

eWGMS Installation & Admin Guide

Enterprise Wave Glider Management System

Item Number: 11157

Revision 02

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REVISION HISTORY

Rev #	Date	Author	Revision Description
01	6 Jan 2021	B. Fisher	Initial Release
02	11 Nov 2021	B. Fisher	General updates

Abstract: The eWGMS Installation & Admin Guide provides system setup and configuration information regarding the installation of commercial Enterprise WGMS.

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Section 1: Introduction

1.1 Purpose

This document describes the administration tasks needed to configure, troubleshoot, and maintain eWGMS.

1.2 Scope

This document is limited to the administration of eWGMS. For eWGMS operation or other tasks please see the relevant documentation.

1.3 Intended Users

This document is intended for use by IT administrators of eWGMS. Administrators of eWGMS should be expected to use command line tools under Windows or Linux, have knowledge of IP addresses, and understand the fundamentals of firewalls and ssh keys.

Section 2: Terms, Icons, and Abbreviations

This section contains terms and abbreviations that are unique to this guide.

	This icon denotes critical information that could result in data loss or improper operation if not followed.
IIS	Internet Information Server
NLog	The log output used by eWGMS
RUDICS	Router-Based Unrestricted Digital Internetworking Connectivity Solutions; an Iridium enhanced data service
SCP	Secure Copy Protocol, a protocol to securely transfer files between computers, based on SSH.
SSH	Secure Shell; a cryptographic protocol allowing secure network service operations and data transfer over an unsecured or partially secured network

Section 3: eWGMS system summary

3.1 Overview

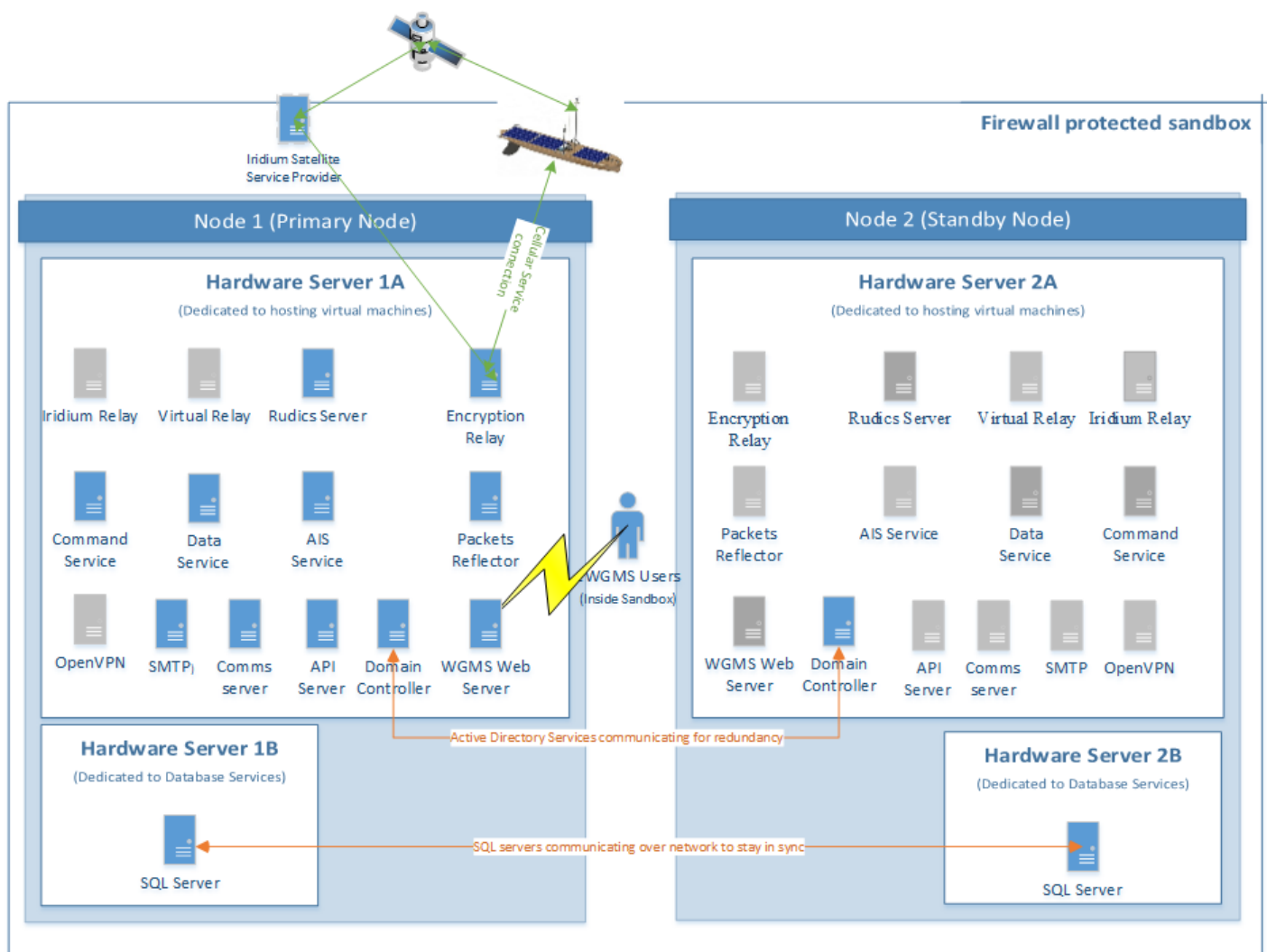
The commercial Wave Guilder Management System, or eWGMS, is a distributed collection of servers designed to work together for the monitoring and controlling Liquid Robotics Wave Gliders.

There are 13 distinct eWGMS services, and although they can run on the same computer, they are distributed to their on their own Virtual Machines for performance, stability, and redundancy reasons. The Virtual machines are Microsoft Windows's based servers.

- API Server
- Alarm AIS Server
- Command Service
- Comms Server
- Database Server

- Data Service
- Domain Controller
- Encryption Server
- Iridium Relay
- OpenVPN Server
- Packet Reflector
- eWGMS Web Server
- Virtual Relay

3.2 Topological Map



Section 4: AIS Alarm Service

4.1 Overview

AIS (automatic identification system) is a global nautical system used to help commercial shipping avoid collisions. This eWGMS server uses AIS to calculate collision threats for in water gliders from commercial and other watercraft.

4.2 Configuration

Management Account

- Server URL
- Email
- Password
- Organization

Parameters

- Render Moving Distance (m)
- Render Stationary Distance (m)
- Warning Distance (m)
- Alarm Distance (m)

AIS Data Source

Management Account

Server URL:

Email:

Password:

Organization:

Parameters

Render Moving Distance (m):

Render Stationary Distance (m):

Warning Distance (m):

Alarm Distance (m):

Gliders Data Source Starting.

☒ Log Events Items to display:

Section 5: Iridium Relay

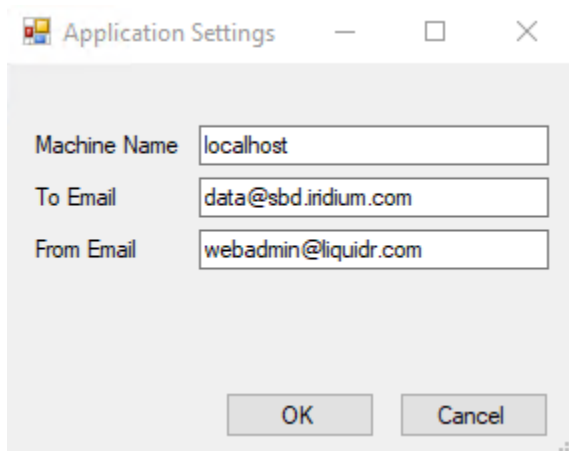
Overview

The Iridium relay server is the access point for all satellite communications. This service requires an external IP address.

Configuration

Application Settings

- Machine Name
- To Email
- From Email

A screenshot of a Windows-style dialog box titled "Application Settings". It contains three text input fields: "Machine Name" with the value "localhost", "To Email" with the value "data@sbd.iridium.com", and "From Email" with the value "webadmin@liquidr.com". At the bottom right are "OK" and "Cancel" buttons.

Machine Name: localhost

To Email: data@sbd.iridium.com

From Email: webadmin@liquidr.com

OK Cancel

Relay User Interface

MANAGEMENT TAB

- Server URL
- Email
- Password
- Org Internal Name
- Relay Name
- Log Events
- Filter Messages

The screenshot shows the 'Iridium Relay' application window with the 'Configuration' tab selected. The window has a menu bar with 'File', 'Edit', 'Tools', and 'Help'. Below the menu bar are three tabs: 'Management', 'Configuration', and 'Clients'. The 'Configuration' tab contains several input fields: 'Server URL' (https://YourServerUrl/webservices/EntityAPI.aspx), 'Email' (webadmin@liquidr.com), 'Password' (masked with dots), 'Org Internal Name' (liquidr), and 'Relay Name' (Iridium Relay). There are 'Settings' and 'Verify Credentials' buttons. Below these fields is a section for 'Log Events' and 'Filter Messages' checkboxes, and an 'Items to display' dropdown set to '50'. A message box at the bottom states 'Iridium Relay Application Starting. Object reference not set to an instance of an object.' At the very bottom are 'Stop Service' and 'Debug Run' buttons.

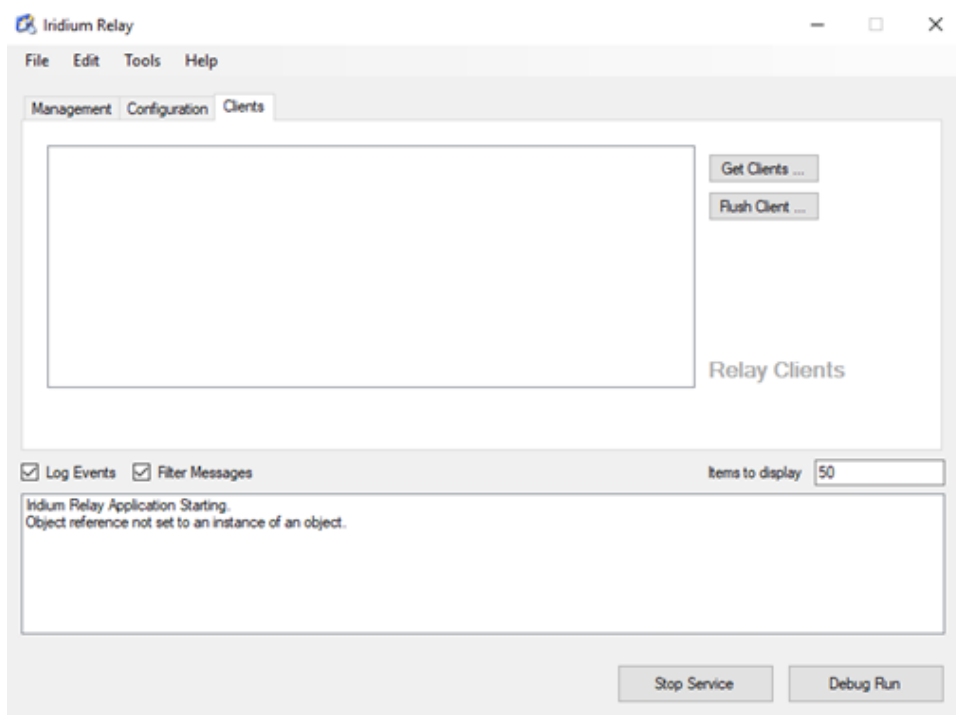
CONFIGURATION TAB

- Output Sources
- Output Sinks
- Command Sinks
- Command Sources
- Ignore Clients

This screenshot shows the 'Iridium Relay' application window with the 'Configuration' tab selected. The window has a menu bar with 'File', 'Edit', 'Tools', and 'Help'. Below the menu bar are three tabs: 'Management', 'Configuration', and 'Clients'. The 'Configuration' tab contains a list of settings: 'Output Sources', 'Output Sinks', 'Command Sinks', 'Command Sources', and 'Ignore Clients'. Each setting has a text input field and a set of buttons: 'Add Iridium', 'Add', 'Edit', and 'Del'. The 'Output Sinks' and 'Command Sources' settings also have an 'Add Reflector' button. Below these settings is a section for 'Log Events' and 'Filter Messages' checkboxes, and an 'Items to display' dropdown set to '50'. A message box at the bottom states 'Iridium Relay Application Starting. Object reference not set to an instance of an object.' At the very bottom are 'Stop Service' and 'Debug Run' buttons.

CLIENTS TAB

- Get Clients
- Rush Client



Section 6: Virtual Relay

6.1 Overview

The virtual relay service is a second glider access point (Along with the Iridium Server). This server provides a faster (and often cheaper) means to allow a glider to communicate with the eWGMS instance. This service requires an external IP address. Often used during glider set up and shoreside configuration. If the glider is equipped with a cell modem and is operating close to shore inside cell tower range, this is often the preferred means of communication.

6.2 Configuring the Virtual Relay Server

A Liquid Robotics Virtual Relay Server is required when you want to establish a direct radio communications link between one or more Wave Gliders and one or more eWGMS instances.

Examples of Wave Glider radio communications methods that require the Virtual Relay Server include:

- WiFi

- Cell

Typically, a Virtual Relay Server and a Packet Reflector are installed on a PC along with a eWGMS instance, and a Virtual Relay Client is installed on each Wave Glider vehicle. The Virtual Relay Server consists of a Virtual Relay Service that runs in the background, and a Virtual Relay Application that you use to configure and manage the Virtual Relay Service. When the Virtual Relay Service is started, it will continue running any time your PC is running, until you deliberately stop the service using the Stop Service function in the Virtual Relay Application.

Regardless of the radio communications method, the TCP/IP protocol is used for data transmissions between eWGMS and a vehicle. The LRI Virtual Relay protocol rides on top of the TCP/IP protocol to support encryption and to ensure messages are received by their specified recipients.

Communications between the Virtual Relay Server and eWGMS are transmitted through a Packet Reflector in an LRI Data Packet format over TCP/IP.



