GateHouse AIS Subscriber Proxy - User Guide

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– *software that connects*

GateHouse AIS Subscriber Proxy

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1 Introduction

1.1 References

Reference Name	Comments
AIS Subscriber Proxy Installation Guide	Installation Guide for GateHouse AIS Subscriber Proxy Application
AIS Provider Proxy Installation Guide	Installation Guide for GateHouse AIS Provider Proxy Application
AIS Provider Proxy User Guide	User Guide for the GateHouse AIS Provider Proxy Application.

1.2 Definitions, Acronyms, and Abbreviations

Definition Name	Comments
AIS	Automatic Identification System
ASM	AIS Service Management
IEC Format	Refers to the following standards: IEC 61162-1, IEC/PAS 61162-100 and IEC/PAS 61162-101.
Subscriber Application	The Subscriber Application can be any type of software capable of understanding IEC format compliant AIS data. E.g. a database application storing data, a statistics program, or a chart application displaying the AIS information.
SSL	Secure Socket Layer. A commonly-used protocol for managing the security of a message transmission on the Internet. SSL is included as part of both the Microsoft and Netscape browsers and most Web server products.
TCP	Transmission Control Protocol. A communications protocol used to ensure data is received and transmitted properly.

1.3 Software Version

This user guide is for GateHouse AIS Subscriber Proxy v.1.3.0

1.4 About this Guide

The document at hand is the user configurations and operations manual for the Subscriber Proxy part of the land based AIS system supplied by GateHouse. Descriptions of how to install the proxy application can be found in the GateHouse AIS Subscriber Proxy Installation Guide.

This document is divided into five main sections:

- Chapter 2: A brief introduction to AIS technology and the suite of GateHouse AIS applications, in particular the distinctive features of the AIS Proxy applications and the functionalities associated with these.

- Chapter 3: Comprises a characterization of the "core concepts" of Subscriber Proxy, how the Proxy is started, and how the interface is structured.

- Chapter 4: Contains User Operations and common tasks such as logging on and logging off, changing passwords, and configuring the Subscriber Proxy.

- Chapter 5: Comprises a troubleshooting guide, where possible solutions to any issues with the Subscriber Proxy might be found.

This guide assumes that the appropriate GateHouse AIS components have been installed at your site.

Following conventions appear in this guide:

Symbol or Type Style	Represents	Example
Courier 11 + bold	A term used in the Proxy application	**Waiting to reconnect...**
alternate color	Hyperlinks to online locations	http://www.gatehouse.dk/
Arial 11 + italic	Application paths, referring to a location in the Start Menu	*Programs - GateHouse - Subscriber Proxy*
Arial Unicode MS 10	File paths, referring to a location on the hard drive	C:\Program Files\GateHouse\Subscriber Proxy\
Courier New 9,5	File names	proxy_serverlist.ini

1.5   Target Group

The AIS Proxy applications are intended for users of the AIS system, including administrators, as well as technical support staff. The users of the AIS system are recommended to read sections 2 and 3 carefully, whereas technical support staff is recommended to read every section of this manual.

Please note that this guide contains instructions on how to configure the Subscriber Proxy. Because this can be a very complex task, it is <u>recommended</u> that it is carried out by qualified IT support personnel.

1.6   Acknowledgements

This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit (http://www.openssl.org/) Copyright (c) 1998-2004 The OpenSSL Project. All rights reserved.

2 Overview

AIS is a VHF transponder-based communication system allowing participants to track each other and communicate through an AIS network. The AIS network is designed for automatic data communication between vessels, and between vessels and shore stations. AIS transponders (base stations) broadcast data on shared channels, and the data is received by all other transponders within VHF range, including transponder-equipped vessels (ship stations) and base stations located on shore.

According to the International Convention for the Safety of Life at Sea (SOLAS), the majority of maritime traffic are required to carry AIS equipment since 2004. Thus, authorities globally monitor traffic in their territorial waters using AIS technology.

2.1 AIS Data

The land based AIS system sends and receives data such as:

- MMSI number
- Call sign and name
- IMO number
- Length and beam
- Type of ship
- Location of position-fixing antenna on the ship
- Position with accuracy indication and integrity status
- Time in UTC
- COG (course over ground)
- SOG (speed over ground)
- Gyro heading (if interfaced)
- Navigation status
- Rate of Turn
- Ship's draught
- Hazardous cargo type
- Destination and ETA (at Master's discretion)
- Safety related messages (reading and writing)

2.2 GateHouse AIS System

The suite of GateHouse AIS Server applications can be used to gather the vast amounts of AIS data and present these to end users in various forms. The three main GateHouse AIS Server applications are the System Configuration Tool (Sys Conf), the User Configuration Tool (User Conf) and the System Monitoring Tool (MON). This User Guide is, however, focused on operations in relation to the AIS Subscriber Proxy. The Subscriber Proxy application is a utility for AIS clients to logon to the AIS system in order to receive data.

