

Documentation ScanNav AIS/DSC/ARPA Module

Contents:

INTRODUCTION.....	1
SETTINGS.....	2
ANALYTIC LIST VIEW.....	3
COLLISION ALERTS:.....	5
MAN OVER BOARD AIS BEACONS.....	5
MMSI CUSTOM LISTS USAGE.....	5
DSC FUNCTIONS.....	6
RECEPTION AND DISPLAY OF DSC REPORTS:.....	6
PILOTING YOUR DSC VHF:.....	6
Voice Call:.....	7
Position Request:.....	7
Position Report:.....	7
Fleet tracking:.....	8
DSC Anchor Alarm:.....	8
DSC Requests Queue window:.....	8
DSC specific Settings for piloting functions.....	9
ARPA / MARPA SUPPORT.....	10
IMPORT OF SSN POSITION REPORTS FOR TRACKING.....	10
CONNECTIONS:.....	10

Introduction

The AIS module is an optional module of ScanNav. When active, it lets you visualize on screen all boats equipped with a transmitter (required above 300 tons), and manage anti-collision alerts.

Radar ARPA or MARPA targets, as well as DSC position reports are also managed and displayed in a similar manner. Starting with version 16.1, you can pilot your DSC VHF (providing that it accepts DSC and DSE NMEA sentences as input, which is the case for ICOM), giving you extra possibilities such as calling ships, sending or requesting position reports (one shot or periodic), without the need of an AIS transponder. Just right click on a target on the map, or in a list, to have access to the corresponding feature.

Targets are represented on screen in a similar way to your own boat, with or without heading line, track, and corridor proportional to the target's real dimensions. When placing the mouse over a target, a pop-up window will show all information such as the target's name, size, heading, speed, destination, etc... Options related to the AIS module are grouped in the following 2 locations:

Right-clicking on the map on a target opens a contextual menu listing all intersecting targets, with for each target, access to specific functions related to this target (see related chapter for more details):

- AIS targets list: Selects this target into the analytic list view.
- Properties: Display the alarm window for this target to view properties for this target in a synthetic form.
- DSC functions (Voice Call, query or Send Position reports).
- Include/Remove the target into/from one of the 3 MMSI lists (Friends, MOB, ignored)

Settings

You can tune all display and alert options using the preferences window. To access, use menu "File" ==> "Preferences" and go to the "AIS" tab.

The "**Security distance**" will be the basis to trigger collision alerts. The unit can be expressed in "NM" (Nautical miles), "KM" (Kilometers), or "M" (Meters). This unit is also used for the minimum distance to show CPA vectors (see below)

Draw at real size: If this option is checked, targets for which dimensions are known will be displayed at real size when the zoom factor is sufficiently high.

Watch AIS MOB: when checked, an alarm will be triggered if a MMSI target corresponding to the MOB MMSI list is detected (see later in this doc).

Your own **MMSI** number only needs to be given if you have a transponder on board. The MMSI number entered in this field will be ignored by ScanNav. If you do not enter it, you might have collision alerts with your own boat. If you just have an AIS receiver, you can just leave this field to 0.

Erase targets older than: Targets will disappear from screen if they do not send any information after the given value in seconds. (They will independently also change color after 10 seconds without reception). If this value is 0, targets will never disappear.

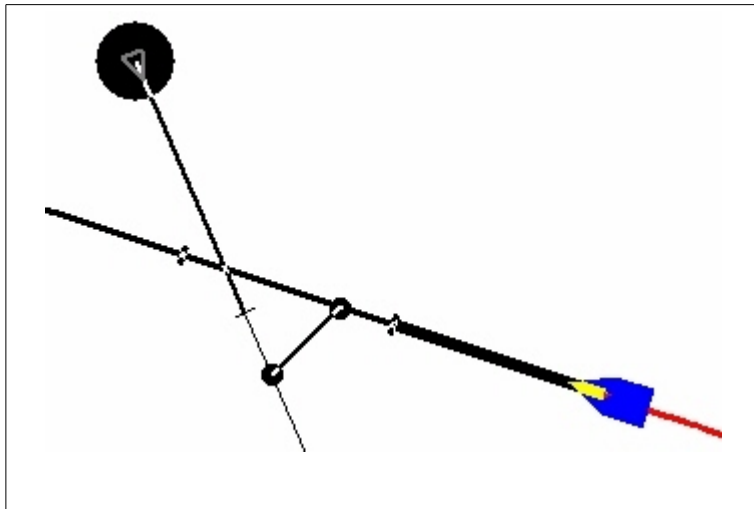
Collision Alerts: An alarm will be triggered if the option "**Collision alerts**" is checked, and if the target's CPA or TCPA are below the given values in "security distance" (for CPA), or "minutes before..." (for TCPA). (here 300 meters for CPA and 10 minutes for TCPA). Alerts may be audible ("**Audible alarm**") and/or visual ("**Show alert box**"), and the alert window may stay opened or close after the alert conditions are safe ("**Auto close**"). On another side, targets in alert condition are highlighted on screen to distinguish them more easily. "**Limit alerts to targets with speed higher than**" lets you ignore targets that are anchored or below a given speed (very useful in or near harbors)

