<h1 style="text-align:center">Notes on significant Changes since V112</h1>

<p style="text-align:center">No details of these changes are in the help files</p>

If upgrading from prior to V118 please backup all your initialisation files (.ini in \settings folder)

From V117 my website has been moved from my own webserver at arundale.co.uk to a commercial web provider on the domain nmearouter.com. When I have sorted some issues with the new web server provider, I will be moving it again to my arundale.com domain.

This change has meant a number of links have had to be changed which are within the program as well as scripts for generating my email address, which has also changed, although my current email address will continue to be re-routed to my new address.

Changes to tags
Tags are used by almost all users requiring decoded output to either a file or network. They are also used to identify decoded data fields which users require filtering.

Because the AIS sentence (when transmitted) has no provision for including a time stamp, there has been a number of requests for AisDecoder to handle data fields that are contained within NMEA sentences that are not AIS sentences, in particular GPS sentences containing time stamps.

The use of networked AIS data by shore stations is increasing. This data often contains sentences that originate from a number of different sources which may or may not include an embedded time stamp that has been inserted by the shore station originally receiving the data from the transmitting vessel.

When I originally wrote AisDecoder (2009), it was designed to decode the payload (encoded) part of the NMEA sentence containing the AIS specific data. The tags were used to identify data fields contained in the payload part of the sentence and was not designed to handle the NMEA fields outside the payload.

Similarly the input filtering was designed to filter data contained within the payload.

From V118 the tags can be generated from any NMEA field including non-AIS sentences and fields contained within the NMEA comment block.

These changes affect both the generation of the tags and input filter, particularly if your setup requests synchronisation of the input filter to the tags.

It has also required some detailed changes to the initialisation files. Although I have attempted to convert an "old" format initialisation file to the new format when the file is first loaded, I may not have been successful in all cases. I therefore strongly recommend you backup any old format files you are using before reading the file into V117 or later as when you save the file, or AisDecoder does this silently for you, your old file could get overwritten. The new format file may or may not later work with an earlier version of AisDecoder, it depends on exactly what settings are in use in your initialisation file.

It is also possible an old format file, even when loaded, does not work as expected. If this occurs you may need to remove the existing tags and re-create them from the detail display.

Use of Tags- Logical Names
You should be able to set up a unique tag for any NMEA field of Payload Field.
When you create a tag from the detail display, AisDecoder creates a unique internal (physical) tag for the field. This tag is NOT the same as the logical name you give to the tag. AisDecoder generates a default physical name for the tag which you can change when you create the tag by altering the default logical name before you click OK on the "Input Field" display. Note you cannot edit the logical name later, you must delete the tag and re-create it with the new name.

If after filtering any sentence contains data which matches your (logical) tag name, the value associated with your tag name is updated.

Example 1
Ais message type 1,2,3 and 18 both contain Latitude and Longitude. If you wish to output the latest position for both Class A and Class B vessels in the same Output field (eg same column on a spreadsheet), you should change the default name to the same logical name for Latitude (eg Lat) for all 4 message types, similarly a different name for Longitude (eg Lon).

Example 2
Ais Message 23 contains a box defined by 2 Latitudes and 2 Longitudes
In the case it would be nonsensical to combine the latitudes and longitudes in 2 logical names, even though the default generates 2 names, you need to rename the default name to your own logical name.

Default Name	Logical Name	Description
Lon_2	Lon_NE	NE longitude
Lat_2	Lat_NE	NE latitude
Lon_2	Lon_SW	SW longitude
Lat_2	Lat_SW	SW latitude

Use of Tags-Values

Each logical tag has only one value associated with the tag.
The value of the tag is set when a valid filtered sentence containing a tag is received.
The value is cleared when the tag value is output.

Example 1
If you are outputting individual sentences to a CSV file.
The tag value will be cleared each time a complete sentence is output. If the sentence is a multi-part AIS sentence this will be when the last part has been output for this Sequential Message ID.