2.3 GateHouse AIS Proxy

The purpose of the GateHouse AIS Proxy applications is to encapsulate the transfer of data in the IEC format specified for AIS data, and handle additional services such as authentication and distribution of status information.

The GateHouse AIS Proxy provides two different operation modes, receive or transmit data from/to an AIS Server. These different operation modes translate into two distinct proxy applications:

- The Subscriber Proxy

- The Provider Proxy

NB! Both proxy applications utilize the SSL protocol when receiving and transmitting AIS data, in order to manage the security and integrity of these data being distributed via the Internet.
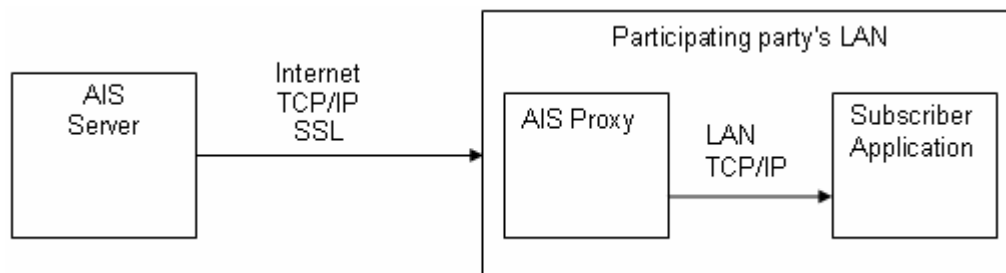
2.4 Subscriber Proxy

Figure 1: System Overview (Subscriber Proxy – Receive Data)

As shown in Figure 1, the Subscriber Proxy is physically positioned in the subscriber (client) computer network. The Subscriber Proxy allows subscriber applications to <u>receive</u> data from the AIS system in the IEC format.
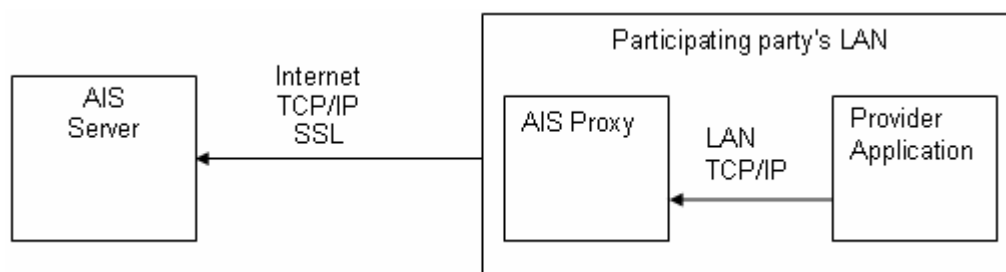
2.5 Provider Proxy

Figure 2: System Overview (Provider Proxy – Transmit Data)

Similarly, the Provider Proxy is positioned in the (client) computer network. This is illustrated in Figure 2. However, the Provider Proxy allows provider applications to <u>transmit</u> data to the AIS system in the IEC format.

2.6   AIS Subscriber Proxy Functionality

Key functionalities of the GateHouse AIS Subscriber Proxy application are:

- **User Authentication Interface**
  As the system only allows authenticated users to access the data, the proxy presents a user interface where it is possible to enter the user name and password used for the authentication. The information is sent to the AIS server which does the actual authentication and assesses whether the user is allowed to receive AIS data.

- **Seamless Server Handover**
  To ensure continuity in the stream of data in the event of an AIS server breakdown, the proxy will automatically and seamlessly (it will not require any user interaction) connect to another AIS server (if available). The effect obtained is that the only thing the user will notice is a small gap in the data flow. The handling of the AIS server addresses is done from the AIS server. When the program is installed it must be configured with a predefined list of AIS servers the proxy can connect to. The list of servers is supplied by staff at the AIS Control Centre.

- **Security**
  Because user name, password and AIS data are transmitted over the Internet, it is important that they are protected (encrypted). The encryption is handled with SSL. It is worth noting that the proxy will try to connect to an AIS server on a predetermined port. This port must be open on the firewall guarding the AIS server. But if there is another firewall between the local computer running the proxy and the AIS server, this port has to be opened too.

- **Filter Data**
  To conserve bandwidth requirements it is possible to filter the received AIS data stream before it is sent to the proxy.

- **Access to Remote Configuration**
  The proxy can also function as a tunnel for the AIS configuration system; this makes it possible to synchronize a local copy of the configuration on a separate machine, without being on the same network as all the AIS servers.

- **Control Replay**
  If the system the proxy connects to have replay functionality it is possible to control a replay session from the proxy.

