St. Lawrence Seaway AIS Data Messaging Formats and Specifications

Harmonized with U.S. Coast Guard PAWSS
AIS Messages

Revision 4.0A

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Revision History

Document Version	Description
1.0 (all versions)	Internal draft, Not publicly released
2.0 (all versions)	Internal draft, Not publicly released
3.0 (all versions)	Initial draft release, Seaway specific messages
4.0 (April 25, 2002)	Revised all messages to harmonize with USCG PAWSS AIS messages
4.0A (May 9, 2002)	Corrections: Page 6, changed text to read “If there is more than six station readings,... Section 7, Page 15, Main table - corrected bit count on table Section 7.2, Page 16, Example – corrected Function ID in example Section 8.1, Page 18, Example – Corrected Function ID in Example Section 9, Page 19, put the two reserved bits between App ID and Function ID Section 12, Page 21, Hydro message – corrected spare bit count from 14 to 16 Section 12, Page 23, Revised Vessel Procession Order Message

St. Lawrence Seaway AIS Data Messaging Formats and Specifications

Table of Contents

1 Introduction

1.1 Message Structure

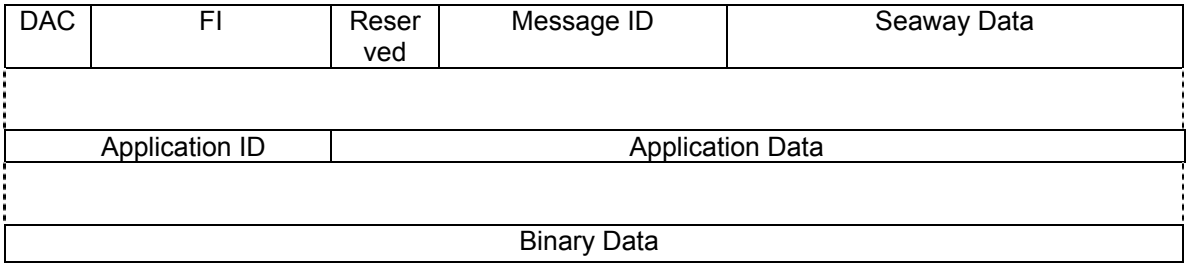
All Saint Lawrence Seaway AIS messages defined in this specification (except for the safety related text messages in Section 10) are transmitted as either Broadcast or Addressed Binary messages. The message data formats defined in the following sections make up the "binary data" parameter of ITU-R M.1371 messages 6 and 8. A description of the proposed AIS sentence formats used to interface to the AIS transponder presentation port is found in Annex B of IEC 61993-2 or IEC PAS 6112-100.

Messages transmitted within the border of the United States shall have a Designated Area Code (DAC) of 366. A DAC of 316 shall be used for transmissions that originate within the border of Canada.

Except for the safety related messages, as discussed in Section 10, the Function Identifier (FI) for all transmitted Seaway messages shall be:

Function Message Type	Function Identifier (FI)
Metrological and Hydrological	1
Vessel/Lock Scheduling	2
Seaway Specific Messages	32

Individual message types shall be identified by the Message ID field following the Application Identifier.



1.2 Broadcast Intervals

Each individual Seaway message has an assigned update interval established by the Seaway Traffic Management System (TMS). However, the AIS network may elect to retransmit any messages, system resources permitting, at more frequent intervals.

1.3 Location Fields

All binary messages include a location field (latitude and longitude in WGS-84 datum). The position designates the general or specific area for which the message data is applicable. For example, weather information messages specify the location of the actual weather sensor used as the data source. The position field for some message types may define an arbitrary point in the vicinity of the applicable area. For example, a lockage order message will include a latitude and longitude near the lock, but not necessary at center of the lock chamber.

The location fields are intended to provide a reference point for the data in the messages so that the information may be represented geographically with appropriate symbology. How this data is represented on electronic chart display systems is left to the discretion of the developers (at least until an agreed upon standard is developed for “marine information object” display).

2 Common Message Fields

The following message fields are commonly found in more than one Seaway messages.

2.1 Application Identifier

Parameter	Number of bits	Description
Designated Area Code	10	The Designated Area Code will be 366 for the United States or 316 for Canada depending on the location of transmitter. Refer to Section 1.1 for description
Function Identifier	6	Function Identifier, See Section 1.1
Total number of bits	16	

2.2 UTC Time

Parameter	Number of bits	Description
Month	4	Month of year (01- 12 Month); 0 = not available; 13-15 not used
Day	5	Day of month (01 – 31 Days); 0 = not available
Hours	5	UTC Hours (0-23); 24 = not available; 25-31 not used
Minutes	6	UTC Minutes (0-59); 60 = not available; 61-63 not used
Total number of bits	20	

All time-referenced information, including month, day and time of sensor reading observations, will be expressed in Coordinated Universal Time (UTC).