Example 2
If you are using Scheduled Output with output on MMSI change set.
The tag value will be cleared when the latest sentence containing the tag for this MMSI is older than the Time To Live.

Time Stamps
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 Field Position

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,18/11/2013 15:39:38

3   Prefixed to NMEA sentence
    1382054400 !AIVDM,1,1,,A,13P;JOh02kC:SehNt493:R`h0D03,0*7F

4. Embedded in NMEA sentence
    $PGHP,1,2013,9,30,22,18,33,15,316,2,316000002,1AIS_S,7F*02

5. Included in NMEA Comment Block (note this actual data does not comply with the IEC61162 spec)
    \s:rEV01,c: 1382054400*58\!AIVDM,1,1,,A,13P;JOh02kC:SehNt493:R`h0D03,0*7F

6. 2 Unix Time stamps appended to NMEA sentence
    !AIVDM,1,1,,A,13P;JOh02kC:SehNt493:R`h0D03,0*7F,1382054402,1382054400

The changes made to the tags enable any of these time stamps to be tagged and hence extracted to an output file.

Input Filter Changes
In order to enable tagging fields other than AIS payload fields, the input filter has been changed.

All the sample initialisation files have been changed to use the new format.

The fields common to all AIS payloads can set up once for all AIS sentence types, previously these had to be repeated for each AIS sentence type.
These Fields are AIS Message type, Repeat Indicator, Originating MMSI, MID

Decoded NMEA sentences $GPZDA, $GPGGA, $GPRMC and $PGHP have been added to the input filter.

Other NMEA sentences will be added to the input filter if Synchronise Input Filter to Tags is ticked and a NMEA Sentence field is tagged.

If a from MMSI is specified, the AIS payload is only partially decoded, speeding up the filtering when very large log files are filtered for specific vessels.

Multi-Part AIS Sentences
Because NMEA sentences are limited to a maximum length of 82 characters, an AIS payload may be split over more than one NMEA sentence. AisDecoder recombines the split payload into a single AIS payload.
The AIS specification contains a very simple way of checking which NMEA sentences contain the relevant parts of the same payload. Most of the time this works well, but in the event of one of the relevant parts missing or being separated by other multi-part NMEA sentences, it can be impossible to reconcile which NMEA sentences to recombine. This is becoming an increasing problem when data is networked from a number of different sources. I have changed the algorithm to reduce the likelihood of this being done incorrectly.

The NMEA comment block is currently treated as being part of the prefixed sentence. As yet I have not implemented handling Groups

The $PGHP sentence is treated as encapsulating the following NMEA sentence only.

Generation of NMEA GPS sentences ($GPGLL) from AIS sentences (!AIVDM)
AisDecoder can generate GPS sentences from AIS sentences. If you wish to do this in order to display AIS data from a moving AIS transponder to a GIS plotter, please email me and I'll explain how to do this.

You can use AisDecoder to spoof OwnShips position using this technique, in order to emulate the view on an onboard chartplotter, for example an inshore lifeboat. would see on board; a chart plotter expects to see !AIVDO sentences. A better solution is to use NmeaRouter which will spoof !

AIVDO OwnShip messages at 3 second intervals.

Filtering by Range from OwnShip
!AIVDO sentences are now detected as being MyShip. This allows the output to be filtered by range from MyShip, so you may for example eliminate vessels further than a few miles being output.