3   Getting Started

3.1   Starting the Subscriber Proxy

Start the application by clicking Subscriber Proxy in Start Menu under the menu folder
Programs - GateHouse - Subscriber Proxy:

Figure 3: Starting the Subscriber Proxy

To use the system, a valid user name and password are required. To enhance security in the
system, it is required that the user must change password at first logon. The process of
changing a password is described in section 4.1.

3.2   Interface Description

3.2.1   User Interface

The Subscriber Proxy UI consists of a simple four-tabbed interface, with the primary function of
controlling logon to an AIS Server. In addition to this, the interface also allows for some
configuration of the logon procedure and filtering of the AIS data stream.

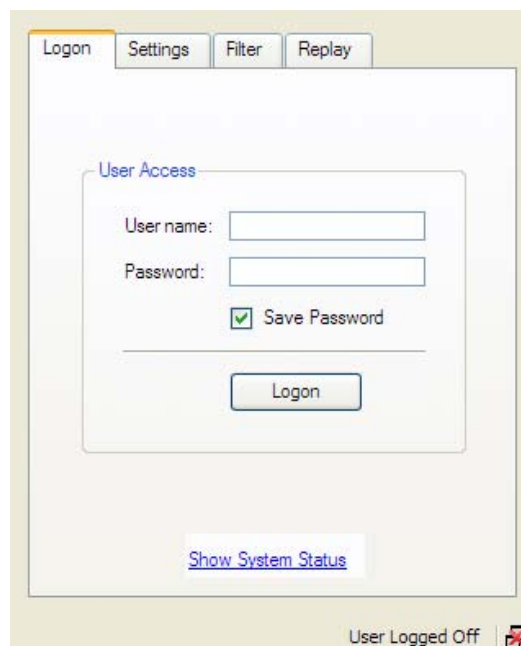The Subscriber Proxy UI is shown below.

Figure 4: Starting the Subscriber Proxy UI

Details of functionalities controlled through the individual Subscriber Proxy UI tabs are:

Tab	Description
Logon	The Logon tab is used to control logging on and off the AIS Server.
Settings	The Settings tab is used to configure various aspects of the subscriber proxy, as well as changing password.
Filter	The Filter tab is used to configure filtration of the AIS data stream from the AIS Server.
Replay	The Replay tab is used in relation to replay old AIS data.

When starting the Subscriber Proxy UI, the logon tab is selected by default:.

3.2.2   External Interface

For the Subscriber Proxy application to be able to communicate with AIS servers at the AIS Control Center, information about AIS Server IP addresses must be available to the respective proxy application. This information is stored in a local configuration file called:

`proxy_serverlist.ini.`

By default, the Subscriber Proxy will connect to an AIS server, and start listening on a predetermined port and IP address, listed in this file. The file is placed in the folder:

C:\Program Files\GateHouse\Subscriber Proxy\

Locate and edit this file if you wish to edit port and IP details of the default AIS server the Subscriber Proxy application connects to.

3.2.3   Internal Interface

The Subscriber Proxy will accept one TCP/IP connection on the network interface local host (IP 127.0.0.1) port 4001 or on the IP address assigned to the default network interface. To change the default port 4001 alter the LocalClientPort attribute in the `proxy_configuration.ini` file, located here:

C:\Program Files\GateHouse\Subscriber Proxy\

Editing port details in configuration files can be a very complex task, and we recommend that only qualified IT support personnel carry out the task.

4   User Operations

4.1   Changing Passwords

Change of password is done from the Subscriber Proxy UI Settings tab.
The following requirements apply for passwords:

- It must be at least 8 characters long.
- It must contain both uppercase and lowercase characters.
- It must contain a number character i.e. 0 1 2 3 4 5 6 7 8 9.
- It must contain a special character i.e.! " # % & / ( ) etc.
- It must be different from the previous 10 passwords used.

Note: You must be logged on to an AIS Server before you can change password. This is because all AIS system user accounts and passwords are managed remotely on the AIS Server(s). If your password has expired you will automatically be prompted to change password when logging on.

The procedure for changing password is as follows:

1) Start the Subscriber Proxy as described in section 3.1.