Virtual Relay Server Configuration Procedure

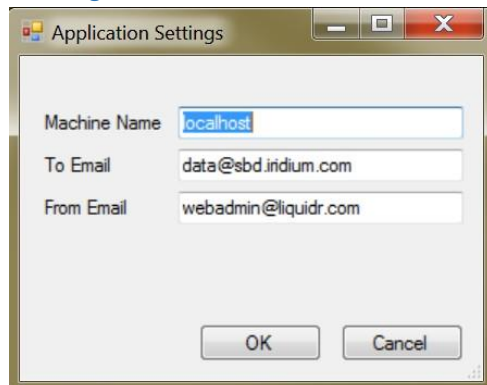
The Virtual Relay Server and Virtual Relay Clients are factory installed by Liquid Robotics. Use the following procedure to configure a Virtual Relay Server:

1.



Click on the **Virtual Relay Application** icon on your desktop to open the **Application Settings** window.

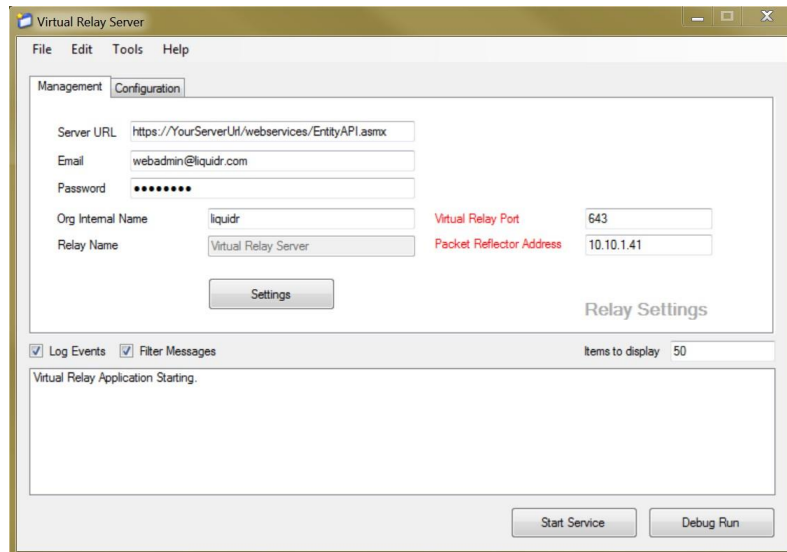
Application Settings Window



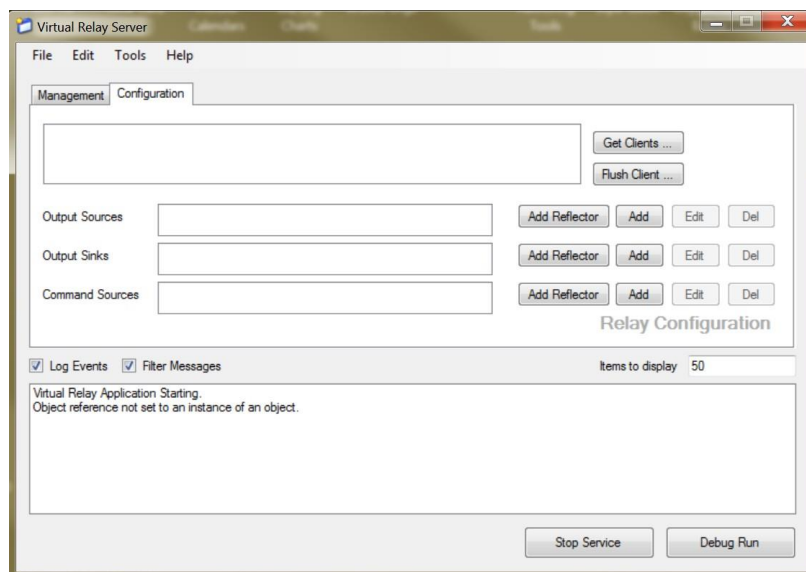
2. Accept all default settings and click **OK** - the **Virtual Relay Server** screen will appear. The **Management** tab is selected by default.

If you click on the **Configuration** tab, the **Output Sources**, **Output Sinks**, and **Command Sources** fields will be empty.

Virtual Relay Server Main Screen - Management Tab Before Configuration



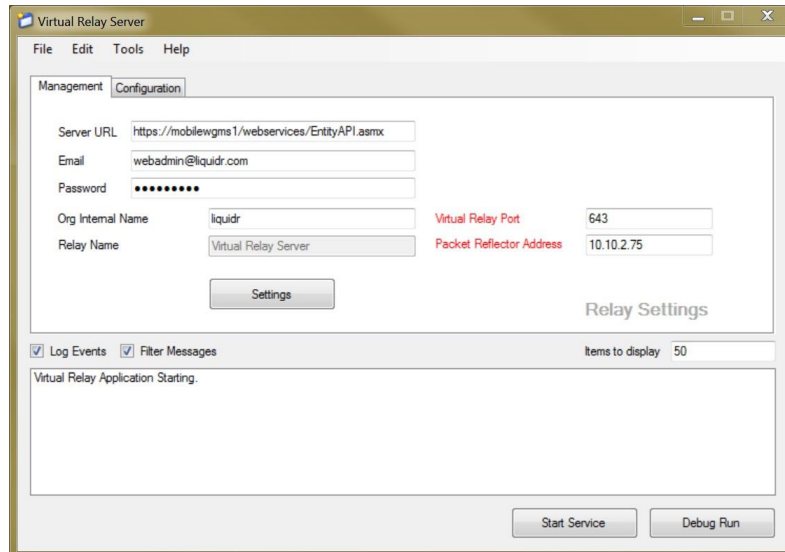
Virtual Relay Server Main Screen - Configuration Tab Before Configuration



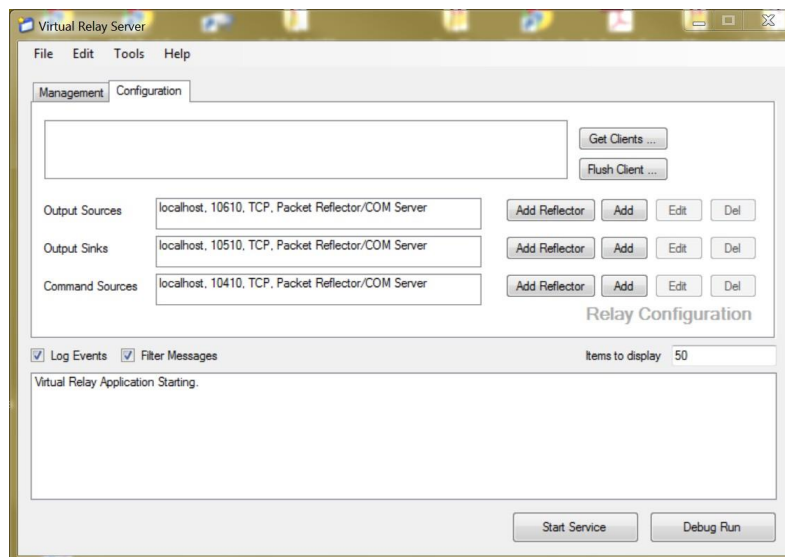
3. In the tool bar of the **Virtual Relay Server** main screen, click on **File > Open > C:**

> **config** and select the **Virtual Relay settings.vrx** file, then click **Open**. The **Virtual Relay settings.vrx** file will correctly populate the fields in both the **Management** and **Configuration** tabs of the Virtual Relay Server screen.

Virtual Relay Server Main Screen - Management Tab After Configuration



Virtual Relay Server Main Screen - Configuration Tab After Configuration



4. If the **Start Service** button appears, click on it to turn on the Virtual Relay Server.

If the **Stop Service** button appears, this means the Virtual Relay Server was already running when you installed the **Virtual Relay settings.vrx** file. In this case you do not need to take any further action.

5. Click on **Stop Service** to turn the Virtual Relay Server off.

Section 7: Encryption Relay

7.1 Overview

The Encryption relay provides the only access point for encrypted communications between the gliders and the eWGMS system.

7.2 Configuration

Please see the eWGMS Encryption Relay Guide for using and administering the Encryption communication system. (PN 12075-t)

Section 8: Packet Reflector

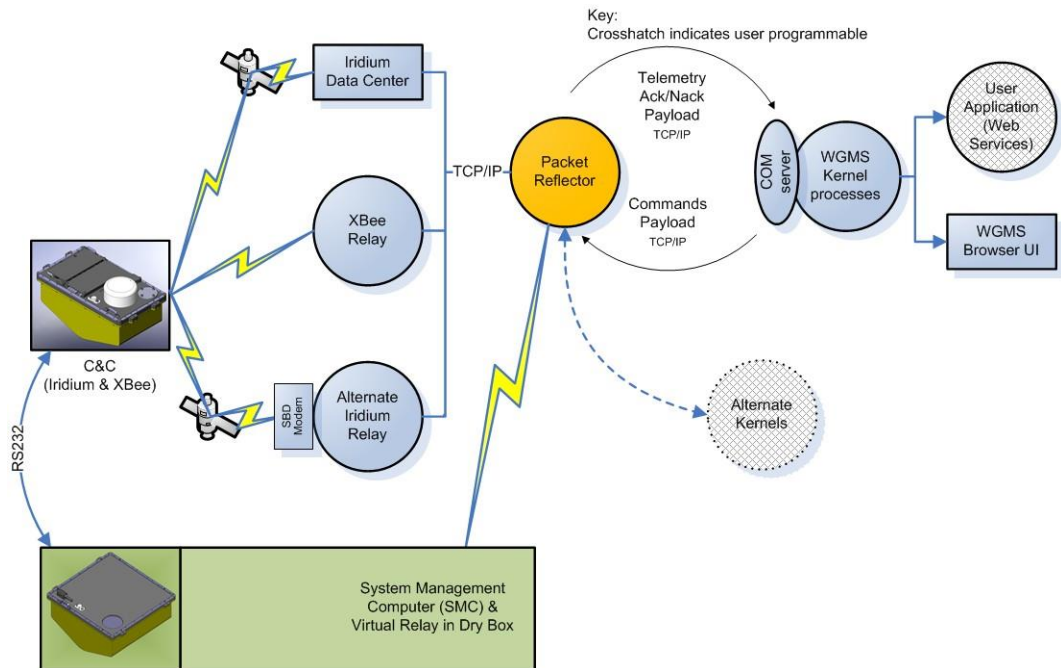
8.1 Overview

The packet reflector acts a data packet and vehicle command packet relay system. It does little more than routing eWGMS packets to the proper eWGMS service for processing or distribution.

8.2 Configuration

The eWGMS Packet Reflector is a software based TCP/IP bidirectional router that transfers output data packets between Wave Gliders and eWGMS and transmits command packets from eWGMS to the Wave Gliders.

8.2.1.1.1 Figure 4.1. Data Transfer Overview



Home Screen

The eWGMS Packet Reflector [Home Screen](#) includes:

- [Windows Menu Bar](#)

The Windows menu bar includes **File**, **Edit**, **Tools**, and **Help** menus containing typical options. (Note: The **Customize** option in the **Tools** menu is not supported.)

The **File** menu includes several packet reflector configuration file management options:

- Click **Open** to open a packet reflector configuration file stored on your system.
- Click **Retrieve from eWGMS** to retrieve a packet reflector configuration file saved in eWGMS.
- Click **Save To File** or **Save To File As** to save a packet reflector configuration file on your system.
- Click **Save To eWGMS** to save a packet reflector configuration file in eWGMS.

- Configuration Window associated with 8 Configuration Tabs

When you click on the **Output Sinks**, **Output Sources**, **Command Sinks**, **Command Sources**, **Configuration Sinks**, **Configuration Sources**, **Settings**, and **Performance** tabs, related configuration fields and settings are displayed below in the Configuration Window. Instructions on using each of the eight configuration tabs are contained in the following sections:

- “Configuring Output Sinks”
- “Configuring Output Sources”
- “Configuring Command Sinks”
- “Configuring Command Sources”
- “Configuration Sinks”
- “Configuration Sources”
- “Settings”
- “Performance”

- Log Window with associated Display Settings

The log window displays events and performance data that is optionally stored in the Windows system events log under: Control Panel\All Control Panel Items
Administrative Tools -> Computer Management (Local) -> Event Viewer
-> Applications and Services Logs -> ReflectorLog. There are 4 display settings associated with the log window:

- **Log Events** check-box

This setting is selected by default to log events to the Windows system events log. If you do not want to log events, deselect this setting.

- **Filter Sink to Source** check-box

This setting is selected by default to prevent incoming command packets from being reflected back to the same IP address subscriber. **For a single computer configuration, this setting should be deselected.**

– **Display Performance Data** check-box

This setting is selected by default to display performance data in the **Performance** tab. If you do not want to display performance data, deselect this setting.

– **Items to display** field

The default setting is 50. The minimum setting is 50 items and the maximum setting is 5000 items. The log window expands when you expand the Packet Reflector home screen. You can also scroll within the Log window to see events and data that have been recorded.

- Global Enables Window

The global enables window includes 6 global packet reflector settings:

– Listen to Output Sources

This setting is selected by default to listen to output sources. If you deselect this setting, no output sources packets will flow to the packet reflector.

– Send to Output Sinks

This setting is selected by default to send output sources packets to the output sinks. If you deselect this setting, no output sources packets will flow to the output sinks. Instead, they will accumulate in the packet reflector and eventually trigger a FIFO buffer overflow.

– Listen to Command Sources

This setting is selected by default to listen to command sources. If you deselect this setting, no command sources packets will flow to the packet reflector.

– Send to Command Sinks

This setting is selected by default to send command sources packets to the command sinks. If you deselect this setting, no command sources packets will flow to the command sinks. Instead, they will accumulate in the packet reflector and eventually trigger a FIFO buffer overflow.

