

## AisDecoder Help

This PDF Help file (81 pages) has been electronically created from the Windows Help distributed with AisDecoder .

Updated v145 Feb 2017

Help can be viewed independently of AisDecoder by locating AisDecoder.chm in your Program Files\Arundale\AisDecoder\Help directory and clicking on it.

To print the entire help (approx 80 pages)	
1.	Highlight (click) Ais Decoder Help on Contents tab.
2.	Right-click and <b>Print</b>
3.	Select <b>Print the selected heading and all subtopics.</b>

To View/Print a PDF version click [here](#)

## Getting Started

Ais Decoder has a large number of options to enable you to output decoded AIS data for your own purposes.

I would suggest you start by setting up the input so you can see you are receiving valid data

Once you can see valid data, try changing some of the options.

I have supplied a number of initialisation files which hold pre-set settings, these enable you to see how you can tailor the output to suit various requirements.

## Overview

All ships over 300 tons as well as many smaller ships continuously transmit messages giving their position principally for collision avoidance.

These messages can be received by an AIS receiver, however to produce meaningful information they need decoding.

AisDecoder outputs meaningful information, in a variety of formats, by decoding the data output from a dedicated AIS receiver, or from a network

## Features

The decoder will decode all the NMEA and AIS content of all 27 AIS message types (!AIVDM or !AIVDO) including many binary messages. A few NMEA GPS sentences are also decoded.

Input: Serial or USB from AIS receiver, UDP or TCP from network, Log File

Input Filter: AIS Message type, DAC, FI, ID, MMSI, \$GPxxx (some)

Output: Display, File, FTP, UDP

Output Frequency As received or at Scheduled intervals

Output Filter: Lat/Lon or any other decoded field

Output Formats: Text, CSV, HTML, XML, KML, KMZ, NMEA

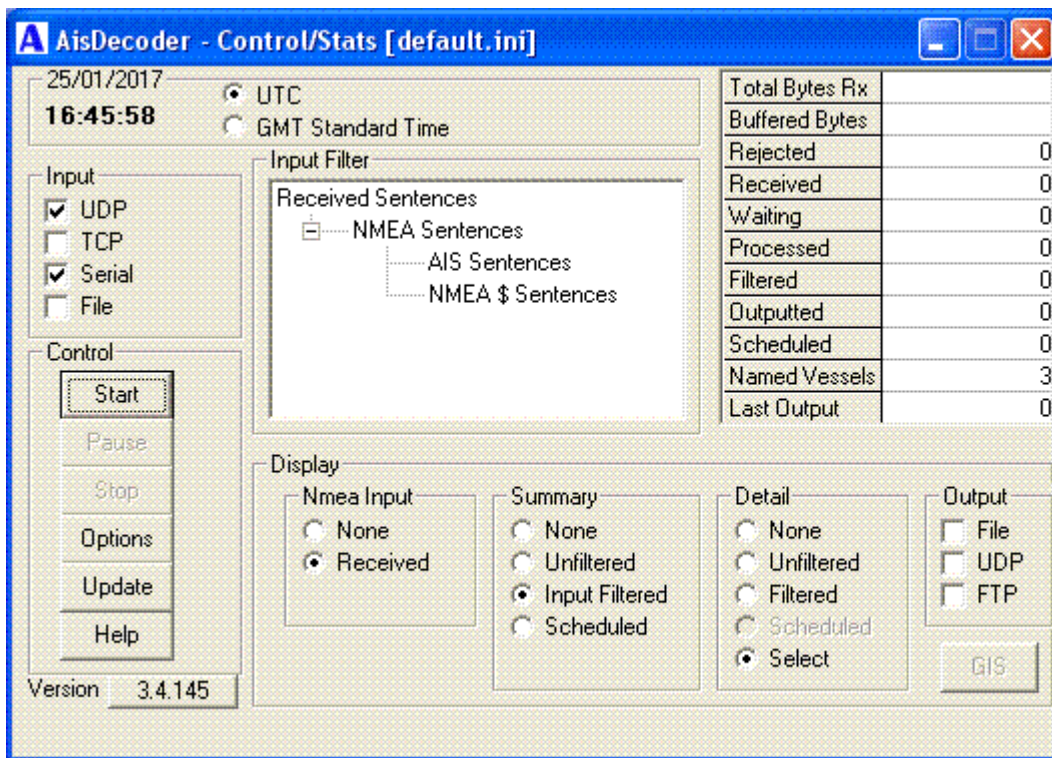
## **Details**

Decodes all 27 AIS message types  
Also decodes 50 Binary message types  
All fields are fully decoded  
Input Logging with optional daily roll-over  
Input log may be time stamped  
NMEA input monitor  
UDP, TCP and Serial (RS232) Input  
Input filtering by AIS message type and/or binary message DAC/FI/ID  
Some GPS NMEA sentences decoded (more to come)  
Message Summary display  
Dual Channel Output to File or UDP  
Output display  
NMEA or Formatted Output  
Timed (Scheduled) Output by MMSI for Web Sites  
Decoded CSV Output for import into Excel  
User selectable fields  
Displays Ships on Google Earth  
KML or KMZ Output to Google Earth  
XML Output to Google Maps  
HTML output to web site  
Automatic FTP upload to web site  
Output Format may be tailored to individual requirements  
Output Filtering by individual AIS Message Fields  
Range filtering by any Field value (for example Area by Latitude and Longitude)  
Filters NMEA AIS log files by all message types and all AIS fields  
Reads ShipPlotter spnmea log files  
Can be run like a Server (no visible windows)  
Output can be linked to update database

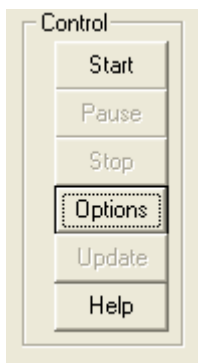
## **Quick Start**

Having downloaded the installation file, AisDecoder\_setup\_x.x.x.x.exe, run this file.  
Click Start > Programs > Ais Decoder > Ais Decoder

The Control/Stats window will be displayed.



Tick the Input Source from where your PC will be receiving data.  
If [USB](#) tick Serial

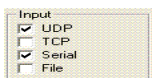


Then click on Options to display the Options Window.

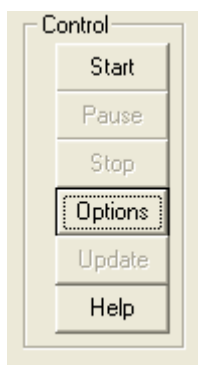


Configure the External Input Source you have selected by setting the Port, Host (or IP address) and speed as appropriate for the External Source you are using. For more information see [Network](#) , [Serial](#) or [USB](#) Data

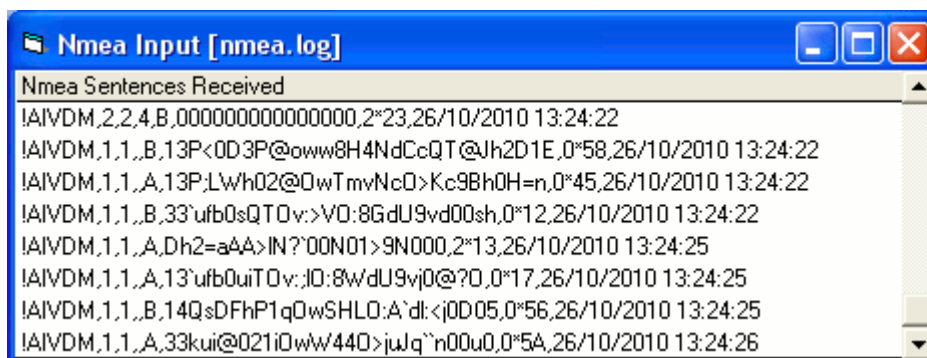
On the Control/Stats Window ensure you have ticked the configured Source of your data (you may have more than one source).



Click the Start button



Two additional windows will be displayed, the NMEA Input Window and the message Summary Window. These Windows will only be displayed if you are receiving NMEA data and, on the Control/Stats Window Display > Nmea Input Received and Summary> Unfiltered are ticked.



Summary								
Sentence	MMSI	Message Type	DAC	FI	ID	Vessel Name	Comments	
IAIVDM	220514000	1				ORASUND	Position Report Class A	
IAIVDM	255816000	3				J.AUGUSTUS ESSBERGER	Position Report Class A (Response to interrogat	
IAIVDM	248693000	3				M/T ARAL	Position Report Class A (Response to interrogat	
IAIVDM	246457000	1				WESTGARD	Position Report Class A	
IAIVDM	002320789	4					Base Station Report	
IAIVDM	002320709	4					Base Station Report	
IAIVDM	002320780	4					Base Station Report	
IAIVDM	255816000	3				J.AUGUSTUS ESSBERGER	Position Report Class A (Response to interrogat	
IAIVDM	371793000	1				HARLEQUIN	Position Report Class A	
IAIVDM	235077712	5				UKD ORCA	Ship and Voyage Report (Msg ID = 0, part 1 of	
IAIVDM	235077712	5				UKD ORCA	Ship and Voyage Report (Msg ID = 0, part 2 of	
IAIVDM	235068575	1					Position Report Class A	
IAIVDM	235077712	1				UKD ORCA	Position Report Class A	
IAIVDM	235249000	3				PRIDE OF HULL	Position Report Class A (Response to interrogat	
IAIVDM	244281000	1				DUTCH FAITH	Position Report Class A	
IAIVDM	249594000	1					Position Report Class A	
IAIVDM	220514000	1				ORASUND	Position Report Class A	
IAIVDM	304010331	1				BEATRICE	Position Report Class A	
IAIVDM	255816000	3				J.AUGUSTUS ESSBERGER	Position Report Class A (Response to interrogat	

The Nmea Input Window displays the data being received on your selected Input Source

The Summary Window displays a summary of the decoded data for each sentence received.

Click on any line (Sentence) on the Summary Window to see the fully decoded data for the Sentence.

A Detail		
Description	Value	Value Description
Creation Time Local	27/01/2017 17:45:41	
Creation Time Unix UTC	1485539141	27/01/2017 17:45:41
<b>Nmea Sentence</b>	!AIVDM,1,1,,A,13QM8n0vQR00fIF0<@	
Received Time UTC-Unix	27/01/2017 17:45:35	1485539135
Talker	AI	Mobile class A or B
Sentence	VDM	AIS VHF data-link message
AIS Sentence	!AIVDM	Mobile class A or B
Fragments in this message	1	
Fragment No	1	
Sequential Message ID		(blank)
Radio Channel	A	
Payload	13QM8n0vQR00fIF0<@	168 bits (28 6-bit words)
Fill bits	0	
CRC check	05	
AIS Payload	13QM8n0vQR00fIF0<@	168 bits (21 8-bit words)
<b>Vessel Name</b>	STEN ARNOLD	
AIS Message Type	1	Position Report Class A (Scheduled)
Repeat Indicator	0	Repeatable
MMSI	236407000	
MID	236	Gibraltar
Navigation Status	0	Under way using engine (Rule 23(a) or
Rate of Turn (ROT)	-6	2°/min to Port
Speed Over Ground (SOG)	9.8	Knots
Position Accuracy	0	low (>10m)(default)
Longitude	0.1584	0° 9.502' E
Latitude	54.5112	54° 30.670' N
Course Over Ground (COG)	321.7	° (degrees)
True Heading (HDG)	321	° (degrees)
Time Stamp	36	Second of UTC timestamp
Manoeuvre Indicator	0	not available (default)
Spare	0	3 bits
RAIM Flag	0	RAIM not in use
<b>Communication</b>	0	SOTDMA
Sync State	0	UTC Direct
Slot Time-out	5	Slots Left
Received Stations	10	

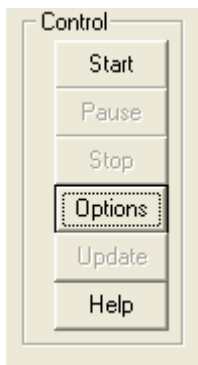
Congratulations, you are now decoding AIS data.

## Google Earth View

To Display the Ships on Google Earth

Install [Google Earth](#)

In the Control/Stats window click the Options button



In the Options window click the Open New button



Browse to the directory shown on the bottom of the Control window, select the Settings folder, Open the file GoogleEarth.ini  
Close the Options window (Click on the X)

Within one minute all vessels data received since you started the decoder will be available to view in Google Earth and the GIS button on the Control/Stats window will be available (not Greyed out).

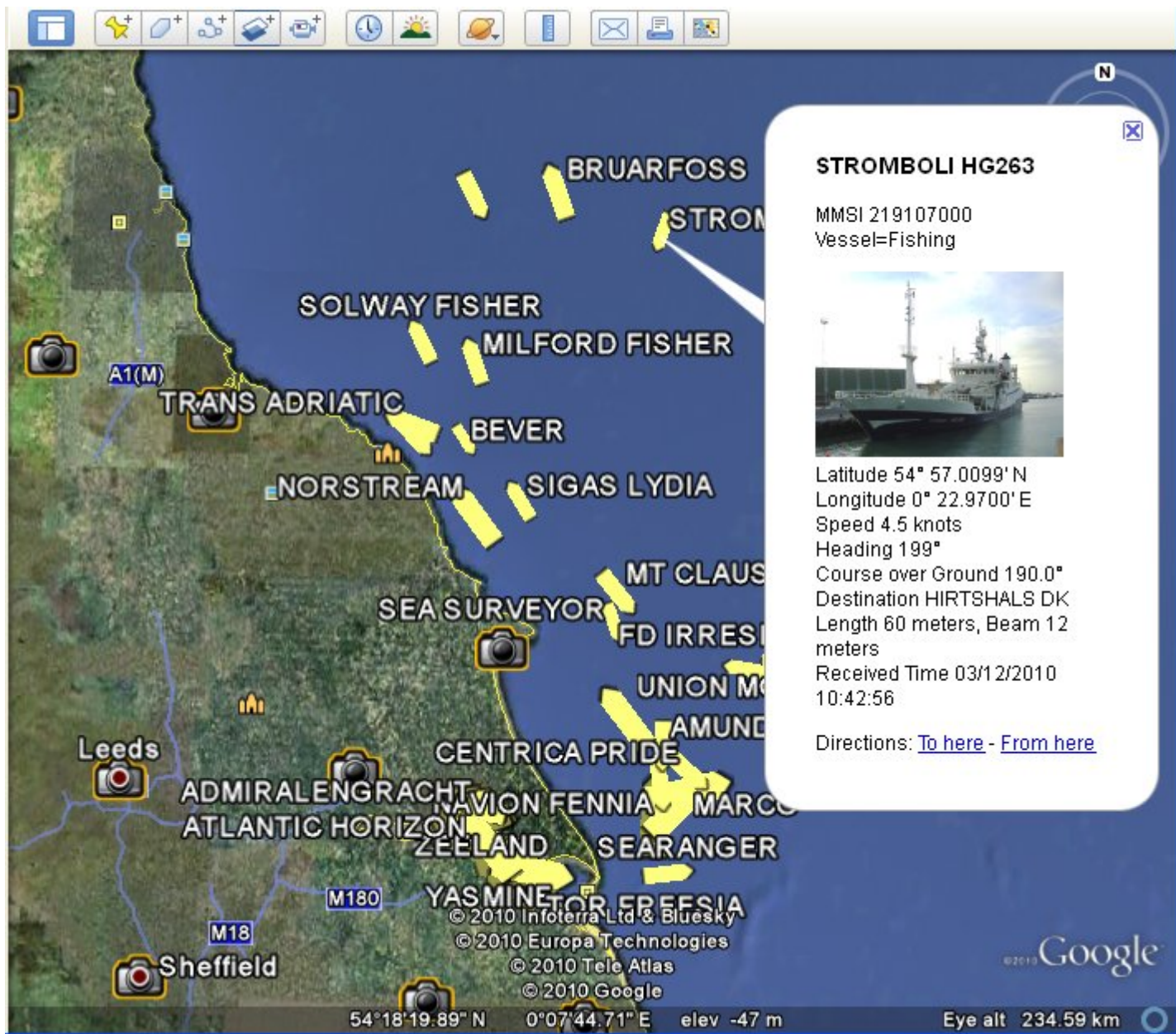


Click the GIS button

Any ships, from which you have received data, will be displayed on Google Earth.

### **Example of Google Earth**





## Physical Connection

This is the connection between your data source (Input Data) and your PC.

AisDecoder will accept Serial, Network, USB or from a file

The Network Data may be TCP or UDP

The Network data could be from an AIS receiver, or from the internet (Wlan) or your local network (Lan), your local PC

See also [Serial Data](#), [Network Data](#), [USB Data](#)

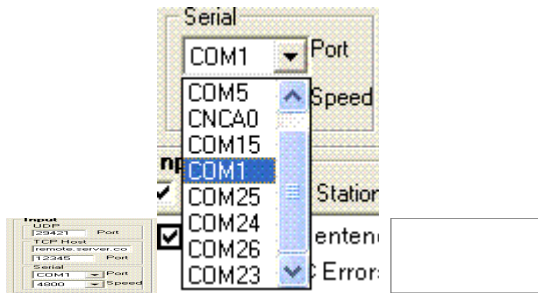
## Serial Data Input

Connect your AIS Receiver to a Serial Port on your PC

See [USB Data Input](#) if your receiver uses USB output

See [Network Data Input](#) if your receiver uses UDP or TCP output

Control/Stats > Options

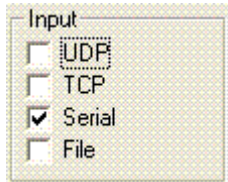


On the Options Display set the Port No you have connected your receiver to, which is COM1 in the above example.

You will only be able to select ports which may be available. Note some drivers may create a serial port which is not available to you for AIS data input.

For AIS set the Speed to 38400.

On the Control/Stats Window tick Input > Serial



## Network Data Input

The Network Protocol must be UDP or TCP.



If UDP only the Port number on which you are receiving UDP data is required, the data may be arriving from more than one host. There is no communication from your PC to the host(s) sending the data.

If TCP a Port and a Host must be set, as your PC will be communicating to the Host sending the data, to verify the data has been received correctly. The TCP Host can be either an IP address (xxx.xxx.xxx.xxx) or a Name (any.server.com). If you use a name, the name will be resolved to an IP address by any DNS server available to your PC. Normally this will be the DNS server you have set up when you configured your internet connection to your ISP.

If you are receiving input from an AIS Network Receiver, consult your receiver manual on how to set up an output port on your receiver. The input port on AisDecoder must be the same port number.

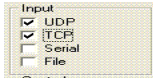
If you are receiving network data from the internet, the port number must be the same as is being sent by the Server supplying you the data.

If you are receiving UDP data direct from your PC, for example from another



program (eg ShipPlotter), the other program should be set up to send UDP data to IP address 127.0.0.1 This IP address is always the local PC (even if your PC has another IP address on the Local Newtwork) The port numbers must be the same on both programs.

If you are receiving data from a different PC on your Local network, the Server PC will send the data to the Local IP address of the PC receiving the data.



On the Control/Stats Window tick Input > TCP and/or UDP

## USB Data Input

If your PC does not have a serial port, or your AIS receiver outputs USB data, you PC will be receiving the incoming data via USB.

If you have had to use a Serial to USB adaptor, the adaptor will have come with a USB Driver.

Otherwise your USB AIS Receiver will have come with a USB Driver.

USB Drivers are individual to the hardware device plugged into the USB port on your PC, they are extremely unlikely to be interchangeable.

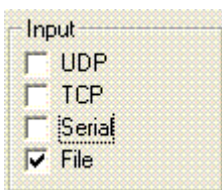
The USB driver will make the output from the USB port on the PC appear to the PC as though the data is being received from a COM port. This is called a Virtual COM Port, because the COM port does not physically exist on the PC.

After you have plugged the USB device (Receiver of Serial.USB adaptor) into your PC you will set up a COM Port, for example COM12.

Having set up this Virtual COM Port, you must configure the [Serial](#) Port on AisDecoder to the same port number.