2) Log on

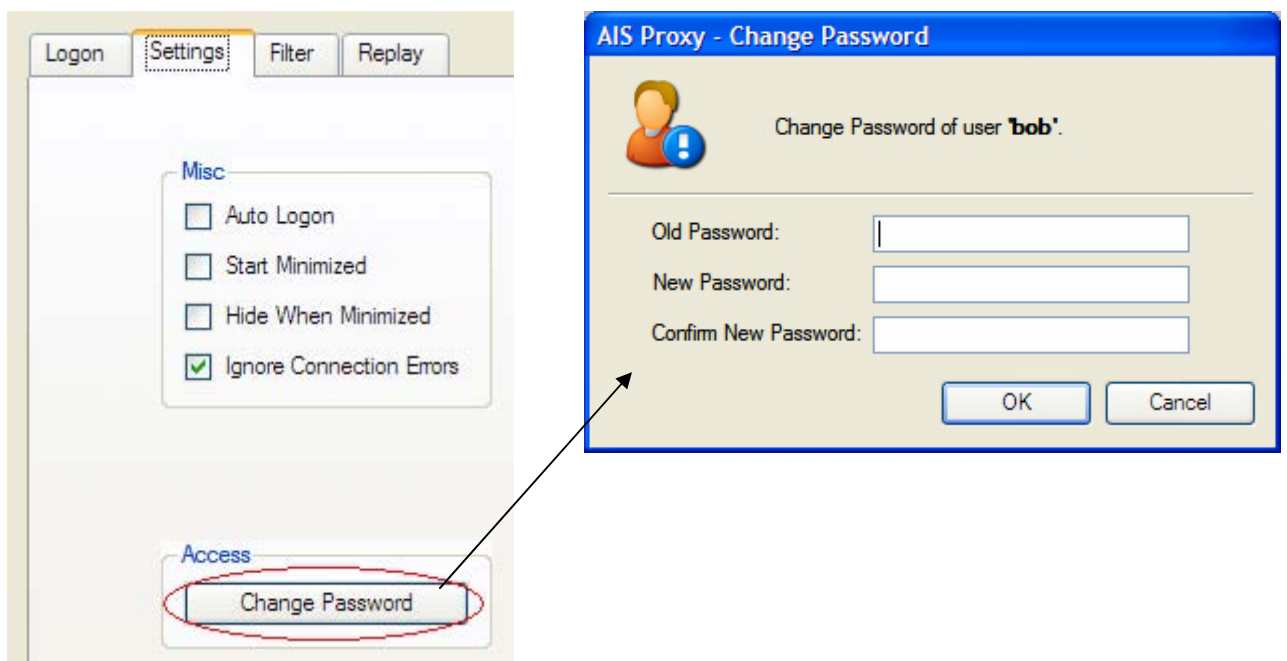3) Select the Settings tab and click the Change Password button, which causes the Change Password dialog to open.

Figure 5: Change Password

4) In the Old Password field, enter the old password.

5) Enter a new password in the New Password field according to the password requirements listed above and repeat the same password in the Confirm New Password field.

6) Click the OK button.

7) When the password has been changed, a confirmation window is displayed.

4.2   Logon/Logoff

Logon/Logoff processes are – naturally! – controlled through the Logon tab in the Subscriber Proxy UI.

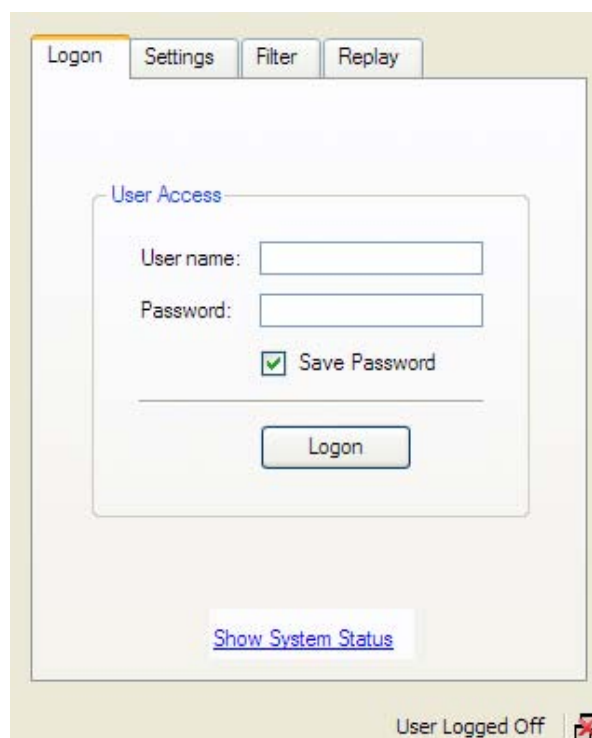When the Subscriber Proxy UI is started, it will display a logon window as shown in Figure 6.

Figure 6: Logon Window

To log on, enter the user name and the password, then click the Logon button.
When the user has been successfully logged on, the logon window changes appearance as shown in Figure 7. Refer to section 5.1 if logon fails.

Figure 7: Logon Window - when logged on

It is possible to make the proxy application save the password (and user name) so that the next time the proxy is started there is no need to enter it again. This feature is enabled by clicking the Save Password box under the Password field. Please note that the username and password are only saved if they have been validated against the AIS server.

To close the connection to the AIS server and log the user off again, click the Logoff button.