If "**Show Alert box**" is unchecked, no alert window will open, but the targets in collision alert will still be Highlighted on the map. "**Delay on validation**" lets you ignore alerts from a given target for a given period, once the alert box is validated. (this option can also be changed in the alert box when it appears before closing it).

The length of the **Heading line** can be set according to time. It can also be graduated in time steps as for your own boat (but independent parameters). A corridor with a width proportional to the target's length can also be shown.

MMSI Lists lets you define 3 independent lists:

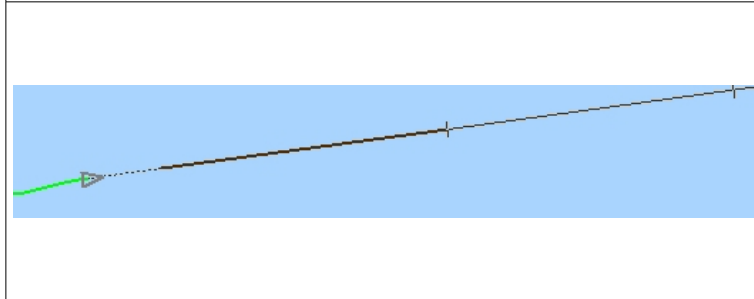
- **MOB AIS targets:** List of MMSI targets that will trigger a Man Over Board alert.
- **Friends:** Lets you define a list of MMSI to differentiate and find them easily.
- **Ignored MMSI:** All alerts from any MMSI in this list will be ignored.



If "**CPA vectors**" (Closest Point of Approach) is checked, a vector will be drawn between your own boat and targets to show the estimated position of both boats at the time where they will be the closest to each other.

You can therefore see on the example at the left, that your own boat (in blue) will pass behind the AIS target.

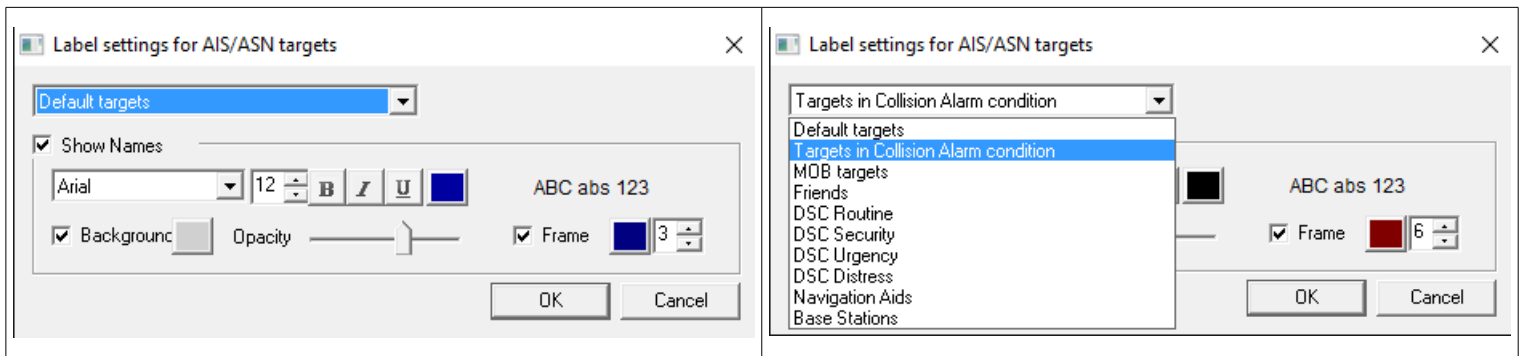
To have a lighter display, you can limit the CPA vectors to targets for which CPA is lower to given distance, by checking "**Limit to**" option, and entering a distance value (in same unit as "**security distance**")



"**Dead reckoning**": When checked, ScanNav will estimate the position of targets that do not emit anymore, according to their last known position/heading/speed. In this case, the target is shown at it's last known position, and a first segment with a dashed line will show the estimated route done since. The estimated position is therefore at the end of the dashed line segment.