Example: May 29, 12:34AM

Month				Day					Hour					Minute					
0	1	0	1	1	1	1	0	1	0	0	0	0	0	1	0	0	0	1	0
5				29					00					34					

3 Wind Information Message

Parameter	Number of bits	Description
Application ID	16	DAC = 316 or 366; FI = 1; See Section 2.1
Reserved	2	
Message ID	6	Message Identifier = 2 (00 0010 in binary)
Binary Data	Max 864	From 1 up to 6 wind information reports, each structured as defined in Section 3.1
Total Number of bits	Max 888	= 24 + N*144 N Total Bits (Slots Required) 1 168 bits (2 slots) 2 312 bits (2 slots) 3 456 bits (3 slots) 4 600 bits (4 slots) 5 744 bits (4 slots) 6 888 bits (5 slots)

3.1 Wind Information Report

Parameter	Number of bits	Description
Timetag	20	Month, Day and Time of measurement, See Section 2.2
Station ID	42	Seven 6-bit ASCII character ID
Longitude	25	Longitude in 1/1000 minute (±180 degrees, East = positive, West = negative. 181 degrees = not available)
Latitude	24	Latitude in 1/1000 minute (±90 degrees, North = positive, South = negative. 91 degrees = not available)
Wind Speed	10	Average Wind Speed in 1/10th Knot (0-102.2 knots, 1022 = 102.2 kts or greater, 1023 = not available)
Wind Gust	10	Wind Gust in 1/10th Knot (0-102.2 knots, 1022 = 102.2 kts or greater, 1023 = not available)
Wind Direction	9	Quantized to 16 compass points (Seaway only); See Section 3.1.1
Reserved	4	Reserved for future use
Total Number of bits	144	

Notes:

Wind information is gathered from anemometers at various Seaway facilities; this information is updated every 15 minutes.

The wind speed is derived from averaging the instantaneous readings over a 15-minute interval.

Wind gust represents the highest wind speed measured over 15 minutes.

Each wind information message may contain up to six station readings. If there are more than six station readings, additional messages shall be generated.

Wind information from all sensors is transmitted to users throughout the entire Saint Lawrence Seaway AIS network.

3.1.1 Wind Direction Quantization

Wind direction will be quantized to represent 16 compass points for Saint Lawrence Seaway Stations.

Parameter	Number of bits	Description
Direction	9	Direction, 0-359 degrees, 511 = not available For Saint Lawrence Seaway, refer to table below for descriptions of quantized values.
Total Number of bits	9	

Direction Value	Description
0	N
23	NNE
45	NE
68	ENE
90	E
113	ESE
135	SE
158	SSE
180	S
203	SSW
225	SW
248	WSW
270	W
293	WNW
315	NW
338	NNW

3.2 Example: Wind Information Message

Designated Area Code										Function Id						Res.		Message Id					
0	1	0	0	1	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0
316										1						0		2					

Timetag																				…			
0	1	0	1	1	1	1	0	1	0	0	0	0	0	1	0	0	0	1	0	0	1	0	1
5				29					00					34						“T”…			

…Station Id…																							
0	0	0	0	0	1	0	1	0	1	0	0	1	1	0	1	0	1	0	0	1	1	0	0
…“T”				“E”					“S”					“T”						“1”…			

…Station Id														Longitude…									
0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1
…“1”				“ ”					“ ”					27° 05’ E…									

…Longitude															Latitude…								
1	0	0	1	0	1	1	1	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1
…27° 05’ E															5° 05’ N…								

…Latitude															Wind Speed…								
0	1	0	0	1	1	1	0	1	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0
…5° 05’ N															3.2 Knots								

…	Wind Gust										Wind Direction									Reserved			
0	0	0	0	0	1	0	1	0	0	0	1	0	0	1	0	0	1	0	1	0	0	0	0
…	4.0 Knots										293 Degrees									0			

4 Weather Station Message

Parameter	Number of bits	Description
Application ID	16	DAC = 316 or 366; FI = 1; See Section 2.1
Reserved	2	
Message ID	6	Message Identifier = 1 (00 0001 in binary)
Binary Data	Max 768	Message contains 1 to 4 weather station reports, each structured defined in Section 4.1
Total Number of bits	Max 792	= 24 + N*192 N Total Bits (Slots Required) 1 216 bits (2 slots) 2 408 bits (3 slots) 3 600 bits (4 slots) 4 792 bits (5 slots)