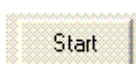
## Input File

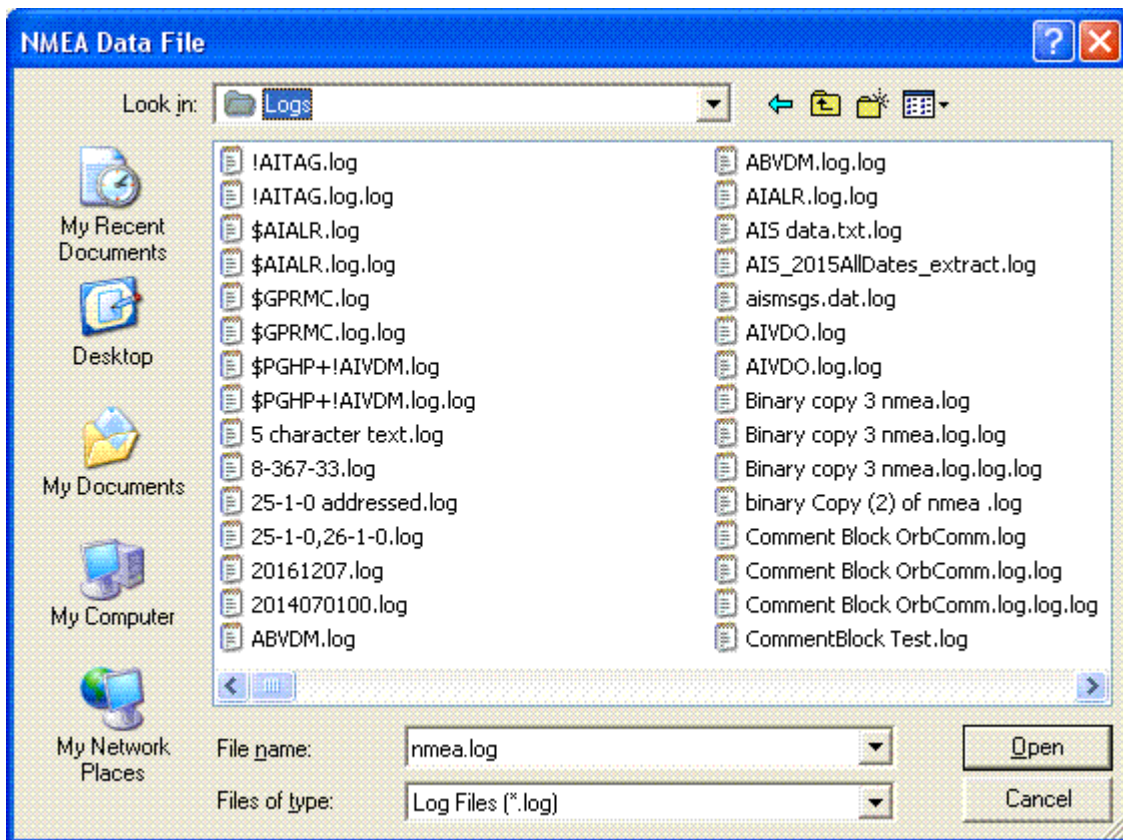
Control/Stats > Input > File



Tick file

Click Start





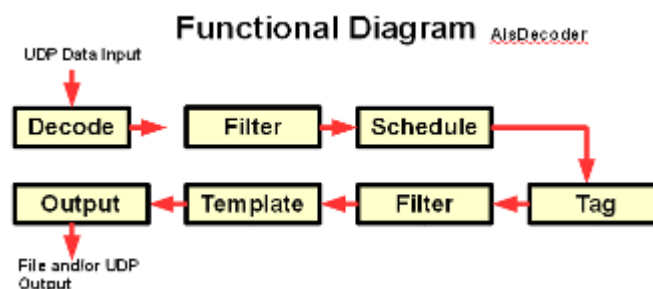
Select the input file

The selected file will be decoded

## Functional Description

There are two main windows which allow you to alter the behaviour of the decoder.

- [Control/Stats](#)
  - Start/Stops/Pauses the decoder
  - Controls various display windows
  - Displays various statistics
  - Access the Options Window
- [Options](#)
  - Selects most settings
  - Saves/Retrieves frequent settings



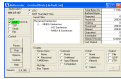
The incoming NMEA sentences are decoded. The [input filter](#) passes the AIS message types you have selected. If [scheduled output](#) is required, these messages are held in the scheduler buffer until the scheduled time. If specific AIS fields are required the value of the field is [tagged](#). If the value of the tag requires filtering, by having a valid range set, the range is

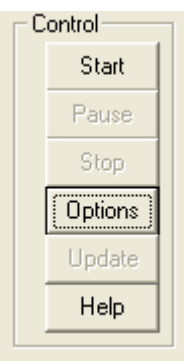
validated, by the [tag range filter](#).

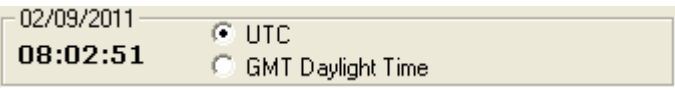
The Formatter replaces the tag in the [tag template](#) file, with the tag value.

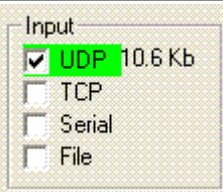
The fully formatted and decoded sentence is [output](#) to a file, by UDP and/or displayed.

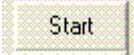
## Control/Stats Window

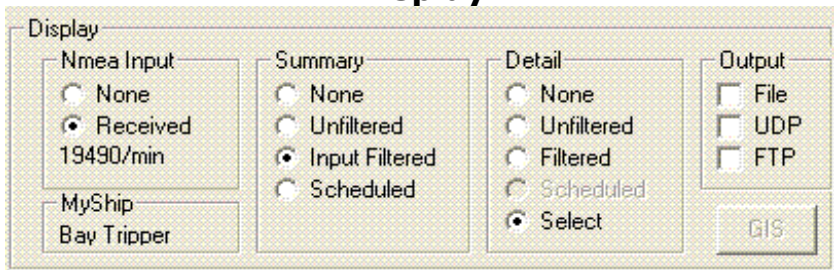


Control		
	Start	commences decoding NMEA sentences
	Pause	continues receiving sentences but holds them in a buffer until pressed again, when processing will recommence. This enables you to pause scrolling screens without losing incoming messages
	Stop	stops all processing
	Options	displays the <a href="#">Options Window</a>
	Update	will be enabled if there is a new update available for download
	Help	displays this file

Time		
	UTC	Display UTC time. The Input Log time is always UTC
	Local Time	Display Local Time

Source		
	UDP	decodes input from the UDP input port set on the <a href="#">Options Window</a>
	TCP	decodes input from the TCP input port set on

	the <a href="#">Options Window</a>	
	Serial	decodes input from the Serial Com port set on the <a href="#">Options Window</a>
	File	decodes <a href="#">input from a File</a> accessible from the PC/ The file will be asked when the Start Button  is clicked

Display		
		
Nmea Input	displays the NMEA sentences before decoding in the <a href="#">Nmea Input Window</a>	
Summary	displays the Decoded message summary before input filtering, after input filtering or on being output from the scheduler in the <a href="#">Summary Window</a>	
Detail	displays all messages as they are being received or after filtering in the <a href="#">Detail Window</a> . By clicking on a message in the summary display, the detail of the selected message only will be displayed. This will stop any display of message detail if previously selected	
Output	displays the output currently being sent to either a file or to the UDP port. FTP displays the communication between your PC and a FTP server. see <a href="#">Output Windows</a>	
GIS button	GIS (Geographic Information System, eg Google Earth) displays the current Tagged Output file using the application associated with the file extension. see <a href="#">GIS Button</a>	

Input Filter
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Input Filter

Received Sentences

NMEA Sentences

AIS Sentences

AIS Message 1

AIS Message 2

AIS Message 3

AIS Message 5

AIS Message 9

Displays a summary of the [Input Filter](#)

Version Button

Version 3.4.145

Displays the current version, click to view version history

## Statistics

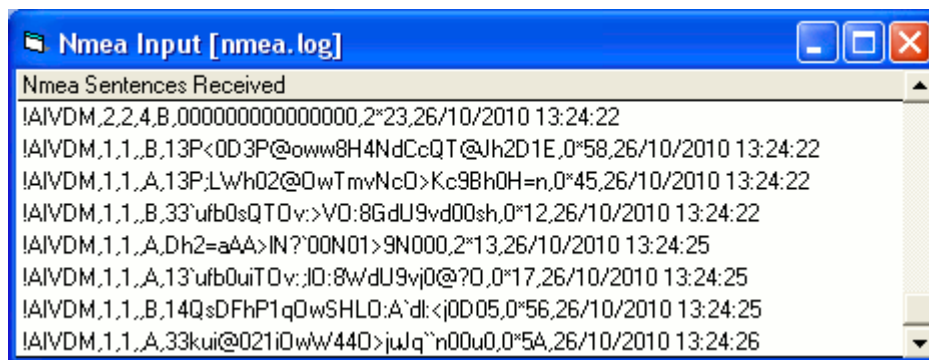
Total Bytes Rx	1.1 MB
Buffered Bytes	0
Received	0
Waiting	20039
Processed	0
Filtered	20039
Scheduled	0
Scheduled	0
Harmed Vessels	124648
Last Output	0

Max counter size is  $400 \times 10^9$

Statistics Pane on Control/Stats Window	
Total Bytes RX	are the total number of 8 bit bytes received prior to input processing, since AisDecoder was started
Buffered Bytes	are the number of bytes received and buffered prior to passing to the NMEA complete sentence buffer
Received	are the number of NMEA sentences entering the decoder. As each part of a multi-part AIS message consists of a separate AIS message, each part is counted separately
Waiting	are the number of messages being held in the receives sentence buffer awaiting decoding
Processed	are the number of incoming NMEA sentences which have been decoded
Filtered	are the number of NMEA sentences that have been accepted by the input filter
Scheduled	are the number of sentences currently being held in the Scheduler buffer, these will be output when the next scheduled time interval is reached

Outputted	are the total number of NMEA sentences that have been output to both a file and by UDP
Last Output	are the number of different MMSI's that were last output by the Scheduler
Named Vessels	are the current number of MMSI's that have a vessel name associated with them that will be used to put a name to a MMSI, if required, on outputting the MMSI. These are the number of <a href="#">cached vessels</a> .

## Nmea Input Window



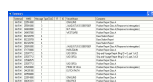
The Nmea Input window displays the NMEA sentences before decoding.

Left Click any sentence to display the [Detailed decoded sentence](#)

The NMEA sentence has a time stamp appended by Ais Decoder. This time is obtained from the PC's clock. You may set whether or not you wish to have the time stamp appended to the NMEA input log file.

See also [Input Log File](#) , [Time Stamps](#)

## Summary Window



The Summary window will display the Decoded message summary before input filtering, after input filtering or on being output from the scheduler, dependent on the selection in the [Control/Stats Window](#).

If you click on any line, the [Detail Window](#) for the selected sentence will be displayed.

The DAC (Designated Area Code), FI (Function Identifier), ID (Optional sub-Identifier) are only applicable to ASM's (Application Specific Messages). These can



be used to filter input messages.

## Detail Window

As well as displaying the detailed decoding of AIS messages this window is also used to

- Select a AIS message Field for Output ([Tagging](#))
- Select a NMEA sentence word for Output
- Saves the entire contents of the Window as CSV text



Messages can be displayed as they are being received or after filtering or be selecting an individual message on the [Summary Window](#).

If you **RIGHT** click on the detail display, a sub-menu is displayed

Detail		
Description	Value	Value Description
Creation Time Local	29/01/2017 12:20:33	
Creation Time Unix UTC	1485692433	29/01/2017 12:20:33
<b>Nmea Sentence</b>	!AIVDM,1,1,,A,13aGuuh	
Received Time UTC-Unix	29/01/2017 12:20:29	1485692429
Speed Over Ground (SOG)	6.5	Knots
Position Accuracy	1	high (<=10m)
Longitude	4.6634	4° 39.806' E
Latitude	51.8901	51° 53.407' N
Course Over Ground (COG)	270.4	
True Heading (HDG)	511	
Time Stamp	27	amp
Manoeuvre Indicator	0	
Spare	0	
RAIM Flag	1	RAIM in use

If you click Create Tag the selected field (in Yellow) is selected for [tagging](#).

If you click Copy All to Clip Board as CSV, a copy of the complete window will be placed on the PC's clipboard, enabling you to save the details to Excel, Word, a file or any other program you wish.

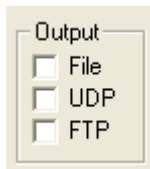
If you click on Copy, only the selected field (in Yellow) will be copied to the Clip Board

## Notes

The Vessel Name preceding the AIS Message Type, is the name that has been cached by the AisDecoder. This is the name you should select for inclusion in any output. See [Vessel Names](#) for further information.

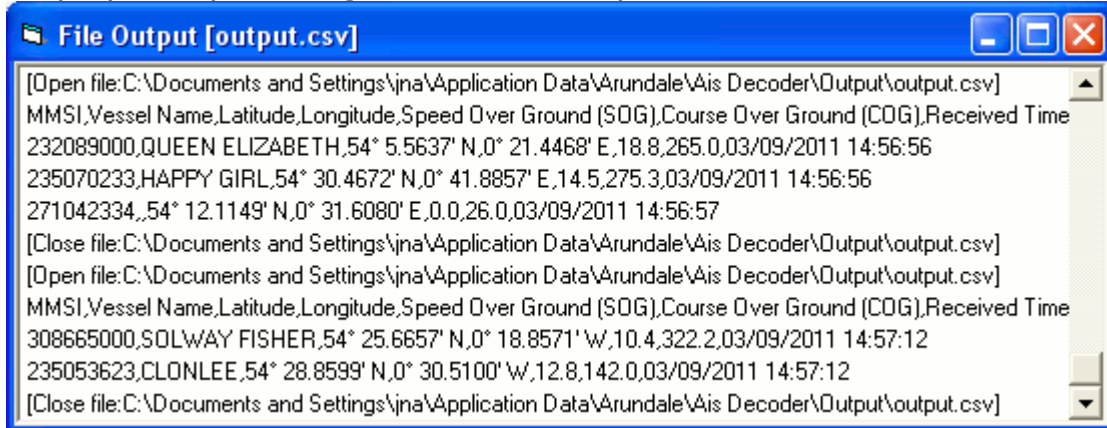
This is the only field which may not actually be encoded within the displayed name sentence and AIS message.

## Output Windows



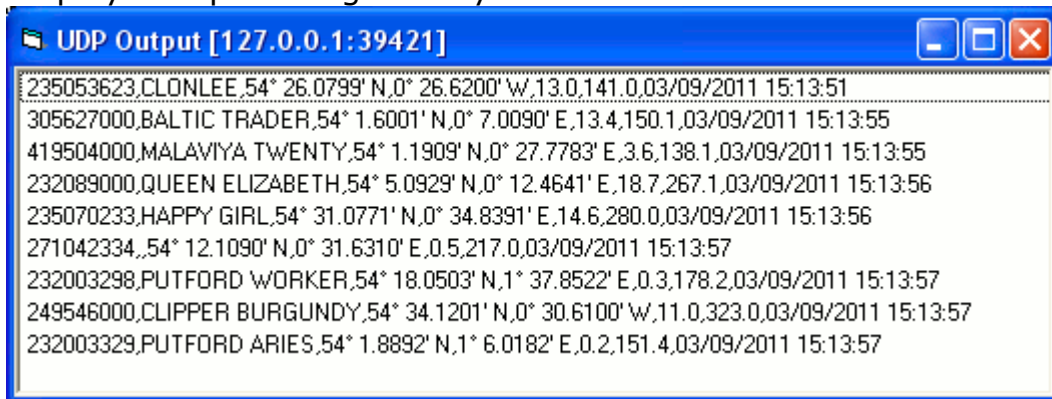
### File Output

Displays Output being sent to the Output File



### UDP Output

Displays Output being sent by UDP



### FTP Output

Displays the FTP log of the File being sent by FTP



### FTP Errors

These are logged to [error.log](#) file

```
02/09/2011 21:57:24
FTP Error
02/09/2011 21:57:01 Local
Remote Host: 80.176.254.178:21
User Name: webftp
Password:
> CD "/var/www/html/web/docs/ais"
Waiting for response
Command CD Timeout (10 seconds) timed out after 20.96875 seconds
Command CD - Aborted after 2 secs
> CLOSE
FTP operations failed after 22.96875 seconds
02/09/2011 23:21:34
FTP Error
02/09/2011 23:21:00 Local
Remote Host: 80.176.254.178:21
User Name: webftp
Password:
```

```
> CD "/var/www/html/web/docs/ais"
Waiting for response
> PUT "C:\Documents and Settings\jna\Application Data\Arundale\Ais
Decoder\Output\yorkshirecoast.kmz" "yorkshirecoast.kmz"
Waiting for response
Command PUT Timeout (30 seconds) timed out after 30.10938 seconds
FTP State Error 12002 Timeout Aborting
Command PUT - Aborted after 32.10938 secs
> CLOSE
FTP operations failed after 33.40625 seconds
```

This should enable you to debug any web upload problems

## GIS Button



Pressing the GIS button, will display the current Tagged Output file using the application associated with the file extension.

For example, if the output file extension is .KML, Google Earth will be used to display the output file, provided KML is set as the default program to run using explorer.

If the current output file was an HTML file, the current default browser will be used to render the HTML file.

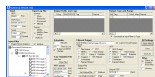
The button is only enabled after a new Tagged file has been created after the Start button has been pressed. It is also disabled temporarily during creation of a new output file by the Scheduler.

All Tags will be listed in the Output Tags and Range list. This shows a list of those you will most probably want to output for GIS. Note for all vessels the corresponding Field Tag list will contain approx 50 Tagged Fields.

See also [Google Earth](#)

## Options Window

All settings can be saved in a [Settings](#) file. This includes the settings on the [Control/Stats Window](#).

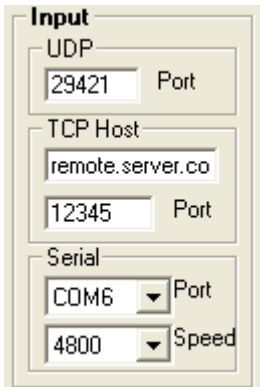


Options Window - Sections	
<a href="#">Input</a>	Change miscellaneous input settings
<a href="#">Input Log File</a>	Change how the input Nmea data is logged
<a href="#">Input Filter</a>	Select the message filter settings prior to decoding

<a href="#">Output Fields and Tags</a>	Select the individual message fields to be output
<a href="#">Output Tags and Range</a>	Select the Range of values for any decoded field to output
<a href="#">Scheduler</a>	Set how often the latest value of the selected fields will be output
<a href="#">Tag Template File</a>	Select the template file to be used to output the selected fields
<a href="#">FTP server</a>	Sets the Web server to which an output file is to be sent.
<a href="#">Filtered Output</a>	Set the type of file and the format to output
<a href="#">All Settings</a>	Opens and or Saves all AisDecoder settings
<a href="#">Other</a>	Any other options

Some Options may not be changed when AisDecoder has been Started, these will be "Greyed Out".

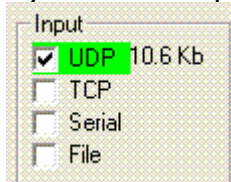
## Options - Input

	
UDP	the input Port that will be used for UDP input. For more information see <a href="#">Network Input</a>
TCP	the input Host and Port that will be used for TCP input. For more information

	see Network Input. For more information see <a href="#">Network Input</a> . TCP will try to connect both as a Client and a Host until a connection is made.
Serial	Sets the serial port and speed. For AIS the speed will normally be 38,400 and for GPS NMEA normally 4,800. For more information see <a href="#">Serial</a> or <a href="#">USB Data Input</a>

## Notes

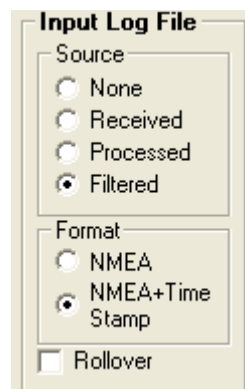
Each Input source is buffered separately. If the buffer exceeds 1k the buffered bytes are displayed, see below.



If the buffer size exceeds a predefined limit, the green will turn red and the input will be suspended until there is 20% free, when input processing will re-commence. This will normally only occur at very high data rates or if the PC is running at 100% CPU utilisation.

Please note processing output to be displayed is very CPU intensive and can rapidly cause 100% CPU usage. In particular do not display the Detailed Window, except at low receive rates. You can monitor the effect of different configurations using System Monitor (Ctrl+Alt+Del).

## Options - Input Log File



Log File Source	determines whether Received, Processed or Filtered NMEA sentences are written to the log file (nmea.log).
Format	determines whether the logged NMEA sentences have a time stamp appended to the sentence. All incoming sentences have a UTC time stamp (obtained from the PC's clock) appended, as the scheduler needs to know when the sentence was received. If NMEA only is selected, this time stamp is removed prior to being written out to the log file
Rollover	Messages are appended to the log file (nmea.log) as they are received. This is NOT reset each time you start the decoder, so the file can get

very large. If you wish you can have the log file "Roll Over" to a new file at midnight every day. If you select Log File Rollover, the log file will be named nmea\_yyyymmdd.log, where yyyymmdd is the current Year, Month, and Day

## Notes

See [Files and Directories](#) to find the absolute location of all files

If the [Input Source](#) to the decoder is a file, the Log File Source must be Processed or Filtered for any output as no data will actually be Received.

If the Input Source is **not** a file, the log file name will be nmea.log and will be output in the \Logs folder

If the Input Source is a file, the log file name will be the same as the input file with .log appended and will be output to the same folder as the input file.

## Options - Input Filter

For a NMEA sentence to pass through the filter, it has to reach the end of a number of checks. A message failing at one level will fail completely.

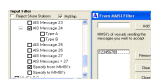


**Reject Shore Stations** (if ticked) will reject any MMSI's starting with 00.

**MyShip** (if ticked) will NOT reject AIS !AIVDO sentences. These sentences are NOT transmitted by a vessels AIS transponder but are present on the vessels NMEA bus. The vessels position will be transmitted as a !AIVDM sentence. Typically !AIVDO sentences contain the vessels position. this is so a Chart Plotter (or AisDecoder) used on a vessel can differentiate between MyShip and other Ships. AisDecoder uses !AIVDO to output MyShip's position and the range and bearing of other ships from MyShip.

