or other serial device) to. Either a COM port is physically not present, or an existing port is in use by another device (perhaps another NMEA navigation device, or other serial peripheral eg: PACTOR modem, PalmPilot etc).
**Step 1: Create a serial port for the computer**

Use a **Serial to USB Converter** to create a "virtual" COM port for the computer. Pictured are two types, left is a single serial port from one USB port, and right creates two serial ports from a USB port. Also available are Quad Serial/USB Converters. These are relatively cheap devices available from office-supply and computer equipment shops. Dual and Quad Converters can be purchased online from our 'Shop' webpage.

All Serial/USB Converters will be supplied with a driver disk which must be installed. The driver creates the virtual COM port which programs running on your computer can use as if it were a built-in COM port.

Note: there is no guarantee that the same COM port number will be assigned to the same USB device every time it is connected. To reduce the chance of a problem, always connect your Converter to the same USB port. This problem is mostly apparent if you plug the Converter into a USB port on a hub.

**Step 2: Identify the port number assigned to the Virtual COM port**

There is a SOB Port Identify and Configure utility installed automatically to your SOB folder: **SOB_PORTS.EXE**. This program can be run directly from Windows™ Explorer, or within SOB via the [Identify Ports] button on the Raw NMEA Data form.

This example image shows that 4 COM ports have been identified, and the status shows that they are all suitable for SOB's use. The description will not always definitively identify a device for you. Note in the example, COM2 is a USB/Serial converter, as you'd expect from the description, and so is COM4 (its description is not quite as clear). But COM3 is actually a USB GPS Receiver (pictured right).

If ever in doubt, simply unplug the device, wait a short moment and press the [Refresh] button. The unplugged USB device should be removed from the list. Plug the device back in, wait for the "New Hardware Found" to complete, then [Refresh] to confirm.

**Step 3: Set and Configure the COM port for SOB**

In the step above, we used **SOB_PORTS** program to identify all available COM ports in your computer. It is usually a simple matter to determine which port your "Serial GPS" (in our example) is using. However if many devices are connected and sending data, use the [Test for data] button and SOB will quickly check each port in turn and try to recognise the device attached (it must be a NMEA Talker).
So for this example, the USB GPS has been identified on COM3, and a Garmin GPS on COM2. Remember, COM2 was the USB/Serial Converter virtual port (with a Garmin connected).

<table>
<thead>
<tr>
<th>COM</th>
<th>Description</th>
<th>Status</th>
<th>Data Rec?</th>
</tr>
</thead>
<tbody>
<tr>
<td>COM1</td>
<td>Communications Port</td>
<td>Opens OK</td>
<td>no data rec</td>
</tr>
<tr>
<td>COM2</td>
<td>ATEN USB to Serial Cable</td>
<td>Opens OK</td>
<td>NMEA Device: Garmin GPS</td>
</tr>
</tbody>
</table>

Add >> COM2

Select this item in the list (above) then press the [Add >> COM2] button.

Set the baud rate to 4800, then [Save & Exit] this program.

**Example 3: Connect to a USB GPS**

This is a very similar scenario to the previous example, step 2 & 3. Step 1 would require you to install the driver that was supplied with the USB GPS Receiver. Then follow Step 2 and 3 above to identify the COM port, then configure SOB to use it.

**Example 4: Connect a Bluetooth GPS**

This scenario requires an additional piece of hardware connected to the computer – a *Bluetooth USB Radio* (many modern laptops and tablet PCs have this feature inbuilt). The GPS communicates with the PC via radio waves.

**Step 1: Install and Setup the Bluetooth Dongle and GPS Drivers**

The external USB Bluetooth radio is in the form of a "Dongle", and is characterised by its bright-blue LED light. The dongle will be supplied with Bluetooth Manager software and a Driver disk, which must be loaded.

Bluetooth radio manufacturers use different management and device configuration software with different interfaces. So it is not possible for us to assist you too much with configuring your Bluetooth GPS device.

However, in short, you must:

1. Install **BT Dongle driver** (and BlueTooth Manager software)
   - This will install via Plug & Play the first time you plug-in the Bluetooth dongle
   - If a driver disk is required, it will be included with the dongle
   - This step is not required if your laptop/tablet has Bluetooth built-in

2. Install the **GPS driver**
   - the Bluetooth GPS will be provided with a driver disk

3. **Pair** the GPS with your computer
   - this establishes the link between the GPS and computer
   - a 4 character code may need to be input, it is usually "0000"

4. Enable the "Serial communication" **Service** for the Bluetooth pairing
   - this step will set and enable the virtual COM port which SOB will use to communicate with the GPS

The actions required to perform steps 3 & 4 are determined by your Bluetooth management software. No more specific advice can be supplied here ...

**Step 2: Identify the Virtual COM Port, and configure SOB’s ports**

Follow Example 2, Steps 2 & 3 above.
Example 5: Connect to a built-in NMEA GPS or other serial NMEA data source

NMEA instruments that aren't provided with a PC connector cable will have to be wired up to the computer manually. The User Manual for the device is necessary to complete this task. If you don't have this in possession, then they can usually be downloaded from the Internet (for free) as a PDF file. You must locate and become familiar with the "wiring", "connecting", "other NMEA devices" (or similar) section of your manual.

In brief: identify the NMEA input and output connections for the device. There is no standard nomenclature for these connections, examples are:

- IN+ and IN-, OUT+ OUT-
- POS (or DATA) and NEG (or GROUND, or EARTH, or COMMON)
- IN-A and IN-B
- etc etc

Wires for the connections are hand soldered to the pins on a blank "9-pin Female Serial D-plug" (pictured). Pin 2, 3 and 5 are used (caution must be exercised if using an older style 25-pin serial plug, as the rôle of pin 2 and 3 are reversed, and the ground pin is pin-7, not 5).

The wire-to-plug connection involves soldering two (or three) small wires to even smaller holes. The soldering is easy, it's the fiddly parts that make this job more complex. Test the connection using the "tug test", it will want to be a strong solder joint to survive the marine environment. Recommend that you knot or kink the wire before it leaves the plug housing to prevent direct pulling on the solder joints, some plugs include a clamping mechanism where-in the wire usually needs to be padded-out for the clamp device to work effectively.

The pin numbers are impressed into the plastic of the plug next to the correct pin. Pin 3 is only connected if the accessory cable has a wire for NMEA-IN - this allows SOB to talk to the GPS, perhaps uploading waypoints or routes, if they're compatible. Only pins 2 & 5 are required for SOB to connect to a GPS for data reception only. Pin 3 typically connects SOB to an Autopilot.

These example pictures show a connection between a 9-pin serial plug and a Garmin GPS data connector. The blank serial plugs are available from Computer or Electronics shops for a few dollars. The colour image includes connections for a remote power source to avoid the need for batteries installed in the GPS.

If you don't have a serial port in the computer, then create one with a USB/Serial Converter cable as described above in Example 2.

14.4 Complex Connection Scenarios

If you have multiple NMEA-0183 devices to connect to SOB, then there is no standard way to perform this. Each job must be individually planned, depending on such factors as budgets; room available for installation; makes/models of devices; distances between devices and the computer; and your technical ability.

If many devices are all from the same manufacturer (eg: B&G, VDO), then they can be daisy-chained into a single stream of NMEA data. Some manufacturers (eg: Raymarine) use proprietary "bus" data protocols which are not directly compatible with the serial NMEA language, these companies will have as an option a "converter to NMEA" available. Alternately, other companies or devices may be
able to perform the conversion – eg: multiplexers from ShipModul (The Netherlands) or Brookhouse (New Zealand) will accept a Seatalk (Raymarine’s proprietary language) input and convert it to NMEA for connection to the computer.