4.1 Weather Station Report

Timetag	20	Month, Day and Time of measurement, See Section 2.2
Station ID	42	Seven 6-bit ASCII character ID
Longitude	25	Longitude in 1/1000 minute (±180 degrees, East = positive, West = negative. 181 = not available)
Latitude	24	Latitude in 1/1000 minute (±90 degrees, North = positive, South = negative. 91 = not available)
Wind Speed	10	Speed in 1/10th Knot; 0-102.2 knots, 1022 = 102.2 kts or greater, 1023 = not available
Wind Gust	10	Gust in 1/10th Knot; 0-102.2 knots, 1022 = 102.2 kts or greater, 1023 = not available
Wind Direction	9	Direction in degrees; 0-359 degrees, 511=NA
Atmospheric Pressure	14	Expressed in 1/10th millibars. (16383 = not available)
Air Temp	10	Temperature in 1/10th of a degree Celsius (signed) (-511 to 511 valid range, -511 = -51.1°C or less, 511 = 51.1°C or greater, -512 = not available)
Dew Point	10	Temperature in 1/10th of a degree Celsius (signed) (-511 to 511 valid range, -511 = -51.1 °C or less, 511 = 51.1°C or greater, -512 = not available))
Visibility	8	Visibility in 1/10 kilometers. (0-254, 254 = 25.4km or greater, 255 = not available)
Water Temp	10	Temperature in 1/10th of a degree Celsius (signed) (-511 to 511 valid range, -511 = -51.1 °C or less, 511 = 51.1°C or greater, -512 = not available)
Total Number of bits	192	

Notes:

The Weather Station Reports are station observations from the National Data Buoy Center (NDBC). Typically, the information is updated once every hour. Depending on climatic conditions, traffic controllers at the Massena, New York Vessel Traffic Control Center may provide weather condition updates at a more frequent update interval.

The Seaway AIS network will broadcast the following NDBC stations for the Saint Lawrence River:

- Superior Shoals, NY — Station Identifier: SUPN6
- Thousand Island Bridge, NY — Station Identifier: THIN6
- Alexandria Bay, NY — Station Identifier: ABAN6

Please refer to the National Data Buoy Center web site at the following address for additional information.

http://seaboard.ndbc.noaa.gov/overview.shtml

The Weather Station Messages are transmitted to users throughout the entire Saint Lawrence Seaway AIS network.

4.2 Example: Weather Station Message

Designated Area Code										Function Id						Res.		Message Id					
0	1	0	0	1	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
316										1						0		1					

Timetag																				…			
0	1	0	1	1	1	1	0	1	0	0	0	0	0	1	0	0	0	1	0	0	1	0	1
5				29					00					34						“T”…			

…Station Id…																							
0	0	0	0	0	1	0	1	0	1	0	0	1	1	0	1	0	1	0	0	1	1	0	0
…“T”			“E”					“S”						“T”						“1”…			

…Station Id														Longitude…									
0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1
…“1”			“ ”					“ ”						27° 05’ E…									

…Longitude															Latitude…								
1	0	0	1	0	1	1	1	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1
…27° 05’ E															5° 05’ N…								

…Latitude															Wind Speed…								
0	1	0	0	1	1	1	0	1	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0
…5° 05’ N															3.2 Knots								

…	Wind Gust										Wind Direction									…			
0	0	0	0	0	1	0	1	0	0	0	1	0	0	1	0	0	1	0	1	1	0	0	1
…	4.0 Knots										293 Degrees									…			

…Atmospheric Pressure										Air Temp										Dew Point…			
1	1	0	0	0	1	0	0	0	0	1	1	1	1	1	1	1	1	1	0	1	1	1	1
1000 millibars										-0.2°C										…			

…Dew Point						Visibility								Water Temp									
1	1	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	1	1	1	0	0
…-1.2°C						0.9 Km								6.0°C									

5 Water Level Message

Parameter	Number of bits	Description
Application ID	16	DAC = 316 or 366; FI = 1; See Section 2.1
Reserved	2	
Message ID	6	Message Identifier = 3 (00 0011 in binary)
Binary Data	Max 864	Message contains 1 to 6 water level reports, each structured as defined in Section 5.1
Total Number of bits	Max 888	= 24 + N*144 N Total Bits (Slots Required) 1 168 bits (2 slots) 2 312 bits (2 slots) 3 456 bits (3 slots) 4 600 bits (4 slots) 5 744 bits (4 slots) 6 888 bits (5 slots)

5.1 Water Level Report

Timetag	20	Month, Day and Time of reading, See section 2.2
Station ID	42	Seven 6-bit ASCII character ID
Longitude	25	Longitude in 1/1000 minute (±180 degrees, East = positive, West = negative. 181 degrees = not available)
Latitude	24	Latitude in 1/1000 minute (±90 degrees, North = positive, South = negative. 91 degrees = not available)
Water Level Type	1	0 or 1; 0 = Relative to reference datum , 1 = Water Depth , Note: Always 0 for Saint Lawrence Seaway
Water Level	16	Water level in centimeters -327.67 to +327.67 meters, -32767 = -327.67 m or less, +32767 = +327.67 m or greater, -32768 = not available
Reference Datum	2	Defines datum used 0 = MLLW 1 = IGLD-85 2,3 = reserved for future use Note: Always 1 for Saint Lawrence Seaway
Reserved	14	Reserved bits for future use
Total Number of bits	144	

Notes:

Readings are updated once every hour. Information from available water level sensors will be broadcast throughout the Saint Lawrence Seaway.