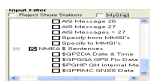
Each level is indented (to the right) from the previous level. When you tick one level, if there are any more levels, you will be presented with another set of tick boxes. If you do not tick any boxes on any one level, the whole of the level will be removed, in which case all messages ticked on the previous level will be accepted. You do not have to tick sub items - they are assumed to be ticked.

If a binary message is selected (see message 6 above) the tick boxes will expand (as required) to allow you select the DAC, followed by the Function, and if applicable the Function Identifier.

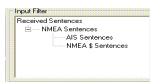


At the bottom of the filter there is the option to accept only messages sent **from** a number of specified MMSI, and/or **to** a number of specified MMSI's.



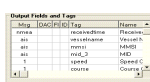


Some NMEA \$ sentences may be filtered. If **only** NMEA \$ Sentences is ticked, all NMEA sentences will be output. The GPS NMEA sentences \$GPZDA, \$GPGGA and \$GPRMC sentences are decoded and their values available for tagging. These may be used (for example) to extract NMEA time stamps.



The complete Filter tree is displayed on the Control/Stats Window, with all redundant options removed. Only sentences at the ends of each branch will be allowed through for output. In the above example it will be all AIS and NMEA \$ sentences.

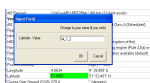
## Options - Output Fields and Tags



AIS messages consist of a number of fields, it is the value of these fields which AisDecoder is decoding. All these fields and/or values are displayed in the [Detail Window](#). If you **right** click on any of these fields, you will be asked to create a Tag.



If you click Create Tag, the pop up box Input Field will appear.



You may change the name of accept the default name. In the above example, the default name is lat\_1\_2. lat\_1 is the default name the AisDecoder has allocated to the decoded field. \_2 is appended and the data in the second column of the Detail Window (51.8901) will be output as the decoded field. You could have right clicked the 3rd column in which case (51° 53.407' N) would be output as the decoded field. If you click OK the Tag will be created.

Output Fields and Tags

Msg	DAC	FI	ID	Tag	Name
3				lat 2	Latitude

Output Tags and Range

No	Tag	Min	Max
1	lat 2		

You will see the Tag in both the Output Fields and Tags and the [Output Tags and Range](#) list.

By default the Tag name has \_2 appended signifying it has the value in the second column of the Detail window. If you wished to have the descriptive name "Latitude" output and clicked the first column, the default Tag would be lat\_1, Likewise if you wished the formatted Latitude 51° 53.407' N" to be output and clicked the third column, the default Tag would be lat\_3.

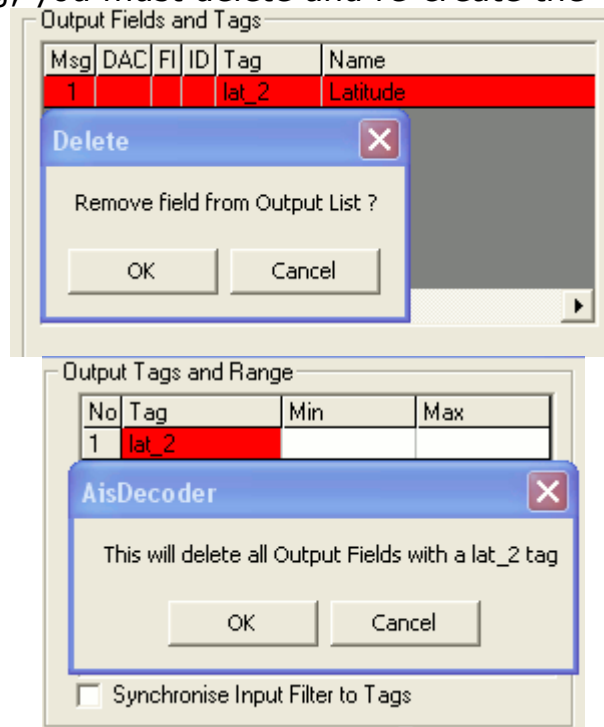
The same default Tag name can be generated by differing AIS message types, only you know whether this is the required behaviour. For example Latitude is not necessarily the position of a vessel, it could be defining an area (see AIS message type 22).

It is more likely you will wish to have the latest value of Latitude to be Output when the vessels position is available from more than one message type (see AIS message types 1,2,3).

In this case you will need to set a Field Tag for all three message types (1,2 and 3),

in each case give the Tag the same name say "lat". In this case there will be three separate entries in the Fields and Tags table, but only the one in the Tags and Range table. You can rename the Tag name before (but not after) you click OK in the Input Field box above.

To delete a Field Tag, click on the Tag in the Fields and Tags list. You cannot edit the tag, you must delete and re-create the Tag.



All differing Tags you have created in the Field and Tags list, will be put in the [Output Tags and Range](#) list.

### Notes

To keep the size of the Windows a reasonable size, the Fields and Tags sub-windows can be much larger, necessitating scrolling to view all the data. for example only part of the Fields required for GoogleEarth output is

Msg	DAC	FI	ID	Tag	Name
nmea				receivedtime	Received Time
ais				vesselname	Vessel Name
ais				mmsi	MMSI
ais				mid_3	MID
1				speed	Speed Over Ground (SOG)
1				course	Course Over Ground (COG)
1				lat_3	Latitude
1				Heading	True Heading (HDG)
1				lon_3	Longitude
1				lat	Latitude
1				lon	Longitude
2				lat_3	Latitude
2				lon_3	Longitude
2				lon	Longitude
2				Heading	True Heading (HDG)
2				course	Course Over Ground (COG)
2				lat	Latitude
2				speed	Speed Over Ground (SOG)
3				lon_3	Longitude
3				speed	Speed Over Ground (SOG)
3				lat	Latitude
3				course	Course Over Ground (COG)
3				lon	Longitude
3				lat_3	Latitude
3				Heading	True Heading (HDG)
5				destination	Destination

To include the 16 tags in the associated template file, 60 fields in all messages need to be defined.

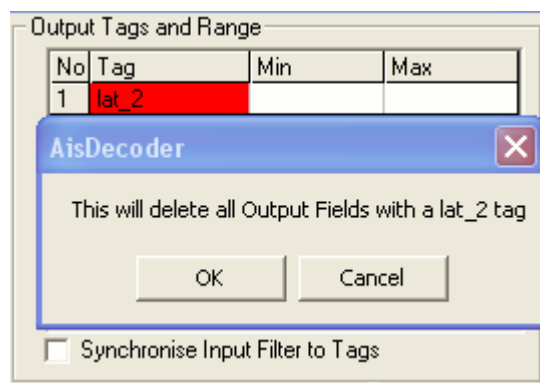
## Options - Output Tags and Range

Output Tags and Range

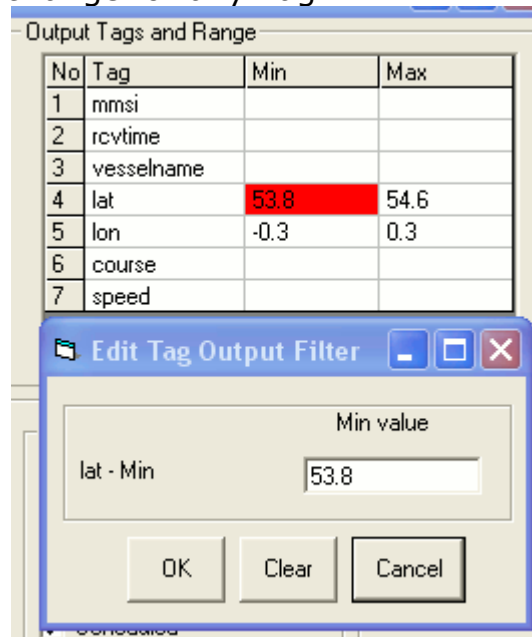
No	Tag	Min	Max
1	mmsi		
2	rcvtime		
3	vesselname		
4	lat		
5	lon		
6	course		
7	speed		

☒ Synchronise Input Filter to Tags

You can delete an Output Tag and all Fields with the same Tag, by clicking on the Tag name in the Output Tags and Range list.



You can set a valid output range for any Tag.



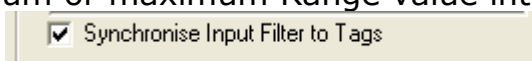
Click on the Min or Max cell for the Tag for which you wish to filter the range.

Enter the Minimum, Maximum or both for the Tag.

If Range Filtering is selected as an Output Option, only those MMSI's passing the range check will be output.

If any range is blank, the range check will pass.

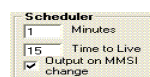
You can insert the minimum or maximum Range value into a Tagged Output File.



If using tagged output, Synchronise sets the input filter to process all messages containing output tags and not process redundant messages (those without any tagged fields).

See also [Options - Fields and Tags](#)

## Options - Scheduler



### Options - Scheduler

Minutes

are how often the Scheduler will output messages. This is in whole minutes, if 0 no output will be scheduled.

Time to Live	is the number of minutes messages remain in the Scheduler's buffer before removal
Output on MMSI change	If ticked the latest Tag values will be output whenever the MMSI changes. This is the normal behaviour. If unticked the Tags/CSV will be output after each message rather than on change of MMSI. This is to allow, when reading a log file, to output the history of one vessel.

The output is triggered by the arrival of a new message into the Scheduler's buffer and NOT by the PC's clock.

The output can be used to [trigger a script](#) to process the [Output File](#). This can be used to add the decoded data to a database.

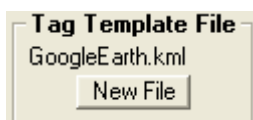
The Scheduler outputs AIS messages in MMSI order.

If messages are duplicated, only the last received message is output.

If you are using the output of the decoder to display live vessel position data, the Time To Live will be the time the vessel will remain on the [GIS display](#), after the last message from the vessel was received, before being removed from the GIS display.

See also [MMSI change](#)

### Options - Tag Template File



The Tag Template File is used to format the decoded data to your own requirements.

The Template file should be created using a text editor such as Notepad.

Options - Tag Template File	
New File	Click to change the current Tag Template file used to create a Tagged Output File

The file name displayed is the Current Tag Template File name. To view the complete path to the Tag Template File, tick the [Show Files](#) box on the [Options window](#).

## Options - FTP Server

FTP server

my.server.com	Host
username	User
password	Pass
mydirectory	Dir

These are the settings to access your FTP server, normally to upload an [Output File](#) to your [Web server](#).

Options - FTP Server	
Host	is the domain or the IP address to access your FTP (web) server, for example my.server.com <b>or</b> 80.123.243.110
User	is your login User Name
Pass	is your password to login to the FTP (web) server. This password is retained in the current initialisation file in an encrypted format. It is encrypted by using some details of your PC as a key. If you use the initialisation file on a different PC you will must re-enter your password as the un-encrypted password, recovered from the initialisation file, will be incorrect.
Dir	is the directory below your root directory, where you wish the output file to be placed, example /uploads/ais Note this will probably be case sensitive (it depends on the Web server).

The file is sent to the above FTP server at the scheduled interval, provided FTP output has been selected.

File

☒ File Output ☒ FTP

☐ NMEA ☒ +Time Stamp

☐ CSV ☐ Header Delimiter

☒ Tagged ☒ GIS Filtered

☒ Scheduled

☐ Range Filtered

Scheduler

1 Minutes

15 Time to Live

☒ Output on MMSI change

The FTP connection from your PC to the FTP server will be made and the file transferred. You can view this process by ticking Control/Stats > Display > FTP.

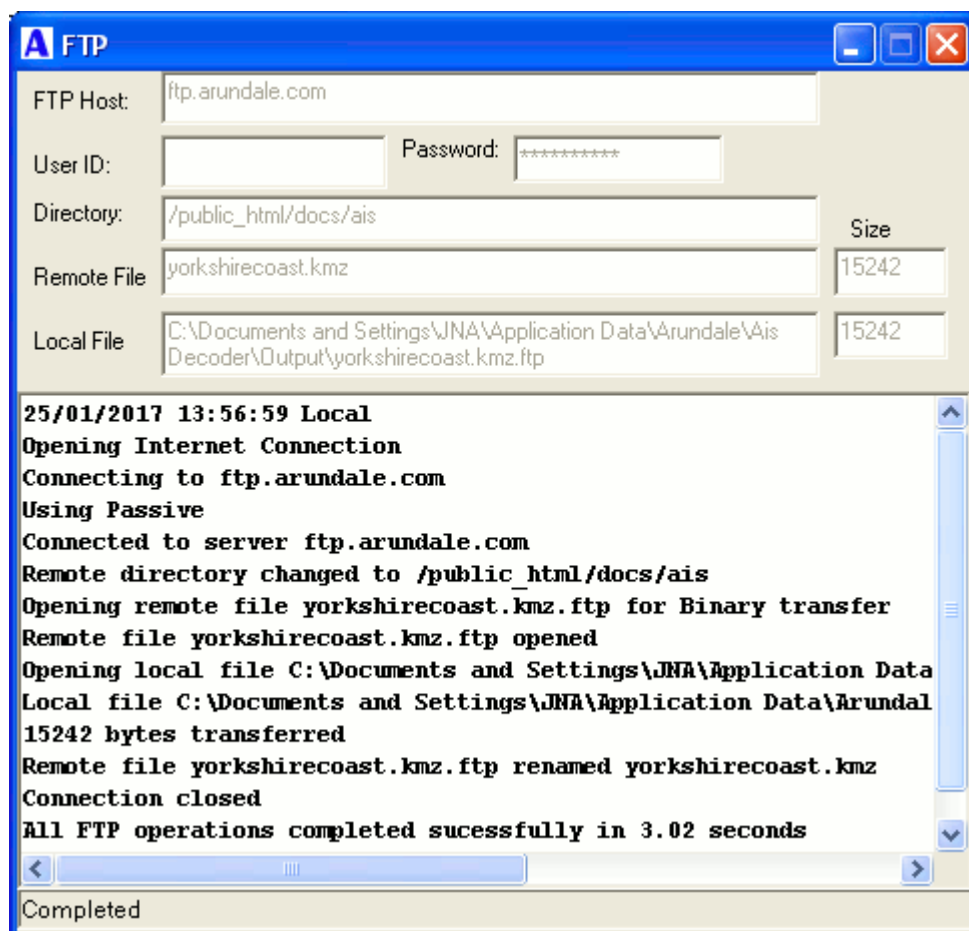
Output

☐ File

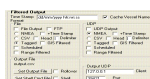
☐ UDP

☒ FTP





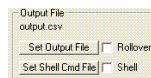
## Options - Output



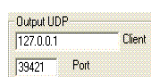
There are two Output "Channels". One outputs to a file, and the other to an IP address using UDP. The options for both are the same.

Options - Output	
<a href="#">Time Stamp</a>	sets the output format for received and created dates, except the log file date stamp will always be the PC's regional setting.
Cache Vessel Names	Vessel Names will be retained between sessions. If a vessel name changes the new name will be used.
File/UDP Output	turns on the output
<a href="#">FTP</a>	sends then Output File to FTP server (Website)
NMEA	NMEA sentences are output.

+ Time Stamp	the NMEA output will be time stamped
<a href="#">CSV</a>	All Tag values will be output in CSV format. If CSV output is selected with Tagged, you have the option of adding a header at the top of the file. This is useful if the CSV file is to be imported into <a href="#">Excel</a> . The default delimiter is a Comma. If the delimiter character is found within the value of a tag, the tag value will be quoted (within " "). GIS filtering is applied to CSV output as well as Tagged output.
<a href="#">Tagged</a>	Tags in the Tag Template file are replaced with the Tag value before output
<a href="#">GIS Filtering</a>	The MMSI will only be output if both a Latitude and a Longitude have a value for the current MMSI. A Special Tag <IconHeading> will also be created
<a href="#">Scheduled</a>	The data will be output in batches at the Scheduled Interval
<a href="#">Range Filtered</a>	The value of <b>all</b> Tags must be within the values set in the Output Tags and Range list for <b>any</b> data for the current MMSI to be output.



Options - File Output	
File Name	If NMEA output the default name will be output.nmea If CSV output the default name will be output.csv If Tagged output the default name will be the same as the Tag Template File
Set Output File	Allows you to select your own file name If the file extension is KMZ, the output file will be Zipped Up.
Rollover	Start a new Output File (with a new name) daily at midnight. Only allowed if output file is not scheduled.
Set Shell Cmd File	Select the command file (script) you wish to run every time the output file is closed
Shell	Tick to start processing the command file



Options - UDP Output
----------------------

IP	The IP Address of the UDP Client to send the data to. This can be on this PC (use 127.0.0.1) or the local network (LAN) or the internet (WLAN) You may use an internet address (eg arundale.com) or IP address (eg 111.222.333.444)
Port	The UDP Port number to use

## Options - All Settings

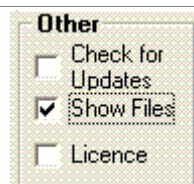
Retrieve, Save or Create your setting. There is no limit to the number of settings you can create.



All Settings	
Open New	Will allow you to browse for an existing initialisation file, which contains any previously saved settings. This setting file selected will be used immediately by the decoder, even if currently running.
Save	Saves the current settings to the Current setting file displayed in the top of the window. The directory is displayed at the bottom of the Options Window.
Save New	Saves the current settings to a new Settings File

See Also [Default Setting](#) and [Example Settings](#)

## Other Options



Check for updates	will check my website on start-up, to see if a later version of AisDecoder has been placed on the Web Server. This may not have a later version number if the changes are minor.
Show Files	Tick to display the <a href="#">Files and Directories</a> window

Licence	Not used

### Example Settings

There are a number of different Example Settings file distributed with AisDecoder, to demonstrate some of the possibilities for you to tailor the Output.

To select a different setting see [Options - All Settings](#)

Example Settings				
Setting	Description	Initialisation File	Template File	Output File
<a href="#">default</a>	Textually displays decoded data of all messages	default.ini	none	none
<a href="#">Google Earth</a>	Creates a File formatted for display by Google Earth	GoogleEarth.ini	GoogleEarth.kml	GoogleEarth.kmz
<a href="#">Google Maps</a>	Creates a File formatted for display by Google Maps	GoogleMaps.ini	data.xml	data.xml
<a href="#">CSV</a>	Creates a CSV File containing the decoded data of all received AIS messages	CsvAll.ini	none	output.csv
<a href="#">Excel</a>	Creates a CSV file suitable for import into an Excel spreadsheet, containing common navigational fields	Excel.ini	none	output.csv
<a href="#">UDP Tags and</a>	Outputs to a UDP port decoded data containing	UdpTagsRange.ini	none	none (UDP)

<a href="#">Range</a>	selected AIS message fields for vessels within a selected Geographical area. Typically this could be used to interface to OpenCPN			
<a href="#">HTML</a>	Outputs HTML for submission to Web Server	Html.ini	example.html	example.html
<a href="#">aspx</a>	aspx script	aspx.ini	example.aspx	example.aspx
<a href="#">spnmea</a>	Creates a decoded CSV file from a Shipplotter spnmea file	spnmea.ini	none	output.csv

## Default Setting

The default setting is the initial start-up setting.

### Initial Settings

UDP input on port 29421

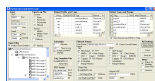
Log all NMEA input to nmea.log (with time stamp)

Displays All Received NMEA Sentences

Displays Summary of Received AIS messages

Click on Received AIS message to display fully decoded textual content

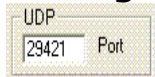
## Google Earth Setting



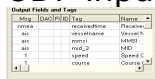
Creates KMZ file for display on local PC using [Google Earth](#)

Once a file has been created you may click the [GIS button](#) to view your Vessels on Google Earth

### Settings

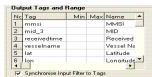


UDP input on port 29421



Field Tags are set to decode Ships data that is required to be displayed on Google

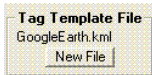
## Earth.



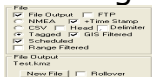
### Input Filter is Synchronised to Output Tags



The update interval is 1 minute and vessels will be displayed for 15 minutes after the last message has been received.



The Tag Template file being used is \Templates\GoogleEarth.kml



This Output File will be created using Tags (specified in the Output Tags and Range) GIS filtering ensures no vessel is output unless a Latitude and Longitude has been received.

A new file is Scheduled for output every one minute

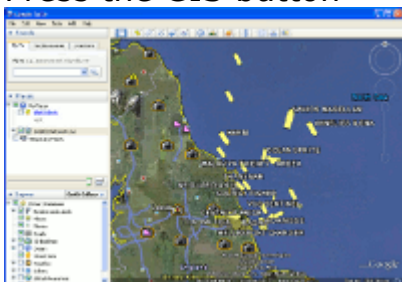
The Output File will be \Output\GoogleEarth.kmz

Start the decoding (press the start button)

The GIS button will become available when the kmz file has been created



Press the GIS button



Google Earth will display the vessels.

## See also

[Uploaded To Web Server](#) for display on the internet.

[Configuring Google Earth](#) to Automatically refresh

## Google Maps Setting

Creates an Output XML file formatted for display by Google Maps

### Initial Settings

UDP input on port 29421

Field Tags are set to decode Ships data that is required to be displayed on Google Maps.