– Listen to Configuration Sources

This check-box is selected by default, but is not relevant to current Wave Glider models. You can ignore it. Also, the Configuration Sources tab is not used with current Wave Glider models. Do not make any configuration settings under this tab.

– Send Configuration Sinks

This check-box is selected by default, but is not relevant to current Wave Glider models. You can ignore it. Also, the Configuration Sinks tab is not used with current Wave Glider models. Do not make any configuration settings under this tab.

- Failover Settings Window

The failover settings window includes **Master Mode** and **Slave Mode** radio buttons with corresponding **IP Addr** and **Port** fields. These settings must be configured as follows:

- **Slave Mode** must be selected.
- **IP Addr** must be set to localhost
- **Port** must be set to 10101



Warning

The GUI will allow you to enter different settings, but they will not be functional. If you do not use the above stated settings, unpredictable results could occur.

- Start Service/Stop Service Toggle Button

When the packet reflector service is running this button will be in the Stop Service mode. If you click on Stop Service, the packet reflector service will stop and the button will revert to the Start Service mode. If you click on the button when it is in Start Service mode, the packet reflector service will resume.

- Debug Run/Debug Stop Toggle Button

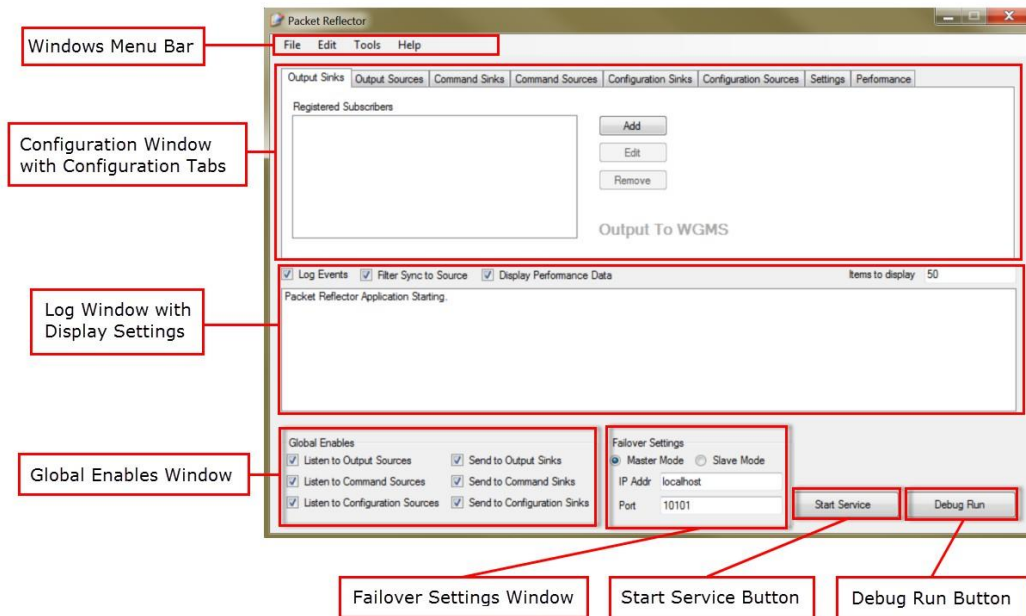
The Debug Run/Debug Stop toggle button is for LRI internal use only.



Warning

If you click on this button unpredictable results could occur. If you accidentally click on Debug Run, promptly clicking on Debug Stop should return the packet reflector to a predictable state.

Home Screen



8.2.2 Configuring Output Sinks

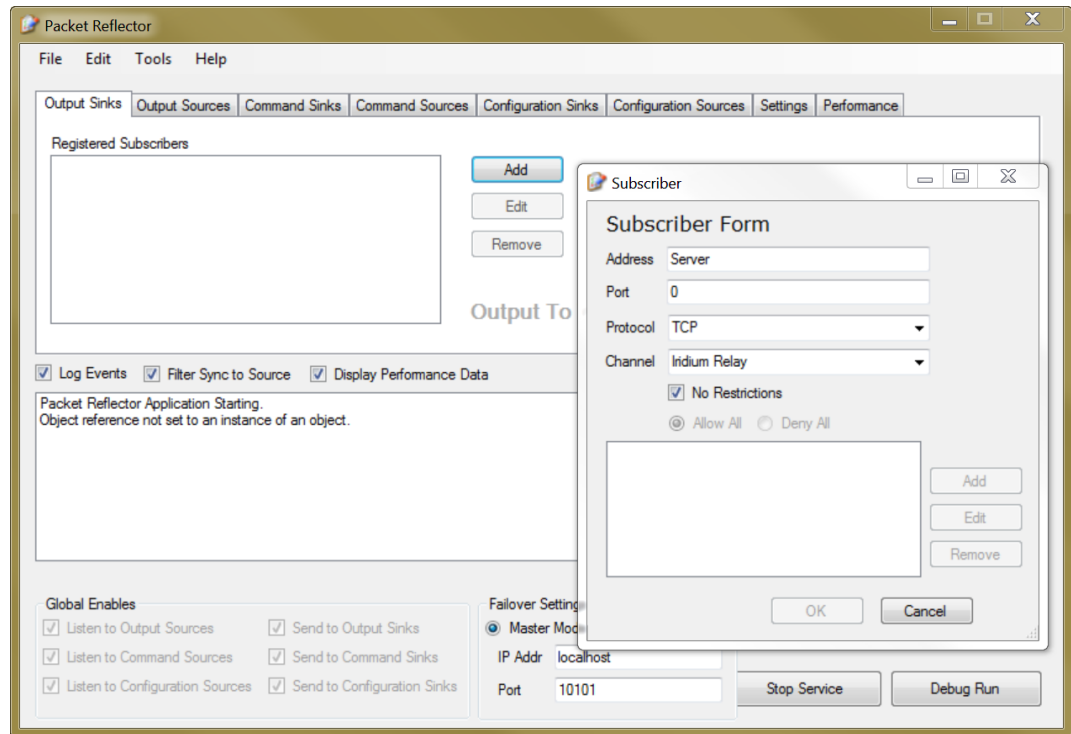
Packet reflector output sinks are subscribers registered to receive Wave Glider data packets from packet reflector output sources. When you click on the **Output Sinks** tab, the **Registered Subscribers** list appears in the configuration window. Registered subscribers can be added, edited, or removed.

Adding Registered Subscribers

To add a registered subscriber:

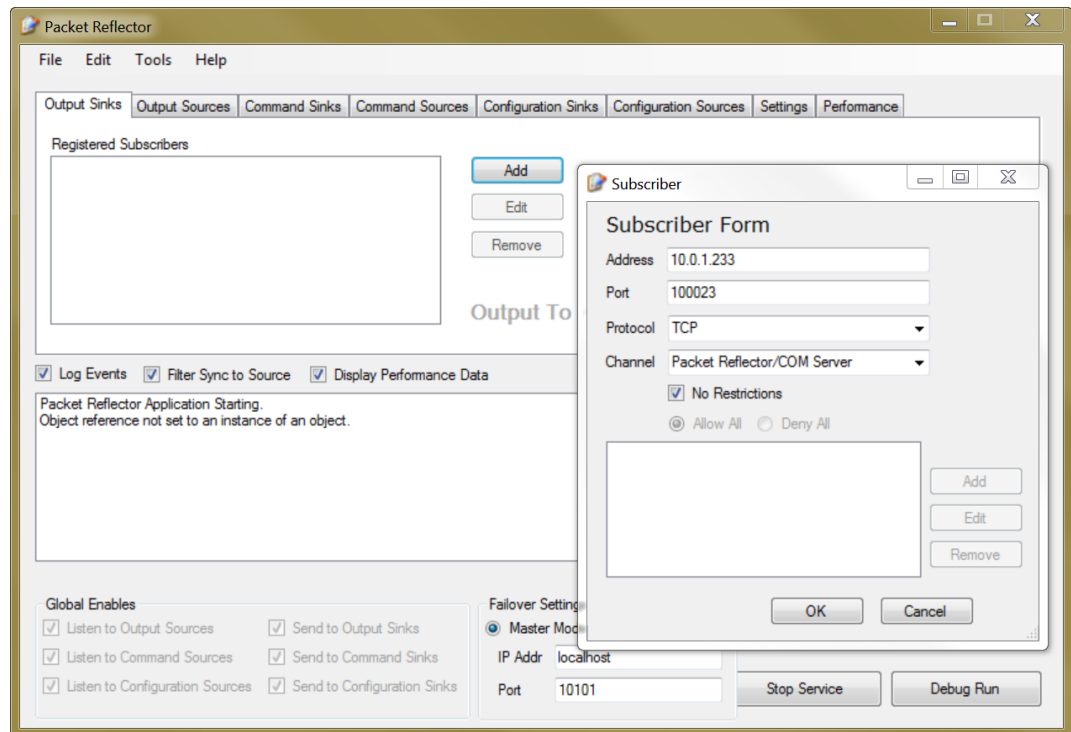
1. Click **Add** and the Subscriber Form will appear.

Adding a Registered Subscriber



2. Enter the **Address** (IP address or Fully Qualified Domain Name) of the subscriber.
3. Enter the **Port** used to access the subscriber.
4. Select the data transmission protocol (TCP or UDP) to be used from the **Protocol** drop-down menu. TCP is the default protocol setting and it is recommended.
5. Select the data transmission channel to be used from the **Channel** drop-down menu. There are 7 preconfigured options and 4 custom options, however, only the Packet Reflector/COM Server data transmission channel is supported with output sink subscribers. You must select the **Packet Reflector/COM** Server option.
6. The **No Restrictions** check-box is selected by default. If you do not want to set any restrictions on Wave Glider communication channels that the output sink can receive data packets from, click **OK** and the new unrestricted output sink subscriber will be added to the **Registered Subscribers** list under the **Output Sinks** configuration tab on the packet reflector Home Screen.

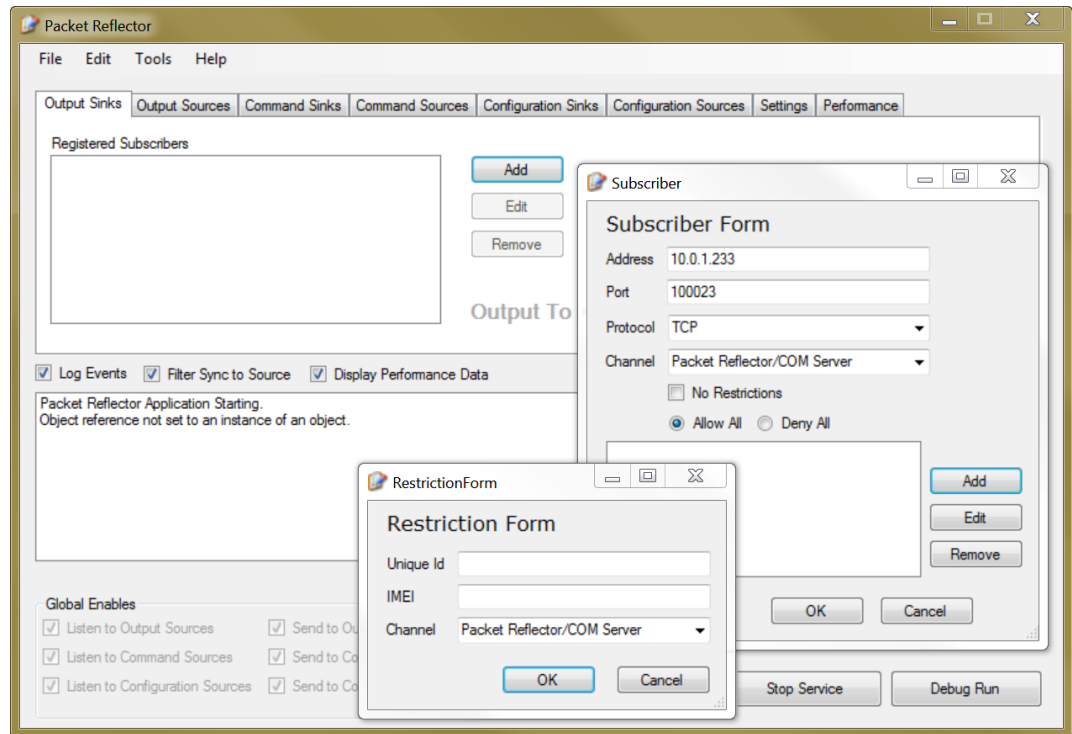
Adding a Registered Subscriber - No Restrictions



the following steps explain how you can configure restrictions to limit the Wave Gliders that the output sink subscriber can receive data packets from:

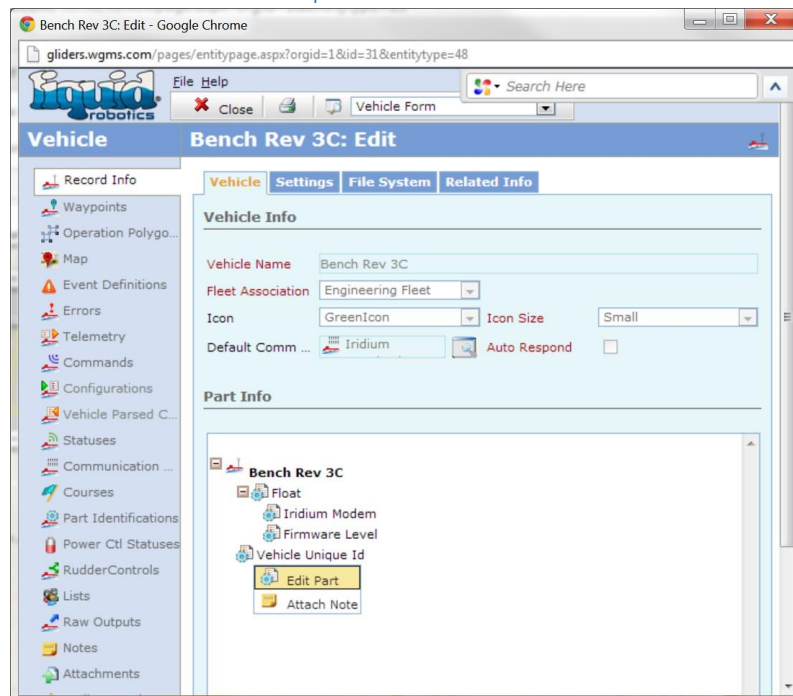
7. If you want to limit the Wave Gliders that the output sink subscriber can receive data packets from to one or more specific Wave Gliders, deselect the **No Restrictions** check-box, select the **Allow All** radio button, and click **Add**. The **Restriction Form** will appear.