Typically a **Multiplexer (aka MUX)** is the answer to connecting many instruments to SOB. These devices accept the NMEA data from multiple instruments and merge it into a single serial data stream to connect to one COM port on the computer.

Pictured (left) is a simple multiplexer from ShipModul ([www.shipmodul.com](http://www.shipmodul.com)) which allows 3 devices to connect, and has a nice extra – the connection to the computer is USB.

Both Brookhouse and ShipModul provide options for connecting Seatalk and NMEA devices simultaneously. ShipModul also has a model that connects to the PC via Bluetooth.

### 14.4.1.1 Multiple Instrument Connection Examples

Presented here are a few standard scenarios for multiple instruments, many more examples are available throughout the Internet, and we have several wiring schematics available on our website: [www.digiboat.com.au/manual/man_technical.htm#schematic](http://www.digiboat.com.au/manual/man_technical.htm#schematic)

**Example 1: Connect GPS and Autopilot**

Because a GPS is a NMEA "Talker" and an Autopilot is a "Listener", these two devices can share a single serial port, using the Rx and Tx pins, and sharing a common Ground connection.

Note this wiring diagram does not allow communication FROM the computer TO the GPS (for example to upload routes/waypoints to the GPS).

However, the PC-Output (red wire) could be split to feed data to both the GPS and Autopilot. (NMEA devices should provide enough power to split the output from a "Talker" to up to four different NMEA "Listeners".)

**Example 2: Daisy-Chain Multiple Devices**

For this configuration to work, the Wind, LOG, Depth and Compass would generally have to be from the same hardware manufacturer.

Note: in this example, the GPS output is split to feed the daisy-chain and the RADAR. The NMEA specifications state that a NMEA Talker can be split to send data to 4 separate NMEA Listeners.

Be aware that the inverse is NOT possible – multiple Talkers can’t be directly wired together into a single data stream (a multiplexer is required in this instance, see next example)
Example 3: Multiplex Multiple Devices

When connecting a number of disparate devices, and for many other connection scenarios, a **multiplexer** is a dedicated NMEA device that can be used to simplify complex installations.

An option with newer model multiplexers is to connect to the PC via USB or even Bluetooth. The distinct advantage with Bluetooth is the simplification of physical connections, as wires don't need to be run between the two. This is especially convenient if using a laptop, as it can still receive data from ALL your onboard instruments from any position in the boat. For less technical users, Bluetooth connections can be frustratingly difficult to install, set-up and configure.

Example 4: Connecting to Seatalk instruments

Seatalk is Raymarine's proprietary communication system which IS NOT compatible with NMEA devices, nor SOB. However through the use of a Seatalk/NMEA Converter, SOB can read all data provided by the Seatalk instruments. A converter is supplied by Raymarine as an accessory (part #E85001). Other options are 3rd-party devices supplied by private companies and individuals (search the Internet for "Seatalk NMEA convert"), and a NMEA multiplexer which includes an input for Seatalk devices (eg: ShipModul and Brookhouse devices):
Example 5: Connecting every electronic device ever invented!

Good planning, and clear understanding of each device's User Manual (particularly the NMEA Wiring connections) is essential before attempting a scenario like this:

14.4.2 Further Help with SOB COM/Serial Connections

- Extra help with connecting hardware for use with SOB can be found in the FAQ (Frequently Asked Questions) section of our website:
  www.digiboat.us/support
  or on our Facebook User Page:
  http://www.facebook.com/#!/groups/149303558465326/

- Many more schematics and diagnostic procedures are available on this webpage:

- Registered SOB users can contact help@digiboat.com.au for assistance with their SOB-NMEA connections.

- For data cables for GPS to PC connecting, check the particular device's website,
  eg: www.garmin.com
15 SOB PORTS

SOB PORTS is a Digiboat companion-application that is installed with SOB. After SOB installation there will be a Desktop link for the SOB PORTS program.

SOB PORTS can also be opened using the [Setup COM Ports] button on the Raw NMEA Data form, or the button on the SOB License and Registration form.

Important Note: if running SOB PORTS from the Desktop link, SOB should not be running. IE Exit SOB first if running SOB PORTS from the Desktop.

Refer to previous chapter for detailed information and discussion about physically connecting your devices to your PC and installing drivers etc as necessary.

15.1.1 Listing all available NMEA devices

Once all your devices are connected to the computer, open the SOB PORTS app and confirm that all your devices are listed:

If you are happy that SOB PORTS has listed all your connected devices, then press the [Test for Data] button and SOB will poll all the listed ports at all used baud rates and sense if any NMEA data is being received.

Note that Bluetooth ports will be automatically excluded from the poll as these will often freeze if trying to receive data (which SOB sends to each port to help identify the attached device). You can tick any other items in the list to skip the data test.

SOB PORTS will also recognise several non-NMEA devices, including a standard MODEM (often built into COM3); a PACTOR SSB modem as well as your NMEA devices; INMARSAT satellite receiver; Iridium phone and a Garmin GPS (when not set for NMEA transfer).

Although a Garmin GPS will be identified, note that SOB cannot directly use it for navigation unless it is re-configured to output NMEA data. If you click on a Garmin device in the list, the following form will appear:
15.1.2 Configuring SOB’s Ports

To complete the configuration of ports for SOB to use, select each desired port in the list – use Shift+Click and Ctrl+Click to select multiple items. The caption on the [Add …] button will change to show how SOB’s ports will be assigned. When ready, click the [Add…] button and the Ports assignments will be completed. If you used the Test for Data then the baud rate will also be pre-set, however you can override this as necessary.

Make any additional settings you desire with the tick-boxes. If you don’t understand these then best to leave the defaults, or contact our Support Dept for assistance. When satisfied, close the SOB PORTS app and start SOB. SOB will attempt to open the set ports and post messages to this effect into the purple Messages Data Panel.

On SOB’s Raw NMEA Data Form the colour of the Ports buttons will be GREEN if the port is open, and RED if closed. For troubleshooting, or any other reason, each port can be opened or closed from SOB on the Raw NMEA Data form, although no further port configuration is possible here – return to SOB PORTS for any fine tuning.

15.1.2.1 Checksums

Selectively choose to use the NMEA error checking, known as checksums, with each received data sentence.

Ignore any received NMEA data with no checksum, or a wrong checksum. The checksum is added to the end of the NMEA sentence as an error checking mechanism to ensure the integrity of the received data, although not all NMEA instruments make use of the checksum, and of those that do, some of them append an incorrect checksum!

Generally, you don't need to use the checksum, although if you discover some inaccuracies with the received data, then enabling checksum checking will prevent SOB from trying to process corrupt data.

If you are experiencing data integrity problems (which could resulting in incorrect data and ship positioning, even SOB crashing or freezing) then try enabling Checksum checking. This will slow down the computer (depending on your computer power, and how much NMEA data is being received, this may, or may not, be noticeable).

Guidelines for Use

It is probably best to enable checksum checking if it doesn't noticeably slow down your computer. It should definitely be enabled if you notice a lot of erroneous data being displayed by SOB.

Unfortunately, it is more common than it should be, that some devices are known to transmit their data with incorrect checksum values. Of course these sentences will be discarded by SOB if Checksum checking is enabled. However, if incomplete sentences are being received (usually due to communication or wiring problems), there is a good chance that SOB can still extract some useful data from them if checksums are not being used.
15.1.2.2 **Hardware Flow Control**
Some connected serial devices (eg: ACTISENSE OPTO Isolator, MiniPlex multiplexer) require hardware flow control to be enabled for the serial port. SOB's default setting is NO Flow Control (requiring only a two-wire serial connection).
Use this checkbox to use Hardware Flow Control (also known as RTS/DTR control).
Note: the serial plug must have additional connections for these devices to work – consult your device's connection manual/diagram for more information.