Input Filter is Synchronised to Output Tags

File Output is Tagged with GIS filtering

A new file is Scheduled for output every one minute

The Tag Template file to merge AIS data into XML format is data.xml

### You may also

The file created may also be uploaded to a Web Server for display on Google Earth by anyone.



**Example** - These use the templates produced by my [Data Analysis Program](#), the principle is identical.

The XML or KML files have to be integrated with Google Maps to create a meaningful ("rendered") display on your website.

The original way Google rendered your ships on their map necessitated you placing a XML file on your (or ISP's) server, registering with Google, and creating a custom webpage. It is the custom webpage you view to see your ships on Google's map. To view my current XML list of ships overlaid on Google maps click [View XML file rendering](#).

### Example XML Source

```
<markers>
<marker lat="53.648310" lon="-0.208423" name="FS PHILIPPINE" dx="0.000" dy="0.000" type="Tanker-carrying DG,HS,MP,IMO haz or
pollutant X" ais="228320800!9310305!FMDU!IMMINGHAM!0222:0930!0.0!79.0!!Under way sailing (Rule 25)!140!23!8.8!22/02/2011 17:40:57!
Ship and Voyage Report"/>
<marker lat="54.035500" lon="0.206833" name="" dx="0.000" dy="0.000" type="" ais="250000962!!!!:13.3!135.0!!Under way using
engine (Rule 23(a) or Rule 25(e))!!!!22/02/2011 17:40:57!"/>
<marker lat="53.738860" lon="-0.260938" name="" dx="0.000" dy="0.000" type="" ais="304970000!!!!:10.0!285.0!!Under way using engine
(Rule 23(a) or Rule 25(e))!!!!22/02/2011 17:41:03!"/>
<marker lat="54.441670" lon="0.698505" name="" dx="0.000" dy="0.000" type="" ais="419504000!!!!:11.0!139.0!!Under way using
engine (Rule 23(a) or Rule 25(e))!!!!22/02/2011 17:40:59!"/>
</markers>
```

Google now have another method which allows you to see your ships overlaid on their map, without you needing a custom webpage data. This requires a KML file and will not work with a XML file, the KML file does need to be on a webserver. The same method (using a KML file) is used to render your data using Google Earth rather than Google maps. To use a KML file you simply upload the KML file and in your browser enter

<http://maps.google.com/maps?q=mywebsiteurl>.

For example to view my current data click <http://maps.google.com/maps?q=http://arundale.com/docs/ais/data.kml>

If you have looked at both the XML and KML renditions, you will have noticed the XML version contains much more information about the ships than the KML version. This is because XML version I have of the actual webpage I am using is to make it compatible with the widely used sample webpage vbship4.zip which can be downloaded from the files section (vbscripts) of the [ShipPlotter forum](#). The KML version I have kept simple so that you can see the wood from the trees. You can alter this later.

## CSV Setting

### Initial Settings

UDP input on port 29421

Log all NMEA input to nmea.log (with time stamp)

Displays All Received NMEA Sentences

Displays Summary of Received AIS messages

Click on Received AIS message to display fully decoded textual content

The Decoder will output all decoded value fields as CSV, if CSV output is selected and **NO** field Tags are selected.

If any fields are tagged, only the tagged fields will be output.

If no fields are tagged the Output Format is:-

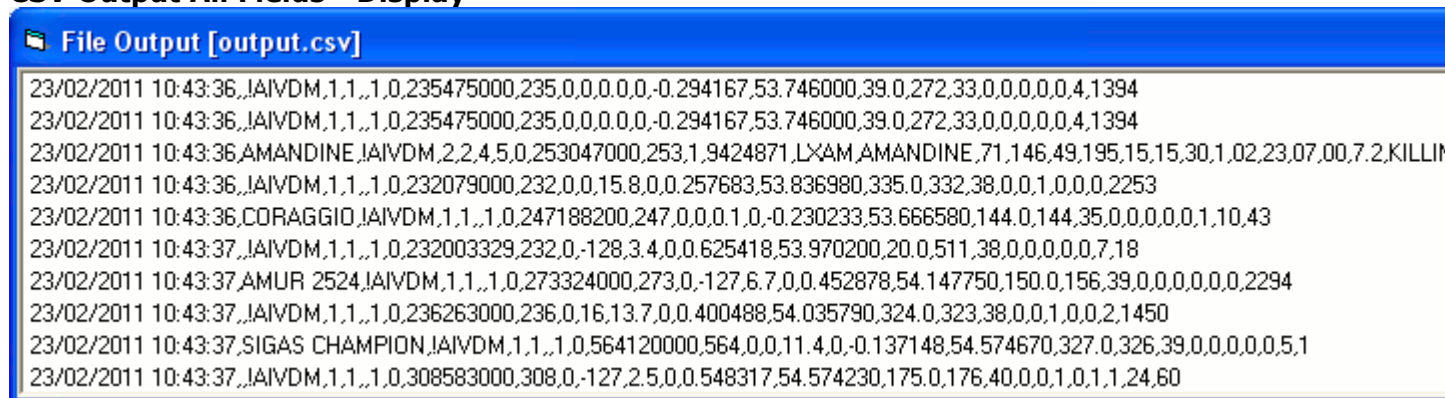
The same as on the Detail Window except for clarity the created time,NMEA sentence and the payload are omitted.

### CSV Output All Fields - File

(Browser may wrap lines)

```
23/02/2011 10:43:36,,!AIVDM,1,1,,1,0,235475000,235,0,0,0,0,0,-0.294167,53.746000,39.0,272,33,0,0,0,0,0,4,1394
23/02/2011 10:43:36,,!AIVDM,1,1,,1,0,235475000,235,0,0,0,0,0,-0.294167,53.746000,39.0,272,33,0,0,0,0,0,4,1394
23/02/2011 10:43:36,AMANDINE,!
AIVDM,2,2,4,5,0,253047000,253,1,9424871,LXAM,AMANDINE,71,146,49,195,15,15,30,1,02,23,07,00,7.2,KILLINGHOLME,0,0
23/02/2011 10:43:36,,!AIVDM,1,1,,1,0,232079000,232,0,0,15,8,0,0.257683,53.836980,335.0,332,38,0,0,1,0,0,0,2253
23/02/2011 10:43:36,CORAGGIO,!AIVDM,1,1,,1,0,247188200,247,0,0,0,1,0,-0.230233,53.666580,144.0,144,35,0,0,0,0,0,1,10,43
23/02/2011 10:43:37,,!AIVDM,1,1,,1,0,232003329,232,0,-128,3,4,0,0.625418,53.970200,20.0,511,38,0,0,0,0,0,0,7,18
23/02/2011 10:43:37,AMUR 2524,!AIVDM,1,1,,1,0,273324000,273,0,-127,6,7,0,0.452878,54.147750,150.0,156,39,0,0,0,0,0,0,2294
23/02/2011 10:43:37,,!AIVDM,1,1,,1,0,236263000,236,0,16,13,7,0,0.400488,54.035790,324.0,323,38,0,0,1,0,0,2,1450
23/02/2011 10:43:37,SIGAS CHAMPION,!AIVDM,1,1,,1,0,564120000,564,0,0,11,4,0,-0.137148,54.574670,327.0,326,39,0,0,0,0,0,0,5,1
23/02/2011 10:43:37,,!AIVDM,1,1,,1,0,308583000,308,0,-127,2,5,0,0.548317,54.574230,175.0,176,40,0,0,1,0,1,1,24,60
```

### CSV Output All Fields - Display



### CSV Decoded Output Selected Fields - File

(Browser may wrap lines)

```
247188200,CORAGGIO,53° 39.9950' N,0° 13.8140' W,0.0,144.0
253047000,,53° 40.1143' N,0° 13.9960' W,0.0,324.0
253310000,,53° 39.9479' N,0° 13.8860' W,0.0,144.0
273324000,AMUR 2524,54° 11.4175' N,0° 24.2075' E,6.7,148.0
308282000,TOISA DEFIANT,54° 15.6109' N,0° 19.2650' E,11.1,335.0
308583000,OCEAN SPRITE,54° 35.5371' N,0° 32.7160' E,2.0,176.0
319402000,STOLT SHEARWATER,54° 2.4300' N,0° 26.7200' E,10.1,147.0
477720300,STAR SEA BULKER,53° 38.2599' N,0° 11.7100' W,0.0,33.0
518408000,SWAN DIANA,54° 11.1028' N,0° 0.0398' E,7.7,316.0
564120000,SIGAS CHAMPION,54° 30.0817' N,0° 3.4236' W,11.1,328.0
```

### CSV Output Selected Fields - Display



## Excel

Creates a CSV file suitable for import into an Excel spreadsheet, containing common navigational fields

### Initial Settings

File

☒ File Output ☐ FTP

☐ NMEA ☐ +Time Stamp

☒ CSV ☒ Head ☐ Delimiter

☐ Tagged ☐ GIS Filtered

☐ Scheduled

☐ Range Filtered

File Output  
output.csv

☐ Rollover

A header line is output

Field Tags are set to decode common navigational vessels' data

Only those Tags which have been added to the Output Fields and Tags are output, because Tagged is not selected. If Tagged was selected, these fields would be merged with the Template file.

Every sentence is output individually because scheduled has not been ticked.

UDP input on port 29421

Input Filter is Synchronised to Output Tags

Displays NMEA data as received

Outputs CSV data to output.csv

Displays CSV data that is output

### You may also

Click on any received message summary to display complete decoded data

Turn off all the displays (click the X on the window)

### Notes

You should not set Tagged output, it should be CSV output otherwise the values output may be re-formatted, which could result in some [characters](#) being formatted incorrectly.

### Sample Output - Imported into Excel

Microsoft Excel - output.csv

	A	B	C	D	E	F
1	MMSI	Vessel Name	Latitude	Longitude	Speed Over Ground (SOG)	Course Over Ground
2	249546000	CLIPPER BURGUNDY	54° 27.0511' N	0° 20.1287' W	8.4	
3	259957000	SKS TRINITY	53° 38.2677' N	0° 11.7286' W	0	
4	233921000	CITY OF PARIS	54° 10.9760' N	0° 0.3980' W	10.9	
5	308583000		54° 35.3920' N	0° 31.2870' E	3.3	
6	249546000	CLIPPER BURGUNDY	54° 27.0705' N	0° 20.1511' W	8.4	
7	233308000	MAGGIE_M	54° 17.0277' N	0° 23.4676' W	0.1	
8	232001610	UKDMARLIN	54° 0.2900' N	0° 5.2630' E	8.9	
9	235453000	PUTFORD PROTECTOR	53° 44.8100' N	0° 17.5100' W	0	
10	235077712	UKD ORCA	53° 38.7573' N	0° 10.6778' W	0.5	
11	246762000		53° 39.9770' N	0° 13.7970' W	0	
12	230366000	BIRKA EXPRESS	53° 44.3651' N	0° 15.8334' W	0	
13	355754000	PEARL ACE	54° 13.3381' N	0° 54.5610' E	17.4	

Notes on Excel formatting

MMSI - Set as Numeric with 0 decimal places

Time Stamp - Use Custom Format to display both Date and Time including Seconds

Headings are the same as Column 1 on the Detail Window

If you wished Latitude and Longitude in decimal notation, set tag up from column 2 on the Detail Window (column 3 is formatted).

### CSV file before import into Excel

(lines may be wrapped by your browser)

MMSI,Vessel Name,Latitude,Longitude,Speed Over Ground (SOG),Course Over Ground (COG),Received Time

249546000,CLIPPER BURGUNDY,54° 27.0511' N,0° 20.1287'

W,8.4,325.0,10/03/2011 15:35:29

259957000,SKS TRINITY,53° 38.2677' N,0° 11.7286' W,0.0,340.0,10/03/2011 15:35:36

233921000,CITY OF PARIS,54° 10.9760' N,0° 0.3980' W,10.9,317.0,10/03/2011 15:35:38

308583000,,54° 35.3920' N,0° 31.2870' E,3.3,94.0,10/03/2011 15:35:39

249546000,CLIPPER BURGUNDY,54° 27.0705' N,0° 20.1511'

W,8.4,326.0,10/03/2011 15:35:40

233308000,MAGGIE\_M,54° 17.0277' N,0° 23.4676' W,0.1,239.0,10/03/2011 15:35:40

232001610,UKDMARLIN,54° 0.2900' N,0° 5.2630' E,8.9,155.0,10/03/2011 15:35:41

235453000,PUTFORD PROTECTOR,53° 44.8100' N,0° 17.5100'

W,0.0,171.0,10/03/2011 15:35:41

235077712,UKD ORCA,53° 38.7573' N,0° 10.6778' W,0.5,354.0,10/03/2011 15:35:42

246762000,,53° 39.9770' N,0° 13.7970' W,0.0,144.0,10/03/2011 15:35:42

230366000,BIRKA EXPRESS,53° 44.3651' N,0° 15.8334' W,0.0,12.0,10/03/2011 15:35:43

355754000,PEARL ACE,54° 13.3381' N,0° 54.5610' E,17.4,303.0,10/03/2011 15:35:45

### UDP Tags and Range Setting

This demonstrates how to receive NMEA data, and output the Decoded data by UDP to another program. Only ships within a defined geographic area are output.



#### Initial Settings

UDP input on port 29421

Field Tags are set to decode Ships data that is required to be output.

Tag ranges are set to only output Vessels within a Geographic area

Vessels are output in batches every minute, containing data received within the previous 15 minutes.

GIS filtering ensures that no data will be output unless the Vessel has output a position report as it may only have output a static data report.

Input Filter is Synchronised to Output Tags

Data is being output both to a file and UDP to a server.

#### Example of UDP Output

(line may be wrapped by browser)

212946000,17/02/2011 11:18:59,PUCCINI,54.136330,0.273500,155.0,11.1

235004970,17/02/2011 11:18:55,,54.234660,0.157333,332.0,15.3

235053623,17/02/2011 11:18:57,CLONLEE,54.351330,-0.226333,327.0,15.6

235059422,17/02/2011 11:18:39,NE GUARDIAN III,54.391570,-0.089543,1.0,19.7  
244242000,17/02/2011 11:18:52,,54.185170,-0.070167,328.0,9.6

## HTML Example

This demonstrates how to output Vessels' data formatted with HTML so that when opened in a browser, it is nicely laid out.

The file created can be automatically uploaded to a web site by setting up the FTP option.

Note you can click on the GIS button to display the outputted file in your default browser.

### Initial Settings

UDP input on port 29421

Field Tags are set to decode Ships data that is required to be output.

The data is output in batches every minute Vessels, containing data received within the previous 15 minutes.

GIS filtering is disabled so all data is output

Input Filter is Synchronised to Output Tags

The source HTML is displayed in a window as it is output to the data.html file

### Example Output - Browser

Name	Position	Course	Speed
PUCCINI	54°4.6701' N, 0°19.4100' E	162.0	11.4
KEY FIGHTER	53°38.0084' N, 0°11.3054' W	67.0	0.0
CITY OF WESTMINSTER	53°44.7599' N, 0°17.6800' W	142.0	0.1

#### Source

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
"http://www.w3.org/TR/html4/loose.dtd">
<html><head>
<title>Ais Decoder</title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
<style type="text/css">
<!--
.html_head {font-size: 10px; color: #000000; font-family: arial, sans-serif; }
.content_header {color: #ff0000; }
-->
</style>
</head>
<body>
<table class="html_head">
<tr
class="content_header"><td>Name</td><td>Position</td><td>Course</td><td>Speed</td></tr>
<tr><td>PUCCINI</td><td>54°4.6701' N, 0°19.4100' E</td><td>162.0</td><td>11.4</td></tr>
<tr><td>KEY FIGHTER</td><td>53°38.0084' N, 0°11.3054' W</td><td>67.0</td><td>0.0</td></tr>
<tr><td>CITY OF WESTMINSTER</td><td>53°44.7599' N, 0°17.6800' W</td><td>142.0</td><td>0.1</td></tr>
</table></body></html>
```

## ASPX Example

This demonstrates a template to produce an Active Server Page Script.

### Initial Settings

UDP input on port 29421

Field Tags are set to decode Ships data that is required to be output.

The data is output in batches every minute Vessels, containing data received within the previous 15 minutes.

GIS filtering is disabled so all data is output

Input Filter is Synchronised to Output Tags

The Template file is example.aspx

The source is displayed in a window as it is output to the example.aspx file

### Example Output - Source

(line may be wrapped by your browser)

Put your Head information here, it will be placed at the top of the file

ais.aspx?mmsi=210445000&vesselname=&receivedtime=17/02/2011

12:07:52&lon=0&#176; 17.2900&apos; W&lat=53&#176; 44.7299&apos;

N&course=331.0&speed=0.0

ais.aspx?mmsi=212946000&vesselname=PUCINI&receivedtime=17/02/2011

12:07:59&lon=0&#176; 21.5400&apos; E&lat=53&#176; 59.4901&apos;

N&course=175.0&speed=11.7

ais.aspx?mmsi=215211000&vesselname=KEY FIGHTER&receivedtime=17/02/2011

12:07:46&lon=0&#176; 11.3056&apos; W&lat=53&#176; 38.0054&apos;

N&course=37.0&speed=0.0

Any text here will be placed at the bottom of the file.

## Shipplotter spnmea Setting

### Initial Settings

Log file input

Log all NMEA input to nmea.log (with time stamp)

Displays All Received NMEA Sentences

Displays Summary of Received AIS messages

Click on Received AIS message to display fully decoded textual content

On Start select spnmea file to be decoded

The Output Format is:-

The same as on the Detail Window except for clarity the created time,NMEA sentence and the payload are omitted

If any fields are tagged, only the tagged fields will be output.

### SPNMEA input file

```
!AIVDM,1,1,,A,13;5<D001L00<t8NwVI5ATEF08Kc,0*7A
```

```
$GPZDA,123047,14,08,2010,+00,00*6E
```

```
!AIVDM,1,1,,A,13Pi8L0P00023hjNrlsA8?wP0<0F,0*02
```

```
!AIVDM,1,1,,A,14WU7D00iqOwteBNw@5L`awP0D0D,0*78
```

```
$GPZDA,123048,14,08,2010,+00,00*61
```

```
!AIVDM,1,1,,A,14Uumt00i:00GQ00;Ab6FTuR0L0>,0*36
```

```
!AIVDM,1,1,,A,14QsCa002Gww>8L01T6<A9uP0D0A,0*64
```

```
!AIVDM,2,1,1,A,58UQ<802@Vj9TaIWW20pE@PE8h4pB1@T@F22220I2Hk8865E0<Tm<p8888888888,0*46
```

```
!AIVDM,2,2,1,A,88888880,2*25
```

```
$GPZDA,123049,14,08,2010,+00,00*60
```

## SPNMEA input file, File Output All Fields - Display

### File Output [output.csv]