Water level readings at the Saint Lawrence Seaway are based on the 1985 - International Great Lakes Datum (IGLD-85).

5.2 Example: Water Level Message

Designated Area Code										Function Id						Res.		Message Id					
0	1	0	0	1	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1
316										1						0		3					

Timetag																				…			
0	1	0	1	1	1	1	0	1	0	0	0	0	0	1	0	0	0	1	0	0	1	0	1
5				29					00						34					“T”…			

…Station Id…																							
0	0	0	0	0	1	0	1	0	1	0	0	1	1	0	1	0	1	0	0	1	1	0	0
…“T”			“E”					“S”						“T”						“1”…			

…Station Id								Longitude…															
0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1
…“1”			“ ”					“ ”						27° 05’ E…									

…Longitude															Latitude…								
1	0	0	1	0	1	1	1	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1
…27° 05’ E															5° 05’ N…								

…Latitude															T	Water Level…							
0	1	0	0	1	1	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
…5° 05’ N															0	0.32m…							

…Water Level								RD		Reserved													
0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
…0.32m								IGLD		0													

6 Water Flow Message (Seaway)

Parameter	Number of bits	Description
Application ID	16	DAC = 316 or 366; FI = 1; See Section 2.1
Reserved	2	
Message ID	6	Message Identifier = 6 (00 0110 in binary)
Binary Data	Max 864	Message contains 1 to 6 water flow reports, each flow report is defined in Section 6.1
Total Number of bits	Max 888	= 24 + N*144 N Total Bits (Slots Required) 1 168 bits (2 slots) 2 312 bits (2 slots) 3 456 bits (3 slots) 4 600 bits (4 slots) 5 744 bits (4 slots) 6 888 bits (5 slots)

6.1 Water Flow Report

Timetag	20	Month, Day and Time of reading, See section 2.2
Station ID	42	Seven 6-bit ASCII character ID
Longitude	25	Longitude in 1/1000 minute (±180 degrees, East = positive, West = negative. 181 degrees = not available)
Latitude	24	Latitude in 1/1000 minute (±90 degrees, North = positive, South = negative. 91 degrees = not available)
Water Flow	14	Water flow in cubic meters per second (16383 = Not Available)
Reserved	19	Reserved bits for future use
Total Number of bits	144	

Notes:

Flow information from sensors will be transmitted to users throughout the Saint Lawrence Seaway via the AIS network.

Water flow readings are updated once every hour and will be repeated over the network every 15 minutes.

6.2 Example: Water Flow Message

Designated Area Code										Function Id						Res.		Message Id					
0	1	0	0	1	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0
316										1						0		6					

Timetag																				…			
0	1	0	1	1	1	1	0	1	0	0	0	0	0	1	0	0	0	1	0	0	1	0	1
5				29					00					34						“T”…			

…Station Id…																							
0	0	0	0	0	1	0	1	0	1	0	0	1	1	0	1	0	1	0	0	1	1	0	0
…“T”			“E”					“S”						“T”						“1”…			

…Station Id														Longitude…									
0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1
…“1”			“ ”					“ ”						27° 05’ E…									

…Longitude														Latitude…									
1	0	0	1	0	1	1	1	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1
…27° 05’ E														5° 05’ N…									

…Latitude															Water Flow…									
0	1	0	0	1	1	1	0	1	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0
…5° 05’ N															8192 m^3/s…									

…Water Flow					Reserved																		
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
…8192 m^3/s					0																		

7 Lockage Order Message (Seaway)

Parameter	Number of bits	Description
Application ID	16	DAC = 316 or 366; FI = 2; See Section 2.1
Reserved	2	
Message ID	6	Message Identifier = 1 (00 0001 in binary)
Timetag	20	Month, Day and Time of Message, See Section 2.2
Lock ID	42	Seven characters in 6 bit ASCII. "@@@@@@@" = not available
Longitude	25	Longitude in 1/1000 minute (±180 degrees, East = positive, West = negative. 181 degrees = not available)
Latitude	24	Latitude in 1/1000 minute (±90 degrees, North = positive, South = negative. 91 degrees = not available)
Reserved	9	Reserved bits for future use
Lock Schedule	Min 120 Max 720	Each Lock Order Message contains up to 6 lock schedule reports structured as defined in Section 7.1
Total Number of bits	Min 264 Max 864	= 144+N*120 N Total Bits (Slots Required) 1 264 bits (2 slots) 2 384 bits (3 slots) 3 504 bits (3 slots) 4 624 bits (4 slots) 5 744 bits (4 slots) 6 864 bits (5 slots)