If "**Memorize tracks**" is checked, all targets positions are logged as tracks for the current session. These tracks will be displayed or not according if you check or not the "**Show tracks**" option. A "**Maximum time**" value can be set to limit the visible section of the AIS tracks to a given amount of time since the last known position. This will avoid an overloaded display, still keeping the essential information. Uncheck this option to recover full tracks at any time.

You may toggle "**Show Names**" on/off globally, and/or tune the display of target names (font, text and background color, opacity, frame) according to the type of target, by clicking on the "**Parameters...**" button.



DSC VHF Parameters... lets you set parameters according to your VHF radio to use the DSC functions. (refer to the corresponding chapter further in this document)

Analytic List View

You may view all targets as an analytic list using menu "**Options**"->"**AIS / DSC / ARPA**" →"**View Analytic window**", that will be displayed as follow:

AIS targets

MMSI	Name	Call sign	IMO ...	Ship type	Length	W.	D...	Status	Desti...	ETA	Position	F ^
227136240	ALIDADE	FAA5748	-	Sailing	12	4	-	-	-	-	47°25,112'N / 002°40...	0
228288000	F/V MARY CHRISTO 2	FHZE	-	Fishing	20	10	-	-	-	d.cem...	47°20,846'N / 002°30,884'W	1
636015874	NEW CALEDONIA M...	D5DG6	9520...	Cargo ship	190	32	11.9	under way using e...	US H...	juin 14...	47°06,741'N / 002°23,934'W	1
227193670	JUSANT V	-	-	Sailing	-	-	-	-	-	-	47°22,959'N / 002°32,675'W	1
227235830	BEMOL III	FAB7599	-	Sailing	10	4	-	-	-	-	47°22,960'N / 002°32,626'W	1
235084915	STOLT FUJI	2EGO8	9468...	Tanker	106	17	5.3	at anchor	DONG...	juin 14...	47°07,276'N / 002°26,403'W	0
373503000	AG VARTHOLOMEOS...	3EXQ4	9110...	Cargo ship	225	32	6.6	Moored	MONT...	d.cem...	47°17,102'N / 002°11,952'W	1

Filter old targets Close

- Targets that are in **collision alert** and/or **MOB** targets will always appear in red and at the top of the list (red text for collision alerts, and red background for MOB targets)
- Just after, comes all targets defined in the **Friends** list with a green background, and then all other targets except the **Ignored** targets that are still present in italic and gray at the bottom of the list.
- You can sort the list according different criteria by clicking on the columns headers.
- The list has the same general behavior as the objects list view or charts library (ordering, etc...). All available information for each target are displayed as separate columns that you can configure to show only what you need, and in your preferred order using the menu entry “**Columns**”.
- Selected lines (highlighted in blue when clicking on them) will show up on the chart in a different color to distinguish them (you may use "Ctrl" and "Shift" keys to select several lines)
- When option "Filter old targets" is checked, only recent targets still visible will be displayed in the list (see preference settings above)
- The button with a green arrow opens a menu to perform different actions on the selected targets.

<ul style="list-style-type: none"> Center on target Properties Include in Friends list Include in AIS MOB list Ignore target DSC: Request Position DSC: Initiate a Voice Call DSC: Report my Position DSC Tracking Delete selected targets MMSI Lists > DSC Requests Queue <input checked="" type="checkbox"/> Filter Old targets <input checked="" type="checkbox"/> Show Archived MMSI Columns 	<ul style="list-style-type: none"> • "Center" will center selected targets on the chart. If several lines are selected, ScanNav will modify the scale so as all selected targets show up on the screen. • "Properties" opens the alert dialog of the selected target • « Include... » and « Ignore » lets you quickly add/remove selected targets to one of the Friends/MOB/Ignored lists. • «MMSI Lists» Open the dialogs to manage one of the lists. • You can access directly to the DSC functions such as Voice Call, Position Report or Request, the DSC tracking windows, or the DSC requests queue. (see chapter on DSC functions) • «Delete selected... » lets you clean your memorized targets list. Deleted targets will nevertheless reappear as soon as they are detected again. • «Show Archived MMSI»: When checked, all targets detected since installation will be listed, even if they were not detected in the current session. This option is grayed out if “Filter Old targets” is checked. • "Columns" lets you select and order the columns to display (same ergonomics as the charts and/or objects libraries)
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- When selecting a target on the map with the contextual menu, the analytic list view will open with the target selected and centered in the list.