4.2.1   Logon State

To help monitor the connection to the AIS server, the Subscriber Proxy has a connection indicator, which is represented by the icon in the lower right corner of the window. This can be one of 5 different icons, each indicating a different state:

- The proxy is disconnected from the AIS server.
- The proxy is connected to the AIS server.
- The proxy is receiving data from the AIS server.
- The proxy is transmitting data to the AIS server.
- The proxy is receiving and transmitting data to the AIS server.

4.3   Configuring Settings

The Settings pane illustrated below, allows configuration of the proxy.
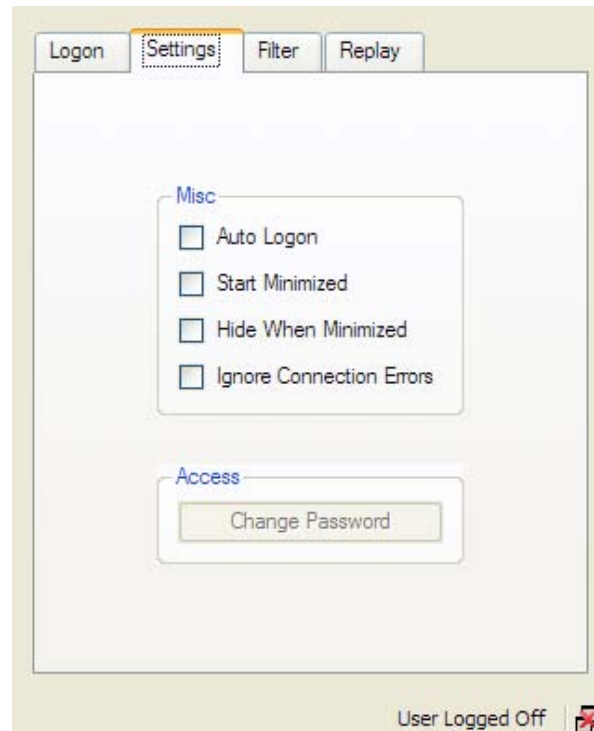
Figure 8: Subscriber Settings

- **Auto Logon**: Indicates that the proxy will attempt to automatically log the user on when it detects that a subscriber application connects to it. Thus, the Auto Logon is activated by any subscriber application trying to connect to the proxy. Please note that it requires the "Save Password" checkbox on the "Logon" tab to be checked.

- **Start Minimized**: Indicates that the application will start in the minimized state.

- **Hide When Minimized**: Indicates that the application is removed from the task bar when minimized. Instead an icon is placed in the task tray as shown below:

Figure 9: Examples of appearances of the Task Tray Icon

The appearance of the icon changes to reflect the status of the proxy, as described in Section 4.1.

To open the UI window again, left-click on the icon.

- **Ignore Connection Errors**: Indicates that the proxy should not stop trying to connect when it encounters a problem with the network connection, when they are of minor importance, such as a network connection being lost for a short period of time.

4.4 Filter

The Subscriber Proxy Filter is a bandwidth conserving feature, where filtering of the AIS data stream is performed at the AIS server before it is sent to the Subscriber Proxy. This way you can limit the amount of AIS data received, thus lowering network traffic while at the same time controlling that absolutely necessary data are received.

AIS Data can be filtered in 5 different ways:
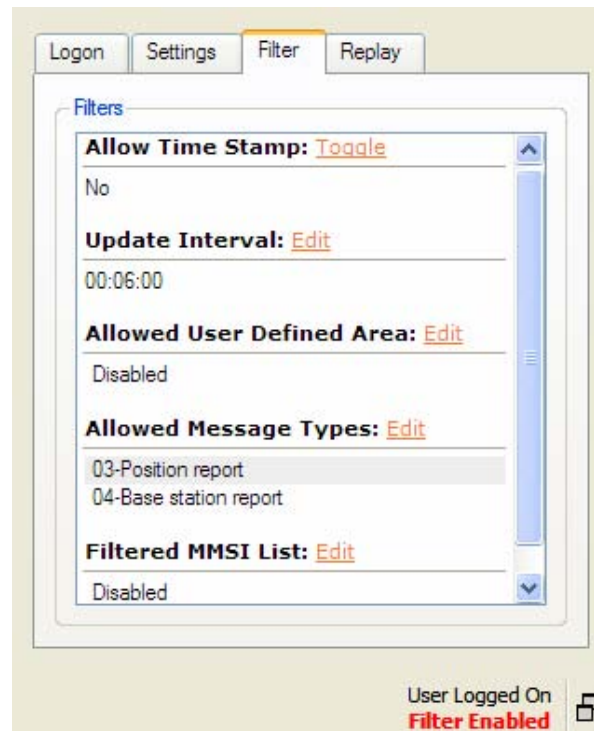
- Time Stamp

- Update Interval

- User Defined Area

- Message Types

- MMSI List

The default filter settings in Subscriber Proxy are shown below.