7.1 Lock Schedule Report

Parameter	Number of bits	Description
Vessel Name	90	15 characters in 6-bit ASCII. "@@@@@@@@@@@@@@@" = not available
Direction	1	TRUE = Up bound = 1, FALSE = Down bound = 0
ETA	20	Estimated time of arrival (format as defined in Section 2.2)
Reserved	9	Reserved bits for future use
Total Number of Bits	120	

Notes:

The Lockage Order Message contains schedule information for the next three lock operations. Two separate messages will be send for Locks with dual chambers, such as the Welland Canal flight locks.

The Lockage Order Message is a local binary broadcast message. Lockage order information is updated every 15 minutes. The transmission of this message is limited to areas where the information is applicable.

Lock Identifiers:

SLS_L01 - Welland Canal Lock 1
SLS_L02 - Welland Canal Lock 2
SLS_L03 - Welland Canal Lock 3
SLS_L4E - Welland Canal Lock 4 East
SLS_L4W - Welland Canal Lock 4 West
SLS_L6E - Welland Canal Lock 6 East
SLS_L6W - Welland Canal Lock 6 West
SLS_L07 - Welland Canal Lock 7
SLS_L08 - Welland Canal Lock 8
SLS_IRO - Iroquois Lock
SLS_IKE - Eisenhower Lock
SLS_SNL - Snell Lock
SLS_BO3 - Beauharnois Lock 3
SLS_BO4 - Beauharnois Lock 4
SLS_CSC - Cote Saint Catherine Lock
SLS_SLB - Saint Lambert Lock

7.2 Example: Lockage Order Message

Designated Area Code										Function Id						Res.		Message Id					
0	1	0	0	1	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
316										2						0		1					

Timetag																				…			
0	1	0	1	1	1	1	0	1	0	0	0	0	0	1	0	0	0	1	0	0	1	0	1
5				29					00					34						“T”…			

…Lock Id…																							
0	0	0	0	0	1	0	1	0	1	0	0	1	1	0	1	0	1	0	0	1	1	0	0
…“T”				“E”					“S”					“T”						“1”…			

…Lock Id														Longitude…									
0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1
…“1”				“ ”					“ ”					27° 05’ E…									

…Longitude															Latitude…									
1	0	0	1	0	1	1	1	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1
…27° 05’ E															5° 05’ N…									

…Latitude															Reserved									
0	1	0	0	1	1	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
…5° 05’ N															0									

Vessel Name…																							
0	0	1	1	0	1	0	0	1	0	0	1	0	0	1	1	0	0	0	0	1	0	1	
“M”					“I”					“L”					“K”								

…Vessel Name…																							
0	1	1	0	0	1	1	0	0	0	0	0	0	1	0	0	1	1	0	1	0	1	0	0
“Y”					“ ”					“S”					“T”								

…Vessel Name…																							
0	0	0	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0
“A”					“R”					“ ”					“ ”								

…Vessel Name																	D	ETA…					
1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	1	1
“ ”						“ ”						“ ”						U	May				…

																		Reserved					
1	1	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
…29th					00						34							0					

8 Estimated Lock Times Message (Seaway)

Parameter	Number of bits	Description
Application ID	16	DAC = 316 or 366; FI = 2; See Section 2.1
Reserved	2	
Message ID	6	Message Identifier = 2 (00 0010 in binary)
Timetag	20	Month, Day and Time of message, See Section 2.2
Vessel Name	90	15 character vessel name in 6 bit ASCII
Last Location	42	7 character identifier of last location in 6 bit ASCII
Last ATA	20	See Section 2.2
First Lock	42	7 character identifier of first lock in 6 bit ASCII
First Lock ETA	20	See Section 2.2
Second Lock	42	7 character identifier of second lock in 6 bit ASCII
Second Lock ETA	20	See Section 2.2
Delay	42	7 character identifier of the first lock which currently has a vessel being delayed
Reserved	4	
Total Number of Bits	366	(3 Slots)

Notes:

The Estimated Lock Time message is an addressed binary message sent to individually targeted vessels. Once the Seaway AIS network receives an acknowledgement from the intended vessel transponder (M.1371/A2-3.3.8.2.5 Message 7: Binary Acknowledge) indicating that the message has been received, no further transmissions will be issued. In addition, any change to the estimated lock times will result in the immediate transmission of the updated information.