Adding a Registered Subscriber - Restricted Allow All



8. Enter the **Unique Id** for the Wave Glider that you want to receive data from. You can find this information in the **Vehicle Info** screen on eWGMS - click **Vehicle Unique Id**, then click **Edit Part** and the **Part Info** screen will appear. Enter the vehicle **Serial Number** from the **Part Info** screen into the **Unique Id** field in the **Restriction Form**.

Wave Glider Vehicle Info - Vehicle Unique Id



Vehicle Unique Id - Part Info

Vehicle Unique Id: Edit - Google Chrome

gliders.wgms.com/pages/EntityPage.aspx?orgid=1&id=1834&entitytype=49&parenttype=48&parentid=31&vehicleid=31

File Help

Search Here

Close Part Form

Part

Vehicle Unique Id: Edit

Record Info

Sub Parts

Audit Records

Notes

Part

Part Info

Part Name: Vehicle Unique Id

Parent Part: [Field] Revision: [Field]

Build Date: [Field] Expected Life T...: [Field]

Part Number: [Field] Remaining Life...: [Field]

Serial Number: 1094795585 LR Serial Num...: [Field]

Type: Unique Id Vehicle

Manufacturer T...: Not Specified

Related Information

Owner: [Field] Organization: [Field] Gliders: [Field]

Created On: 201... 15:3... Updated On: 201... 21:...

Created By: System Admin Updated By: System Admin

9. Enter the International Mobile Station Equipment Identity (**IMEI**) that identifies the Iridium modem on the Wave Glider that you want to receive data from. You can find this information in the **Vehicle Info** screen on eWGMS - click **Iridium Modem**, then click **Edit Part** and the **Part Info** screen will appear. Enter the Iridium modem **Serial Number** from the **Part Info** screen into the **IMEI** field in the **Restriction Form**.

Wave Glider Vehicle Info - Iridium Modem

The screenshot shows the 'Bench Rev 3C: Edit' page in the eWGMS application. The page has a sidebar with a tree view of parts and a main content area with tabs for 'Vehicle', 'Settings', 'File System', and 'Related Info'. The 'Vehicle' tab is active, showing 'Vehicle Info' and 'Part Info' sections.

Vehicle Info

- Vehicle Name: Bench Rev 3C
- Fleet Association: Engineering Fleet
- Icon: GreenIcon
- Icon Size: Small
- Default Comm ...: Iridium
- Auto Respond: ☐

Part Info

- Bench Rev 3C
 - Float
 - Iridium Modem
 - Veh
 - Edit Part
 - Attach Note

Iridium Modem - Part Info

The screenshot shows the 'Iridium Modem: Edit' page in the eWGMS application. The page has a sidebar with a tree view of parts and a main content area with tabs for 'Part' and 'Related Info'. The 'Part' tab is active, showing 'Part Info' and 'Related Information' sections.

Part Info

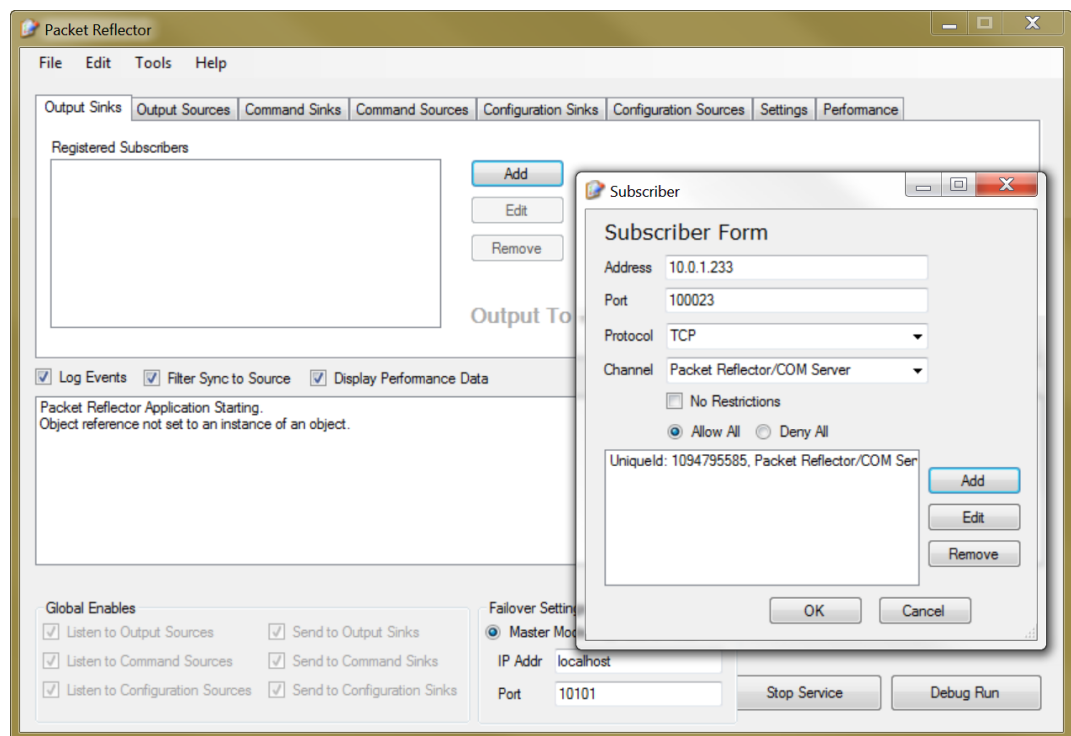
- Part Name: Iridium Modem
- Parent Part: Float
- Revision:
- Build Date:
- Expected Life Time: 0 minutes
- Part Number:
- Remaining Life Ti...: 0 minutes
- Serial Number: 300025010508020
- LR Serial Number:
- Type: Iridium Modem
- Vehicle: Bench Rev 3C
- Manufacturer Type: 9522B

Related Information

- Owner:
- Organization: Gliders
- Created On: 2008/... 19:15...
- Updated On: 2011/... 23:52...
- Created By: System Admin
- Updated By: Jim Kirklin

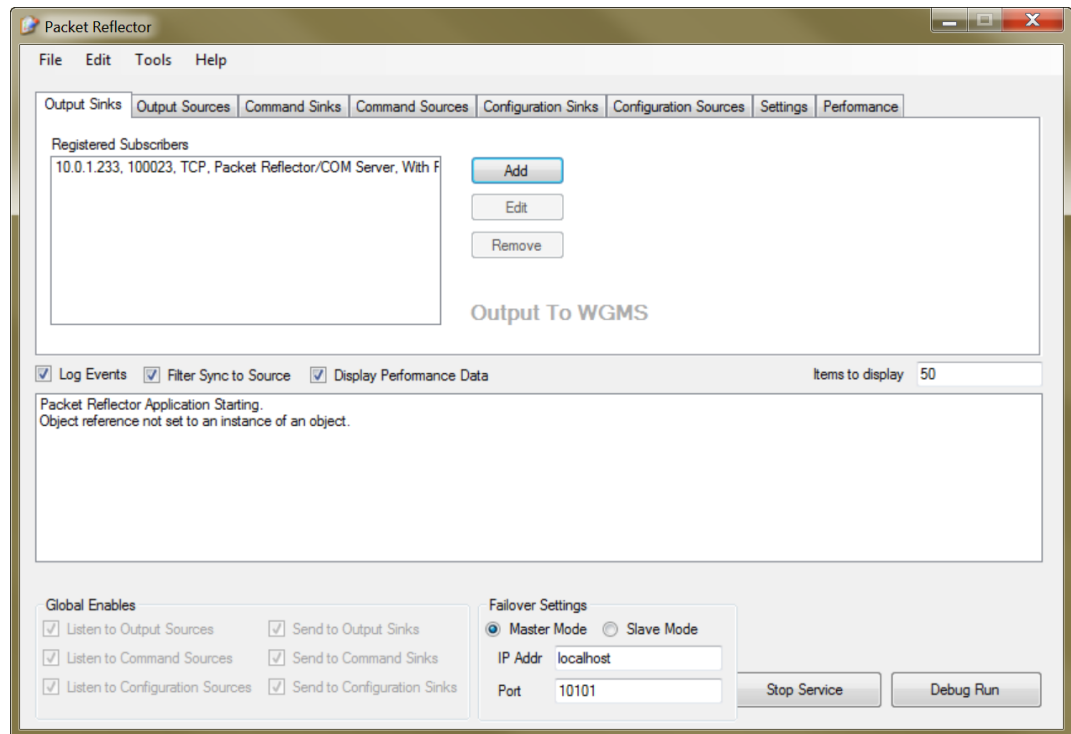
10. Select the data transmission Channel used by the specified Wave Glider for transmitting the data you want to receive. There are 7 preconfigured options and 4 custom options. Note, if you select **Packet Reflector/CommServer** you will receive data from all of the data transmission channels on the specified Wave Glider.
11. Click **OK** on the **Restriction Form** and the Wave Glider will be added to the **Subscriber Form** as an allowed output source.

Adding a Restriction to a Subscriber



12. Click **OK** on the **Subscriber Form** and the new restricted subscriber will be added to the **Registered Subscribers** list under the **Output Sinks** tab on the packet reflector Home Screen.

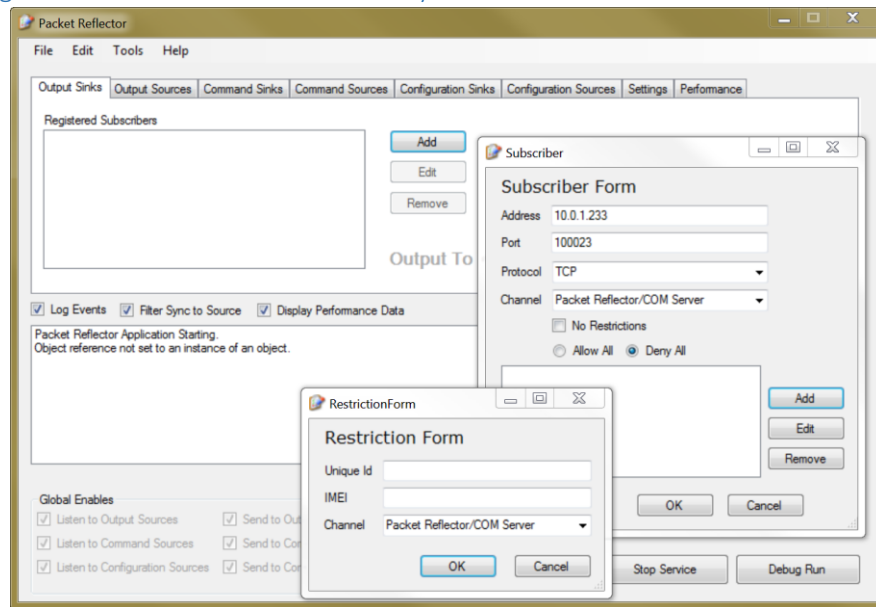
Adding a Restriction to a Subscriber



The following steps explain how you can configure restrictions to prevent the subscriber from receiving data from specific Wave Gliders:

13. If you want to prevent the subscriber from receiving data from one or more specific Wave Gliders, deselect the **No Restrictions** check-box, select the **Deny All** radio button, and click **Add**. The **Restriction Form** will appear.

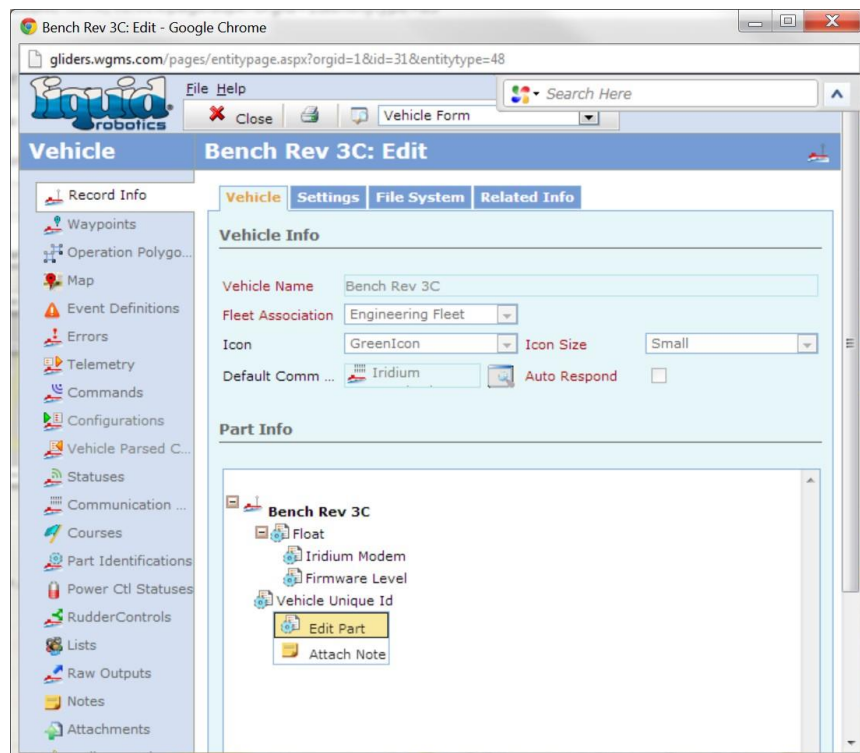
Adding a Registered Subscriber - Restricted Deny All



- Enter the **Unique Id** for the Wave Glider that you do not want to receive data from. You can find this information in the **Vehicle Info** screen on eWGMS - click **Vehicle Unique Id**, then click **Edit Part** and the **Part Info** screen will appear. Enter the vehicle **Serial**

Number from the **Part Info** screen into the **Unique Id** field in the **Restriction Form**.