When the Filter is in its default state as shown above it does not filter the AIS data stream.
To enable the filter functionality for one of the 5 filter elements, click on the orange Edit edit link (or Toggle) in the filter window.

When one or several of the filters are enabled the status bar at the bottom of the Subscriber Proxy window will clearly indicate that the received AIS data are being filtered, as shown below.

Details of the filters and how to configure them are explained in the following sections.

4.4.1   Time Stamp

The "Time Stamp" filter specifies whether or not the AIS data stream should be allowed to contain time stamps. By clicking on the Allow Time Stamp Toggle link, time stamps are either allowed or filtered. Please note that time stamps can not be enabled on an AIS Data stream that does not contain time stamps.

4.4.2   Update Interval

The "Update Interval" filter is used to reduce the amount of data received from the AIS system by filtering ship position reports.
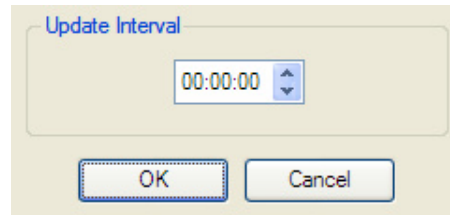
Each ship typically sends a position report every 6 seconds, thus reducing the update interval to e.g. a 6-minute interval will drastically reduce the load on the Internet connection. However it is only the position reports that are filtered, so everything else is still received.

Please note that the maximum update interval is 2 hours.

Staff at the AIS Control Centre can set a maximum update interval. Users of the Subscriber Proxy can then specify a larger update interval, but not a lower update interval than the one defined by the staff at the AIS Control Centre.

To edit the Update Interval filter, do the following:

1) Click the Update Interval Edit link in the Filter tab. The dialog box shown below is displayed.

2) Specify the update interval in hours, minutes and seconds.
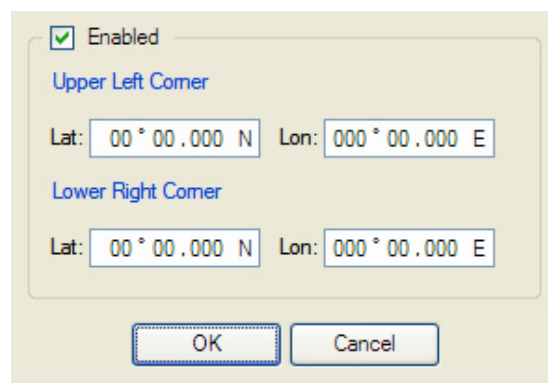
3) Click OK

4.4.3   User Defined Area

The "User Defined Area" filter specifies a geographical, rectangular area from which AIS data should be allowed. The rectangle is defined by lattitude and longitude WGS84 coordinates for its upper left corner and its lower right corner.

When this filter is enabled only AIS data from ships within the specified rectangle are allowed through the filter.

To edit the User Defined Area filter, do the following:

1) Click the Allowed User Defined Area Edit link in the Filter tab. The dialog box shown below is displayed
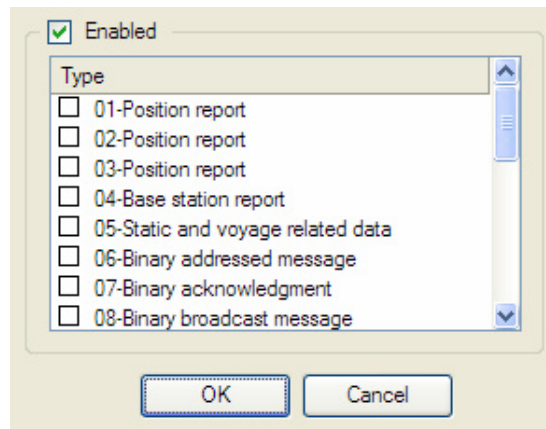

2) Enable the filter by checking the 'Enabled' check box.

3) Enter the details of the geographical rectangle as appropriate.

4) Click OK

4.4.4   Message Types

The "Message Types" filter specifies which NMEA message types should be allowed in the AIS Data stream. There are in total 22 NMEA message types. By default all of these are allowed in the AIS data stream.

To edit the Message Types filter, do the following:

1) Click the Allowed Message Types Edit link in the Filter tab. The dialog box shown below is displayed

2) Enable the filter by checking the 'Enabled' check box.