15.1.2.3 **Keep Alive**
If this setting is ticked, then SOB will attempt to re-open the port if it closes of its own accord. This may happen if a USB converter is removed, and some older USB drivers had a tendency to randomly close the Virtual COM port after a period of time.
SOB will print progress messages to the purple **Messages** panel. Five re-open attempts will be made over about 30 seconds before SOB will give up trying.

15.1.2.4 **GPS Master**
If you have more than one GPS connected to SOB, then select which is to be your primary GPS for SOB to use. SOB will use any other connected GPS data if none is found on the Master port, unless GPS Ignore (next) is ticked.

15.1.2.5 **GPS Ignore**
Under no circumstances will SOB use any GPS data from this nominated Port.
This can be useful if another device, or integrated systems, send GPS data that is unreliable, or all zero’d.

<table>
<thead>
<tr>
<th>15.1.3</th>
<th><strong>SOB PORTS Help</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>From within the SOB PORTS app, press [F1] key anytime for a comprehensive help file to assist with using the program and identifying and configuring the ports.</td>
<td></td>
</tr>
<tr>
<td>Unfortunately, for reasons known only to Microsoft Execs, newer versions of Windows are unable to display the HLP file, although a viewer-app can be downloaded separately from Microsoft.</td>
<td></td>
</tr>
</tbody>
</table>
Please contact DigiBOAT for assistance setting up and using SOB in a Base Station.
17 SOB Networking

17.1 Introduction

Throughout this document, when referring to a network, we regard this as meaning equally a local network, intranet, Internet, VPN, LAN, WAN, Mesh etc etc. Basically any computers linked to each other and using the Internet standard TCP/IP method for communication and data transmission.

Note: The SOB Network User License (AccessLevel 3) is required for SOB's network features to be enabled. This a paid SOB upgrade, refer to the Shop webpage (www.digiboat.com.au) for ordering details.

Example SOB Network Uses:
- Connecting onboard NMEA instruments that are a long way from the nav computer (Cat-5 or wireless connections are possible)
- Connecting onboard instruments to multiple onboard computers
- Use a wireless tablet computer onboard to navigate your boat
- Monitor your boat, or fleet of boats, from your desk or home in real-time
- Track a yacht race in real-time from anywhere in the World

SOB can operate in two fundamentally different networking modes - CLIENT and/or SERVER (aka Host & Remote).

17.1.1 REMOTE (Client)

CLIENT mode is when SOB is networked to a remote NMEA data server, ie: another computer running SOB Server; an onboard GPS over GPRS/CDMA/3G/etc data source; or any other commercial or private networked NMEA data stream.

SOB can connect to a host URL (or IP Address) as a client computer and input the NMEA Data Stream. Using and displaying the host's data as if it were from directly connected devices (GPS, AIS, depth-sounder, wind etc). Any other remote connected ships will be represented in SOB as Targets (using the AIS and ARPA target features of SOB).
Note that the HOST you connect to does not need to be a SOB computer. If you have the Network or Pro SOB license and are interested, ask us for the addresses we have that connect to AIS repeaters in Seattle and Norway. The Norwegian URL sends live data for the AIS traffic along the entire Norwegian coastline - about 800 AIS targets! The Seattle one is similar, however usually about 70 targets are in range. Likewise, if you know/have any addresses of TCP/IP NMEA data streams, or are transmitting your own live data, we would be interested to hear from you!

17.1.2 HOST (Server)

SERVER mode will send all NMEA data received in SOB over the network to any computer that creates a network "channel" to SOB running in SERVER mode.

See page 17-8...

17.2 Client Mode

(aka REMOTE or SLAVE)

SOB Client can read NMEA data from a remote source over any TCP/IP network link, either a boat-wide intranet, or the world-wide Internet.

Multiple simultaneous connections to remote data servers are possible. The number of simultaneous connections is limited only by available RAM memory and CPU processing speed, and the capabilities of the connecting hardware and bandwidth.

Typical methods of use for SOB Client:

Scenario 1: connect multiple onboard computers to a single set of navigation instruments

Scenario 2: track one or more internet enabled ships in SOB running at a remote location

Scenario 3: display the data in SOB from any private or commercial NMEA data stream over the Internet

17.2.1 The WAN Target List Form

The [WAN Connect] button is located on the Raw NMEA Data form. Press the button to open the WAN Target List form to maintain your connection list and control connections to the remote targets.

Each line in the list represents a remote computer that will send NMEA data over TCP/IP network when you create a connection to it. The remote computer can be accessed either via its "dotted decimal" IP Address (eg: 10.1.1.4) or its URL (eg: boat.milltechmarine.com), and a Port number. The combination of a URL or IP Address and Port number allows SOB to create a network "channel" to this server computer.
### 17.2.1.1 Manage your Connections

Create a new connection by typing in the details in the text boxes, then press the [Add] button.

Edit an existing connection by selecting it in the list and make the corrections to the URL/IP, Port or timeout and press the [Apply] button. If you edit the Display Name, then SOB will assume this is a new connection so you must press the [Add] button instead.

To delete a connection select it then press [Delete].

The time out value defaults to 60 seconds, and would rarely need to be changed.

### 17.2.1.2 Making a Connection

**Double-click** any entry in the list to mark it for connecting (or select it then press the [Toggle Connect] button). A "Y" will appear in the "ON" column. Select multiple entries if required, or use the [Connect All] button to mark every item for connecting.

If you wish to nominate any of these connections as your **Primary Ship**, either select it in the list and press [Set as Primary Ship] or right-click the entry. A "Y" will appear in the "OS" column (for OwnShip). Only one entry can be selected as OwnShip. Any remote connected ship that is not set as the Primary Ship will be displayed in SOB as a target, although not all the data will be known that is available for an AIS target.

Note: The OwnShip remote data will appear in SOB as if it were data being received from a direct connected GPS (or other navigation instrument data). To quickly identify in SOB if your data is from a local GPS or a remote networked data source, the **Ships Data** window will display with a black background with local data, or a grey background with remote data. Refer to page 4-5 for sample screen shots.

After you have a "Y" in the "ON" column for each remote data server you wish to connect to, press the [Open/Refresh Connections] button.

A message similar to that pictured will show progress of the connection. When the connection is successful, you will see the NMEA data flowing on the **Raw NMEA Data** form, and the final line:

```
>> xxx.xx.xx.xx connected to yyy.yy.yy.yy.yy
```

will be printed to the Messages panel indicating that a connection "channel" has been created and is now active.

The **TID** column of the **WAN Targets List** form will match the TID printed in the **Messages** window. This is the SOB process' identification number for this network "channel" which can be used by third-party network diagnostic programs if required.

You can open any additional connections or close any current ones at any time without affecting any other connections. You can also nominate any other connection as OwnShip by simply **right-clicking** on it even while connected.

### 17.2.2 Tracking with GpsGate

SOB seamlessly integrates with GpsGate Online, uploading your position to the GpsGate server while simultaneously downloading position fixes from your GpsGate "Buddy List" and displaying them on the chart via the **Targets** feature. Now, anyone with an Internet connection can track your progress using either SOB Pro, or the GpsGate Online map.

Details:

- Supports Ownship Position uploading and buddies positions downloading
- Ownship position is uploaded only if valid GPS is received in SOB (black coloured **Ship's Data** panel)
- URL/IP Address: [online.gpsgate.com](http://www.online.gpsgate.com), port 30175

Refer to: [http://www.gpsgate.com/](http://www.gpsgate.com/) for further information about this real-time online tracking service.