8.1 Example: Estimated Lock Times Message

Designated Area Code										Function Id						Res.		Message Id					
0	1	0	0	1	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
316										2						0		2					

Timetag																				…			
0	1	0	1	1	1	1	0	1	0	1	1	0	0	0	1	1	1	1	0	0	0	1	1
May				29th						12						30				“M”…			

…Vessel Name…																							
0	1	0	0	1	0	0	1	0	0	1	1	0	0	0	0	1	0	1	1	0	1	1	0
…			“I”					“L”						“K”						“Y”…			

…Vessel Name…																							
0	1	1	0	0	0	0	0	0	1	0	0	1	1	0	1	0	1	0	0	0	0	0	0
…			“ ”					“S”						“T”						“A”			

…Vessel Name…																							
0	1	0	1	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0
…			“R”					“ ”						“ ”						“ ”			

…Vessel Name															Last Location…								
0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	1	0	0	1	1
…			“ ”					“ ”							“S”					“L”			

…Last Location…																							
0	0	0	1	0	0	1	1	0	1	1	1	1	1	0	0	1	1	0	0	1	1	0	0
…			“S”					“_”						“L”						“0”			

…Last Location								Last ATA…															
0	0	1	1	0	0	0	1	0	1	0	1	1	1	1	0	1	0	1	0	1	0	0	
…			“1”					May				29th						13				…	

…				First Lock…																			
0	0	0	0	0	1	0	0	1	1	0	0	1	1	0	0	0	1	0	0	1	1	0	1
…00				“S”						“L”						“S”						…	

…First Lock																						…	
1	1	1	1	0	0	1	1	0	0	1	1	0	0	0	0	1	1	0	0	1	0	0	1
“_”				“L”						“0”						“2”						…	

…First Lock ETA																				Second Lock…					
0	1	1	1	1	0	1	0	1	1	0	1	0	1	1	1	1	0	0	1	0	0	1	1
May				29th						13						30				“S”			

…Second Lock…																							
0	0	1	1	0	0	0	1	0	0	1	1	0	1	1	1	1	1	0	0	1	1	0	0
“L”						“S”						“_”						“L”					

…Second Lock												Second Lock ETA…											
1	1	0	0	0	0	1	1	0	0	1	1	0	1	0	1	1	1	1	0	1	0	1	1
“0”						“3”						May				29th				14…			

…Second Lock ETA								Delay…															
1	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	1	1	0	0	0	1	0	0
…			00					“S”						“L”						“S”…			

…Delay…																							
1	1	0	1	1	1	1	1	0	0	1	1	0	0	1	1	0	0	0	0	1	1	0	0
…			“_”					“L”						“0”						“1”…			

…	Reserved				
0	1	0	0	0	0
…	0				

9 Version Message (Seaway)

Parameter	Number of bits	Description
Application ID	16	DAC = 316 or 366; FI = 32; See Section 2.1
Reserved	2	
Seaway Message ID	6	Message Identifier = 1 (00 0001 in binary)
Major Version	8	Major revision number
Minor Version	8	Minor revision number
Reserved	8	Reserved for future use
Total Number of bits	48	(1 Slot)

Notes:

The Version Message identifies the current message specifications being used by the Saint Lawrence Seaway AIS network. The combined major and minor revision numbers refer to the document version of the "Saint Lawrence Seaway AIS DATA Messaging Formats and Specifications".

A major revision number change indicates that an existing message has been revised. Decoding algorithms for previous message versions will misinterpret the content of the revised message.

A change in the minor revision number refers to an addition of one or more new messages. These message additions should ***not*** cause decoding routines that are compliant to the current major revision to misinterpret existing messages. If the Seaway agencies deem that a newly introduced message is critical to transit safety, the operating agencies may elect to make that a Major revision change.

The Version Message is a binary broadcast. All shore stations in the AIS network will transmit this message once every 15 minutes.

Note: Version 4.0 (major version = 4 and minor version = 0) will be the initial version message when the Seaway AIS network begins its operation.

9.1 Example: Version Message

Example:

Designated Area Code										Function Id						Res		Message Id					
0	1	0	0	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
316										32						0		1					

Major Version								Minor Version								Reserved							
0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4								0								0							

10 Seaway Safety Related Message

The Seaway may transmit addressed and broadcast safety related text messages to notify AIS equipped users to waterway conditions that affect transit safety or efficiency. These messages will be formatted as defined in the IEC 61993-2 document Section 7.6.19 (Message 12) and, Section 7.6.21 (Message 14).