3) Select the message types you wish to enable. This effectively disables all other messages types, since all message types are enabled by default.
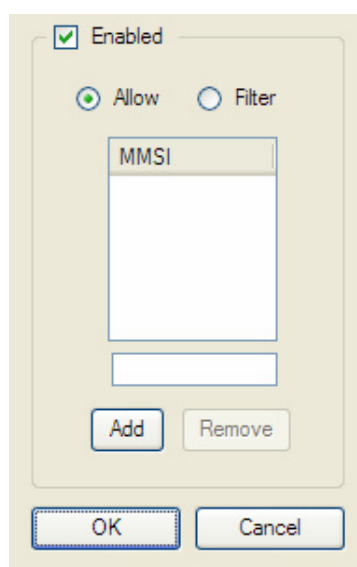
4) Click OK

4.4.5   Allowed MMSI List

The "MMSI List" filter specifies a list of ship MMSI numbers which are either allowed in, or filtered from, the AIS data stream.

The two options 'Allow' and 'Filter' are used to decide whether the list of MMSI numbers is a positive or negative list. When 'Allow' is selected only information about ships with the specified MMSI numbers are allowed in the AIS data stream. And when 'Filter' is selected all other ships than the specified MMSI numbers will pass through the filter.

To edit the MMSI List filter, do the following:

1) Click the Allowed Message Types <u>Edit</u> link in the Filter tab. The dialog box shown below is displayed.

2) Enable the filter by checking the 'Enabled' check box.

3) To add an MMSI number to the list, enter it in the edit box below the MMSI list view and click the 'Add' button.

4) To remove it again, select it in the list and click the 'Remove' button.

5) Click OK

4.5   Replay

The Subscriber Proxy provides for replay of an old AIS data stream (if the AIS server supports it). The Replay tab is shown below:
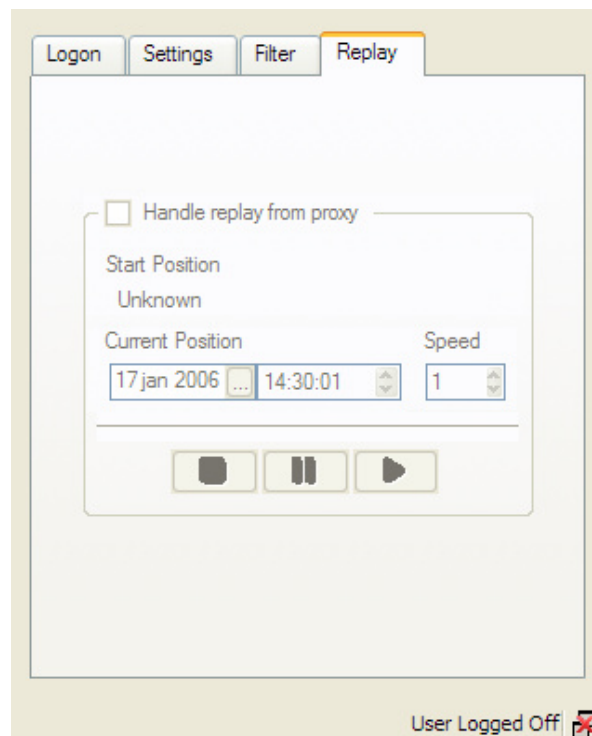
'Start position' specifies the earliest date and time a replay can be started from, and 'Current position' shows the date and time position of the replay AIS data stream.

4.5.1   Enable Replay

To enable the replay controls select the 'Handle replay from proxy' check box. This divides the AIS data stream into two parts, offline replay data delivered on port 5001 and online AIS data delivered on port 4001.

4.5.2   Start Replay

To start a replay session enter the date and time in the 'Current position' edit and then click the 'Play' button. To change the speed of the replay, click the pause button and change it in the 'Speed' edit, start the replay with the new speed by clicking the 'Play' button again. To change position during a replay click the 'Pause' button, select a new date and time in the 'Current Position', and click the 'Play' button to start the replay from the new position. To stop a replay click on the 'Stop' button.

5 Troubleshooting

If you are experiencing issues with the Subscriber Proxy program, try closing it and starting it again. If the problem persists, the following sections might provide you with a solution to the problem.

If the problem could not be resolved and you need to report it to the system administrator, be sure to always include the error code in the report.

5.1 Logon Fails

5.1.1 Invalid User Information

If logon fails, when entering user name/password and clicking the "Logon" button, instead of being logged on, you may see the window shown in Figure 10.
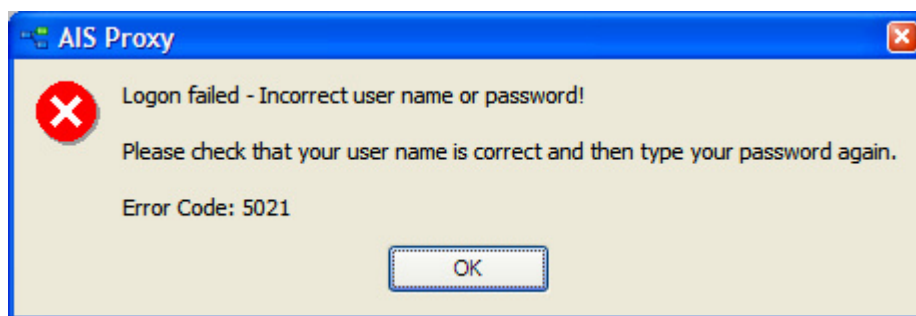

Figure 10: Failed logon popup

This window indicates that the user name or password have been entered incorrectly. Make sure that caps lock is not enabled; type the user name and password again, and then try logging on.