Collision Alerts:

In case of collision risks, an audible alarm is triggered, and a window opens showing all properties of the target, as well as alert conditions (approaching speed, minimum estimated distance (CPA/TCPA), etc...)

You can temporarily disable the audible alarm, and ignore the target for the specified time (default value defined in preferences)

According to values set in preferences, this window can close automatically when the alert condition is finished. It can also be displayed with the "Properties" menu entry of the AIS Analytic List view.

Man Over Board AIS Beacons

The MOB AIS beacons interface uses the same concepts as the NKE MOB, bringing in addition the real time updating of the MOB position through the AIS signal.

IMPORTANT : You must first configure the MMSI numbers of your MOB beacons in the **MOB MMSI List**. Also make sure that **"Watch AIS MOB"** option is checked in the Preferences.

To familiarize yourself with the system, you can specify the MMSI numbers of any ship insight (this is the case in the screen shot, which explains extreme values). Remember however, to restore the right MMSI numbers for real conditions.

An alarm will be raised as soon as a MMSI listed in your settings starts transmitting. A first WP is created at the initial position of the MOB, and a 2nd evolves progressively according to the last AIS position received.

Speed and direction of drift are updated with the latest AIS received values. On activation of the "Drift(dead-reckoning)" check-box, a 3rd WP is created and evolves according drift values entered, which are relative to the last known AIS position and date. In practice, as long as the AIS beacon transmits positions, this 3rd WP will be superimposed on the 2nd WP.

"Navigate to" is initialized by default to the last known AIS position, you may then choose to navigate towards the "Estimated position" or the "Initial MOB position".

The button Re-centers the map on the target's position

MMSI custom lists usage

Three custom MMSI lists can be defined:

- **MOB MMSI List**: Enter the MMSI of your individual MOB beacons in this list so that they trigger an alert

when detected.

- **Friends MMSI List:** You can enter individual or Group MMSIs and give them custom names, so to access them easily, especially for DSC related functions.
- **Ignored MMSI List:** MMSI targets from this list will be ignored (no Alarm, and not displayed on Map)

The three lists are handled with the same interface. They are accessible from different menus ("Options" from the main widow, "MMSI Lists" button from the Preferences, or menu of the Analytic window)

MMSI	Name
022752755	GRCOUREURS
022752756	GRFLOTTE
227527550	ICOM2
227527555	ICOM BRANCHE
228288000	F/V MARY CHRISTO 2
235104549	CHERRY
235109946	BOMBY

Use the Green button to add an entry, and the Red button to delete selected entries. To modify an entry, double-click on it.

The Search button opens a Chooser to browse all known MMSIs. This browser lets you search for MMSIs by entering part of it's name or MMSI number.


The button with a green arrow opens a menu to import or export the list as a file, or import the buddy's list from an Icom VHF.

DSC Functions

The DSC functionality is independent of AIS, and does not need any AIS receiver or transponder. In counter part, it needs to have a DSC VHF with support of the DSC and DSE NMEA sentences in output for simple reception and input and output for advanced piloting functions.

Reception and Display of DSC reports:

ScanNav will display any DSC Distress and Position reports on the map, providing that your DSC VHF **outputs** NMEA DSC and DSE sentences.

DSC targets are represented with a different icon , and show up in the display list with type "DSC Report", and the status indicating the report type which can be any of "Routine", "Security", "Urgency", or "Distress" followed by the type of distress:

- "Fire, Explosion"
- "Flooding"
- "Collision"
- "Grounding"
- "Listing, in danger of capsizing"
- "Sinking"
- "Disabled and adrift"
- "Undesignated distress"
- "Abandoning ship"

For reports other than "Routine", a MOB alert is raised and an associated waypoint is created, as for the AIS MOB function. But with the difference that there is no automatic re-routing to this MOB waypoint.