```

!AIVDM,1,1,A,7A,,1,0,212946000,212,0,0,9.2,0,0,044167,54.165500,135.0,138,43,0,0,0,0,2,1771
$GPZDA,123047,14,08,2010,+00,00,6E
!AIVDM,1,1,A,02,,1,0,235686000,235,0,-128,0,0,0,0,449748,54.035170,29.0,511,48,0,0,0,0,3,22
!AIVDM,1,1,A,78,,1,0,309938000,309,0,127,12,1,0,-0.011238,54.155980,323.0,319,48,0,0,0,0,5,20
$GPZDA,123048,14,08,2010,+00,00,6I
!AIVDM,1,1,A,36,,1,0,308246000,308,0,127,7,4,0,0,080267,54.484330,163.0,158,49,0,0,0,0,7,14
!AIVDM,1,1,A,64,,1,0,304010148,304,0,0,15,1,1,-0.170217,54.219130,314.0,318,48,0,0,0,0,5,17
!AIVDM,2,1,A,46,NETHERLAND TIDE,5,0,576212000,576,0,9476898,YJY9,NETHERLAND TIDE,52,19,51,70,8,8,16,1,08,10,21,00,5,ST3,0,0,-4
!AIVDM,2,2,A,25,NETHERLAND TIDE,5,0,576212000,576,0,9476898,YJY9,NETHERLAND TIDE,52,19,51,70,8,8,16,1,08,10,21,00,5,ST3,0,0
$GPZDA,123049,14,08,2010,+00,00,6O

```

## SPNMEA input file, CSV Output Selected Fields - Display

### Microsoft Excel - output.csv

File Edit View Insert Format Tools Data Window Help										
A2 = 230984000										
	A	B	C	D	E	F	G	H	I	J
1	MMSI	Name	Latitude	Longitude	SOG	COG	Created	GPS	Mon	Day
2	230984000		55° 1.5495' N	0° 5.4240' E	17.5	245	24/02/2011 11:53	2010	8	14
3	244886000		54° 30.0879' N	0° 7.8970' W	13.9	326	24/02/2011 11:53			
4	212946000		54° 9.9300' N	0° 2.6500' E	9.2	135	24/02/2011 11:53	2010	8	14
5	235686000		54° 2.1101' N	0° 26.9849' E	0	29	24/02/2011 11:53			
6	309938000		54° 9.3587' N	0° 0.6743' W	12.1	323	24/02/2011 11:53	2010	8	14
7	308246000		54° 29.0600' N	0° 4.8160' E	7.4	163	24/02/2011 11:53			

## SPNMEA input file, CSV Output Selected Fields - Excel

### Microsoft Excel - output.csv

File Edit View Insert Format Tools Data Window Help										
A2 = 230984000										
	A	B	C	D	E	F	G	H	I	J
1	MMSI	Name	Latitude	Longitude	SOG	COG	Created	GPS	Mon	Day
2	230984000		55° 1.5495' N	0° 5.4240' E	17.5	245	24/02/2011 11:53	2010	8	14
3	244886000		54° 30.0879' N	0° 7.8970' W	13.9	326	24/02/2011 11:53			
4	212946000		54° 9.9300' N	0° 2.6500' E	9.2	135	24/02/2011 11:53	2010	8	14
5	235686000		54° 2.1101' N	0° 26.9849' E	0	29	24/02/2011 11:53			
6	309938000		54° 9.3587' N	0° 0.6743' W	12.1	323	24/02/2011 11:53	2010	8	14
7	308246000		54° 29.0600' N	0° 4.8160' E	7.4	163	24/02/2011 11:53			

## Output

### Outputting Decoded Data - a brief introduction.

Decoded data can be formatted in 3 basic ways.

1. Every field of every input sentence passing through the Input Filter is output as CSV by setting the Output Option to CSV.
2. You can restrict the number of fields output by creating tags, for each type of sentence, in which case only those fields which have been mapped to a named tag will be output, as a CSV record.



3. You can create a Template file which contains selected tags. These tags will be substituted with the relevant values when the template output.

In addition you can set a minimum and maximum value for any tag. The decoded data will only be output if ALL min & max conditions have been met.

Output	
<a href="#">Channels</a>	<a href="#">File</a> , <a href="#">UDP</a> . To Output to a Web Server you first output to a file then send it to a Web Server using FTP
<a href="#">Format</a>	<a href="#">NMEA</a> , <a href="#">CSV</a> , <a href="#">HTML</a> , <a href="#">KML</a> , <a href="#">KMZ</a>
<a href="#">Fields</a>	<a href="#">Selecting message fields</a> to be output
<a href="#">Template Files</a>	Formatting Output using Template Files
<a href="#">Filtering</a>	Range Filtering Output Tag Values
<a href="#">Scheduling</a>	Outputting accumulated messages at times intervals

## Output Channels

There are two output channels.

One outputs to a [File](#), the other outputs [To your Network](#).

The screenshot shows two side-by-side configuration panels. The left panel is titled 'File' and contains the following options: ☒ File Output, ☐ FTP, ☐ NMEA, ☐ +Time Stamp, ☐ CSV, ☐ Head, ☐ Delimiter, ☒ Tagged, ☒ GIS Filtered, ☒ Scheduled, and ☒ Range Filtered. The right panel is titled 'UDP' and contains the following options: ☒ UDP Output, ☐ NMEA, ☐ +Time Stamp, ☐ CSV, ☐ Head, ☐ Delimiter, ☒ Tagged, ☒ GIS Filtered, ☒ Scheduled, and ☒ Range Filtered.

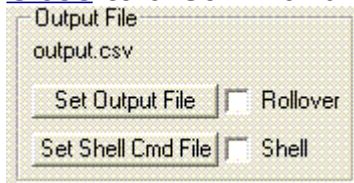
Output Options - Common to both Channels	
Display Output	Displays the data in a separate Window as it is being output.
NMEA	Output NMEA data
Time Stamp	Optionally Time Stamp the NMEA data output
CSV	Output data as CSV
Head	Output a header line at the start of the file
Delimiter	Specify a CSV delimiter (default is comma)



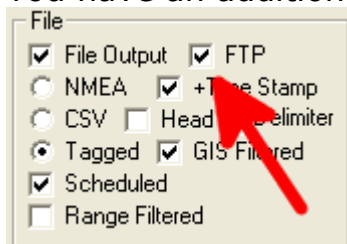
Tagged	Output Template File with Tags replaced by Tag Values
GIS filtered	Only output MMSI if vessel's position is known
Scheduled	Output received sentences at scheduled intervals
Range Filtered	Apply range filtering to output data

The options for both channels are the same excepting

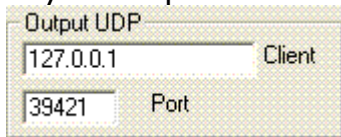
If you output to a **file** you can select an output file name and you can [Shell on File Close](#) to a Command procedure (script or batch file)



You have an additional option of sending the file created to a [Web Server](#) using [FTP](#)



If you output **UDP** to the network you must set up a UDP port.



AisDecoder has no provision for outputting TCP, you can easily use my [NmeaRouter](#) to convert the UDP output to TCP.

## Output To File



Output to File - Specific Options	
File Output	Start Outputting to a File
FTP	Sends the Output File to the FTP server at the Scheduled time

see also [Output Channels](#), [Output to Web Server](#), [FTP](#)

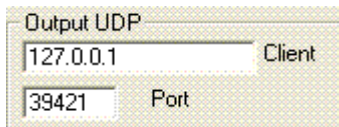
You may also set the Output File Name

## Output To Network

Output to Network - Specific Options	
UDP Output	Start Outputting to UDP Port

See also [Output Channels](#)

If you output UDP to the network you must set up an IP address and UDP port.



Output UDP	
127.0.0.1	Client
39421	Port

127.0.0.1	Outputs to the PC running AisDecoder
192.168.xxx.xxx	Outputs to the Local Network (LAN)
10.xxx.xxx.xxx	Outputs to the Local Network (LAN)
xxx.xxx.xxx.xxx	Outputs to the Internet (WAN)

The IP address (x.x.x.x) can be replaced with a hostname (eg arundale.com). The hostname is converted into an IP address (this is called resolved) either on the Local PC with a hosts file, or more usually by the local PC referring to a Domain Name Server (DNS). Windows does this for you.

## Output To Web Server

### Overview

When you access the Internet on your PC, your browser downloads a file residing on a Webserver to your PC, and having received the file, displays the contents of the file.

- The browser downloads the file
- The browser formats the data in the file and displays this data

The data in the file MUST conform to certain rules (HTML format) in order to successfully display the data

In this scenario Google Earth can be considered as just another browser.

To enable the world on the internet to view your data, this data must reside on a file and be accessible from the internet. To be accessible to the world, the data on your PC must reside in a file on your PC and then be transferred (uploaded) to a Webserver.

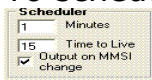
- A file must be created at regular intervals, if the contents are changing
- This file on your PC must be formatted suitable for browsers
- The file must be transferred to a Web server (uploaded)

In AisDecoder these 3 stages are accomplished as follows

- The scheduler holds the data until the file is required
- The encoded (AIS) data is decoded into plain English, formatted by tagging the data and written out to the output file.
- A FTP server uploads the output file to a (web) server

All 3 steps must be carried out in order correctly for the upload to be successful.

To schedule the output ensure the [Scheduler](#) is set up to your requirements



To Output to a Web Server you must [Output to a File](#) first using a template file.

The [Template file](#) will contain the basic format of your webpage

For example a simple web page could contain

```
<html><body>Vessel Name is [vesselname]</body></html>
```

If the tag **[vesselname]** is replaced with **Jane**, when the above web page is viewed with a web browser you would see

Vessel Name is **Jane**.

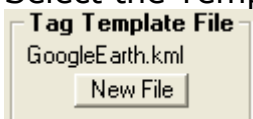
If viewed with Notepad you would see

```
<html><body>Vessel Name is Jane</body></html>
```

All browsers contain an option to view the plain text (or source) of the page being displayed.

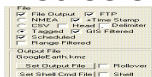
If you navigate to the Arundale\Ais Decoder\Templates and open any of the Templates with Notepad you can view more complex templates, which demonstrate more complex merging of Decoded AIS data with HTML template files.

Select the Template to use



To use this [Tag Template file](#) select Tagged in the File Output section

Also select GIS filtered if using [Google Earth](#) and tick the Scheduled box

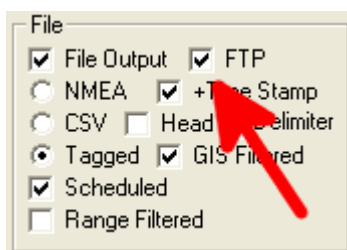


To output a compressed file use a KMZ extension

After you have entered your own server details

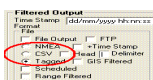


The Output file will be sent by the [scheduler](#) to the Web Server using [FTP](#)



There are a number of [Initialisation Files](#) that will pre-set most of these settings.

## Output Format



There are 3 basic output formats

Output Formats	
<a href="#">NMEA</a>	NMEA (not - decoded) either time stamped or not
<a href="#">CSV</a>	Decoded Comma Separated
<a href="#">Tagged</a>	The format is set by a Template file, which contains Tags which have the tag substituted with a decoded AIS message field value, prior to output.

By creating a [Template File](#) you can output decoded fields in any format you wish.

## NMEA Output

### AIS

```
!AIVDM,1,1,,B,34QsE4P000OvgWnNh<FEICKR06HS,0*44
!AIVDO,1,1,,,11mJmdwP?w<tSF0I4Q@>4?wv0>`<,0*66
```

### Time Stamped

```
!AIVDM,1,1,,B,34QsE4P000OvgWnNh<FEICKR06HS,0*44,28/11/2015 14:49:48
!AIVDM,2,1,0,A,53a`I802<PjU084`00118T@F0tJ18uA@E8@4I0152;5@@6v70?AEDSI3,0*2E,28/11/2015 14:49:49
!AIVDM,2,2,0,A,klU8;H25C385UP0,2*42,28/11/2015 14:49:49
```

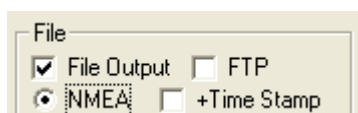
### NMEA GPS

```
$GPRMC,101538.00,A,5116.80067,N,00227.93862,W,0.008,,130514,,,D*68
$GPGSV,4,1,15,05,36,185,39,07,04,062,38,08,30,058,41,09,40,062,46*7A
$GPGLL,5116.80067,N,00227.93862,W,101538.00,A,D*7B
$GPGGA,111617.00,5116.80048,N,00227.93899,W,2,10,0.83,121.7,M,48.4,M,,0000*49
```

NMEA is output to [Input Log](#) files, which allow you to select all received messages or Input Filtered messages. You can input filter messages by Message type, DAC, FI and MMSI

NMEA data is never output as decoded data.

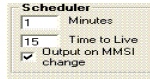
If you wish to output NMEA data which is dependent on individual fields which are not filtered by the input filter this can still be done by setting the output as NMEA.



To append the time stamp of the original NMEA message, tick the + Time Stamp

box.

If you are outputting NMEA messages which and are not using the Scheduler, you may be intermixing AIS sentences with GPS sentences.



Sentences are normally buffered and output when the MMSI changes. You can stop this behaviour by un-ticking MMSI change.

You can [Schedule](#) NMEA output by ticking the Schedule box.

In this case note the NMEA sentences are output in MMSI order and NOT in the order the sentences are received.

You can also [Set Tags](#) for NMEA output; the NMEA sentences for a MMSI will be output if the MMSI passes the Tag Range check. All AIS and NMEA messages that are on the [Input Filter](#) may be Tagged.

See also [Range Filtered NMEA Output](#), [Output Windows](#)

## CSV Output

```
538003323,26/05/2014 09:05:44,AUTUMN,54.43464,-0.2594617,314.4,14.4
311012400,26/05/2014 09:05:45,POLARCUS NAILA,54.52063,0.1212717,88.4,4.2
308574000,26/05/2014 09:05:45,HILDEGAARD,54.05229,0.161215,339.7,6.8
235069106,26/05/2014 09:05:45,MAGIC,54.16152,-0.180425,266.7,8.3
248219000,26/05/2014 09:05:46,OPAL,54.51847,0.1776917,89.8,4.2
308574000,26/05/2014 09:05:46,HILDEGAARD,54.05235,0.1611783,340.5,6.8
308574000,26/05/2014 09:05:47,HILDEGAARD,54.05238,0.16116,340.8,6.8
538003323,26/05/2014 09:05:49,AUTUMN,54.43493,-0.2599583,314.5,14.5
305707000,26/05/2014 09:05:50,MARUS,54.11828,-0.08674,148.1,11.9
311571000,26/05/2014 09:05:54,GRENA,54.20757,-0.18416,292.0,8.3
```

The Decoder will output ALL fields or specified fields you require to be output to a csv file.

The Decoder will output all decoded value fields as CSV, if CSV output is selected and **NO** field Tags are selected. See [Output ALL fields](#)

To output specified fields you need to "tag" the fields you require outputting individually for each AIS message type you are interested in.

Click on the field you are interested in on the detail window and set the outputs to File and Display in the Options window.

This field will be output in the first "column" of the csv file.

For example if you wish to output the MMSI from AIS Message type 1

1. On the Control/Stats Window  
click Options

On the Options Window

2. In the Accept Input Filter box  
Tick AIS Message 1  
Click OK

3. On the Control/Stats Window  
Ensure the Display - Summary - Input Filtered button is selected

Click Start

After a message has been displayed in the Summary Window

On the Summary Window

4. Click any message line

The Detail Display for this AIS message will be displayed

On the Detail Window

5. Click the Cell containing the MMSI number (this will be in the second column).  
The Input Field Window will be displayed

On the Input Field Window

6. Note you can rename the default field names to combine or split them on output)  
Click OK

7. Repeat from step 5 to set up additional fields

8. Repeat from step 2 for additional message types

This all sounds very complicated, but if you try it, it should be fairly obvious

## HTML Output

### Web Server Output

Name	Position	Course	Speed
PUCCINI	54° 3.1899' N, 0° 20.0200' E	167.0	11.6
KEY FIGHTER	53° 38.0063' N, 0° 11.3052' W	23.0	0.0
CITY OF WESTMINSTER	53° 44.7599' N, 0° 17.6800' W	82.0	0.1
REBECCA M	53° 42.2060' N, 0° 14.1607' W	355.0	0.0
CIMBRIA SEAWAYS	54° 20.4101' N, 0° 2.9800' E	327.0	15.3

### Source Data - Sent to Web server

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN" "http://www.w3.org/TR/html4/loose.dtd">
<html><head>
<title>Ais Decoder</title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
<style type="text/css">
<!--
.html_head {font-size: 10px; color: #000000; font-family: arial, sans-serif; }
.content_header {color: #ff0000; }
-->
</style>
</head>
<body>
<table class="html_head">
<tr class="content_header"><td>Name</td><td>Position</td><td>Course</td><td>Speed</td></tr>
<tr><td>PUCCINI</td><td>54° 3.1899' N, 0° 20.0200' E</td><td>167.0</td><td>11.6</td></tr>
<tr><td>KEY FIGHTER</td><td>53° 38.0063' N, 0° 11.3052' W</td><td>23.0</td><td>0.0</td></tr>
<tr><td>CITY OF WESTMINSTER</td><td>53° 44.7599' N, 0° 17.6800' W</td><td>82.0</td><td>0.1</td></tr>
<tr><td>REBECCA M</td><td>53° 42.2060' N, 0° 14.1607' W</td><td>355.0</td><td>0.0</td></tr>
<tr><td>CIMBRIA SEAWAYS</td><td>54° 20.4101' N, 0° 2.9800' E</td><td>327.0</td><td>15.3</td></tr>
</table>
</body>
</html>
```

```

<tr><td>REBECCA M</td><td>53°17'42.2060&#176; N, 0&#176;14.1607&#176; W</td><td>355.0</td><td>0.0</td></tr>
<tr><td>CIMBRIA SEAWAYS</td><td>54°17'20.4101&#176; N, 0&#176;2.9800&#176; E</td><td>327.0</td><td>15.3</td></tr>
</table>
</body>
</html>

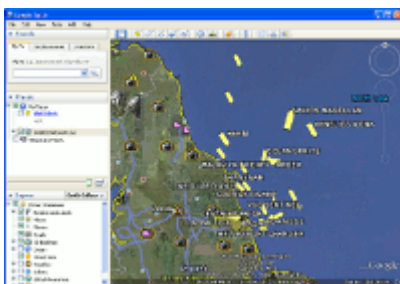
```

You can output your decoded input data as an HTML file by

1. Creating a HTML Template file.
2. Creating Tags for any AIS field values you require substituting in your template file.

See also [Example Settings HTML](#)

## KML Output



KML is the Google Earth and Google Maps format for overlaying your own data on either Google GIS.

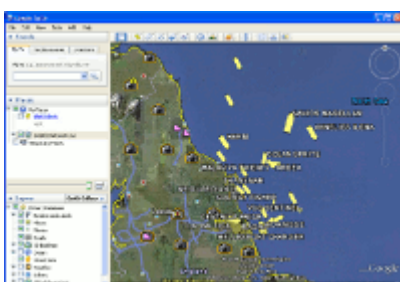
KML is a XML file with "special" Google tags.

You can output your decoded input data as a KML file by

1. Creating a KML Template file.
2. Creating Tags for any AIS field values you require substituting in your template file.

See also Example Settings [Google Earth](#) and [Google Maps](#)

## KMZ Output

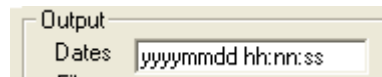


KMZ is Google's preferred format for overlaying your own data on Google Earth. A KMZ file will not work with Google Maps.

The basic content of a KMZ file is the same as a KML file, only it is "Zipped Up"

To Output a KMZ file create a [KML](#) file making the file extension KMZ.

## Date and Time



The time and date stamp appended to the log file will always be UTC formatted with your PC's date and time settings.

You can set the format that is output to the Detail display and the any tags created from the detail display including CSV output by setting the format in the dates box.

This format must conform to "windows" formatting.

These Microsoft examples assume the system date is using USA formatting (mm/dd/yyyy hh:nn:mm AM/PM)

Format specifier	Description	Examples
"d"	The day of the month, from 1 through 31.	6/1/2009 1:45:30 PM -> 1 6/15/2009 1:45:30 PM -> 15
"dd"	The day of the month, from 01 through 31.	6/1/2009 1:45:30 PM -> 01 6/15/2009 1:45:30 PM -> 15
"ddd"	The abbreviated name of the day of the week.	6/15/2009 1:45:30 PM -> Mon (en-US) 6/15/2009 1:45:30 PM -> Пн (ru-RU) 6/15/2009 1:45:30 PM -> lun. (fr-FR)
"dddd"	The full name of the day of the week.	6/15/2009 1:45:30 PM -> Monday (en-US) 6/15/2009 1:45:30 PM -> понедельник (ru-RU) 6/15/2009 1:45:30 PM -> lundi (fr-FR)
"f"	The tenths of a second in a	6/15/2009 13:45:30.617 -> 6



	date and time value.	6/15/2009 13:45:30.050 -> 0
"ff"	The hundredths of a second in a date and time value.	6/15/2009 13:45:30.617 -> 61 6/15/2009 13:45:30.005 -> 00
"fff"	The milliseconds in a date and time value.	6/15/2009 13:45:30.617 -> 617 6/15/2009 13:45:30.0005 -> 000
"ffff"	The ten thousandths of a second in a date and time value.	6/15/2009 13:45:30.6175 -> 6175 6/15/2009 13:45:30.00005 -> 0000
"fffff"	The hundred thousandths of a second in a date and time value.	6/15/2009 13:45:30.61754 -> 61754 6/15/2009 13:45:30.000005 -> 00000
"ffffff"	The millionths of a second in a date and time value.	6/15/2009 13:45:30.617542 -> 617542 6/15/2009 13:45:30.0000005 -> 000000
"fffffff"	The ten millionths of a second in a date and time value.	6/15/2009 13:45:30.6175425 -> 6175425 6/15/2009 13:45:30.0001150 -> 0001150
"F"	If non-zero, the tenths of a second in a date and time value.	6/15/2009 13:45:30.617 -> 6 6/15/2009 13:45:30.050 -> (no output)
"FF"	If non-zero, the hundredths of a second in a date and time value.	6/15/2009 13:45:30.617 -> 61 6/15/2009 13:45:30.005 -> (no output)
"FFF"	If non-zero, the milliseconds in a date and time value.	6/15/2009 13:45:30.617 -> 617 6/15/2009 13:45:30.0005 -> (no output)
"FFFF"	If non-zero, the ten thousandths of a second in a date and time value.	6/1/2009 13:45:30.5275 -> 5275 6/15/2009 13:45:30.00005 -> (no output)
"FFFFF"	If non-zero, the hundred	6/15/2009 13:45:30.61754 -> 61754

	thousandths of a second in a date and time value.	6/15/2009 13:45:30.000005 -> (no output)
"FFFFFF"	If non-zero, the millionths of a second in a date and time value.	6/15/2009 13:45:30.617542 -> 617542 6/15/2009 13:45:30.0000005 -> (no output)
"FFFFFFF"	If non-zero, the ten millionths of a second in a date and time value.	6/15/2009 13:45:30.6175425 -> 6175425 6/15/2009 13:45:30.0001150 -> 000115
"g", "gg"	The period or era.	6/15/2009 1:45:30 PM -> A.D.
"h"	The hour, using a 12-hour clock from 1 to 12.	6/15/2009 1:45:30 AM -> 1 6/15/2009 1:45:30 PM -> 1
"hh"	The hour, using a 12-hour clock from 01 to 12.	6/15/2009 1:45:30 AM -> 01 6/15/2009 1:45:30 PM -> 01
"H"	The hour, using a 24-hour clock from 0 to 23.	6/15/2009 1:45:30 AM -> 1 6/15/2009 1:45:30 PM -> 13
"HH"	The hour, using a 24-hour clock from 00 to 23.	6/15/2009 1:45:30 AM -> 01 6/15/2009 1:45:30 PM -> 13
"K"	Time zone information.	With DateTime values:  6/15/2009 1:45:30 PM, Kind Unspecified ->  6/15/2009 1:45:30 PM, Kind Utc -> Z  6/15/2009 1:45:30 PM, Kind Local -> -07:00 (depends on local computer settings)  With DateTimeOffset values:  6/15/2009 1:45:30 AM -07:00 --> -07:00