Shell on Output File Close
Shell on Output File Close function added to enable another program to process the output file.
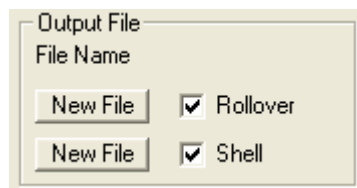
This is currently being tested, please contact me if you wish to use this added functionality. (V119)

Output Range Filtering (V123)
The Range refers to the Max & Min values set on Options > Output Tags and Range. It is not the distance of the vessel from OwnShip.
If you set a Range for the vessels position (Latitude and/or Longitude) on any AIS sentence type and tick the Range Filtered box, the Range Filter will now be applied to all output. The vessels position is taken as the last position received for the MMSI being output.
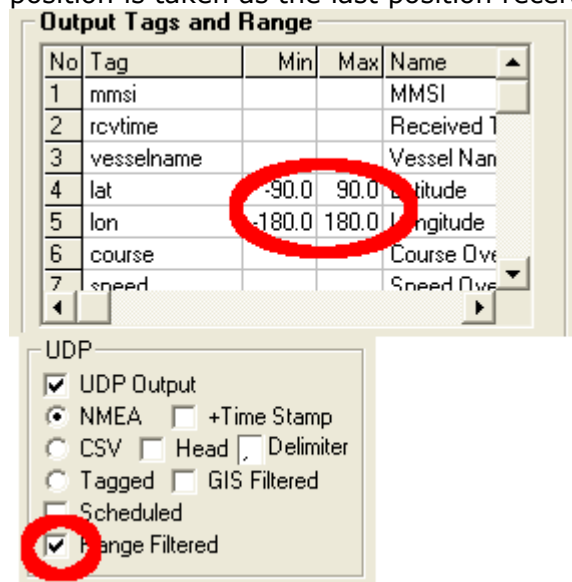
The all AIS messages output are checked against the last position report received for the MMSI of the vessel sending the AIS message being output.
The last position received is taken for ALL messages received, even if the message has been rejected by the Input Filter.

In the above example you would need to set the lat/lon max and min to the required values to delimit the box containing the vessels you wished outputting.

Range Filtering by Lat/Lon is applied for all Output - NMEA, CSV or Tagged, Scheduled or Unscheduled. It may be selected or not selected separately for File or UDP output.

NMEA Output (V123)
Prior to V123 you could not filter using Tags and output NMEA without using the Scheduler.
From V123 NMEA can now be filtered and output without using the Scheduler.

OpenCPN V3.2.2
The functionality of OpenCPN in both handling of AIS messages and Input options has been greatly expanded.
OpenCPN now accepts UDP input, which is the simplest method to use to pass data from AisDecoder to OpenCPN, and eliminates the requirement to use Virtual Comm Ports (VCP) to send data from

AisDecoder to OpenCPN.
The AisDecoder installation package now includes a sample initialisation file OpenCPN.ini

CSV Output further explanation
There are two methods of outputting CSV.
1.   You can output all message fields (in column 2 of the detailed display) as CSV
2.   You can output only those fields which are relevant to your application. These may be any field (row or column) of the detailed display.

Option 1 is unlikely to be useful because both different messages and the same message can contain different numbers and content of each field, which may depend on the content of other fields in the messages. This requires any program processing the CSV file to understand the message content. It does however enable you collect the entire decoded message.
If the CSV file is imported into a spreadsheet, the same column will contain different data fields, also, the same data fields may be in different columns.

If NO tags are defined, method 1 will be output, if one or more tags are defined, method 2 will be used.
To output (as CSV) only selected fields you need to set up Tags for all required fields.

Maximum File Sizes
Because of 32 bit address limit the maximum permitted file sizes were initially limited to around 2 GB. The huge increase in volumes of AIS data has required file size handling to be increased to approx 400 Terra Bytes. This was introduced from V131

Maximum Speed of Processing
The basic decoding speed is around 200k sentences/min on a 2GHz PC. However this speed will be degraded dependant on the amount of additional work the PC is requested to undertake by additional settings. In particular displaying output can seriously degrade the speed. The easiest way to understand cause and effect of various settings is to use the Windows Task Manager to monitor the CPU performance. There is also a limit to the amount of data that can be received on a network connection. TCP is not necessarily slower than UDP because the data is transmitted in larger blocks.