Piloting you DSC VHF:

Starting with version 16.1, you can control your DSC VHF, provided it supports the functionality with a NMEA **input accepting DSC and DSE sentences**. This is the case of the DSC VHF from the **ICOM** brand

This will allow you to initiate Voice calls, Report your position, or Request other ships positions directly from ScanNav. You can also set up a Fleet tracking system by automating position requests to selected MMSI at a regular time interval.

Requests can be done in different manners:

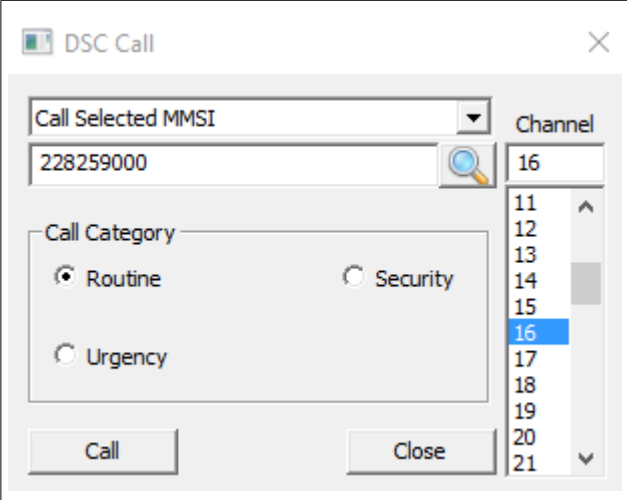
- By Right-clicking on a target on the map and selecting the sub-menu corresponding to the MMSI to request,
- From the Analytic MMSI List view using the contextual menu
- Or from the menu “Options” => « AIS/DSC/ARPA »

To be able to send a request to a MMSI that doesn't broadcast any AIS information, you must first enter it's name and MMSI number in the “Friends” list so as to access it. (see “MMSI custom Lists usage” above)

Note: Usage of DSC requests needs that the NMEA listening be active.

Voice Call:

Select the menu entry “Initiate a Voice Call”. This will open a new window to let you enter the call parameters.

	<p>You may call “All Ships”, or a Selection of individual or Group MMSI.</p> <p>The MMSI number will be pre-filled with the selected MMSI, or by default with the MMSI of the last called ship. You can use the Search button to browse from all known MMSI.</p> <p>Choose the Call Category from Routine, Security, or Urgency, as well as the channel to switch to, then click on the “Call” button.</p> <p>The Call will be sent to the VHF after validating the confirmation dialog. All buttons will be grayed out until the remote station replies or that you cancel the call.</p> <p>The DSC Requests Queue window will display the progress of the call.</p>
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Position Request:

You just need to select the “**Position Request**” entry from the menu. The DSC request will be sent to the VHF after you validate the confirmation dialog.

It is not possible to send a position request to a Group MMSI. You may nevertheless select several Individual MMSI, they will be queued, and sent one at a time to the remote stations. The response time of each request depends on the time the remote station takes to reply, especially if its VHF is setup to reply automatically, or if it requests an operator action to validate.

When the reply of the current request arrives, the position is plotted on the chart, and the next request (if any) is sent. According to the settings on you VHF, you might need to acknowledge the reception before it sends the next request.

The “DSC Request Queue” window will show the progress of the queued requests. You may eventually cancel a request so as to send the following request. If no reply arrives in the maximum time slot set up in the preferences, ScanNav automatically cancels it and sends the next request in the queue if any.

Position Report:

Ergonomics is similar to the Position request: Use the “Position Report” menu entry instead. The DSC request will be sent to the VHF after you validate the confirmation dialog.

As per the position Request, it is not possible to send your position to a Group MMSI number, but you can send it to a list of Individual MMSI.

Position Report requests do not need any reply from the remote station. The response time is therefore less than for the Position Request. It is nevertheless necessary to have a small delay between requests, which is dependent on your VHF model. This delay is given by the “**Delay between requests**” parameter of the DSC specific settings (see below)

If the remote station is equipped with ScanNav, or another software supporting DSC, your position will be plotted on

its chart.

Fleet tracking:

A tracking system is available by sending Position Requests to a list of selected MMSI at a specified interval of time.

To set up, use the “**DSC Tracking**” menu entry to show the following window. Note that the tracking is interrupted while this window is opened.