Step-by-step "How To" guide for using SOB with GpsGate:
17.2.3 Discussion – IP Addresses

If you have a URL name for the remote server, then this provides you with a trouble free connection, although you may need to add SOBv360.EXE as a permitted program in your Firewall settings.

For remotes when an IP Address is used, you must be able to access this IP address from your computer - this can be complicated by firewalls, routers, switches and a variety of other reasons.

Simply stated, the server you wish to connect to must have a URL or a publicly accessible static IP address. You can perform a quick simple test in Windows to see if you can connect to an IP address:

Example: Testing network access to an IP Address

Select Run... on the Start menu, type cmd and hit the [Enter] key. In the COMMAND window that opens, type "ping " followed by the IP address, then [Enter]. You will see screens similar to the following:

This example screen shows that the computer cannot make a connection to the IP address "10.1.1.0"

In this example, "ping" shows that your PC can successfully connect to the IP address "10.1.1.1"

If the server you are trying to connect to is "attached" to the Internet through a cellular phone network (eg GPRS, CDMA, 3G, EDGE, etc) or a satellite connection (eg INMARSAT), then it may not have a publicly accessible IP address. You will need to contact the technical support department of the communication company that supplies you with this Internet connection to determine and/or enable a static IP address (or assigned URL) for it.

For Windows-to-Windows connections over an intranet or Internet, the free utility available from www.hamachi.cc can simplify many complicated network configurations. For other setups, you will likely require the advice of a networking expert to permit such connections from your computer. More about Hamachi, see point Error! Reference source not found., page 17-8.

SOB Client can also connect through a Proxy Server. Email help@digiboat.com.au if you wish to configure this.

17.2.4 Examples for using SOB Client

Example 1: when you might connect to a GPRS/CDMA/3G/etc data server

Although this probably sounds "blah blah" technology to most SOB users. It is actually a very simple and usually quite cheap technology that has wide application.

Basically, it is using your mobile/cellular phone as a wireless internet connection modem. Recent developments in cellular technology has increased the data speeds over cellular networks to very acceptable Internet usage speeds (3G or EGDE standards are the newest and the fastest connections.
available at the time of writing). And in most countries, the cellular ISPs have lowered prices for data-only accounts and created flexible charging either by data volume or connection times.

1. Most cellular phones available have one of these capabilities built-in to connect the phone to the Internet (ie: GPRS, 3G etc); and the phone will also be Bluetooth enabled to allow it to connect to your laptop. So providing you have an account with your cellular ISP that allows data transfer, with NO ADDITIONAL EQUIPMENT* you can connect your laptop to the Internet wherever you have phone reception!

* you may require a Bluetooth dongle for the laptop to complete the laptop's connection to the phone.

2. A second scenario that is confidently predicted as the next boom in the marine industry is to have your onboard GPS connected to a dedicated GPRS Router (or CDMA/3G etc router) and permanently sending your ship's position over the Internet. Now you can precisely track your boat, in real-time, from any Internet connected computer running SOB.

And because SOB can make multiple and simultaneous connections, the same SOB Client computer can connect to many ships (sending their GPS data) at the same time. Only one such connection can be nominated as OwnShip (column "OS" on the WAN Target List form), all other connections will appear in SOB as Targets (same as the AIS and ARPA targets). This provides a simple method for Vessel Tracking Systems (VTS), for any fleet managers, charter operators or yacht races etc.

The schematic pictured shows how you can use this technology to view live navigation data from your boat at a remote location.

The remote computers will run SOB, the ship's IP address and port number (specific to the installed GPRS Router) is entered into the SOB WAN form, then simply make the connection to the boat as OwnShip.

**Example 2: Connecting to WAN/LAN ship(s)**

Note: this applies to a connection over the Internet OR to the devices on your own ship

1. Open **Raw NMEA Data** form (double-click chart surface, or press [N])
   - Press the [WAN Connect] button. (If this button is disabled, then you will need to purchase the SOB Pro User License, refer to the DigiBOAT 'Shop' webpage)

2. (optional) Make a new connection:
   - enter a **Display Name** to help identify the ship (the [Add] button will then be enabled)
   - enter a **URL** or **IP Address** for the remote node. This URL/IP Address will be assigned by your network hardware administrator/installer, or your Internet Service Provider (ISP) of your GPRS connection
   - the correct **Port** number that the node's URL uses to provide a data "path" to the network. This will be assigned with the URL.
   - the **Timeout** value in seconds. A default of 10 seconds will be used if set to 0 or if bigger than 600. The ideal value will be dependent on the transmission rate configured for your **Serial IP Server** to forward its NMEA data to the Internet, and to the transmission rate of the connected NMEA instruments.

Press [Add] to add the new connection to the list.
3. Select an entry in the list that you wish to connect to. (Multiple entries can be selected by using standard Windows™ highlighting commands - eg: hold down Shift and/or Ctrl keys while selecting to extend the items highlighted)
   - Press the [Toggle Connect] button. The ON column will display a "Y" for the selected ship(s).

4. Select [Set as Primary Ship] if necessary...
   Press this button if you want this ship to display in SOB as the OwnShip. If not set to OwnShip, the connected boat will be represented in SOB as a simulated AIS Target. The remote data source must be sending GPS and/or other navigation instrument data to benefit from this setting. If the remote source is only sending AIS data, then the OwnShip setting is meaningless and will be ignored.

**Notes**
- The OS column will display a "Y" for the connection that will be used as OwnShip.
- Only one remote ship can be set as OwnShip.
- The OwnShip status can be changed using this form at any time, even when multiple remote ships are already connected.
- If a connection is changed from not being the OwnShip, to OwnShip, then its AIS Target symbol will still be on the screen. This can be deleted or hidden using the Targets form if desired.
- When a remote ship is set to OwnShip, SOB will close any serial (COM) port currently in use by direct connected GPS (or other instruments), and the OwnShip remote ship data will be used as the primary NMEA data source for SOB.

5. Press [Open/Refresh Connection] button. This button will only be enabled when there are connections that need to be changed (either opened or closed).
   When a connection is made, a unique number will be entered into the TID column of the list. This number is used to represent the remote ship simulated AIS Target. Messages about the connection and disconnection process are posted to the Messages panel.

**Simulated remote Target MMSI:** The temporary MMSI number (which is the unique AIS number for every ship in the World) for this remote target is created from the SOB ID number and is equal to: ID x 10,000.

**ARPA Target Note:** If the remote ship is also sending ARPA target NMEA sentences, then these will also appear in the Target list as their own target, and the MMSI number created for them will be: ID x 10,000 + (ARPA number). The ARPA number is designated by the remote ship's RADAR unit and is a number from 01 to 99.

**AIS Target Note:** If the remote ship is also sending AIS target NMEA sentences, then these targets will be included in the Target list as if they were acquired locally (ie: as regular AIS targets).

Note: that potential problems exist if a single SOB session is connected to multiple remote ships, and its own local AIS receiver, in that the data received for the SAME target could be received out of synch from all the sources. The resultant SOB display would probably show this as the AIS target jumping back and forward along its track.

**Example 3: Disconnecting from a networked ship(s)**

1. Open the WAN Target List form, and highlight the entry you wish to disconnect. Any connected ship will show BOTH a "Y" in the ON column, and a number in the TID column.
2. Press the [Toggle Connect] button. The "Y" will be replaced with a ":-:" in the ON column, and the [Open/Refresh Connection] button will be enabled.
   Several ships can be disconnected at the same time by repeating these steps for any other connected ship. ALL currently connected ships can be flagged for disconnection by pressing the [Disconnect All] button.
3. Press the [Open/Refresh Connection] button when ready ...
Example 4: Using both IP and Serial devices on OwnShip

When a WAN connection is made, SOB automatically closes any open serial ports for any direct connected devices (eg: GPS). This is a safety feature to prevent any misunderstanding about what data source is being displayed by SOB. When WAN/LAN data is being displayed as OwnShip data, the Ship's Data ViewPanel will be displayed with a silver/grey background (see sample Ship's Data displays below).