Wave Glider Vehicle Info - Vehicle Unique Id



Vehicle Unique Id - Part Info

Vehicle Unique Id: Edit - Google Chrome

gliders.wgms.com/pages/EntityPage.aspx?orgid=1&id=1834&entitytype=49&parenttype=48&parentid=31&vehicleid=31

Part Vehicle Unique Id: Edit

Record Info Sub Parts Audit Records Notes

Part Info

Part Name Vehicle Unique Id

Parent Part Revision

Build Date Expected Life T...

Part Number Remaining Life...

Serial Number 1094795585 LR Serial Num...

Type Unique Id Vehicle Bench Rev 3C

Manufacturer T... Not Specified

Related Information

Owner Organization Gliders

Created On 201... 15:3... Updated On 201... 21:...

Created By System Admin Updated By System Admin

- Enter the International Mobile Station Equipment Identity (**IMEI**) that identifies the Iridium modem on the Wave Glider that you do not want to receive data from. You can find this information in the **Vehicle Info** screen on eWGMS - click **Iridium Modem**, then click **Edit Part** and the **Part Info** screen will appear. Enter the Iridium modem **Serial Number** from the **Part Info** screen into the **IMEI** field in the **Restriction Form**.

Wave Glider Vehicle Info - Iridium Modem

Bench Rev 3C: Edit - Google Chrome

gliders.wgms.com/pages/entitypage.aspx?orgid=1&id=31&entitytype=48

Vehicle Bench Rev 3C: Edit

Record Info Waypoints Operation Polygo... Map Event Definitions Errors Telemetry Commands Configurations Vehicle Parsed C... Statuses Communication ... Courses Part Identifications Power Ctl Statuses RudderControls Lists Raw Outputs Notes Attachments

Vehicle Settings File System Related Info

Vehicle Info

Vehicle Name Bench Rev 3C

Fleet Association Engineering Fleet

Icon GreenIcon Icon Size Small

Default Comm ... Iridium Auto Respond

Part Info

Bench Rev 3C

Float

Iridium Modem

Edit Part

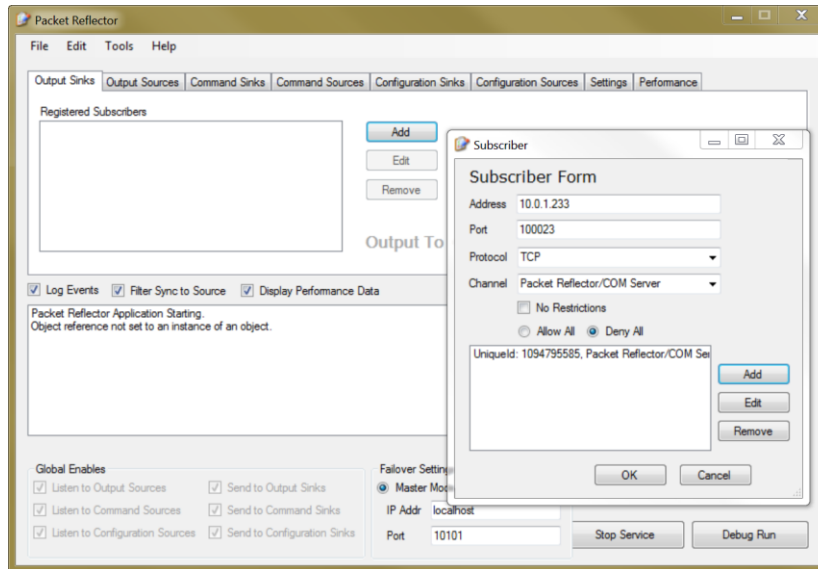
Attach Note

Iridium Modem - Part Info

The screenshot shows the 'Iridium Modem: Edit' form in the eWGMS application. The form is displayed in a Google Chrome browser window. The URL is pack.wgms.com/pages/EntityPage.aspx?orgid=1&id=319&entitytype=498&parenttype=498&parentid=318&vehicleid=31. The form has a left sidebar with 'Record Info', 'Sub Parts', 'Audit Records', and 'Notes'. The main area is titled 'Iridium Modem: Edit' and contains a 'Part Info' section with fields for Part Name, Parent Part, Build Date, Part Number, Serial Number, Type, and Manufacturer Type. It also has a 'Related Information' section with fields for Owner, Organization, Created On, Updated On, Created By, and Updated By.

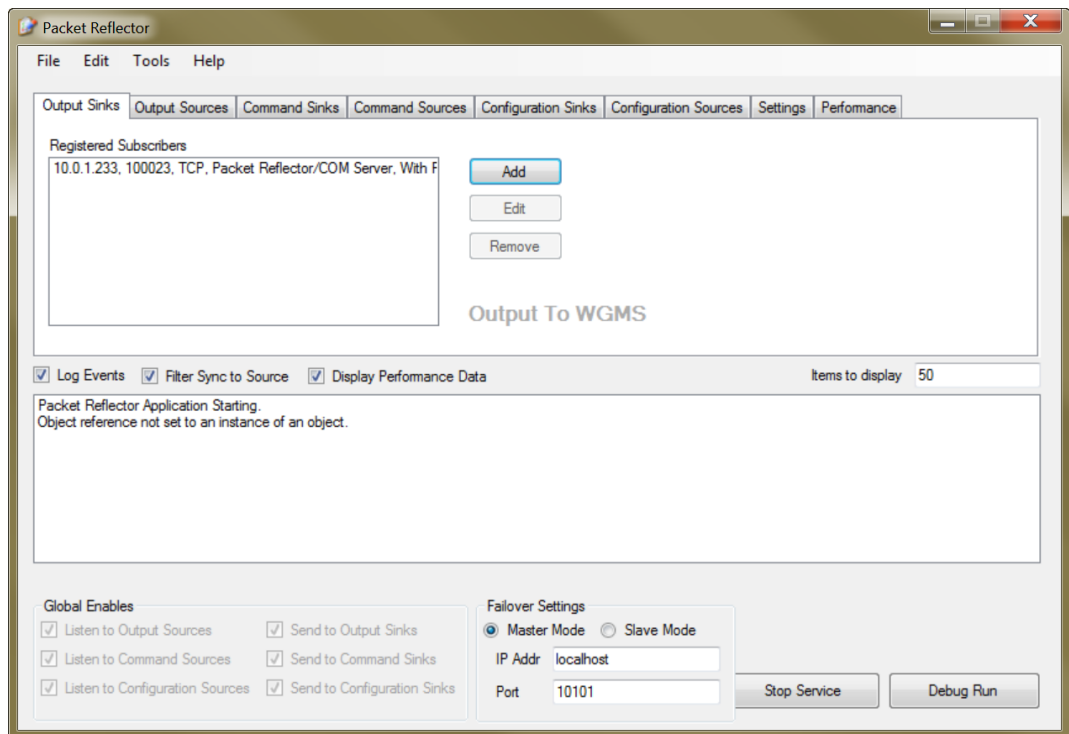
16. Select the data transmission Channel used by the Wave Glider for transmitting the data that you do not want to receive. There are 7 preconfigured options and 4 custom options, however, only the Packet Reflector/COM Server data transmission channel is supported with output sink subscribers because that is the communications link between the packet reflector and eWGMS. You must select the **Packet Reflector/COM** Server option.
17. Click **OK** on the **Restriction Form** and the output source will be added to the **Subscriber Form** as a denied output source.

Adding a Restriction to a Subscriber



18. Click **OK** on the **Subscriber Form** and the new restricted subscriber will be added to the **Registered Subscribers** list under the **Output Sinks** tab on the packet reflector Home Screen.

Adding a Restriction to a Subscriber



8.2.3 Editing Registered Subscribers

To edit a registered subscriber:

1. Select a subscriber in the **Registered Subscribers** list and click **Edit** - a **Subscriber Form** containing the configuration parameters for the selected subscriber will appear.
2. Make edits to the **Address**, **Port**, **Protocol**, and **Channel** fields, as needed.
3. If the **No Restrictions** check-box is selected and you do not need to add any restrictions to the subscriber configuration, click **OK** and the edited subscriber will be added to the **Registered Subscribers** list under the **Output Sinks** tab on the packet reflector Home screen.

If you need to add or edit restrictions to limit the Wave Glider communication channels that the subscriber can receive data from, perform the following steps:

4. Deselect the **No Restrictions** check-box, select the **Allow All** radio button, and click **Add**. The **Restriction Form** will appear.
5. Make edits to the **Unique Id**, **IMEI**, and **Channel** fields, as needed.
6. Click **OK** on the **Restriction Form** and the Wave Glider communication channel will be added to the **Subscriber Form** as an allowed output source.
7. Click **OK** on the **Subscriber Form** and the edited restricted subscriber will be added to the **Registered Subscribers** list under the **Output Sinks** tab on the packet reflector Home Screen.

If you need to add or edit restrictions to prevent the subscriber from receiving data from specific Wave Glider communication channels, perform the following steps:

8. Deselect the **No Restrictions** check-box, select the **Deny All** radio button, and click **Add**. The **Restriction Form** will appear.
9. Make edits to the **Unique Id**, **IMEI**, and **Channel** fields, as needed.
10. Click **OK** on the **Restriction Form** and the Wave Glider communication channel will

be added to the **Subscriber Form** as a denied output source.

11. Click **OK** on the **Subscriber Form** and the edited restricted subscriber will be added to the **Registered Subscribers** list under the **Output Sinks** tab on the packet reflector Home Screen.

8.2.4 Removing Registered Subscribers

To delete a registered subscriber from the packet reflector configuration, select a registered subscriber in the **Registered Subscribers** list and click **Remove**.

8.2.5 Configuring Output Sources

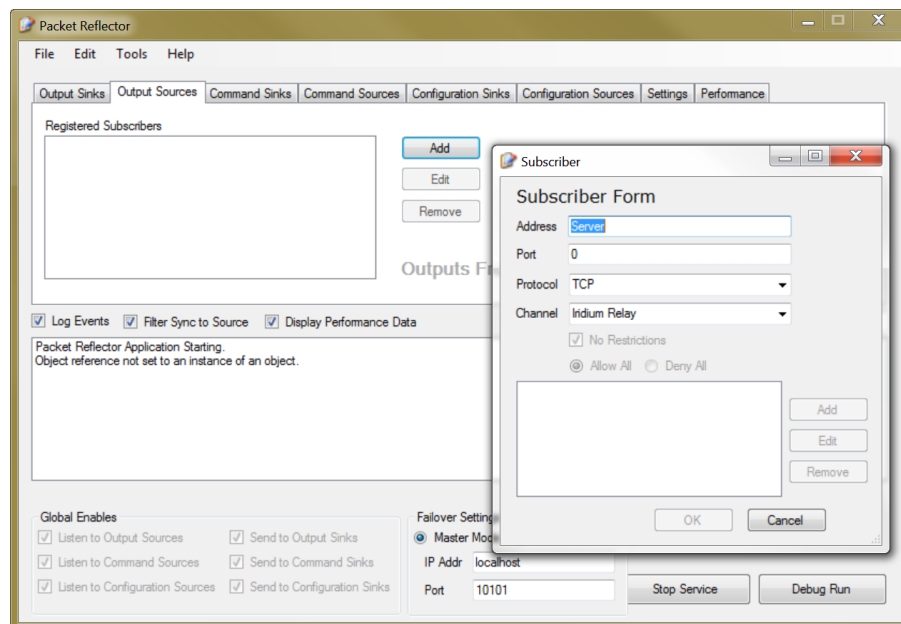
Packet reflector output sources are subscribers registered to send data packets to packet reflector output sinks. When you click on the **Output Sources** tab, the **Registered Subscribers** list appears in the configuration window. Registered subscribers can be added, edited, or removed.

Adding Registered Subscribers

To add a registered subscriber:

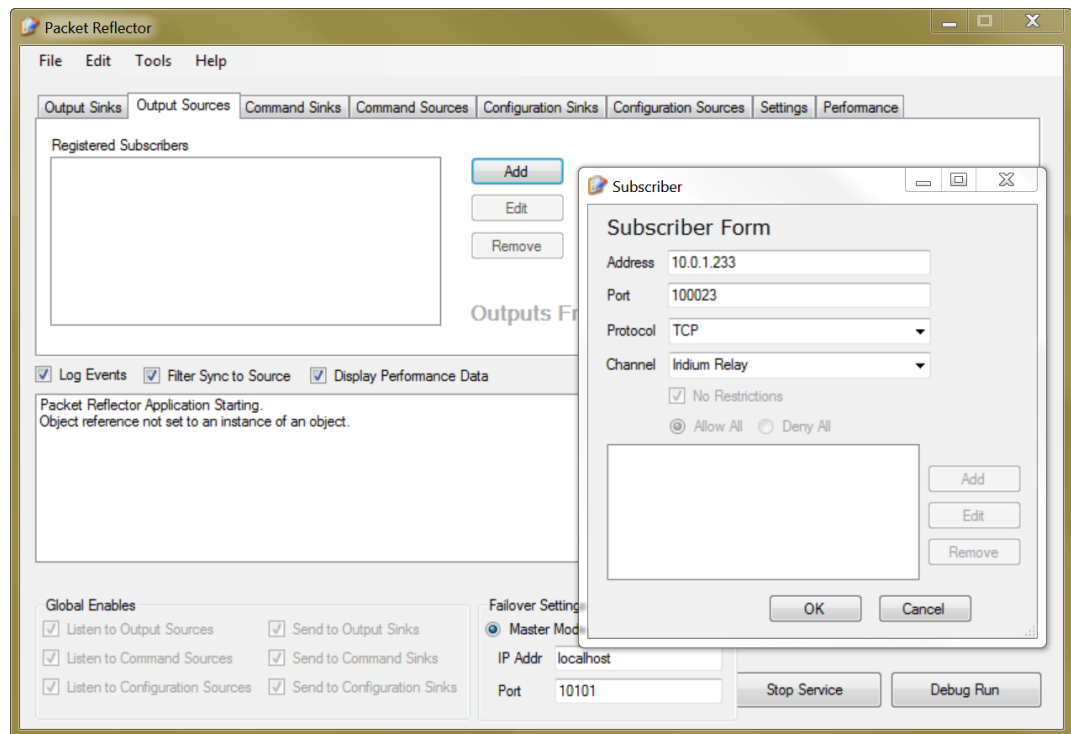
1. Click **Add** and the Subscriber Form will appear.

