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**,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 (ExactEarth)
$PGHP,1,**2013,9,30,22,18,33,15,316**,2,316000002,1AIS_S,7F*02

5. Included in NMEA Comment Block (OrbComm)
\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**

7. Prefixed in proprietary format
2014-01-23T12:00:00Z; !BSVDM,1,1,,A,13bJ@R00000AQIrMH;?eM1l405Kd,0*53

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
   (a) Using a date formatted using the Windows Locale of the PC
   (b) A Numeric date in Unix time (Format 3 above)
   (c) Using the proprietry Format 7 above
3. From the last word added after the CRC check
   (a) Using a date formatted using the Windows Locale of the PC (Format 2 above)
   (b) 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 ?).

Overview
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.

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.