It is possible, and reasonable, to use data from both IP and serial connections simultaneously. For instance, a set of NMEA devices could be located in a remote area of the ship (eg: rudder angle sensor, GPS antenna, SONAR transducer, fluxgate compass), combined (using a multiplexer for example) into a single data stream, then run through a Serial IP Server. The output from the Serial IP Server can then be transferred to the navigation computer running SOB via Cat-5 LAN cable, or via a WiFi wireless connection, and connected to SOB as a **WAN Connect** using the IP Address of the Serial IP Server.

At the same time, other NMEA devices closely situated to the navigation computer (eg: RADAR, wind instruments, backup-GPS, AIS Receiver) can be directly connected to the computer via the normal serial (COM) port(s).

SOB will thus merge data from the two built-in serial ports, and any ONE connected remote node that is set as the **Primary** ship on the **WAN Target List** form.

One particular example application of this feature regards some make/models of AIS Transponders which connect to a computer's network hub and transfer their data over the network, rather than a serial cable. SOB Client can have GPS, RADAR, depth sounder etc connected via serial (or USB) and the AIS Transponder via the WAN list!

17.2.5 Additional Networking Hardware

Recommended GPRS Router & Serial-IP Server Suppliers

<table>
<thead>
<tr>
<th>Region</th>
<th>Supplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Norway</td>
<td><a href="http://www.navip.no">www.navip.no</a></td>
</tr>
<tr>
<td>UK/US</td>
<td><a href="http://www.marineIQ.com">www.marineIQ.com</a></td>
</tr>
<tr>
<td>AUS/NZ</td>
<td><a href="http://www.alloy.com.au">www.alloy.com.au</a></td>
</tr>
</tbody>
</table>
17.3 Server Mode
(aka HOST or MASTER)
SOB Server would typically be the computer onboard with all your GPS and any other NMEA instruments directly connected and another computer in your home or office computer running SOB Client and tracking your ship in real-time. In a different scenario SOB Server could be a land based computer in a VTS setting acquiring and forwarding AIS targets over the Internet where another SOB computer in Client mode could be re-displaying the targets.

17.3.1 Start SOB Server
To start SOB Server open the Raw NMEA Data form and select the NMEA Output page, then simply tick Multiplex and choose a TCP/IP option in the list (see red outline in the picture). Note that the final two combinations IP+Primary and IP+Secondary should be understood to mean "TCP/IP + Primary" etc, in other words ALL received NMEA data will be sent to both the COM port AND the network connection.

The text (outlined in pink) will indicate that the Server has been started and is listening on Port "1001", and further info in the purple Messages panel will indicate additional details.

At this point SOB is now in Server mode and is listening for any other networked computer to create a "channel" to it. When a channel is opened SOB will start to relay its NMEA data to the remote connection. Multiple remote computers can connect to a single SOB Server computer. When a remote Client connects, SOB Server will first send the following two lines before starting to send the NMEA data:

```
$Connected to SOB Navigation
$Home page: http://www.digiboat.com.au
```

Note: SOB will not automatically start the Server when you run SOB. You must "show the NMEA Output page" before the Server will start, so double-click the chart, then select the NMEA Output page. If TCP/IP output was pre-selected the Server will now start. Otherwise, select TCP/IP from the drop-down list for Multiplexer to start the server.

17.3.2 Connecting to a SOB Server
When your SOB computer is in Server mode, a remote computer (either a local network connection or connected over the Internet) running SOB can connect to your computer and have all your data mirrored to SOB on the remote PC.

To connect to this SOB Server, the remote computer will need to know this computer's IP Address (or URL if it's an Internet node) and the Port number.

17.3.2.1 ServerPortNumber
SOB's default listening port number is 1001. Note for network administrators: this value is held in the Windows™ Registry and can be changed to any available value.

Examine and/or change the port number used in the SoftwareOnBoard Registry Key or contact help@digiboat.com.au for instructions if you're not knowledgeable with RegEdit.
17.3.2.2 **Server IP Address**

You must determine your SOB Server computer's unique IP Address used for a network connection.

SOB allows a connection to any valid IP Address available on your computer, you would have multiple IP addresses available if many network connectors are present and enabled, eg: wireless, LAN cable plug, Bluetooth, GPRS modem. SOB Server starts in "Default Connection" mode and is listening for a remote connection on any installed hardware connector.

Note for network administrators: contact help@digiboat.com.au for instructions if you need to statically set the listening connection IP address, eg to the address of only the WiFi, or only the NIC etc; also for loopback testing purposes it could be preset to 127.0.0.1.

If you are a single computer with broadband internet connection, your ISP assigns a unique IP address to your computer that is visible to any other Internet connected computer. This address may be statically or dynamically assigned. A static address will not change each time you boot up your computer and make your Internet connection; a dynamic address is not guaranteed to always be the same each time you make the Internet connection. You can determine your IP address using the `ipconfig` utility, see Example 2, below...

However if your computer is on a local subnet and connected to the Internet via a DSL modem or other router or gateway computer, then the IP Address of your computer is hidden from the Internet unless a VPN (Virtual Private Network) is created. You may need to consult the services of a network technician; or study the help pages in Windows™ or at the Microsoft website to set up a VPN. Typical examples of IP address types on local subnets, and thus invisible to the Internet, are 10.1.1.xx or 192.168.0.xx.

In this situation, a far simpler solution is to install the free software utility **Hamachi** (pictured) on each computer that you wish to be on the VPN. Hamachi creates a zero-configuration Virtual Private Network for any number of computers, and most importantly for our purposes, it will assign each computer in a group with an **accessible static IP address**. ([www.hamachi.cc](http://www.hamachi.cc))

Of course, if you are accessing your SOB Server through your local intranet, then the client computer will connect using the local IP Address of the Server computer.

---

17.3.3 **Example network connections**

**Example 1: Determining your computer's IP Address**

There are many ways to discover your PC's IP Address, Win XP usually displays it simply by hovering the mouse over the small computer icons flashing down near the Clock. Windows 2000 hides this information behind about 27 mouse clicks. A simple way with either Windows versions is to press **Start** then **Run...**, type `cmd` then [Enter]. Now in the DOS window, type `ipconfig` and [Enter]. Write down the IP Address listed (eg: "220.236.198.158") then close this DOS window.

**Example 2: Connect a SOB Client to a SOB server over an intranet**

For the CLIENT computer running SOB to connect to you, they must know your SOB Server computer's IP Address. If your computer is on a local network, perhaps connected to a LAN or WAN hub or other computer with Internet connection, then it will probably have a local IP address (often similar to 10.1.1.xx or 192.168.0.xx).

With only a local IP address, any other SOB computers on your subnet can connect directly to you. The primary SOB Server in the schematic below (with all the devices...
connected) plus the Client 2 laptop plus the Client 1 computer represent a local network or intranet arrangement. Beyond the intranet, this arrangement allows Client 3 to mirror the data on the primary SOB Server, via the relay SOB Server which is also acting as Client 1.

It is actually very straightforward to establish a Server/Client session between two networked SOB computers:

**On the SOB Server computer**

1. Identify which computer on your network is to be the Server. Typically this is the computer with the GPS (and any other instruments) connected.
2. Determine the IP Address of this computer (use `ipconfig` if necessary as described above, see Example 1).
3. Open the **Raw NMEA** form, switch to the **NMEA Output** page, tick the **Multiplexer** box and select **TCP/IP** in the drop-down list.