Adding a Registered Subscriber



2. Enter the **Address** (IP address or Fully Qualified Domain Name) of the subscriber.
3. Enter the **Port** used to access the subscriber.
4. Select the data transmission protocol (TCP or UDP) to be used from the **Protocol** drop-down menu.
5. Select the data transmission channel to be used from the **Channel** drop-down menu. There are 7 preconfigured options and 4 custom options, as follows:
 - Packet Reflector/COM Server
 - Iridium Relay
 - XBee Relay
 - Serial Relay
 - WiFi Relay
 - Alt Iridium Relay
 - Iridium EMSS Relay
 - Custom Relay Type 7
 - Custom Relay Type 8
 - Custom Relay Type 9
 - Custom Relay Type 10
6. The **No Restrictions** check-box is selected by default. Restrictions cannot be configured on output sources. Click **OK** and the new subscriber will be added to the **Registered Subscribers** list under the **Output Sources** configuration tab on the packet reflector Home Screen.

Adding a Registered Output Source Subscriber



Editing Registered Subscribers

To edit a registered subscriber:

1. Select a subscriber in the **Registered Subscribers** list and click **Edit** - a **Subscriber Form** containing the configuration parameters for the selected subscriber will appear.
2. Make edits to the **Address**, **Port**, **Protocol**, and **Channel** fields, as needed.
3. The **No Restrictions** check-box is selected by default. Restrictions cannot be configured on output sources.

Click **OK** on the **Subscriber Form** and the edited restricted subscriber will be added to the **Registered Subscribers** list under the **Output Sources** tab on the packet reflector Home Screen.

Removing Registered Subscribers

To delete a registered subscriber from the packet reflector configuration, select a registered subscriber in the **Registered Subscribers** list and click **Remove**.

8.2.6 Configuring Command Sinks

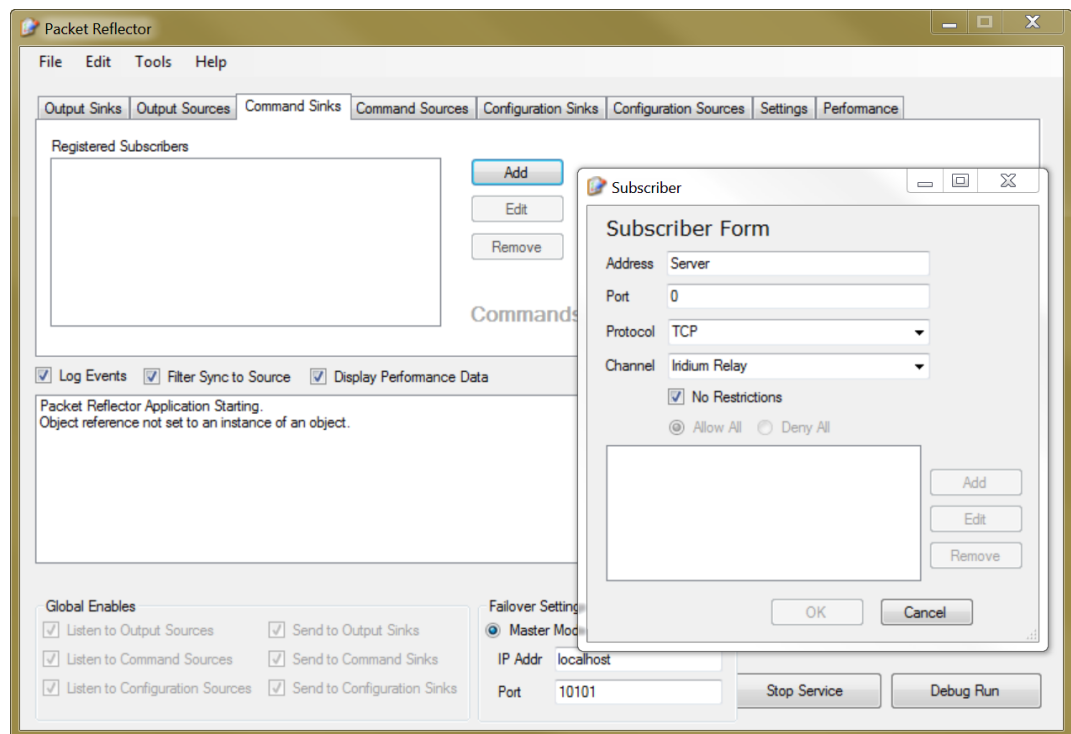
Packet reflector command sinks are subscribers registered to receive command data packets from packet reflector command sources (typically eWGMS). When you click on the **Command Sinks** tab, the **Registered Subscribers** list appears in the configuration window. Registered subscribers can be added, edited, or removed.

Adding Registered Subscribers

To add a registered subscriber:

1. Click **Add** and the Subscriber Form will appear.

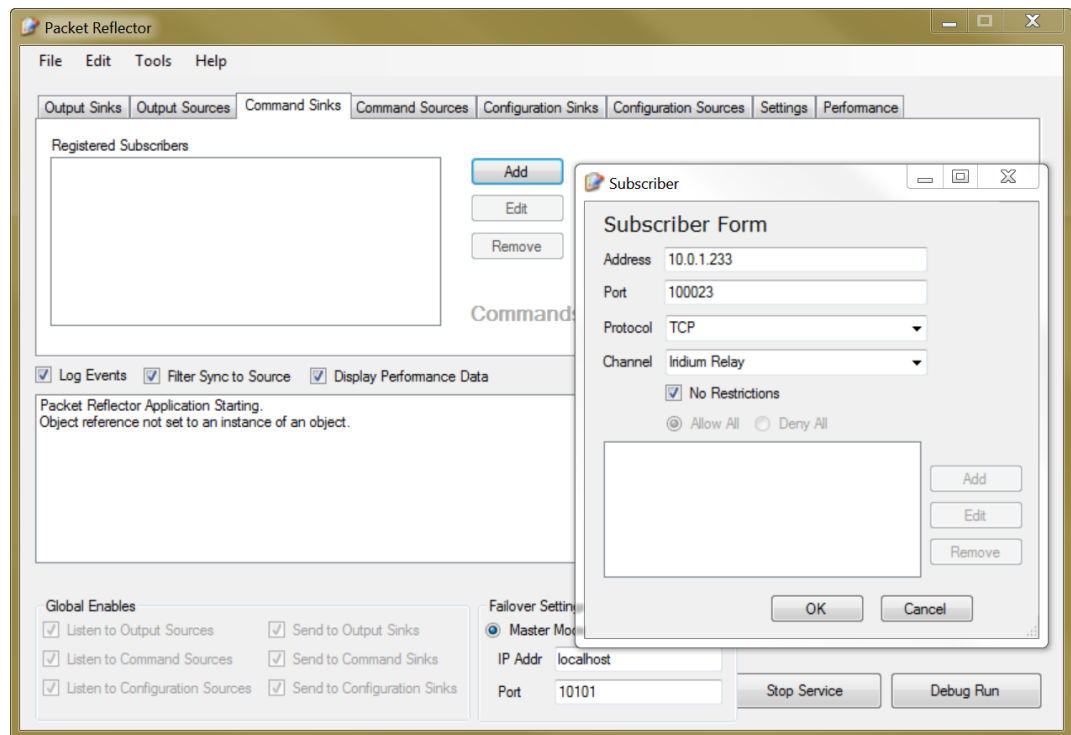
Adding a Registered Subscriber



2. Enter the **Address** (IP address or Fully Qualified Domain Name) of the subscriber.
3. Enter the **Port** used to access the subscriber.
4. Select the data transmission protocol (TCP or UDP) to be used from the **Protocol** drop-down menu. TCP is the default protocol setting and it is recommended.
5. Select the data transmission channel to be used from the **Channel** drop-down menu. There are 7 preconfigured options and 4 custom options, as follows:
 - Packet Reflector/COM Server
 - Iridium Relay

- XBee Relay
 - Serial Relay
 - WiFi Relay
 - Alt Iridium Relay
 - Iridium EMSS Relay
 - Custom Relay Type 7
 - Custom Relay Type 8
 - Custom Relay Type 9
 - Custom Relay Type 10
6. The **No Restrictions** check-box is selected by default. If you do not want to restrict the Wave Glider communication channels that a command sink subscriber can receive command packets over, click **OK** and the new unrestricted command sink subscriber will be added to the **Registered Subscribers** list under the **Command Sinks** configuration tab on the packet reflector Home Screen.

Adding a Registered Subscriber - No Restrictions

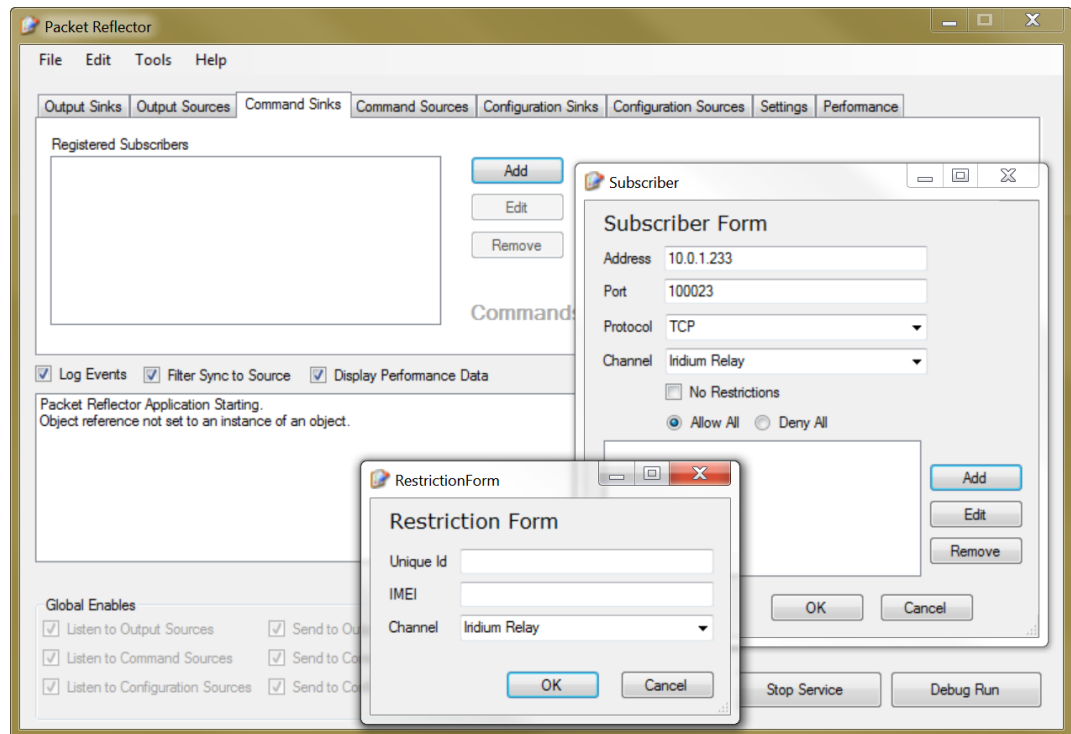


the following steps explain how you can configure restrictions to limit the communication channels that a Wave Glider can receive command packets over:

7. If you want to limit the command sink subscribers that a Wave Glider can receive data packets

from to one or more specific communication channels, deselect the **No Restrictions** check-box, select the **Allow All** radio button, and click **Add**. The **Restriction Form** will appear.

Adding a Registered Subscriber - Restricted Allow All



8. Enter the **Unique Id** for the Wave Glider that the command sink subscriber will be allowed to transmit command packets to. You can find this information in the **Vehicle Info** screen on eWGMS - click **Vehicle Unique Id**, then click **Edit Part** and the **Part Info** screen will appear. Enter the vehicle **Serial Number** from the **Part Info** screen into the **Unique Id** field in the **Restriction Form**.

Wave Glider Vehicle Info - Vehicle Unique Id

The screenshot shows the 'Bench Rev 3C: Edit' page in the eWGMS application. The page is divided into two main sections: 'Vehicle Info' and 'Part Info'.

Vehicle Info:

- Vehicle Name: Bench Rev 3C
- Fleet Association: Engineering Fleet
- Icon: GreenIcon
- Icon Size: Small
- Default Comm ...: Iridium
- Auto Respond: ☐

Part Info:

- Part Name: Bench Rev 3C
- Part Type: Float
- Part Details: Iridium Modem, Firmware Level, Vehicle Unique Id
- Buttons: Edit Part, Attach Note

Vehicle Unique Id - Part Info

The screenshot shows the 'Vehicle Unique Id: Edit' page in the eWGMS application. The page is divided into two main sections: 'Part Info' and 'Related Information'.

Part Info:

- Part Name: Vehicle Unique Id
- Parent Part:
- Revision:
- Build Date:
- Expected Life T...:
- Part Number:
- Remaining Life...:
- Serial Number: 1094795585
- LR Serial Num...:
- Type: Unique Id
- Vehicle: Bench Rev 3C
- Manufacturer T...: Not Specified

Related Information:

- Owner:
- Organization: Gliders
- Created On: 201... 15:3...
- Updated On: 201... 21:...
- Created By: System Admin
- Updated By: System Admin

9. Enter the International Mobile Station Equipment Identity (**IMEI**) that identifies the Iridium modem on the Wave Glider that the command sink subscriber will be allowed to transmit data to. You can find this information in the **Vehicle Info** screen on eWGMS - click **Iridium Modem**, then click **Edit Part** and the **Part Info** screen will appear. Enter the Iridium modem **Serial Number** from the **Part Info** screen into the **IMEI** field in the **Restriction Form**.