11 References:

- IMO Resolution MSC.74(69), Annex 3, Recommendation on Performance Standards for an Universal Shipborne Automatic Identification Systems (AIS)

- ITU-R Recommendation M.1371-1, Technical Characteristics for a Universal Shipborne Automatic Identification System Using Time Division Multiple Access in the Maritime Mobile Band

- IEC 61993-2 Ed.1, Maritime navigation and radiocommunication requirements - Automatic identification systems (AIS) - Part 2: Class A shipborne equipment of the universal automatic identification system (AIS) - Operational and performance requirements, methods of test and required test results

- NMEA 0183: Standards For Interfacing Marine Electronic Devices, © NMEA 2000 Version 3.00, July 1,2000

12 Appendix A – PAWSS Messages

Messages detailed in this section will be used in areas where U.S. Coast Guard PAWSS AIS coverage is available.

- Hydro /Current Message

PARAMETER	BITS	DESCRIPTION	RANGE	RESOLUTION	DATA TYPE
Application ID	16	DAC (10 bits) + FI (6 bits); **FI = 1**			
Spare	2				
Msg ID	6	**Msg ID = [000100] = 4**	1-63		UInt
Station binary data	Max 896	From 1 to 6 "Hydro/Current Reports"			
Total Num Bits	**Max 920**	**= 24 + N*144** **<u>N; Total Bits (Num Reg'd Slots)</u>** **1; 168 bits (2 slots)** **2; 312 bits (2 slots)** **3; 456 bits (3 slots)** **4; 600 bits (4 slots)** **5; 744 bits (4 slots)** **6; 888 bits (5 slots)**			

- Hydro /Current Report

PARAMETER	BITS	DESCRIPTION	RANGE	RESOLUTION	DATA TYPE
Timestamp	20	Timestamp: MMDDhhmm (4,5,5,6 bits) (UTC time)	1-12 Month 1-31 Day 0-23 hour 0-59 min	1 minute	Unsigned Int
Station Id	42	Alphanumeric string (7 6-bit chars)			String
Longitude	25	Longitude : East = positive, West = negative	± 180 deg, 181 deg = NA	1/1000 minute	Signed Int
Latitude	24	Latitude : North = positive, South = negative	± 90 deg, 91 deg = NA	1/1000 minute	Signed Int
Current speed	8	In $1/10^{th}$ of a knot Output Range: 0 to 25.4 knots	0 – 253, 254 = ≥ 254 255 = NA	1/10 kt	Unsigned short
Current direct	9	Travelling toward	0 – 359 deg, 511 = NA	1 deg	Unsigned int
Spare	16	Reserved bits for future use			
TOTAL BITS	**144**				

- Hydro /Salinity Temp Message

PARAMETER	BITS	DESCRIPTION	RANGE	RESOLUTION	DATA TYPE
Application ID	16	DAC (10 bits) + FI (6 bits); **FI = 1**			
Spare	2				
Msg ID	6	**Msg ID = [000101] = 5**	1-63		UInt
Station binary data	Max 816	From 1 to 6 "Hydro Salinity Reports"			
Total Num Bits	**Max 840**	**= 24 + N*144** **<u>N; Total Bits (Num Reg'd Slots)</u>** **1; 168 bits (2 slots)** **2; 312 bits (2 slots)** **3; 456 bits (3 slots)** **4; 600 bits (4 slots)** **5; 744 bits (4 slots)** **6; 888 bits (5 slots)**			