Note that failing to enter the correct password for the same user name three times will disable the user account, and can subsequently only be enabled again by staff at the AIS Control Center.

If the problem persists, contact your system administrator for additional help to solve the problem.

5.1.2 No Network Connection

If the proxy was unable to establish a connection to any of the known AIS servers, it will display the popup window shown in Figure 11.
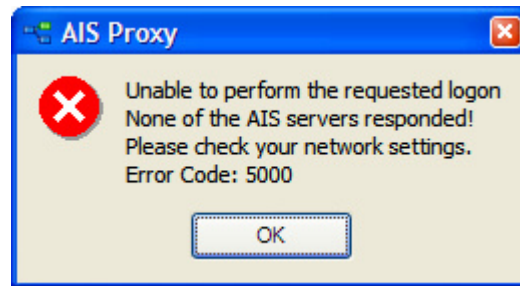
Figure 11: Unable to establish a connection

The problem indicates that there is no working internet route to the AIS servers. Contact your system administrator and make sure that your local firewall is not blocking the connection. A full list of the IP addresses and port numbers, which the proxy must be capable of connecting to, is available in the `proxy_serverlist.ini` file. The file is located in the directory, where the proxy is installed, as described in section 3.2.2.

5.2 The Subscriber Application Does Not Receive Any Data

If the Subscriber Proxy is not receiving any data after a user has logged on to the AIS server using the proxy, the likely cause is one of the following two:

1. **The AIS server is not sending any data**.
   To test that the proxy is receiving data, close the subscriber application and open a telnet session to local host port 4001. After successfully logging on, the telnet should start outputting raw AIS data. If it does not, contact RDANH.

2. **The subscriber application does not connect to the Subscriber Proxy to receive data**. To test that the connection between the subscriber application and the proxy is established correctly, observe the status bar in the bottom part of the proxy window. It will display the message "Client Connected" (for 30 seconds) when it detects a connection from a subscriber application.

5.3 The Subscriber Proxy Starts with a Popup Window Saying "Bind Failed…"

If you see the popup window in Figure 12, it is likely that the proxy program is already running.
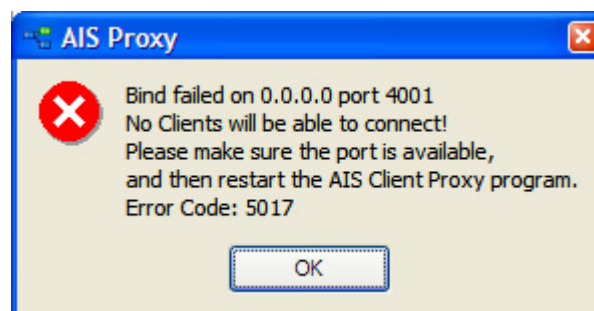

Figure 12: Start up error popup

This could also mean that another program is already using the same TCP/IP port as the proxy program is trying to access. In this case, contact the system administrator to have the port settings in the proxy changed.

5.4   Clicking the Logon button opens an SSL Error Popup Window

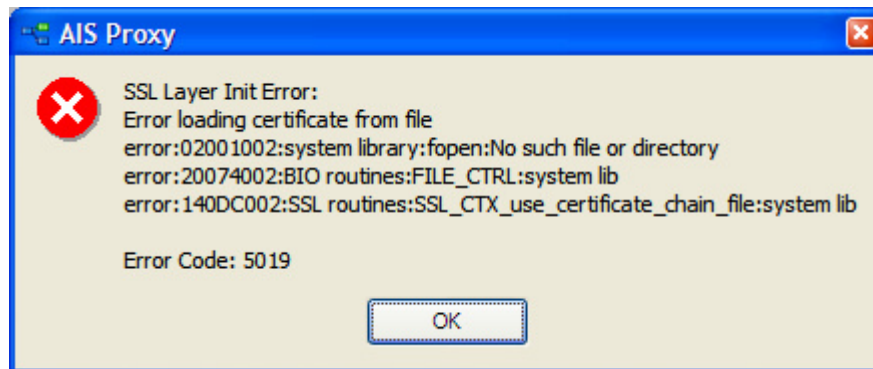The SSL error popup window is shown in Figure 13.

Figure 13: SSL error popup

This is because the `client.pem` file is missing from the proxy directory.

For instructions on how to configure this correctly, refer to the AIS Subscriber Proxy Installation Guide.