**On the SOB Client computer**

4. Start SOB, open the **Raw NMEA Data** form.
5. Use the [WAN Connect] button to open the **WAN Targets List** form, point 17.2.1.
6. Enter the details for your SOB Server computer – **1001** for the port, and the **IP Address** determined in 2. Type a display name for this connection and [Add] it.
7. Double-Click this connection in the list to mark it "ON".
8. (optional) Right-Click the entry for OwnShip display, or leave OS blank to display this as a Target.
9. (optional) select any additional connections to make at this time.
10. Click the [Open/Refresh Connections] button to connect to the Server computer.

The NMEA data collected at the Server computer should now be streaming in the text window of the Client computer's **Raw NMEA** form. SOB on the client computer should be mirroring the data displayed in SOB on the server computer.
Example 3: Connect a SOB Client to a SOB Server over the Internet

If your SOB Server computer does not have a **publicly accessible IP Address** then you must establish a VPN to allow remote SOB Client computers from over the Internet to connect to the SOB Server computer.

Use the methods discussed earlier in this chapter to determine your SOB Server computer's IP Address. Or use a utility such as Hamachi to create a static IP Address for use with a VPN.

Once the IP (or URL if applicable) of the SOB Server computer is known, then simply proceed with the same steps as the previous example to establish the connection.

You may have to change your firewall settings to allow SOBvMAX.EXE access to remote sources.

17.3.4 Support Notes

1. Assisting with connecting remote SOBs over the Internet to a SOB Server not directly Internet addressed is beyond the mandate of our DigiBOAT Support Staff. Your network administrator, or local TCP/IP Consultant would need to assist you with any tricky network connections. Or use the Hamachi utility described above.

2. It is possible to override the automatic IP Address selected by SOB Server (eg: 127.0.0.1 can be used for single PC loopback testing) the default listening Port for the SOB Server (1001) can be changed, and proxy server name (for client connections) can be set... contact help@digiboat.com.au for more details.
17.4 WAN Glossary

WAN  Wide Area Network
Any network extending beyond the boundaries of a single building, mostly now means a connection over the Internet.

LAN  Local Area Network
Generally refers to a local connection, or intranet, such as a home/office network, or a network on your boat connecting TCP/IP enabled devices.

Intranet
A network that is self contained within a single organisation. Traditionally referred to a network (or LAN) that was all physically wired together, however the introduction of wireless connection types (WiFi, Bluetooth etc), and Internet "tunnelling"has blurred this definition somewhat!

Internet

Q.E.D.

TCP/IP  Transport Control Protocol/Internet Protocol
The set of standards that define how data is transported over a network, either a local network, or the Internet.

Network  Internet and/or Intranets
As used in SOB documentation should be understood to mean any number of computers connected together using any available networking technology and using the TCP/IP universal data protocols for communicating. Examples are (but not limited to) a PDA with a Bluetooth connection to your laptop; an office computer in a large LAN or WAN (generally referred to as an "intranet"); or any computer with Internet access.

IP Address or URL  Universal Resource Locator
A unique number or label that defines a node on a network. Every device connected to an intranet or Internet has a unique address. The address is in the popular URL format (eg: www.microsoft.com) or in the "dotted decimal" equivalent (eg: 127.0.0.1).

VPN  Virtual Private Network
A technique that uses Internet connections to make a secure private network between a group of computers.

GPRS  General Packet Radio Service
+ 3G, CDMA, EDGE etc
Data communication systems for Internet connection using the cellular mobile phone network.

The differences between the various connection types are mostly speed, age and Service Provider. The older CDMA and GPRS were the first to offer speeds suitable for Internet browsing (with the even older GSM phones, browsing was just possible, but not practicable). The newer technologies (3G and EDGE etc) offer true broadband speeds for all Internet services over the cellular phone infrastructure.

GPRS Router
The hardware device required to connect to the Internet using GPRS. (Basically just a mobile phone that has a full-time internet connection and only sends data). Each connected Router is assigned its own publicly viewable IP Address (or URL) so it can be identified over the Internet, and SOB uses this known IP Address to establish a one-to-one connection with your boat.

Serial to IP Converter or Server
A hardware device for converting serial (COM) data (such as generated by GPS or any NMEA navigation devices) to TCP/IP data in preparation for transmission over a network (intranet or Internet). Such devices can be used with a GPS onboard to provide sophisticated boat tracking capabilities on any remote SOB Client.
Multiplexer
A hardware device for combining many NMEA serial devices into a single stream of NMEA data.

NMEA National Marine Electronics Association
A set of international standards for interfacing marine electronics devices.

NEMA
A typographical error which should be read as NMEA.
18 Reference

18.1 Glossary, Abbreviations and Acronyms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UTC, GMT</td>
<td>Universal Co-ordinated Time, Greenwich Mean Time</td>
</tr>
<tr>
<td>TZ</td>
<td>Time Zone</td>
</tr>
<tr>
<td>LAT</td>
<td>Latitude</td>
</tr>
<tr>
<td>LNG</td>
<td>Longitude</td>
</tr>
<tr>
<td>MOB</td>
<td>Man Over Board</td>
</tr>
<tr>
<td>LKP</td>
<td>Last Known Position</td>
</tr>
<tr>
<td>RNG</td>
<td>Range</td>
</tr>
<tr>
<td>BRG</td>
<td>Bearing</td>
</tr>
<tr>
<td>ETA</td>
<td>Estimated Time of Arrival</td>
</tr>
<tr>
<td>TTG</td>
<td>Time To Go</td>
</tr>
<tr>
<td>RBL</td>
<td>Range and Bearing Line</td>
</tr>
<tr>
<td>RTE</td>
<td>Route</td>
</tr>
<tr>
<td>WPT</td>
<td>Waypoint</td>
</tr>
<tr>
<td>VMG</td>
<td>Velocity Made Good</td>
</tr>
<tr>
<td>DTS</td>
<td>Direction To Steer</td>
</tr>
<tr>
<td>XTE</td>
<td>Cross Track Error</td>
</tr>
<tr>
<td>kn</td>
<td>Knots (Nautical Miles per Hour)</td>
</tr>
<tr>
<td>Nm</td>
<td>Nautical Mile</td>
</tr>
<tr>
<td>°T, °M</td>
<td>Degrees True, Degrees Magnetic</td>
</tr>
<tr>
<td>°C, °F</td>
<td>Degrees Celsius, Degrees Fahrenheit</td>
</tr>
<tr>
<td>NMEA</td>
<td>National Marine Electronics Association</td>
</tr>
<tr>
<td>NEMA</td>
<td>A miss-typing of NMEA</td>
</tr>
<tr>
<td>MagVar</td>
<td>Magnetic Variation</td>
</tr>
<tr>
<td>C-MAP</td>
<td>Short company name (for C-MAP Electronic Charts) supply the charts that SOB displays.</td>
</tr>
<tr>
<td>N2D</td>
<td>Navigate-To-Destination</td>
</tr>
</tbody>
</table>

**CPA Closest Point of Approach**

The position of your ship (latitude and longitude) at the point when your ship and the target ship are at the minimum distance apart. This location can, at times, be misleading ... for instance it can be half way around the World, or at a point after your two paths cross. SOB considers the ships as "passed" if the CPA is behind your current position.

**TCPA Time to CPA**

Is the time remaining until your ship reaches the CPA

**DCPA Distance apart at CPA**

This is the actual closest distance that the ships will ever be. In the Quick Info box below, it is "Clearance Distance" at the CPA.