- Hydro /Salinity Temp Report

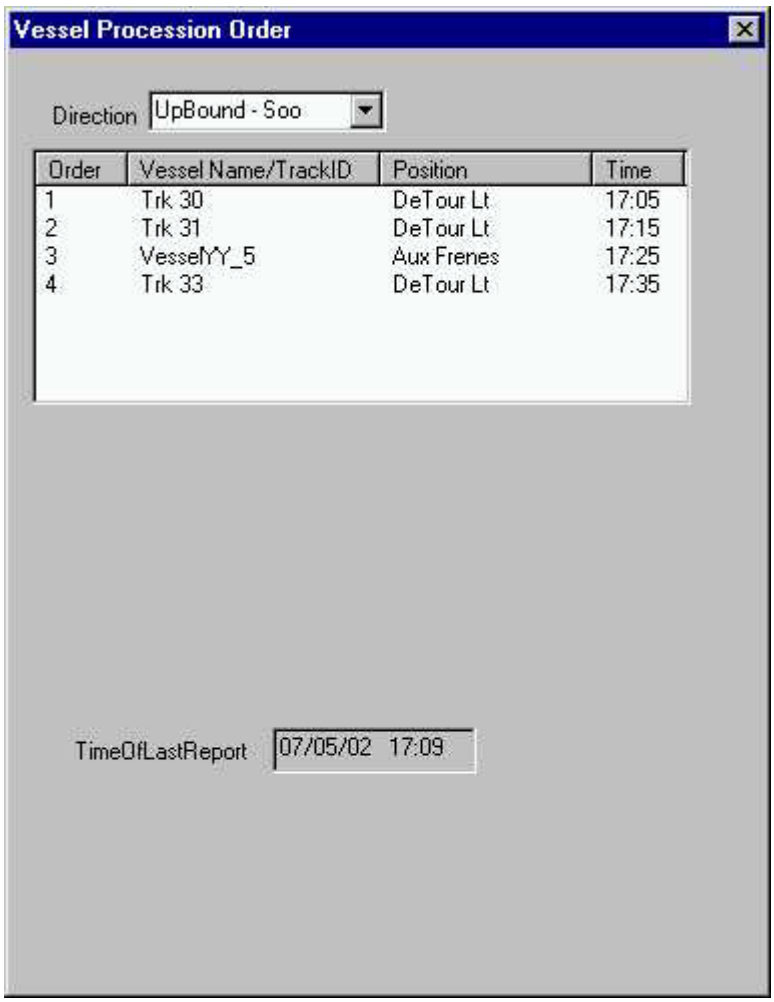
PARAMETER	BITS	DESCRIPTION	RANGE	RESOLUTION	DATA TYPE
Timestamp	20	Timestamp: MMDDhhmm (4,5,5,6 bits) (UTC time)	1-12 Month 1-31 Day 0-23 hour 0-59 min	1 minute	Unsigned Int
Station Id	42	Alphanumeric string (7 6-bit chars)			String
Longitude	25	Longitude : East = positive, West = negative	$\pm$ 180 deg, 181 deg = NA	1/1000 minute	Signed Int
Latitude	24	Latitude : North = positive, South = negative	$\pm$ 90 deg, 91 deg = NA	1/1000 minute	Signed Int
Salinity	10	in Practical Salinity Units (PSU) * 10 Output Range: 0 to 102.2 PSU	0 - 1022, 1023 = NA	0.1 PSU	UInt
Water Temp	10	In $1/10^{th}$ of a degree Celsius Range = -51.1 to +51.1 deg C	-511 to +511, -511 = $\leq$ -511, +511 = $\geq$ +511, -512 = NA	0.1 deg C	Signed int
Spare	13	Reserved bits for future use			
TOTAL BITS	**144**				

- Vessel Procession Order Message

PARAMETER	BITS	DESCRIPTION	RANGE	RESOLUTION	DATA TYPE
Application ID	16	DAC (10 bits) + FI (6 bits)			
Reserved	2	Reserved bits for future use			
Msg ID	6	**Msg ID = [000011] = 3**	1-63		UInt
Timestamp	20	Timestamp: MMDDhhmm (4,5,5,6 bits) (UTC time)	1-12 Month; 0=NA 1-31 Day; 0=NA 0-23 hour; 24=NA 0-59 min; 60=NA	1 minute	Unsigned Int
Direction Id	96	Alphanumeric string (16 6-bit chars)			String
Longitude	25	Longitude : East = positive, West = negative	± 180 deg, 181 deg = NA	1/1000 minute	Signed Int
Latitude	24	Latitude : North = positive, South = negative	± 90 deg, 91 deg = NA	1/1000 minute	Signed Int
Reserved	3	Reserved for future use			
Binary data	Max	From 1 to 4 "Vessel Order Reports"			
Total Num Bits	**Max**	**= 192 + N*184** **<u>N; Total Bits (Num Req'd Slots)</u>** **1; 376 bits (3 slots)** **2; 560 bits (4 slots)** **3; 744 bits (4 slots)** **4; 928 bits (5 slots)**			

- Vessel Procession Order Report

PARAMETER	BITS	DESCRIPTION	RANGE	RESOLUTION	DATA TYPE
Order	5	Vessel's procession order in list ("1" being the first vessel to proceed)	1-31		UInt
Vessel Name	90	15 6-bit chars			string
Position Name	72	vessel position at time of last call-in (12 6-bit chars)			string
Time	11	time of call-in associated with position "Position Name" : hhmm (5,6 bits) (UTC time)	0-23 hour 0-59 min	1 minute	Unsigned Int
Reserved	6	Reserved bits for future use			
TOTAL BITS	**184**				


Vessel Procession Order
Direction
UpBound - Soo
Order
Vessel Name/TrackID
Position
Time
1
Trk 30
DeTour Lt
17:05
2
Trk 31
DeTour Lt
17:15
3
VesselYY_5
Aux Frenes
17:25
4
Trk 33
DeTour Lt
17:35
TimeOfLastReport
07/05/02 17:09