		6/15/2009 8:45:30 AM +00:00 --> +00:00
"m"	The minute, from 0 through 59.	6/15/2009 1:09:30 AM -> 9 6/15/2009 1:09:30 PM -> 9
"mm"	The minute, from 00 through 59.	6/15/2009 1:09:30 AM -> 09 6/15/2009 1:09:30 PM -> 09
"M"	The month, from 1 through 12.	6/15/2009 1:45:30 PM -> 6
"MM"	The month, from 01 through 12.	6/15/2009 1:45:30 PM -> 06
"MMM"	The abbreviated name of the month.	6/15/2009 1:45:30 PM -> Jun (en-US)
		6/15/2009 1:45:30 PM -> juin (fr-FR)
		6/15/2009 1:45:30 PM -> Jun (zu-ZA)
"MMMM"	The full name of the month.	6/15/2009 1:45:30 PM -> June (en-US)
		6/15/2009 1:45:30 PM -> juni (da-DK)
		6/15/2009 1:45:30 PM -> uJuni (zu-ZA)
"s"	The second, from 0 through 59.	6/15/2009 1:45:09 PM -> 9
"ss"	The second, from 00 through 59.	6/15/2009 1:45:09 PM -> 09
"t"	The first character of the AM/PM designator.	6/15/2009 1:45:30 PM -> P (en-US)
		6/15/2009 1:45:30 PM -> 午 (ja-JP)
		6/15/2009 1:45:30 PM -> (fr-FR)
		6/15/2009 1:45:30 PM -> PM (en-US)
"tt"	The AM/PM designator.	6/15/2009 1:45:30 PM -> 午後 (ja-JP) 6/15/2009 1:45:30 PM -> (fr-FR)

"y"	The year, from 0 to 99.	1/1/0001 12:00:00 AM -> 1
		1/1/0900 12:00:00 AM -> 0
		1/1/1900 12:00:00 AM -> 0
		6/15/2009 1:45:30 PM -> 9
"yy"	The year, from 00 to 99.	1/1/0001 12:00:00 AM -> 01
		1/1/0900 12:00:00 AM -> 00
		1/1/1900 12:00:00 AM -> 00
		6/15/2009 1:45:30 PM -> 09
"yyy"	The year, with a minimum of three digits.	1/1/0001 12:00:00 AM -> 001
		1/1/0900 12:00:00 AM -> 900
		1/1/1900 12:00:00 AM -> 1900
		6/15/2009 1:45:30 PM -> 2009
"yyyy"	The year as a four-digit number.	1/1/0001 12:00:00 AM -> 0001
		1/1/0900 12:00:00 AM -> 0900
		1/1/1900 12:00:00 AM -> 1900
		6/15/2009 1:45:30 PM -> 2009
"yyyyy"	The year as a five-digit number.	1/1/0001 12:00:00 AM -> 00001
		6/15/2009 1:45:30 PM -> 02009
"z"	Hours offset from UTC, with no leading zeros.	6/15/2009 1:45:30 PM -07:00 -> -7
"zz"	Hours offset from UTC, with a leading zero for a single-digit value.	6/15/2009 1:45:30 PM -07:00 -> -07
"zzz"	Hours and minutes offset from UTC.	6/15/2009 1:45:30 PM -07:00 -> -07:00
":."	The time separator.	6/15/2009 1:45:30 PM -> : (en-US)
		6/15/2009 1:45:30 PM -> . (it-IT)
		6/15/2009 1:45:30 PM -> : (ja-JP)

		6/15/2009 1:45:30 PM -> / (en-US)
"/"	The date separator.	6/15/2009 1:45:30 PM -> - (ar-DZ)
		6/15/2009 1:45:30 PM -> . (tr-TR)
"string"		6/15/2009 1:45:30 PM ("arr:" h:m t)
	Literal string delimiter.	-> arr: 1:45 P
'string'		6/15/2009 1:45:30 PM ('arr:' h:m t)
		-> arr: 1:45 P
%	Defines the following character as a custom format specifier.	6/15/2009 1:45:30 PM (%h) -> 1
\	The escape character.	6/15/2009 1:45:30 PM (h \h) -> 1 h
Any other character	The character is copied to the result string unchanged.	6/15/2009 1:45:30 AM (arr hh:mm t)
		-> arr 01:45 A

### Selecting and Tagging Output Fields

Each AIS message consists of a number of fields, for example AIS message 1 contains MMSI, Longitude & Latitude *plus a number of other fields*.

Fields		
Field Name	Field Value	Field Description
MMSI	249379000	
Longitude	0.301626	0° 18.0975' N
Latitude	54.773910	55° 46.4346' N

To identify these fields uniquely, these fields must be named with a "Tag"  
All Decoded AIS Message fields can be viewed in the [Detail Window](#) on which you select the fields you wish to output.

The Default names for these fields are

Default Tags		
Name Tag	Value Tag	Description Tag
mmsi_1	mmsi_2	mmsi_3

lon_1	lon_2	lon_3
lat_1	lat_2	last_3

If you create a template file, which is a plain text file, containing this one line:-  
**Name is <lon\_1>, Value is <lon\_2>, Description is <lon\_3>**

The Decoder will output:-

**Name is Longitude, Value is 0.301626, Description is 0° 18.0975' N**

You can see the tags <lon\_1>, <lon\_2> and <lon\_3> in the template have been replaced with the actual values in the AIS message fields.

Note that in this example as <lon\_1> will always translate to Name, in practice you can reduce the processing by making the template:

**Longitude is <lon\_2>**

which will output **Longitude is 0.301626**

or if you prefer the formatted longitude

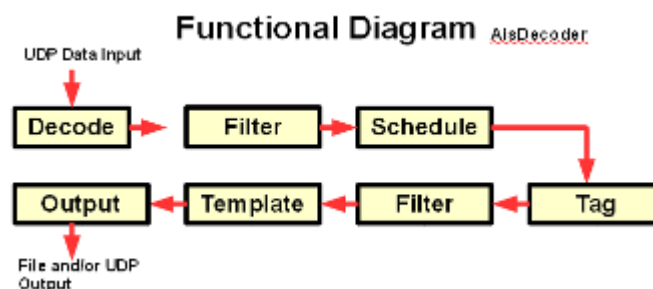
**Longitude is <lon\_3>**

which will output **Longitude is 0° 18.0975' N**

In a similar manner you can select and organise all output in the format of your choice.

See also [Template Files](#), [Tagging -Overview](#), [Creating Tags](#), [Deleting Tags](#), [Outputting Fields and Tags](#)

## Tagging Overview



Tagging an AIS message field enables the decoded data in the field to be identified and output individually by the name of the tag.

Every Field in every individual AIS message type may be Tagged with a name.

All AIS messages have some fields that are common to all message types. For example every AIS message has the MMSI number of the sender.

Some fields appear in more than one AIS message but not in all (for example Speed), and some fields are totally unique to one AIS message type.

AisDecoder regards every different binary message type as a different AIS message type. This means you can apply a different tag to every field in every DAC,FI and ID combination.

When a field of decoded AIS message is output it is identified by the name of the Tag.

Although all AIS message fields have a default Tag name, you can (and probably will) give the field your own name.

Because the output layout is arranged by the name of the Tag, if you wish a field that exists in more than one AIS message type to appear in the same position when output, you must give the field in each AIS message the same Tag name.

Currently AisDecoder decodes around 1500 different AIS message fields, so mapping these fields to your output layout may not be trivial. It all depends on the data you wish to output.

See also [Selecting Output Fields](#), [Creating Tags](#), [Deleting Tags](#), [Outputting Fields and Tags](#), [Template Files](#)

## Outputting Tagged Fields

You will need to Tag some AIS message fields if you wish to

Tagged Fields	
Create a Tagged Output File	the Tags in the Template File will be replaced by the value associated with the Tag
Create a CSV Output File without outputting all fields	The Tagged fields will be output as a CSV file
Create a NMEA Output File requiring Output Range Filtering	the NMEA message will be Output Filtered by the Range allowed by the Tag

There are a number of stages to output Decoded AIS Message fields.

1. Display in the [Detail Window](#) the AIS message containing the field you wish to output.
2. [Select the Field](#) in the Detail Window
3. [Rename](#) the default tag name (if required)
4. Create a new [tag template file](#) (if required)
5. Add the tag name (if not previously used) to your tag template
6. On the [Options Window](#) set the appropriate options to output your tagged fields.
7. [Start decoding](#)

**See also** [Character Encoding](#)

## Creating Tags

AIS messages consist of a number of fields, it is the value of these fields which AisDecoder is decoding. All these fields and/or values are displayed in the [Detail Window](#). If you left click on any of these fields, you will be asked to create a Tag.

The screenshot shows the AisDecoder interface. On the left is the 'Summary' window with a table of AIS messages. In the center is an 'Input Field' dialog box titled 'Enter Tag' with a text input field containing 'lat\_2' and 'OK'/'Cancel' buttons. On the right is the 'Detail Window' showing the decoded fields of a selected message.

Sentence	MMSI	Message Type	DAC	FI	ID	Vessel Name
IAIVDM	205099000	1				
IAIVDM						
IAIVDM						
IAIVDM						
IAIVDM						
IAIVDM						
IAIVDM						
IAIVDM						
IAIVDM						
IAIVDM						
IAIVDM	244384000	1				
IAIVDM	356562000	1				
IAIVDM	235069074	3				MAAS VIKING
IAIVDM	564134000	1				

Fragment No	1
Sequential Message ID	
Radio Channel	A
Payload	33P;NTU0000w5RjI
Fill bits * CRC check	0*0A
Received Time	28/10/2010 16:05:3
<b>Vessel Name</b>	MAAS VIKING
AIS Message Type	3
Repeat Indicator	0
MMSI	235069074
Navigation Status	5
Rate of Turn (ROT)	0
Speed Over Ground (SOG)	0.0
Position Accuracy	0
Longitude	-0.199532
Latitude	53.637660
Course Over Ground (COG)	131.0

If you click OK you will see the Tag in both the [Field and Tags](#) and the [Tags and Range](#) table. By default the Tag name has \_2 appended signifying it has the value in the second column of the Detail Window. If you wished to have the descriptive name "Latitude" output and clicked the first column, the default Tag would be lat\_1, Likewise if you wished the formatted Latitude "53° 36.9981' N" to be output and clicked the third column, the default Tag would be lat\_3.

The same default Tag name can be generated by differing AIS message types, only you know whether this is the required behaviour. For example Latitude is not necessarily the position of a vessel, it could be defining an area (see AIS message type 22).

It is more likely you will wish to have the latest value of Latitude to be Output when the vessels position is available from more than one message type (see AIS message types 1,2,3). In this case you will need to set a Field Tag for all three message types (1,2 and 3), in each case give the Tag the same name say "lat".

There will be three separate entries in the [Fields and Tags](#) table, but only the one in the [Tags and Range](#) table. You can alter the Tag name before (but not after) you click OK in the Input Field box above.

All differing Tags you have created in the Field and Tags list, will be put in the Output Tags and Range list.

See also [Tagging -Overview](#), [Selecting Output Fields](#), [Deleting Tags](#), [Outputting Fields and Tags](#), [Template Files](#)

## Vessel Names

AisDecoder will extract the vessel name for all AIS messages received which may contain the vessel name - even if the message containing the vessel name is



excluded by the input filter.

The vessel name list is re-started each time the Decoder is started and is updated every time a message containing the vessel name is received. This ensures the vessel name you see is the name that is currently being transmitted.

If you require the vessel name on every CSV or Tagged output (and you probably will), you must tag the vessel name that is displayed next to the Vessel Name in bold, immediately before AIS Message Type on every Detail AIS message type you select for other field tags.



AIS Detail	171.123.45.6789 (171.123.45.6789)
Vessel Name	<b>123456789</b>
AIS Message Type	1

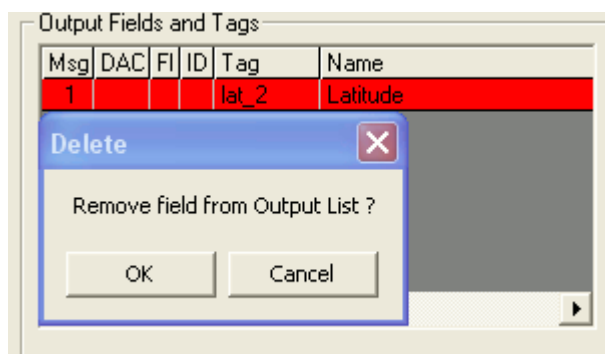
This vessel name is displayed on every AIS message detail, if it has been received, including other AIS message types.

Do not Tag the second Vessel Name (not in bold) on the static data message (AIS message type 5), unless you **only** want the vessel name outputting when AIS message type 5 is output.

See also [Creating Tags](#),

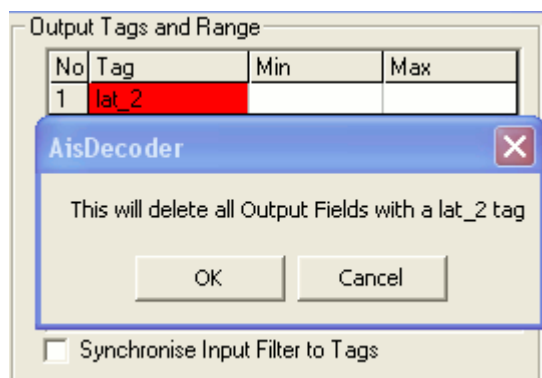
## Deleting Tags

To delete a **Field** Tag, click on the Tag in the Fields and Tags list. You cannot edit the tag, you must delete and re-create the Tag.



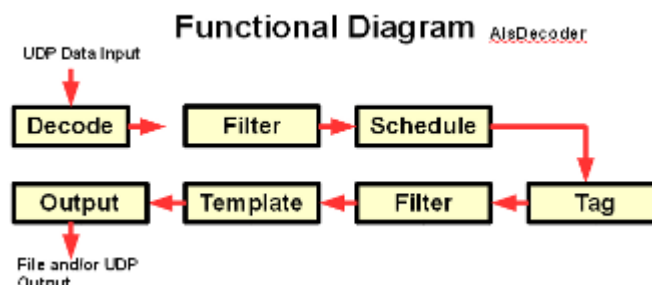
All differing Tags you have created in the Field and Tags list, will be put in the Output Tags and Range list.

You can delete an Output Tag and all Fields with the same Tag, by clicking on the Tag name in the Output Tags and Range list.



See also [Tagging -Overview](#), [Selecting Output Fields](#), [Creating Tags](#), [Outputting Fields and Tags](#)

## Output Template Files



Any tags you have defined will be replaced in the Template with the value of the tag when the Vessel is output to the Tagged Output File. For example if in the Template file you have added a tag <lat>, <lat> will be replaced with the value for the Vessel, so if the latitude of the Vessel was 53.1234, <lat> would be replaced with 53.1234.

The Maximum and Minimum Range values may be inserted into the Tagged Output File by using the tag name with `_min` or `_max` appended. For example if the minimum latitude range for the <lat> tag was 53.0, <lat\_min> would be replaced with 53.0.

A Special Tag <IconHeading> is created, if GIS has been ticked on output, which will contain the ships Heading (HDG) if it is available, otherwise it will contain the vessels Course Over Ground (COG), this is because some vessels do not output heading and it enables the Icon on GIS displays to be oriented to the COG rather than the Heading (HDG). This conforms to IALA Guidelines on Presentation.

All tags are case sensitive.

The Tag token delimiters are normally < and > however if you are outputting an XML file an XML parser will fail because the tokens will not have a closing tag. You may use the alternative delimiters [ and ]. If you do you must not intermix < with ] because the template file will be scanned to determine which delimiter you are using and will only recognise one type either <> or [].

See also [Tagging -Overview](#), [Selecting Output Fields](#), [Creating Tags](#), [Deleting Tags](#), [Outputting Fields and Tags](#)

## Output Range Filtering

You can set a valid output range for any Tag.

Detail		
Description	Value	Value Description
Creation Time Local	29/01/2017 12:20:33	
Creation Time Unix UTC	1485692433	29/01/2017 12:20:33
<b>Nmea Sentence</b>	IAVDM,1,1,,A,13aGuuh	
Received Time UTC-Unix	29/01/2017 12:20:29	1485692429
Speed Over Ground (SOG)	6.5	Knots
Position Accuracy	1	high (<=10m)
Longitude	4.6634	4° 39.806' E
Latitude	51.8901	51° 53.407' N
Course Over Ground (COG)	270.4	
True Heading (HDG)	511	
Time Stamp	27	amp
Manoeuvre Indicator	0	
Spare	0	
RAIM Flag	1	RAIM in use

Right Click on the Min or Max cell for the Tag for which you wish to filter the range.

AIS Payload	13aGuuhP11PEE2PMc	168 bits (21 8-bit words)
<b>Yes</b> Input Field		
AIS		Class A (Scheduled)
Rep		
MM		
MID		Kingdom of the)
Nav		g engine (Rule 23(a) or
Rate		ation available (default)
Spe		
Position Accuracy	1	high (<=10m)
Longitude	4.6634	4° 39.806' E
Latitude	51.8901	51° 53.407' N
Course Over Ground (COG)	270.4	° (degrees)

Click on the Output Tags and Range Min or Max column for the Tag on which you wish to set a range,

Output Tags and Range			
No	Tag	Min	Max
1	mmsi		
2	rcvtime		
3	vesselname		
4	lat	53.8	54.6
5	lon	-0.3	0.3
6	course		
7	speed		

Edit Tag Output Filter	
Min value	
lat - Min	53.8
OK	Clear
Cancel	

Enter the Minimum, Maximum or both for the Tag.

If Range Filtering is selected as an Output Option, only those MMSI's passing the range check will be output.

If any range is blank, the range check will pass.

You can insert the minimum or maximum Range value into a Tagged Output File.

All Tags are listed in the Output Tags and Range list.

This shows a list of those you will most probably want to output for GIS. Note for all vessels the corresponding Field Tag list will contain approx 50 Tagged Fields.

If using tagged output, Synchronise ensures the decoder will process all messages containing output tags and not process redundant messages not containing tags.

See also [Tagging -Overview](#), [Selecting Output Fields](#), [Creating Tags](#), [Deleting Tags](#), [Outputting Fields and Tags](#), [Template Files](#)

### Range Filtered Tagged Output

No	Tag	Min	Max
1	mmsi		
2	rcvtime		
3	vesselname		
4	lat	53.8	54.6
5	lon	-0.3	0.3
6	course		
7	speed		

☒ Synchronise Input Filter to Tags

You can set a valid output range for any Tag.

No	Tag	Min	Max
1	mmsi		
2	rcvtime		
3	vesselname		
4	lat	53.8	54.6
5	lon	-0.3	0.3
6	course		
7	speed		

Edit Tag Output Filter

Min value

lat - Min53.8

OKClearCancel

Click on the Min or Max cell for the Tag for which you wish to filter the range.

Enter the Minimum, Maximum or both for the Tag.

If Range Filtering is selected as an Output Option, only those MMSI's passing the range check will be output.

If any range is blank, the range check will pass.

You can insert the [minimum or maximum Range](#) value into a Tagged Output File.

## Range Filtered NMEA Output

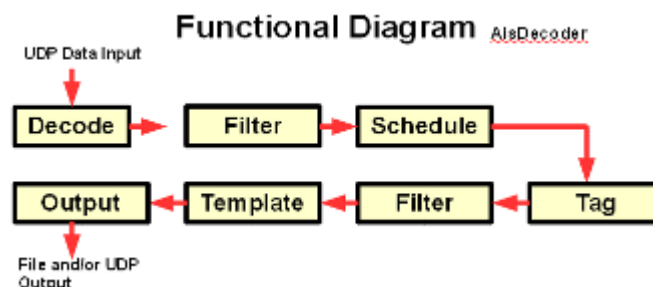
Extracting Tag values and Range filtering must be done by MMSI because you may select tags or ranges which span two different AIS message types. For example, you may choose to output a vessel's position (AIS message type 1,2 or 3) and at the same time the vessel's length (AIS message type 5). The position is on one message type and the length on another. As it is very unlikely both messages will arrive together, neither message will be output if both position AND length are required for output.