**DTG Distance To Go**
The distance you are from a fixed position. This may be a CPA, destination waypoint, next TurnMark of a route etc. EG, for DTG to CPA position, this is a calculation based on the TCPA and your current speed.

**ROT Rate Of Turn**

As received from an AIS target and measured as degrees per minute. SOB displays the value, for example:

- No ROT indicator data received: nothing is displayed
- Straight (ROT indicator present): (straight)
- Right at 14 degrees per minute: |-> 14°/min
- Left at 123 degrees per minute: <-| 123°/min
- Right or Left (value out-of-range): >+> or <+<

**ARPA (or MARPA) Automatic Radar Plotting Aids**

A pre-AIS technology based on RADAR signals to determine lat/lng, speed and course of defined RADAR blips. MARPA (Mini ARPA), for all intents and purposes, is the same as ARPA, just without the official ratification.

**DSC Digital Select Calling**

Relatively old technology initially used for making telephone phone calls with VHF radios. New life has been given to DSC as a semi-automatic position fixing service by digital transmission to a receiving station.

**DR Dead Reckoning**

A method of navigating using an estimation of your current position, course and speed. DR is typically used when (1) the GPS is unavailable, or (2) to simulate a passage when away from the boat.

**SPD Boat Speed (Speed-Over-Water)**

**SOG Speed-Over-Ground**

Boat Speed is the speed through the water as measured by manual means or with an onboard LOG device. Speed-Over-Ground is your speed relative to the Earth's surface, as measured by a GPS.

**HDG Compass Heading**

**COG Course-Over-Ground**

Compass Heading is your course as measured by an onboard magnetic or electronic compass.
COG is the true direction of the ship's movement measured by a GPS.

**RL Rhumbline**

Rhumbline is a straight line course on a Mercator chart (C-MAP charts in SOB use the Mercator Projection). Rls follow a constant magnetic heading, and mathematically are known as a "loxodromic" curve.

**GC Great Circle**

Great Circle courses (orthodromes) represent the shortest distance between two geographic locations, but require a continuous change in the ship's heading.

**PastTrack**

The "tail" behind the moving ship that indicates the exact path taken by the ship.
Show/Hide the PastTrack on the Ship's Settings Form.
Further analyse the PastTrack by importing "SOB\Logfiles\!PastTrack.txt" into Excel.

**OS OwnShip Ship's Target**

SOB's indicator showing the current ship's location.

**MAPI Messaging API**

This is computer-talk (API = Application Programming Interface) which describes the set of features and interaction with your Email program (also called the "Email Client").
MS Outlook is full MAPI compatible program.
Outlook Express, Eudora, Netscape mail etc are Simple MAPI compatible.
18.2 KeyStrokes

[Space] Refresh chart display and tool drawings, centre ship.
   End auto-centre mode (if enabled)
[Space+Space] place Wpt at ship’s position
[Arrow keys] pan the chart
[Enter] Quick Object Info mode
[I] and [O] zoom in and out
[Enter], [Space] enable Auto Centre mode
[Backspace] PastTrack form
[Tab] Dampen & Calibrate form
[Enter], [Space] enable Auto Centre mode
[Backspace] PastTrack form
[Space] Refresh chart display and tool drawings, centre ship.
   End auto-centre mode (if enabled)
[Space+Space] place Wpt at ship’s position
[Arrow keys] pan the chart
[Enter] Quick Object Info mode
[I] and [O] zoom in and out
[Enter], [Space] enable Auto Centre mode
[Backspace] PastTrack form
[Tab] Dampen & Calibrate form
[Enter], [Space] enable Auto Centre mode
[Backspace] PastTrack form

[F1] Help Screen list of keyboard shortcuts
[F2] Toggle Chart Levels Toolbar
[F3] Toggle Chart Toggles Toolbar
[F4] Toggle Depth Shading
[F5] Display Depth Spot Soundings
[F6] Toggle Chart MixLevel Mode
[F7] Night-Mode Settings
[F8] Toggle Declutter Mode
[F9] Display Ship’s Settings Form
[F10] AllWaypoints Form
[F11] AllRoutes Form
[F12] Toggle Perspective View

[A] start/stop Anti-Grounding
[B] show Chart Borders form
[C] hide/show Cursor Box
[D] start/stop Dead Reckoning
   [L] [R] steer the ship Left or Right
   [Shift] to toggle 1° or 10° steps
   [+ ] [-] add or subtract 2.5kn to speed
   toggle Fastdraw mode (rarely used)
[F] toggle Fastdraw mode (rarely used)
[G] toggle GRIB Viewer
   [+] [-] cycle loaded F’cast periods
   [B] toggle Wind arrows big/small
[N] display the Raw NMEA Data form
[P] hide/show Printing tools
[T] display the Targets form
[V] hide/show View Panel menu
[W] toggle Wind Tools

[1] Hide/Show Main toolbar
[2] Hide/Show Status Bar
[3] Perspective View (3D View)
[4] Depth Shading form (use with [F4])
   [PgUp,PgDn, Home, End]
   Set depth area colouring
[5] Cycle alternative chart palettes
[6] Show highlighted depth range
[7] Toggle Pointer colour (Blue/Yellow)
[8] Toggle Datum Shift
[9] Toggle Ship’s Bells
[0] virtual-zoom mode
   (rarely used)
[9] Fixed-Scale/Level-Changing zooming
   (rarely used)
[0] (zero) Reset chart scale

[Ctrl-A] toggle Animated Lights
[Ctrl-G] toggle Graticule
[Ctrl-M] start Man Overboard mode
[Ctrl-R] Reset the chart display
[Ctrl-Shift-Y] Show isomagnetic graph (Mag Var)
[J] & [K] change Year used for MagVar graph
18.3 Mouse Clicks & Touch-screen Actions

- **MouseWheel** will perform fast zooming, by changing chart detail levels.
- **Left-Click** will centre the chart at that position (used to pan the chart). However left-click action will be determined by what tool or mode is presently active.
- **Middle-Click** at any time to centre chart.
- **Middle-button Drag** create a Zoom Window into the chart by dragging from top-left to bottom-right. If GRIBs are active, then the zoom window is also used to "seed" the boundaries for the next GRIB data request area.
- **Right-Click** at any time to view data about that chart point (same as Info->Touch).
- **Double-Click** the chart to display the Raw NMEA Data form.
- **Touch/Slide** along chart edges to pan chart (when Auto Panning button depressed).

SOB is equally useable with a touchscreen interface, as such the following terms appear throughout this manual:

- **Touch** is the same as **Left-Clicking** the chart.
- **Slide** is equivalent to **Left-Drag**.
- **Press** is what you do to Buttons or Check Boxes.

Note:

1. Some actions involve **Touching** the chart twice, particularly when route editing. This is NOT double-clicking, the first Touch selects the item, Touching it again performs the action (i.e: showing a form)

2. Hold down the [CTRL] key when left-clicking the Ship's position will NOT show the Ship's Form. So if any other object is concealed beneath or overlaps the Ship's target, then it will be selected instead of the Ship. This allows an easy way to select a Waypoint or Route mark (for example) that is at the same location as the Ship.
18.4 Files and Folders

18.4.1 Installation Notes

SOB is installed in an unconventional manner ...

SOB is designed to be self contained within its own folder (similar to MYOB or the DOS programs of old...). This enables an installed copy of the program, with its data and charts, to be simply copied to any other disk or another computer and run as if fully installed. (IE, the original install disk, or downloaded setup file is not required)

A pre-installed copy of SOB can run from a USB Storage Drive, Network Drive, even a large memory card.