	<p>Set up the list of wanted MMSI using the research, add, and delete buttons (similar functions as for the MMSI custom Lists window)</p> <p>Check/Uncheck the “Tracking active” option according to your desired action, and enter the time interval at which the tracking will be triggered. Make sure to enter a sufficient time slot so as all requests be finished before the next run.</p> <p>You can test the call manually on a selection of MMSI in the list before the final activation.</p> <p>If “Tracking Active” is checked, you must confirm the action after clicking on OK. If you click on “Cancel” the tracking will be reset to Active if it was Active when entering the dialog. So you will also need to confirm. To deactivate the tracking, uncheck “Tracking active” and click on OK.</p>
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As per the individual Position Requests, and according to your VHF settings, you might have to acknowledge the reception of the positions on your VHF, before it can send the next request. Please refer to the VHF documentation so as to check if it can perform an automatic acknowledge, and/or set the auto-validation timeout to its minimum value.

DSC Anchor Alarm:

<p>ScanNav can operate your DSC VHF to send an alarm if your boat drifts anchor in your absence. The alarm can be sent to one or more remote VHF's, to warn you on your VHF portable radio, as well as eventually your anchorage neighbors by entering their MMSI numbers.</p> <p>To activate the alarm, create a swing area (see documentation in release notes), check the box "Send Drift alarm to MMSI", and fill in the MMSI numbers list, separated by a comma. The simplest is to use the MMSI selector using button "..."</p> <p>If your boat leaves the defined swing area, its position will be immediately sent via DSC to the selected MMSI numbers.</p>	
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DSC Requests Queue window:

By default, this window shows up automatically as soon as a DSC request is sent to the VHF, so as to have some feed-back on the progress of requests.

- The current request is displayed in blue with a bold font.

- Finished requests are displayed with a background color to reflect the success or failure of the request:
 - Green for requests that finished successfully
 - Orange for requests that didn't end up successfully (no reply from the remote station, or unable to process)
 - Red for requests that ended up in error: impossible to send request, configuration error, etc...
 - Yellow for requests needing specific attention on the VHF (alternate channel for a voice call...)
 - Gray for canceled requests

Request	MMSI	Name	status
Position Request	235104549	CHERRY	Station replied
Position Request	235109946	BOMBY	Request timed out
Position Req...	227527550	ICOM2	Sending Request
Position Report	227143600	F/V THOMA...	Request Queued
Position Report	228259000	F/V JOKER	Request Queued

Closes selected requests.

 Cleans up the list by removing finished requests

 Opens a window to set up options:

In this example, the first Position Request ended successfully, and the second didn't finish in the allocated time.

A Position Request is waiting for the reply from station ICOM2.

Two Position Report requests are queued, and will be sent when the Position Request towards ICOM2 is finished.

<input checked="" type="checkbox"/> Auto Clean 20 Minutes	- Auto Clean: If checked, removes finished requests after the specified delay.
<input checked="" type="checkbox"/> Auto Show	- Auto Show: Uncheck this option if you don't want the window to be displayed automatically when sending DSC requests.
<input type="checkbox"/> Details OK Cancel	- Details : Opens a window with additional logs. Only useful for debug.

DSC specific Settings for piloting functions

Unlike AIS or DSC reception that only requires an input connection, DSC piloting functions need a bi-directional connection in order to send requests to the VHF.

You therefore need to:

1. Setup a "NMEA Output" in the preferences of ScanNav. If the output connection shares the same port as the Input connection, make sure to give the same settings as for the corresponding NMEA Input if any (same port, same speed and other settings). If the connection replaces the GPS input of the VHF, you will need to generate NMEA sentences to replace the GPS input. Setting RMC sentence should be sufficient. If the GPS input on the VHF uses another port, you don't need to generate any sentences, just to declare the port. In this case, you just need to declare the NMEA Output instrument, but it may stay inactive ("Active" unchecked)
2. Declare this created output as the "NMEA output" in the "DSC VHF Parameters"

The "DSC VHF Parameters" button in the AIS tab of the preferences let you define basic parameters according to your VHF, so as to enable the use of DSC functions.