The primary reason the Scheduler exists is to resolve this problem. The Scheduler retains the most recent message, of each message type, for the "Time to Live", outputting them in batches of the same MMSI.

Range Filtered NMEA Output		
Output Range Filtered	Scheduled	Output
No	No	As received
No	Yes	In MMSI order
Yes	No	Output Range is checked when MMSI changes. Either all or no sentences with the same MMSI are output
Yes	Yes	In MMSI Order, Output Range is checked when MMSI changes. Either all or no sentences with the same MMSI are output

See also [Output Range Filtering](#), [NMEA Output Format](#)

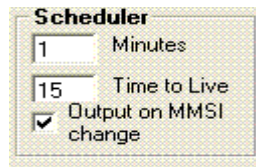
## Scheduling Output



The functional diagram above shows the longest path messages may take before being output. Dependant on your options, messages may miss any or all of the possible stages.

The Scheduler outputs messages in batches at timed intervals in MMSI number order. This allows the data from different AIS message types to be combined together by Vessel. For example, static vessel data such as Length, Beam, Call Sign are transmitted in a different message and at different intervals to navigational

data such as Latitude, Longitude. Speed or Course.



The data from these different messages are combined together in one decoded output for the one vessel, which could be one line of CSV data, or one entry in a tagged file.

AIS messages are held in the Scheduler's buffer for a fixed time, the default being 15 minutes. If you are plotting a vessel's position using any GIS system, the vessel will remain on the GIS display for 15 minutes after the last position message was received for any given vessel.

If you are outputting tagged fields, the value of the latest tagged field will be output.

The Output Filter test is normally applied to all the data pertaining to the same MMSI in a block, so all the data for the one vessel is output or no data for the vessel is output.

This behaviour causes a problem if a log file, with no time stamps, is processed by the Scheduler because all the messages for the same MMSI will appear to have been received at the same time. The result is only the last message will actually be output. This behaviour can be changed by unticking the [MMSI change](#) box, so all complete messages are processed individually, even for the same MMSI.

See also [Options - Scheduler](#)

## Miscellaneous

This folder contains Miscellaneous Topics

## NMEA GPS Sentences

The NMEA sentences which are decoded (V145 Feb 2017) are

\$GPZDA	GPS Date & Time	Time Stamp
\$GPGGA	GPS Fix Data	Position
\$GPRMC	GPS GNSS Data	Time & Position
\$PGHP	Proprietary Message GH Internal	Time Stamp
\$AITAG	Marine Com Proprietary AIS Message	Time Stamp

!AIALR Set Alarm State

Encapsulated NMEA - Used by me

!AIABM AIS Addressed Binary Message

!AIABM AIS Broadcast Binary Message

The default tags are the type of NMEA sentence (eg \$GPZDA).

Note if trying to output tag values (including CSV), the Tag Value is only output when the MMSI changes, as GPS sentences will not have a MMSI, you will not get any output until an AIS sentence with an MMSI is output, unless the MMSI change option is unticked.

As with all tagged output, the decoder will only output the latest Tag value, if more than one message with the same Tag has been received, since the previous Tag was output.

If you require to see all messages, you should use NMEA output.

## Start Up Command Options

### Syntax

"C:\Program Files\Arundale\Ais Decoder\AisDecoder.exe" anoption/anotheroption

Note there is a space between exe" and option

Command Line Options	
Option	Description
/start	To automatically start decoding on startup
/nowindow	To start the decoder without any windows
/ini=full path and filename	To specify a specific startup initialisation file
/minimise or /minimize	To Start the decode in the system tray

### Example

To start the decoder without any windows (so you can use it as a server)

"C:\Program Files\Arundale\Ais Decoder\AisDecoder.exe" start/ini="C:\Documents and Settings\username\Application Data\Arundale\Ais Decoder\Settings\MyFile.ini"/nowindow

## User Profiles

If you are the only user on your PC and you installed AisDecoder you do not need to worry about Profiles.

When the Ais Decoder Setup program is run these files (which I have included to to "start you off") are now placed into the "All Users" profile.

default.ini	Initial Startup File
aspx.ini	Microsoft IIS ASPX Web server Output
CsvAll.ini	Outputs all fields (decoded) of all AIS messages to a file
CsvUdpTags.ini	Outputs selected fields (decoded) to local a UDP Server (eg a GIS program such as OpenCPN)
Excel.ini	Outputs selected fields as an Excel file
GoogleEarth.ini	Outputs a KMZ file and uploads to a Web server that displays the data on Google Earth
GoogleMaps.ini	Outputs a KML file and uploads to a Web server that displays the data on Google Maps
Html.ini	Outputs a HTML files that will display a formatted list on a Web browser
opencpn.ini	Outputs UDP data for a vessels in a given area to OpenCPN
spnmea.ini	Outputs decoded NMEA data that can be inputted to ShipPlotter
UdpTagsRange.ini	Outputs decoded data that is range checked

The **first** time AisDecoder is run by any user, **all** files currently existing in "\All Users\Application Data\Arundale\AisDecoder" are copied to "Current User\Application Data\Arundale\AisDecoder". This will include all the above list of sample files as well as any additional files the Administrator may have placed in the All Users profile.

Although the Current User does have access to their own files, by default, files in \Application Data\ are hidden, unless you are an Administrator.

If the current user requires directory access to any of the AisDecoder folders or files, create a shortcut in the user's "My Documents".

After re-installing a new version of AisDecoder (or you have Administrator privilege), when you first run the new version, you will be prompted as to whether you require any of the above sample files which differ from those in your own profile, being overwritten.

If you are not an administrator, they will be overwritten anyway.

The first time a user runs a new version, default.ini is always overwritten in the Current Users profile.

Any user who is not an Administrator, will not be able to access the Options



Window so can only change settings on the Control/Stats Window, and cannot save these settings and will not be prompted on exit.

The uninstaller will only remove the downloaded files (in All Users), the "Current User" files will be automatically removed if you delete the "Current User" profile.

## Binary Messages

The International Binary Messages are still evolving, all the common ones I believe I have decoded. St Lawrence Seaway, Inland Waterways and most ITU/IMO will be decoded by the program. To see which, [click here](#).

Many binary messages are subject to local interpretation. Potentially there are many thousands of different binary messages possible. I have decoded many of the more common ones, where I can find the requisite information. If you have details of any of the DAC/FI messages types where I do not display at least some of the information, I would be pleased to receive more details.

The format of binary messages are becoming more complex and because they have to be individually programmed, some can take a considerable time to program the decode. If you have a specific requirement for an as yet undecoded message, please let me know.

## Output Character Encoding

Characters are output using the normal 7 bit ASCII codes (32-127) for printable characters

All decoded data (Column 2 in the Detail Window) uses these codes.

Formatted Data (Column 3 in the Detail Window) may use the codes in the table 1 below

Table 1 - Decoded Character Set				
Character	English	ASCII Code	Output Code	Comments
°	Degree Sign	176	176	
‰	Per Thousand	137	137	Not used
%%	Per Thousand	037,037	%%	Is Used for clarity

Table 2 and table 3 contain the characters that will be replaced in any Tagged Data prior substitution tags in the template file. No substitution is carried out if a Template file is not being used.

### Table 2 - HTML, HTM, XML, ASPX Character Replacements

Character	English	ASCII CODE	Output Code	Comments
°	Degree Sign	176	&#176;	
‰	Per Thousand	137	&#8240;	
&	Ampersand	038	&amp;	Reserved in XML
<	Less than	060	&lt;	Reserved in XML
>	Greater than	062	&gt;	Reserved in XML
"	Quote	034	&quot;	Reserved in XML
'	Apostrophe	039	&apos;	Reserved in XML

**Table 3 - Additional KML, KMZ Character Replacements**

Character	English	ASCII CODE	Output Code	Comments
=	Equals	061	&#061;	Reserved in Google Earth

### Example UDP CSV output with one tag set

Output Fields and Tags						Output Tags and Range			
Msg	DAC	FI	ID	Tag	Name	No	Tag	Min	Max
1				lon_3	Longitude	1	lon_3		

### Template file is not used because output is CSV

UDP

☒ UDP Output

☒ Display Output

☐ NMEA ☐ +Time Stamp

☒ CSV ☐ Delimiter

☐ Tagged ☐ GIS Filtered

☐ Scheduled

☐ Range Filtered

UDP Output

81.137.214.195 IP

39421 Port

UDP Output [81.137.214.195:39421]

```

0° 29.0190' E
0° 10.1100' E
2° 3.7066' E
0° 16.1879' W
0° 30.4474' E
0° 16.2370' W
0° 17.5000' W

```

## HEX Dump

```

00000000  30 80 20 32 39 2E 30 31 39 30 27 20 45 0D 0A 30  0. 29.01 90' E..0
00000010  80 20 31 30 2E 31 31 30 30 27 20 45 0D 0A 32 B0  . 10.110 0' E..2.
00000020  20 33 2E 37 30 36 36 27 20 45 0D 0A 30 B0 20 31  3.7066' E..0. 1
00000030  36 2E 31 38 37 39 27 20 57 0D 0A 30 B0 20 33 30  6.1879' W..0. 30
00000040  2E 34 34 37 34 27 20 45 0D 0A 30 B0 20 31 36 2E  .4474' E ..0. 16.
00000050  32 33 37 30 27 20 57 0D 0A 30 B0 20 31 37 2E 35  2370' W. .0. 17.5
00000060  30 30 30 27 20 57 0D 0A  000' W..

```

If Tagged output was selected - template file would be used

UDP

☒ UDP Output

☒ Display Output

☐ NMEA ☐ +Time Stamp

☐ CSV ☐ Delimiter

☒ Tagged ☐ GIS Filtered

☐ Scheduled

☐ Range Filtered

UDP Output

81.137.214.195 IP

39421 Port

If Template file only contains <lon\_3> and NOT named HTML, HTM, XML, ASPX, KML or KMZ  
Output would be the same as above.



If same Template file WAS named HTML, HTM, XML, ASPX, KML or KMZ  
Output would be



## HEX Dump

```

00000000  30 26 23 31 37 36 38 20 31 30 2E 39 34 38 38 26  0°&#176;; 10.9488&
00000010  61 70 6F 73 38 20 57 0D 0A 30 26 23 31 37 36 38  apos;; W. .0&#176;;
00000020  20 31 31 2E 39 37 33 30 26 61 70 6F 73 38 20 57  11.9730 &apos;; W
00000030  0D 0A 30 26 23 31 37 36 38 20 31 35 2E 36 37 35  ..0&#176 ; 15.675
00000040  32 26 61 70 6F 73 38 20 57 0D 0A 30 26 23 31 37  2&apos;; W..0&#17
00000050  36 38 20 34 33 2E 32 31 33 30 26 61 70 6F 73 38  6; 43.21 30&apos;;
00000060  20 45 0D 0A 30 26 23 31 37 36 38 20 33 34 2E 31  E..0&#1 76; 34.1
00000070  30 33 36 26 61 70 6F 73 38 20 45 0D 0A 30 26 23  036&apos ; E..0&#
00000080  31 37 36 38 20 32 2E 38 37 35 30 26 61 70 6F 73  176; 2.8 750&apos
00000090  38 20 45 0D 0A  7; E..

```

## Configuring Google Earth

I have provided sufficient links to enable you to use all Google Earth's facilities,

however I have kept the examples as simple as practicable. I am no expert using Google Earth and have no intention of being so! It is up to you to make the alterations to change and improve the output formatting to provide the visual display you wish. For example you can change the default icon for a ship.



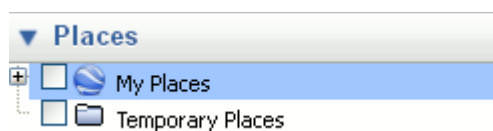
You can configure Google Earth to display your vessels' automatically when it starts.

The file can be on your PC, a PC on the local network or a file on the internet.

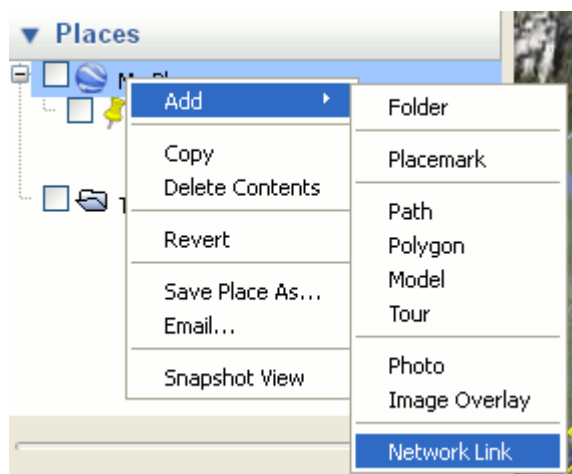
You can also set up Google Earth to refresh the view at intervals.

Google Earth will normally zoom-in to the area containing your vessels.

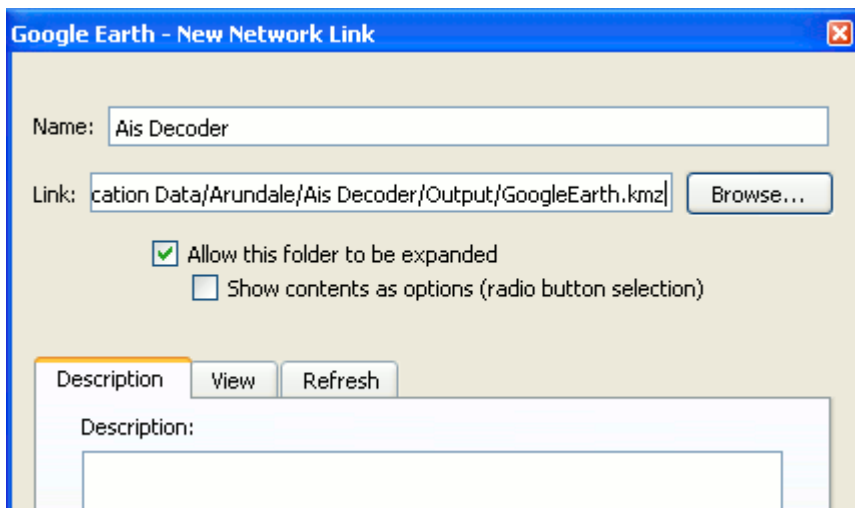
### **Setting up Google Earth to Automatically refresh the vessels**



#### **Right Click My Places**



#### **Select Network Link**

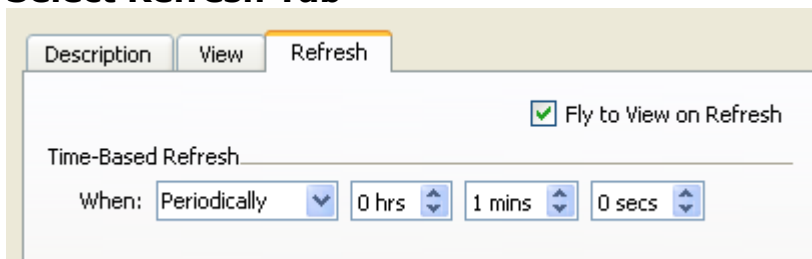


**Insert Name:** Ais Decoder

**Browse for the link and select \Output\GoogleEarth.kmz**

If you are uploading the file to a Web Server, you can display the page from the internet by inserting the URL of the Web Server page to display.

**Select Refresh Tab**

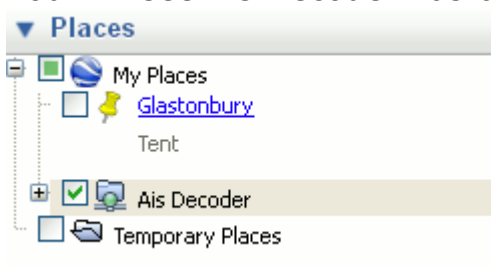


**Tick Fly to view on refresh**

**Set Periodically 1 minute**

**Click OK**

You will see Ais Decoder has been added to my places.



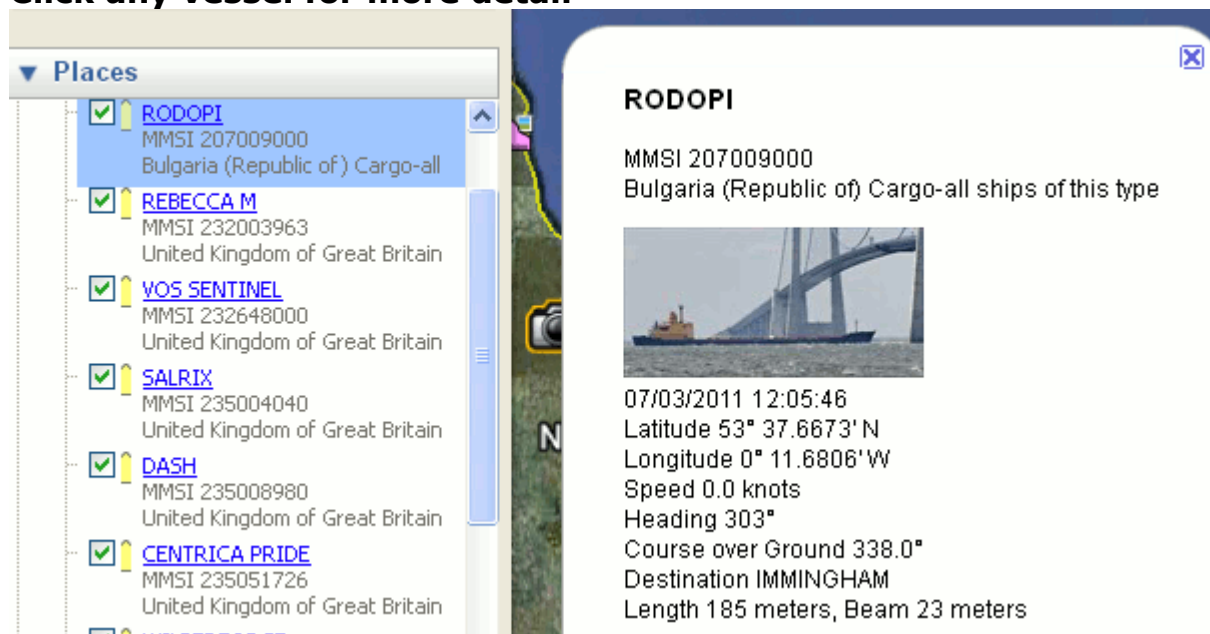
Google Earth will update your vessel's position (from the Output File) every minute.

**To stop displaying your vessels, untick the box**

**To list the vessels expand Ais Decoder (click the +)**



**Click any vessel for more detail**



## **To alter the display format of Vessels**

On the Tools Option select Properties

For example to change this size of the vessel names

Tools > Options > 3D View > Choose 3D font

Select the required font size

## **Notes**

If when Google Earth "Flies" it displays the whole earth, it is probably caused by a vessel with no Latitude or Longitude being output because:-

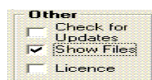
1. An error in the Template File
2. The GIS box in Options is not ticked.

## **See also**

[Google Earth - Setting](#)

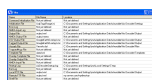


## Files and Directories



If you tick Show Files on the Options Window, you will see the file names and locations of all current files in use.

Note that not all files are used all the time, as it depends what you are doing and will not be created unless required, and some files are for my use only.



## Filter by Range from MyShip

### Outputting Decoded Data – a brief introduction.

Decoded data can be formatted in 3 basic ways.

1. Every field of every sentence is output as CSV by setting the Output Option to CSV.
  2. You can restrict the number of fields output by creating tags, for each type of sentence, in which case only those fields which have been mapped to a named tag will be output, as a CSV record.
  3. You can create a Template file which contains the tags. These tags will be substituted with the relevant values when the template file is output.
- In addition you can set a minimum and maximum value for any tag. The decoded data will only be output if ALL min & max conditions have been met.

### Vessel Range Filtering

The last Position if received from either OwnShip or OtherShip is cached by MMSI. The cached Positions are retrieved by means of Tags. The values of these tags can be seen on the Detail display for the MMSI. The MyShip values are displayed at the bottom of the detailed display after the MyShip data has been received.

The Range from MyShip is calculated as the Great Circle Distance between MyShip Lat/Lon and the From MMSI Lat/Lon.

MMSI of distance TO is determined by

!AIxxx (with any talker ID – eg VDM) Sentences containing a from Lat/Lon which are:-

- |       |                                  |
|-------|----------------------------------|
| 1,2,3 | Position Report                  |
| 4,11  | Base Station                     |
| 9     | Standard SAR Position Report     |
| 17    | GNSS                             |
| 18    | Standard Class B Position Report |
| 19    | Extended Class B Position Report |
| 21    | AtoN Position Report             |
| 27    | Long Range Position Report       |

MyShip position is determined from any of the above !AIVDO sentences.

Because the sentence that is decoded is the received sentence, the Range is the

distance from the received from MMSI and MyShip.

To not generate a distance from say Base Stations, or AtoNs these messages should be filtered out using the input filter. Even if these messages are filtered out, the last position of the Received From MMSI is still cached. Therefore if a message is received from a MMSI that does not contain a Position report (eg Message 5), the Range reported will be the range when the previous position was last reported. In this case the Age of the last position will be -ve (if the last position of MyShip was after the last position of OtherShip). This can be confusing, but AisDecoder has to deal with data from a log file not real-time data. With real-time data the age is from the current time, so the age will always be +ve, with a log file the OtherShip's position can be more recent than the time MyShip's position is logged.