Wave Glider Vehicle Info - Iridium Modem

The screenshot shows the 'Bench Rev 3C: Edit' page in the eWGMS web interface. The page has a sidebar with navigation links and a main content area with tabs for 'Vehicle', 'Settings', 'File System', and 'Related Info'. The 'Vehicle Info' section contains the following fields:

- Vehicle Name: Bench Rev 3C
- Fleet Association: Engineering Fleet
- Icon: GreenIcon
- Icon Size: Small
- Default Comm: Iridium
- Auto Respond: ☐

The 'Part Info' section shows a tree view with 'Bench Rev 3C' expanded, showing 'Float', 'Iridium Modem', and 'Veh'. The 'Iridium Modem' is selected, and a context menu is open with options 'Edit Part' and 'Attach Note'.

Iridium Modem - Part Info

Part **Iridium Modem: Edit**

Record Info
Sub Parts
Audit Records
Notes

Part Info

Part Name: Iridium Modem

Parent Part: Float Revision:

Build Date: Expected Life Time: 0 minutes

Part Number: Remaining Life Ti...: 0 minutes

Serial Number: 300025010508020 LR Serial Number:

Type: Iridium Modem Vehicle: Bench Rev 3C

Manufacturer Type: 9522B

Related Information

Owner: Organization: Gliders

Created On: 2008/... 19:15... Updated On: 2011/... 23:52...

Created By: System Admin Updated By: Jim Kirklin

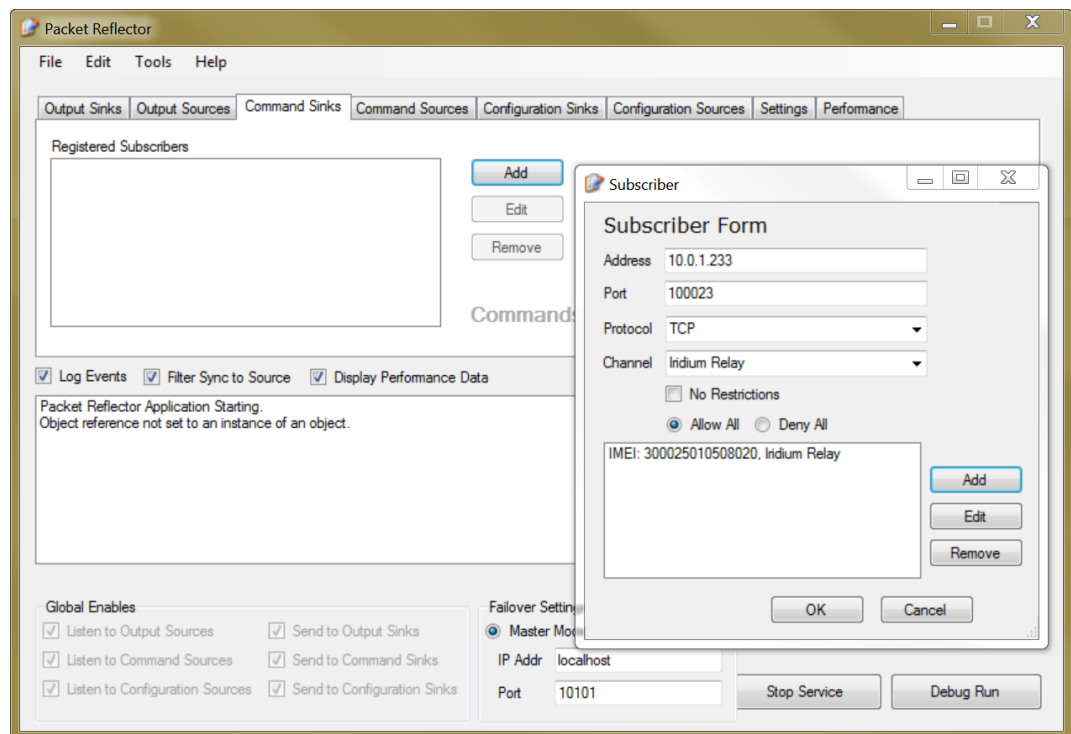
10. As in Figure 4.28, Select the Wave Glider transmission Channel used by the command sink subscriber you want to receive command packets from. There are 7 preconfigured options and 4 custom options, as follows:

- Packet Reflector/COM Server
- **Iridium Relay**
- **XBee Relay**
- **Serial Relay**
- **WiFi Relay**
- **Alt Iridium Relay**
- **Iridium EMSS Relay**

- **Custom Relay Type 7**
- **Custom Relay Type 8**
- **Custom Relay Type 9**
- **Custom Relay Type 10**

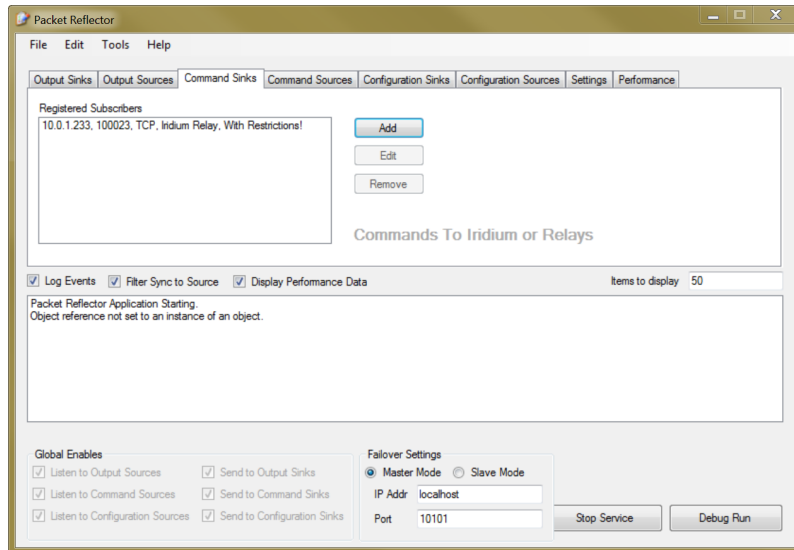
11. Click **OK** on the **Restriction Form** and the Wave Glider communication channel will be added to the **Subscriber Form** as an allowed command source.

Adding a Restriction to the Subscriber Form



12. Click **OK** on the **Subscriber Form** and the new allowed subscriber will be added to the **Registered Subscribers** list under the **Command Sinks** tab on the packet reflector Home Screen.

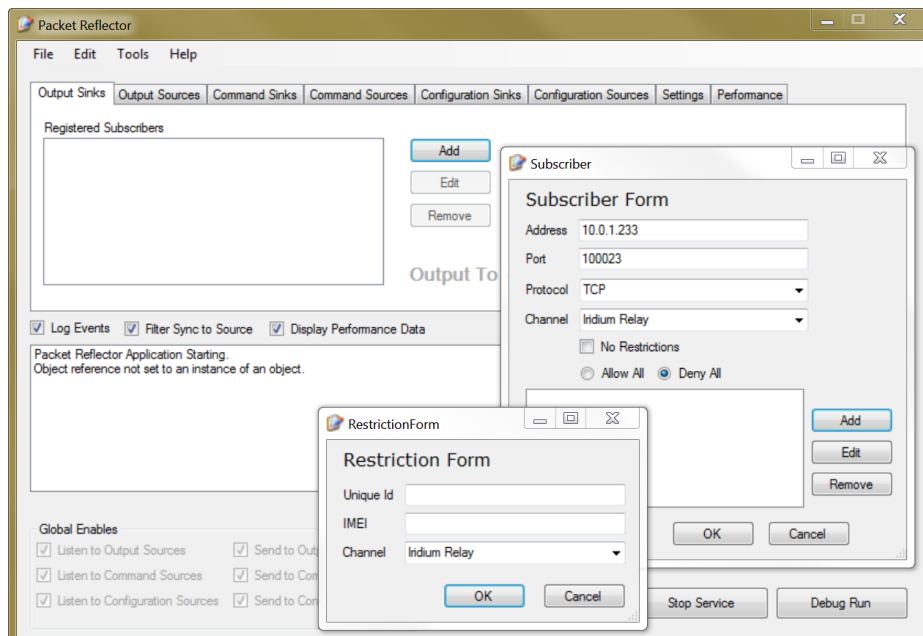
Adding a Restricted Subscriber



The following steps explain how you can configure restrictions to prevent the Wave Glider from receiving command packets over specific communications channels:

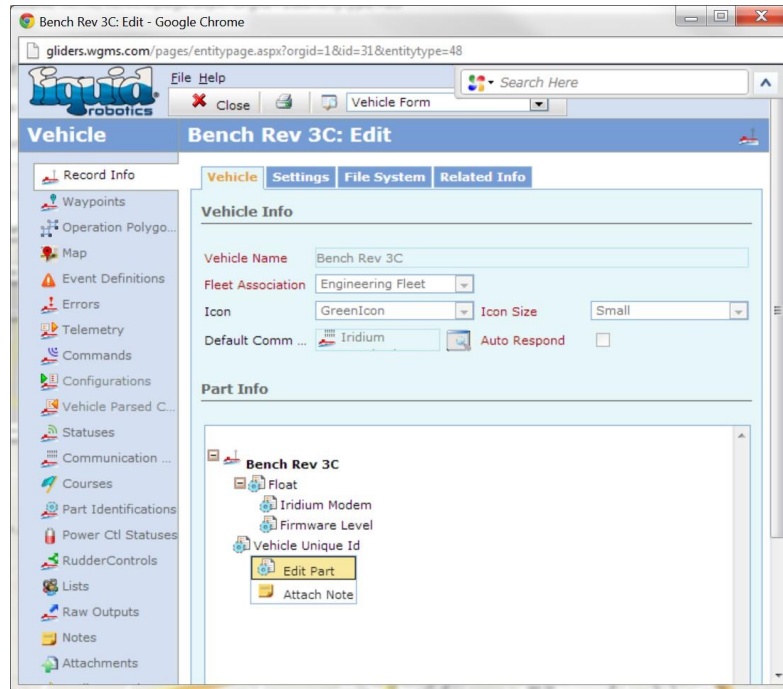
13. If you want to prevent the Wave Glider from receiving command packets from one or more specific communication channels, deselect the **No Restrictions** check-box, select the **Deny All** radio button, and click **Add**. The **Restriction Form** will appear.

Adding a Registered Subscriber - Restricted Deny All

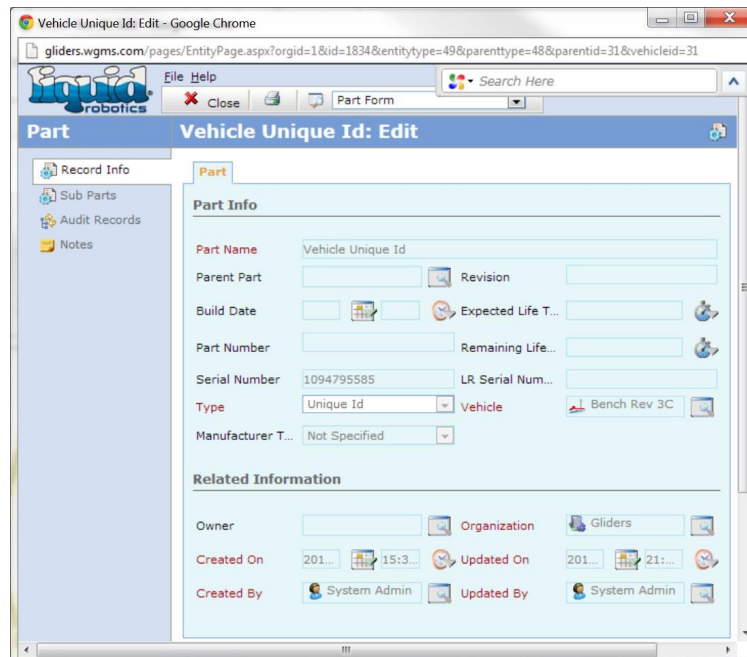


14. Enter the **Unique Id** for the Wave Glider that you do not want command packets transmitted to. You can find this information in the **Vehicle Info** screen on eWGMS - click **Vehicle Unique Id** , then click **Edit Part** and the **Part Info** screen will appear. Enter the vehicle **Serial Number** from the **Part Info** screen into the **Unique Id** field in the **Restriction Form**.