<div style="border: 1px solid gray; padding: 5px;"> <p>DSC VHF Parameters</p> <p>VHF Model: ICOM My ID: 90 VHF ID: 16 <input checked="" type="checkbox"/> Auto set</p> <p>NMEA Output: GPS Delay between requests: 1 seconds</p> <p>Timeout value: 1 Minutes OK Cancel</p> </div>	<p>Choose model (ICOM or «Other»).</p> <p>ICOM VHF's need an ID to identify the PC(My ID) and the VHF(VHF ID). "VHF ID" will be determined automatically if "Auto set" is checked. You should only change it in case you have more than one Icom VHF connected.</p> <p>You only need to change the default value for "My ID" if</p>
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This is also where you will declare the NMEA Output defined in the preferences	you have other connected equipments that have the same value.
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- «**Timeout value**» corresponds to the maximum delay before ScanNav falls in timeout waiting for a reply from the remote station or the VHF.
- «**Delay between requests**» is used to define the delay between sending each requests that do not need a reply from the remote VHF (such as Position Report), to avoid saturation of your VHF.

ARPA / MARPA Support

The AIS module also lets you monitor Radar targets with an ARPA or MARPA interface, with equivalent functionality. ARPA/MARPA targets will be distinguished from AIS targets in the list view by their name, starting by "ARPA" and followed by the target number. Supported ARPA sentences are:

- "TTM" (Tracked Target Message) or "TLL" (Target Latitude and Longitude): to report radar targets positions
- "RDS" (RADAR System Data): to display the Radar cursor on screen

Import of SSN position reports for tracking

The AIS module also lets you visualize SSN position reports, used for tracking fishing fleets. Boats are visualized as AIS targets including their tracks. To import SSN reports, use menu "File" -> "SSN position reports import"

Connections:

There are many different cases according to your AIS and VHF equipment. The following are just a few guidelines, you should refer to AIS and VHF documentation for details.

For the use of **AIS, ARPA, and DSC without sending request**, you just need an input connection, as ScanNav will only listen to instruments

1. When possible, plug your GPS to the AIS receiver, then the AIS receiver to your PC with ScanNav. If supported by the AIS receiver's possibilities, it will send the GPS positions together with it's own sentences. In this case, you just have to modify the settings in the **GPS tab** of the ScanNav preferences, to position the speed at 38400bds. Although most AIS boxes only retransmit GPS data, a few may also retransmit any NMEA data received as input. Using a multiplexer results in exactly the same settings in ScanNav, as everything arrives through the same communication port.
2. Some AIS hardware also include an integrated GPS (case of most transceivers). In this case, you might not need an additional GPS if the AIS retransmits the GPS info. The configuration is in this case the same as 1 above.
3. In other cases, you will need to plug your AIS hardware on another independent port. In this case, you need to configure a specific instrument in the "Instruments" tab of preferences. The speed parameter should be positioned to 38400bds. At the opposite of other NMEA instruments that send information continuously, some AIS receivers only send information when a target is in view. This can be interpreted by ScanNav as a low reception alarm. In this case, you should give very high values to "Communication timeout" and "Valid sentence timeout" parameters to avoid raising useless alarms. These timeout values being in seconds, you should enter very high values (for example 3600 for one hour, or 86400 for 24h)
4. If you are using a NMEA 2000 connection (through the Actisense NGT1), all instruments connected to the NMEA 2000 bus including GPS and AIS will arrive on the same port. You therefore just need to select the « Actisense NGT1... » model, and leave the speed value to its default (115200bds), unless you modified them in the adapter. Please refer to the paragraph related to NMEA 2000 in the release notes.

To enable the use of the DSC piloting functions, you will also need to declare a NMEA Output in ScanNav, that will be plugged to the NMEA input of your VHF.

Many cases are also possible, according to your VHF. Wiring may be common to AIS or on different ports, and you

will need to declare instruments accordingly in the preferences of ScanNav. The specific part is that you need to **declare an NMEA Output in ScanNav**.

If this connection uses the same COM port as an existing input, make sure all the parameters are the same on both input and output (same speed, etc...). If not possible, you will need to use 2 different COM ports.

If the VHF input is only dedicated to DSC/DSE sentences, you don't need to activate any sentences. In this case, just declare the NMEA Output, and uncheck the "Active" option. It will only be used by ScanNav when sending DSC requests.

If the VHF accepts the DSC/DSE sentences on the same input as the GPS, you will need to generate GPS sentences from ScanNav, as you cannot plug both ScanNav and the GPS on the same input of the VHF (unless going through a multiplexer). In this case, activate sentence RMC in the NMEA output settings, which should be sufficient.

Note : DSC functionalities are only supported using the NMEA 183 protocol.