If MyShip or OtherShip's position is not known, the Range is assumed to be 0.000 Nm.

The Minimum Range is 0.001 Nm. If the minimum range tag is set to 0.001, the Range test fails, therefore MyShip will also fail as the Range will be 0.000 so the ! AIVDO sentence will not be output.

A message containing a position report within the Min & Max range set on Options > Output Tags and Range > myshiprange\_2 will be output.

Change the Min or Max Range by Left Clicking on the appropriate Min or Max range box on Options > Output Tags and Range > myshiprange\_2.

If a message from an MMSI does not contain a position report, the last position report from the same MMSI (if any) is assumed to be the last position.

If a Position Report from a MMSI has not been previously received and the current sentence does not contain a position report (eg Message 5 – Static and voyage related data). the current sentence will not be output. The previous position report must be within the permitted range.

You can delete any CSV output Tag and all linked Fields by Options > Output Tags and Range > Left Click required Tag.

You set up new Message fields and linked Tags by On the Summary display Click on any vessel with the required AIS message No

This will display the Detail of the decoded message then Left Click on the Cell (Line & Column) of the data for which you wish to create a Tag and Link to the Tag. This will create both a Tag (if it does not already exist) and a link from the message field to the Tag.

### **Sample Initialisation File**

This initialisation file (was Aida.ini) uses method 2 above for outputting the decoded data.

To use this file you should download [RangeFromMyShip.ini.zip](#), saving the .ini file (within the zip archive) in the same folder as your other [initialisation files](#).

I have set up the Input Filter to only allow Vessel type messages, Red are not included

1,2,3    Position Report



- 4,11 Base Station
- 9 Standard SAR Position Report
- 17 GNSS
- 18 Standard Class B Position Report
- 19 Extended Class B Position Report
- 21 AtoN Position Report
- 27 Long Range Position Report

The File Output (unselected) when input into Excel is as below

Note the heading line is prefixed with a tilde (~) the enable the heading to be filtered out if processing the output file into a database

### Sample Output (using RangeFromMyShip.ini)

~MMSI	Received Time	Vessel Name	Latitude	Longitude	Course Over Ground (COG)	Speed Over Ground (SOG)	IMO Number	True Heading HDG
246346000	20130824 15:28:07	CAPEWATER	54.38634	-0.21023	322	12		
235003560	20130824 15:28:12	NORDSTRAND	54.30748	-0.26755	142.1	11.1		
246346000	20130824 15:28:16	CAPEWATER	54.38673	-0.21076	321.9	12		
235003560	20130824 15:28:21	NORDSTRAND	54.30719	-0.26717	142.2	11.1		
246346000	20130824 15:28:25	CAPEWATER	54.38713	-0.21129	321.5	12		
235003560	20130824 15:28:31	NORDSTRAND	54.30674	-0.26658	142.6	11.1		
246346000	20130824 15:28:36	CAPEWATER	54.38763	-0.21195	321.1	12		
246346000	20130824 15:28:37	CAPEWATER					9423841	
235003560	20130824	NORDSTRAND	54.30628	-0.266	143	11		

15:28:42

24634600 2013082  
4  
0 CAPEWATER 54.38802 -0.2125 320.2 12  
15:28:45

This can easily be changed by adding or deleting Tags

The UDP output is in the same format, excepting there is no Header and the Delimiter is changed.

Note that Range Filtering must be enabled for the range selected for the tags to be actioned.

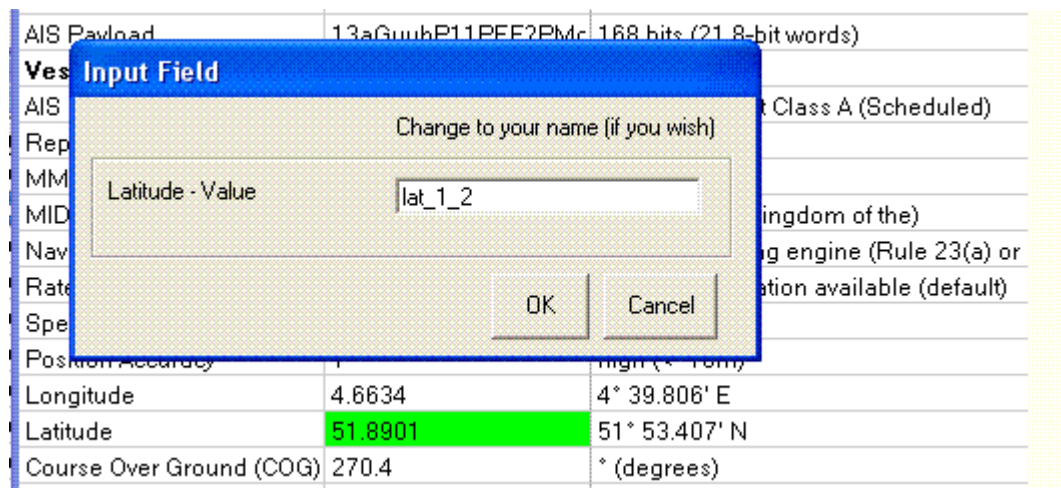
Hopefully the rest of the settings are either not used or pretty obvious.

### Shell on File Close

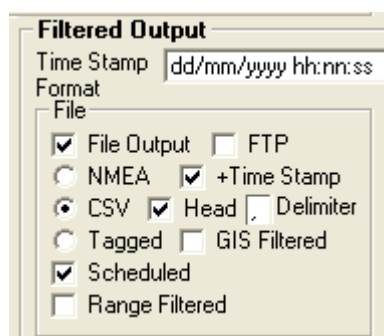
If you have problems with the "shelling", could send me a copy of the startup log file and the shell command file.

To insert decoded data into a database you need to:

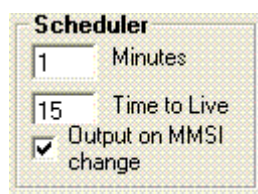
1. Create a Tag for the and data field you require in your data base



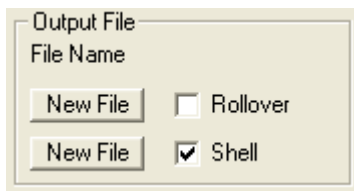
2. Create a Csv output file



3. Schedule the Output



4. Set the Output file to execute a Shell command on close



Keep it simple by using Arundale\Ais Decoder\Settings for the .ini files and Arundale\Ais Decoder\Output for Output files including Shell command and script files (because they will likely be using/creating output files).

### Example 1

The example initialisation file (shell.ini) defaults to the Shell file shellcommand.cmd in %appdata%\Arundale\Ais Decoder\Output. You can change this by clicking New File.

The actual location of %appdata% can be found by → Run a command shell (start/Run, then "cmd") and type "set appdata"

The sample command file (shellcommand.cmd) contains

**cmd.exe /C "copy "output.csv" "output copy.csv""**

The sample command file (shellcommand.cmd) runs the command string interpreter (cmd.exe) which copies the output file to a renamed file.

The Process Directory (the directory of the command prompt) is the same at the directory containing the Shell File. This is to keep the dos prompt in the same security context as the user. You will need to create your own command file containing your script to insert the appropriate records into your database.

Cmd.exe should be used as the command string interpreter (dos prompt).

/K keeps the console open after executing the command, when debugged it should be changed to /C, which will close the console after execution of the shell has completed.

Note the Shelled process runs synchronously so AisDecoder will be stalled until the shell completes. This is required in order the for the output file not to be re-opened by AisDecoder before the shell process has finished processing the output file.

### Example 2

A second example demonstrates how to name output files after they have been created by timestamping the file. The initialisation file Shell\_vbs.ini is used.

The file shellcommand\_vbs.cmd demonstrates how to run a script (in this case VBS). Place this file in the %appdata%\Arundale\Ais Decoder\Output folder.

The file contains

**cmd.exe /C "logfiledate.vbs"**

and executes the VBS script file within the DOS shell context.

Place the VBS script file (logfiledate.vbs) in the same folder as the .csv file it is copying.

The .vbs file contains a script to copy the output file (output.csv), immediately after it is closed (normally by the scheduler), to output\_yyyymmdd\_hhmmss.csv. This may appear rather complicated but is required in order for internationalisation formatting issues to work properly.

You could use any other scripting language if your PC supports it to for example make an entry into a database

**Further information** can be found below.

The Shell uses the windows [CreateProcess api](#)

The Security context is as the calling program.

Command string interpreter [CMD.exe](#)

More commands [Command Shell Overview](#)

[Download Sample Files](#) in ShellOnFileClose.zip

File	Place in Folder
shell.ini	%appdata%\Arundale\Ais Decoder\Settings
shellcommand.cmd	%appdata%\Arundale\Ais Decoder\Output

shell_vbs.ini	%appdata%\Arundale\Ais Decoder\Settings
shellcommand_vbs.cmd	%appdata%\Arundale\Ais Decoder\Output
logfiledate.vbs	%appdata%\Arundale\Ais Decoder\Output

For simplicity, keep the Command file in the same folder as the output file

## NMEA & AIS Message Time Stamping

Because there is no global standard for Time Stamping NMEA messages, a number of different systems are being used to both position a time stamp within an NMEA data stream as well as the actual format of the time stamp itself.

### Time Stamp Format

There are 2 fundamental formats

1. Plain Date/Time eg **3 September 2013 11:22:33** This could be in any acceptable local format **3/9/13 11:22:33** (European) **9/3/13 11:22:33** (American) **20130903 112233** (Maritime)
2. Unix format eg **1382564803** This is the number of seconds past 1-Jan-1970

In addition there is potential confusion if Local Time rather than UTC is used for the displayed Date/Time

### Time Stamp Positioning

1	Basic AIS sentence without time stamp	!AIVDM,1,1,,A,13P;JOh02kC:SehNt493:R`h0D03,0*7F
2	Appended to NMEA sentence	! AIVDM,1,1,,A,13P;JOh02kC:SehNt493:R`h0D03,0*7F, <b>18/11/2013 15:39:38</b>
3	Prefixed to NMEA sentence	<b>1382054400</b> ! AIVDM,1,1,,A,13P;JOh02kC:SehNt493:R`h0D03,0*7F
4	Embedded in NMEA sentence eg (ExactEarth)	\$PGHP,1, <b>2013,9,30,22,18,33,15,316</b> ,2,316000002,1AIS _S,7F*02
5	Included in NMEA Comment Block (OrbComm)	\s:rEV01, <b>c: 1382054400</b> *58\! AIVDM,1,1,,A,13P;JOh02kC:SehNt493:R`h0D03,0*7F

6	2 Unix Time stamps appended to NMEA	!AIVDM,1,1,,A,13P;JOH02kC:SehNt493:R`h0D03,0*7F, <b>1382054402,1382054400</b>
7	Prefixed in proprietary format (SAAB)	<b>2014-01-23T12:00:00Z</b> ;!BSVDM,1,1,,A,13bJ@R00000AQIrMH;?eM1I405Kd,0*53
8	Encapsulated NMEA (CLS/Argos)	\$AITAG <b>1402560214</b> ,2272 !AIVDM,1,1,,A,15Mqdu0P00JdGf0G@E>h0?w20>`<,0*5C

### Time Stamp Processing by AisDecoder

The Time Stamp is displayed as the Received Time UTC. AisDecoder attempts to identify a time stamp included in the NMEA AIS sentence, in the following order.

1. From the Comment Block
2. From a NMEA sentence Prefix
  1. Using a date formatted using the Windows Locale of the PC
  2. A Numeric date in Unix time (Format 3 above)
  3. Using the proprietry Format 7 above
3. From the last word added after the CRC check
  1. Using a date formatted using the Windows Locale of the PC (Format 2 above)
  2. A Numeric date in Unix time (Format 6 above)
4. Using the Current UTC date/time assuming the Windows Locale of the users PC

If the data is networked across time zones this will be the time the data is received by the PC.

The Locale of the PC is used to (for example) differentiate between American and European date formatting (2/7/14 – 2nd July or February 7th ?).

### Background to AIS Time Stamping

< b=""> AIS was developed purely for Collision Avoidance at Sea, and became mandatory as part of the SOLAS (Safety of Life at Sea) regulations which through the IMO (International Maritime Organisation) regulate world wide all vessels at sea.

As such AIS is a real time system, supplementing radar. It was never intended to be used for monitoring and tracking, therefore it does not contain any built in time stamp. The CURRENT position of other vessels in immediate proximity of Own Ship is the only relevant data.

It is only users that are trying to use AIS data for purposes other than it's prime purpose of Collision Avoidance that are looking for TimeStamps.

Time Stamps are normally added when a user receives data broadcast by a AIS transponder on a vessel. There is no standard as to how this time stamp is added, it is up to individual manufacturers to decided how (in their receivers) they wish to time stamp the data received.

Note: the Seconds in some AIS message fields is not a time stamp. It is used to organise the transmission of AIS data from the various vessels within range of one another without each vessel transmitting data at the same time. Many position reports do not contain this field, it depends on the state the transponder is in when it wished to transmit data. If you wish for a more detailed explanation see ITU R-REC-M.1371.

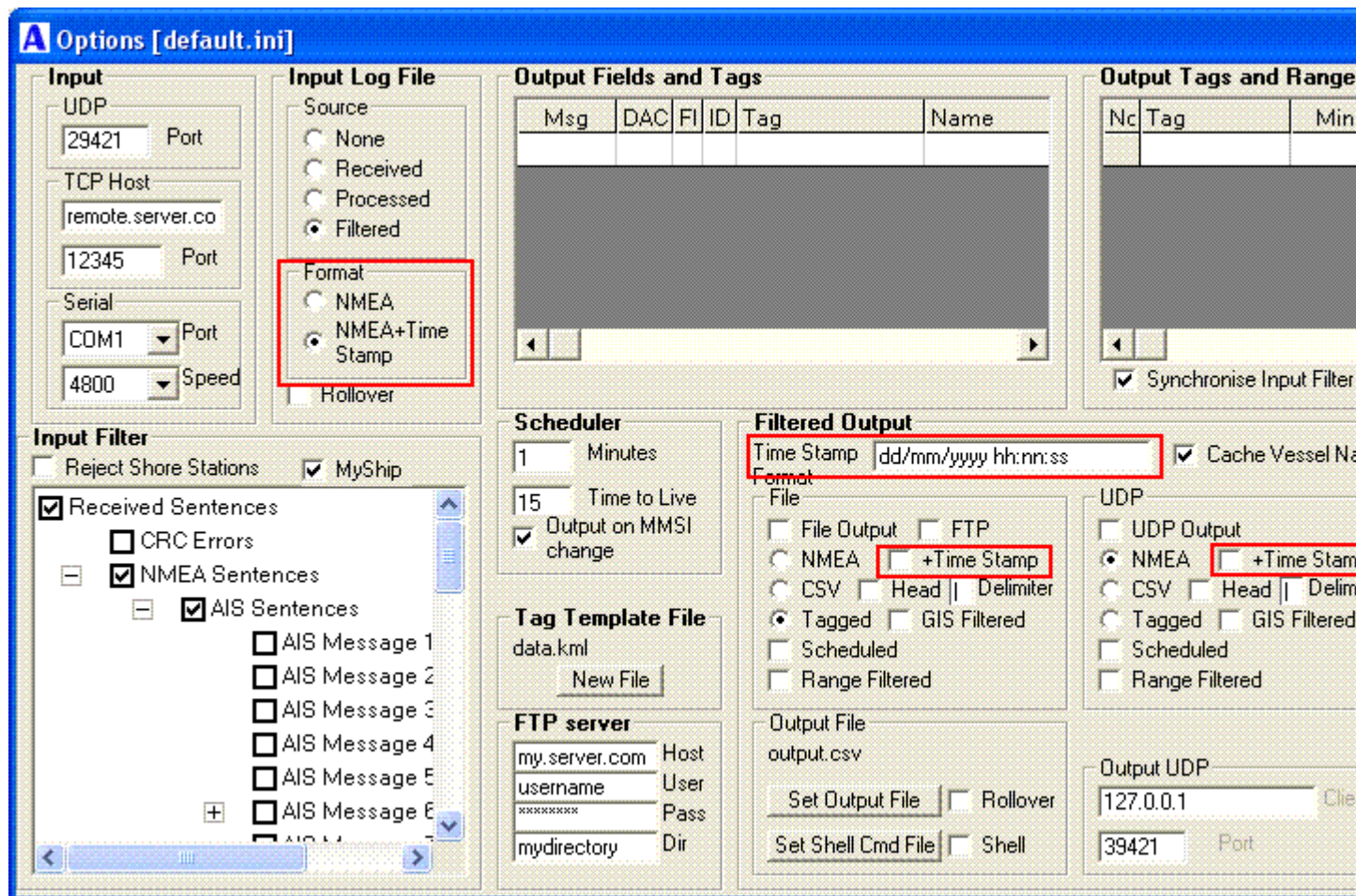
To build a pathway of vessels' positions you need accurate time stamping added by the AIS receiver. In the case of satellite data, the satellite is the receiver so you have to go with the satellite provider's method of time stamping. If you were receiving real-time data you could add the time stamp yourself, but as satellite data from all AIS satellites presently in use has to be download in batches when the satellite is in range of a ground station, so the basic time stamping must be done by the receiver in the satellite.

Comment Blocks are a relatively new addition to the NMEA specification - they are NEVER transmitted, the receiver has to add a comment block.

Very few receivers will be adding comment blocks at the moment, but clearly their use is expected to grow as it is the first real attempt at introducing a standard way of adding time stamps.

I have also been asked numerous times - Can the time stamp encoded within some AIS messages be used. These time stamps are used purely by the AIS system to allocate/deallocate the slots used by the system, they are not complete stamps and cannot in practice be usefully used. They are likely to cause more confusion.

Before you ask (!) there is no chance of time stamps being transmitted in the future as bandwidth is far more important, in any case a time stamp can always be added by the receiver rather than the transmitter. The time delay between transmission and reception is irrelevant.



By default AisDecoder appends a time stamp as the sentence is received. This time stamp is always held internally as UTC. If you use local time, on daylight saving time changes, you will either duplicate or lose a complete hour.

See also [Output Format Date & Time](#)

## Glossary

Here are some simplistic acronyms/definitions used in AIS

Glossary		
ITU	International Telecommunication Union	Allocates the radio spectrum and sets standards
IALA	International Association of Lighthouse Authorities	Standards for navigation and pilotage
AIS	Automatic Identification of Ships	
UAIS	Universal AIS	Extended AIS - principally binary messages (USA)
NMEA	National Marine Electronics	Standards for communication between wired

	Association	electronic ship device
RAIM	Receiver Autonomous Integrity Monitoring	AIS Receiver monitors electronic position fixing device
DSC	Digital Selective Calling	Selectively call one (or many) station from another station
TDMA SOTDMA ITDMA CSTDMA RATDMA FATDMA	Time Division Multiple Access Self Organising TDMA Incremental TDMA Carrier Sense TDMA Random Access TDMA Fixed Access TDMA	It allows for large numbers of transmitters to share one single narrow band radio channel, by synchronizing their data transmission to an exact timing standard (GPS) There are a number of different methods used to allocate and synchronise "slots". A Slot is a time slice used by the transmitter and receiver of the data.
GNSS	Global Navigation Satellite System	Any type of GPS system
MMSI	Maritime Mobile Service Identifier	Unique number to identify a ship or coast radio station
EPFD	Electronic Position Fixing Device	eg GPS
DTE	Data Terminal Equipment	Ais tx/rx & associated equipment
SAR	Search and Rescue	
SART	Search and Rescue Transponder	Automatic Emergency Beacon
CRC	Cyclic Redundancy Check	Checks integrity of Nmea message
MID	Maritime Identification Digits	The part of the MMSI identifying the home Country or base area
tx/rx	Transmitter/Receiver	
IAI	International Application Identifier	Binary Message header consisting of the DAC and the FI
DAC	Designated Area Code	Geographic area for the binary application (1=international, normally the MID)
FI	Function Identifier	Type of binary message



IEC	International Electrotechnical Commission	Electrical Standards, in particular for AIS inter-equipment NMEA formatted messages
ENI	European Vessel Identification Number	Unique European inland waterways vessel identification number (similar to MMSI)
EMMA	European Multiservice Meteorological Awareness system	Standards for weather warnings & symbols
GIS	Geographic Information System	Any system for plotting data on a map - eg Google Maps, Google Earth
IP	Internet Protocol	The most commonly-used set of rules for dispatching data across a large computer network
IP Address	Internet Protocol Address	A computer's address under the Internet Protocol, above, in the format xxx.xxx.xxx.xxx
TCP	Transmission Control Protocol	A way of transferring data between computers, guaranteeing error free delivery.
UDP	User Datagram Protocol	A simpler way than TCP of transferring data, error free delivery is not guaranteed.
TCPIP	TCP + IP	A set of rules used to transmit/receive data normally on the internet
DNS	Domain Name System	Translates domain names meaningful to humans into the numerical IP addresses
FTP	File Transfer Protocol	A way of transferring files between computers (from a Host (server) to a Client)
Host		A supplier (server) of data
Client		A consumer (user) of data