SOB doesn't care where its folder is located on the hard disk, for example:

- C:\SOBv360 ➔ our default, and recommended, installation folder
- C:\Program Files\SOB ➔ in the regular Windows program folder
- C:\My Documents\SOB ➔ in your personal folder
- D:\Navigation\SOB ➔ second hard drive or other storage device
- \BRIDGE\C\Nav\SOB ➔ network drive

...are all valid locations for SOB.

For Win2000 and newer computers, ensure that you have read/write rights to your SOB installation folder, both (1) while installing, and (2) whenever you run SOB. If you don't have multiple user ID's on your system then you may need to be logged-in as "Administrator"

**NOTE 1:** that SOB can NOT run from a CD-ROM or other read-only storage device, or any folder without read/write access privileges - SOB needs to be able to create certain files on the disk which is not possible with a CD-ROM or security protected drive.

**NOTE 2:** SOB (Ver10 and newer) can run from a removable disk – ie a USB Thumbdrive, USB Remote Hard disk or even an SD Card. SOB should be installed onto the removable drive from the Setup.exe file.

18.4.2 Chart Folders

\SOB\Charts and \SOB\DemoCharts folders are now used inter-changeably by SOB. Chart files (demo or licensed) can reside in either or both of these folders. However we recommend you don’t have THE SAME CHART file in both folders, as SOB will return double entries for some functions (such as the Port Find feature).

C-Map’s default chart installation folder is:

C:\Program Files\C-MAP NT PC Selector\Charts

We recommend moving the chart file to SOB’s chart folder.

18.4.3 User Selectable Data Folders

SOB has the facility to allow you to separate the data folders from the program folder. To change the location of the data folders, they must be moved – all together – to the alternate location. If SOB can't find the SOBvMAX\LogFiles folder when it starts up, then a "Browse for Folder" pop-up will allow you to select the new location, eg: C:\My Documents\sob\...

If a valid folder, containing ALL of SOB's sub-folders is not selected then SOB start-up will be aborted.
### 18.4.4 SOB Installation Folders

<table>
<thead>
<tr>
<th>Folder Location</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C:\SOB</td>
<td>(also, C:\SOBv90, C:\SOBvMAX, C:\SOB+GRIB, C:\SOBv360)</td>
</tr>
<tr>
<td>SOBv360.exe</td>
<td>The main program file. (or SOB.exe, or SOB+GRIB.exe)</td>
</tr>
<tr>
<td>SOB_PORTS.exe</td>
<td>Utility program to help configure the Serial/COM ports that SOB uses</td>
</tr>
<tr>
<td>uninst.exe</td>
<td>If SOB was setup using a self-installing file (instead of simply copying it from another computer), this uninstall program will clean SOB off your computer, however, any Routes, Waypoints or Log files you created will not be removed.</td>
</tr>
<tr>
<td>QuickStart.pdf</td>
<td>Print this file for easy reference while using SOB.</td>
</tr>
<tr>
<td>RELEASE NOTES.pdf</td>
<td>Printable document that highlights the new/different features with the latest version</td>
</tr>
<tr>
<td>ReadMe.txt</td>
<td>Required text files.</td>
</tr>
<tr>
<td>Notes.txt</td>
<td>SOB will not function successfully without these files</td>
</tr>
<tr>
<td>Warning.txt</td>
<td>present in the same folder</td>
</tr>
<tr>
<td>MOB.txt</td>
<td></td>
</tr>
<tr>
<td>cmWin32.dll</td>
<td>Required C-MAP library file.</td>
</tr>
<tr>
<td>FSYS03.dll</td>
<td>Required C-MAP library file.</td>
</tr>
<tr>
<td>WWB00200.dll</td>
<td>The C-MAP world overview chart, used as the background chart in SOB.</td>
</tr>
<tr>
<td>SOBv360v10.RPT</td>
<td>A file created if SOB crashes. May be of use to Digiboat for diagnostic reasons</td>
</tr>
<tr>
<td>!FuelRate.txt</td>
<td>Your Fuel Consumption table used by SOB</td>
</tr>
<tr>
<td>!FuelRate.xls</td>
<td>Excel spread sheet to help create the Fuel Rate Table if using the manual option. See Section 2.2.5.7</td>
</tr>
<tr>
<td>!SOB_PORTS.txt</td>
<td>A diagnostic file for sending to Digiboat Support if assistance with COM connections is required</td>
</tr>
</tbody>
</table>

Windows library files. Generally not required but included for any systems that do not have these automatically installed with Windows.

<table>
<thead>
<tr>
<th>File</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>mfc42.dll</td>
<td>MS standard Library file</td>
</tr>
<tr>
<td>msvcrtd.dll</td>
<td>MS standard Library file</td>
</tr>
<tr>
<td>winmm.dll</td>
<td>MS Library for playing WAV files</td>
</tr>
<tr>
<td>sapi.dll</td>
<td>MS Library for TTS (Talking Pilot feature)</td>
</tr>
</tbody>
</table>

### C:\SOB\Charts

LICENSED CHART FILES

Licensed (purchased) C-MAP Charts are, by default, stored in:

C:\Program Files\C-MAP NT PC Selector\Charts

These licensed charts can be moved/copied to SOB’s C:\SOB??\Charts folder.

You should Backup your Chart License Codes also to this folder from within C-MAP’s Chart Selector program.

Choose any name for the Backup file, we suggest: cmap_licenses.txt
C:\SOB\DemoCharts

DMC0xxxx.MCV  Files of this format are unlicensed demonstration C-MAP charts from various locations around the world, including:
Sydney ; Auckland ; Singapore ; Maldives ; Hawaii ; etc

C:\SOB\Logfiles

*.log  Text file captures of NMEA data.
These can be copied, archived, renamed etc using regular Windows file manipulation techniques (Explorer, dragging etc)

NMEA Log files can be loaded into SOB and replayed as a simulation

SOB_NMEA_DATA.log  This NMEA logfile is opened each time SOB starts. NMEA data is saved to the file if ticked on the Raw NMEA Data Form.
This file can NOT be accessed whilst SOB is running, however after exiting SOB, copy, move or rename this file for easy recall to replay the voyage.

!BAD_NMEA_DATA.log  If SOB receives bad NMEA data it is written to this file. This can be useful for tracking down connection problems with your devices.

!Messages.txt  All text from the Messages data panel in SOB is periodically logged to this file.

!WAN_list.txt  A simple text list of Server IP details for the WAN/LAN Connect Network feature.

!FRIENDS_list.txt  Simple text list containing both AIS target details for those specifically entered into the "Friend's List", and also contains the database of previously received AIS target names if the option "Remember Target Names" is selected on the Raw NMEA Data form.

!AIS_DATA.txt  See Section 9.3.4

- A selection of sample NMEA log files that demonstrate the AIS and ARPA capabilities in SOB are included with the full download.
The AIS log files were captured around Dover/Calais and Guernsey (south of the UK). The included demo ARPA log files for Florida are also for anyone interested in seeing the benefit of a connected RADAR to SOB.

C:\SOB\Routes

{route name}.rte  each route created in SOB is saved in its own file
PastTrack001(yyyy-mm-dd).rte  On program exit, or when requested on the AllRoutes form, SOB will convert the visible PastTrack to a regular Route file. This file can be re-loaded into SOB as a Route and reversed, activated, analysed etc using the standard Route tools.

NOTE: the PastTrack will NOT be automatically saved to a file if there has been less than (about) 20 minutes of running time.

Using Windows Explorer and normal file manipulation commands, these plain text Route files can be: deleted, archived, backed-up, emailed, copied and reloaded

C:\SOB\Waypoints

!default.wpt  This is the "current state" of Waypoints used by SOB's last session ; and to be automatically loaded when SOB next starts.

{filename}.wpt  User defined groups of Waypoints stored in their own files for easy loading/unloading into SOB.