Wave Glider Vehicle Info - Vehicle Unique Id

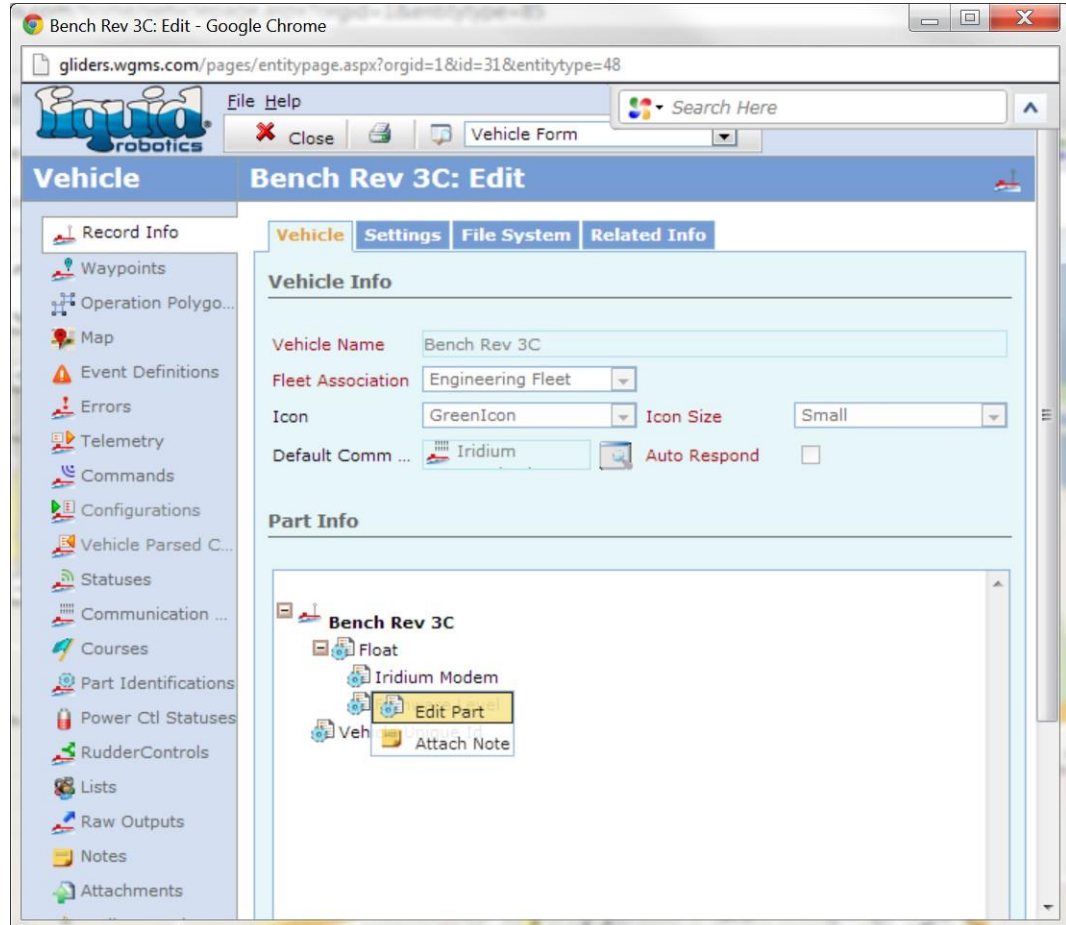


Vehicle Unique Id - Part Info

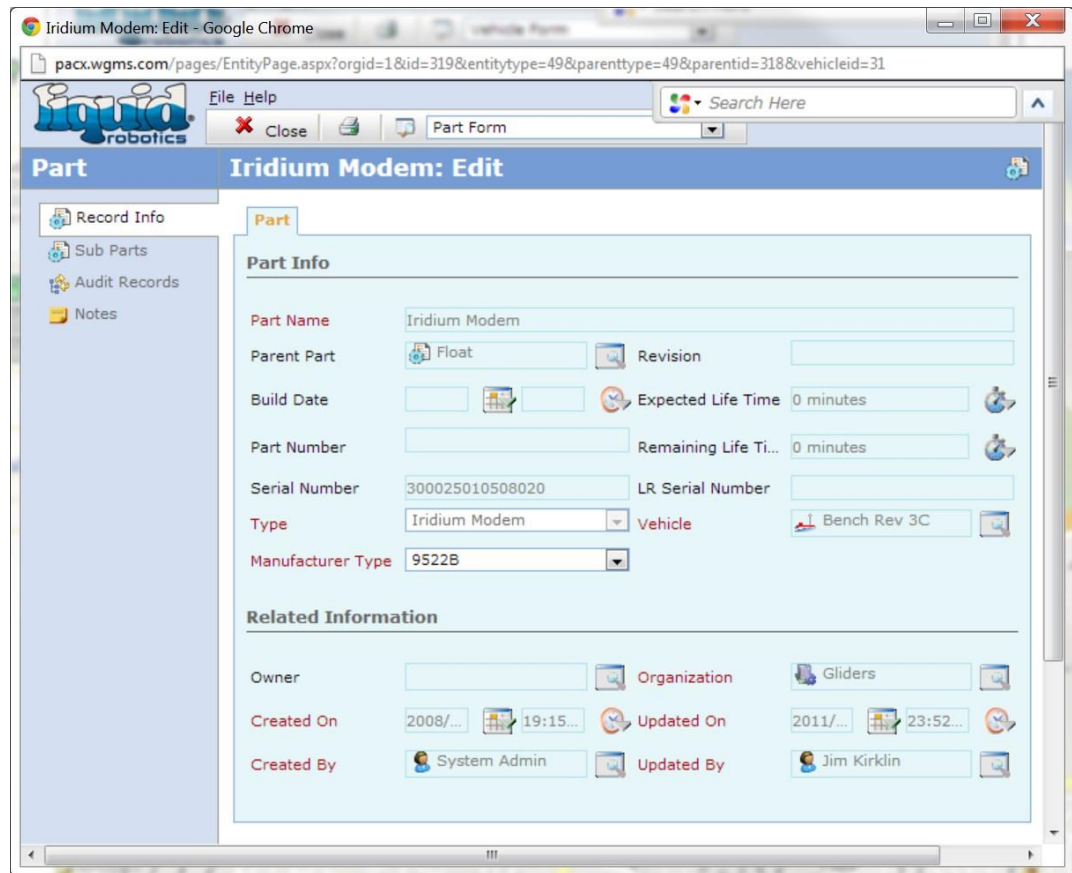


15. Enter the International Mobile Station Equipment Identity (**IMEI**) that identifies the Iridium modem on the Wave Glider that you do not want command packets sent to. You can find this information in the **Vehicle Info** screen on eWGMS - click **Iridium Modem**, then click **Edit Part** and the **Part Info** screen will appear. Enter the Iridium modem **Serial Number** from the **Part Info** screen into the **IMEI** field in the **Restriction Form**.

Wave Glider Vehicle Info - Iridium Modem



Iridium Modem - Part Info



Part **Iridium Modem: Edit**

Record Info
Sub Parts
Audit Records
Notes

Part Info

Part Name: Iridium Modem

Parent Part: Float Revision:

Build Date: Expected Life Time: 0 minutes

Part Number: Remaining Life Ti...: 0 minutes

Serial Number: 300025010508020 LR Serial Number:

Type: Iridium Modem Vehicle: Bench Rev 3C

Manufacturer Type: 9522B

Related Information

Owner: Organization: Gliders

Created On: 2008/... 19:15... Updated On: 2011/... 23:52...

Created By: System Admin Updated By: Jim Kirklin

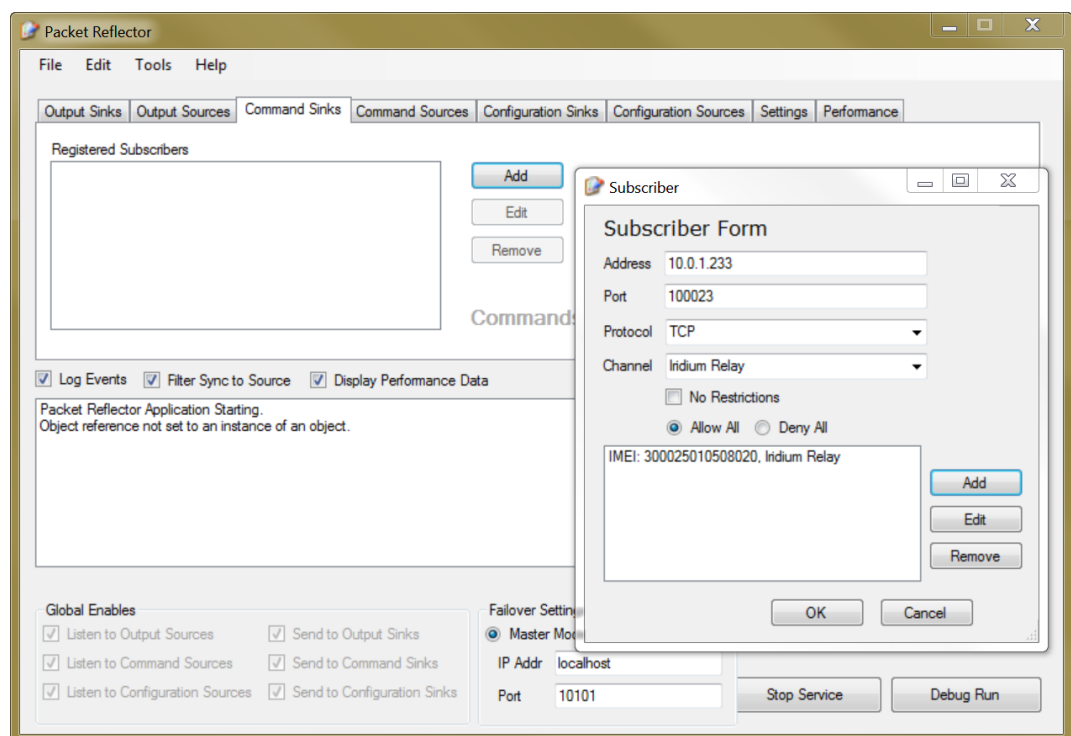
16. Select the Wave Glider communication Channel that you do not want to receive command packets on. There are 7 preconfigured options and 4 custom options, as follows:

- Packet Reflector/COM Server
 - **Iridium Relay**
 - **X Bee Relay**
 - **Serial Relay**
 - **Wiki Relay**
 - **Alt Iridium Relay**
 - **Iridium EMSS Relay**
 - **Custom Relay Type 7**

- **Custom Relay Type 8**
- **Custom Relay Type 9**
- **Custom Relay Type 10**

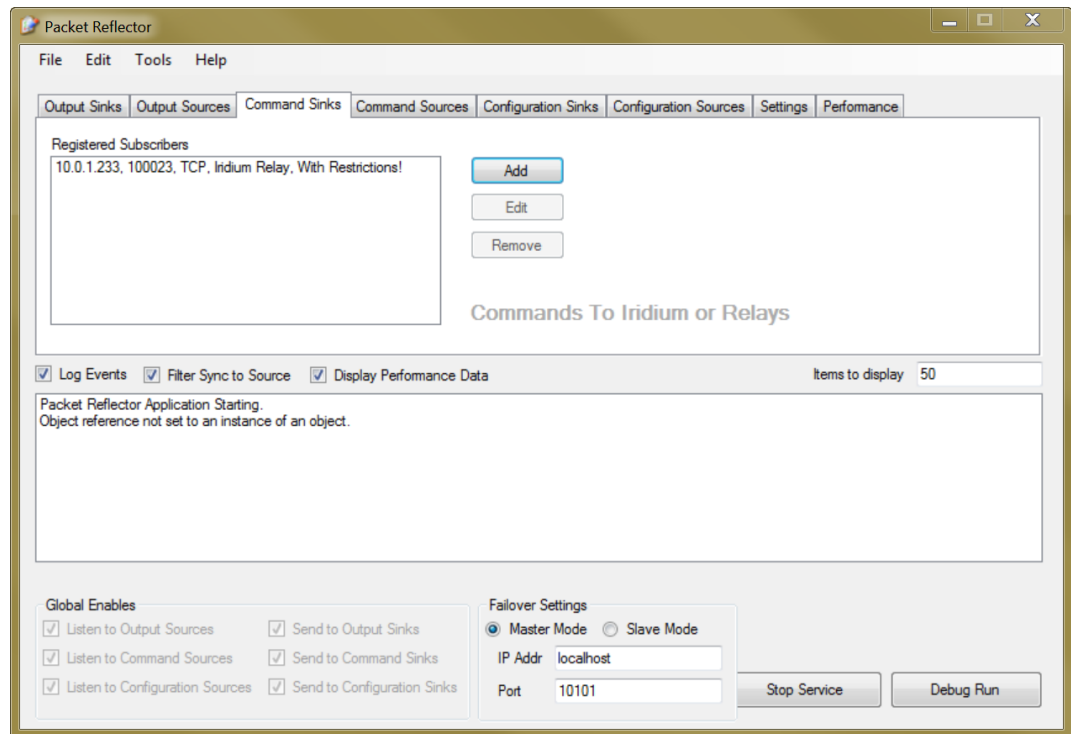
17. Click **OK** on the **Restriction Form** and the Wave Glider communication channel will be added to the **Subscriber Form** as a denied command source.

Adding a Restriction to the Subscriber Form



18. Click **OK** on the **Subscriber Form** and the new restricted subscriber will be added to the **Registered Subscribers** list under the **Command Sinks** tab on the packet reflector Home Screen.

Adding a Restricted Subscriber



8.2.7 Editing Registered Subscribers

To edit a registered subscriber:

1. Select a subscriber in the **Registered Subscribers** list and click **Edit** - a **Subscriber Form** containing the configuration parameters for the selected subscriber will appear.
2. Make edits to the **Address**, **Port**, **Protocol**, and **Channel** fields, as needed.
3. If the **No Restrictions** check-box is selected and you do not need to add any restrictions to the subscriber configuration, click **OK** and the edited subscriber will be added to the **Registered Subscribers** list under the **Command Sinks** tab on the packet reflector Home screen.

If you need to add or edit restrictions to limit the Wave Glider communication channels the subscriber can receive data from, perform the following steps:

4. Deselect the **No Restrictions** check-box, select the **Allow All** radio button, and click **Add**. The **Restriction Form** will appear.
5. Make edits to the **Unique Id**, **IMEI**, and **Channel** fields, as needed.

6. Click **OK** on the **Restriction Form** and the Wave Glider communication channel will be added to the **Subscriber Form** as an allowed command source.
7. Click **OK** on the **Subscriber Form** and the edited restricted subscriber will be added to the **Registered Subscribers** list under the **Command Sinks** tab on the packet reflector Home Screen.

If you need to add or edit restrictions to prevent the Wave Glider from receiving command packets over specific communication channels, perform the following steps:

8. Deselect the **No Restrictions** check-box, select the **Deny All** radio button, and click **Add**. The **Restriction Form** will appear.
9. Make edits to the **Unique Id**, **IMEI**, and **Channel** fields, as needed.
10. Click **OK** on the **Restriction Form** and the Wave Glider communication channel will be added to the **Subscriber Form** as a denied command source.
11. Click **OK** on the **Subscriber Form** and the edited restricted subscriber will be added to the **Registered Subscribers** list under the **Command Sinks** tab on the packet reflector Home Screen.

8.2.8 Removing Registered Subscribers

To delete a registered subscriber from the packet reflector configuration, select a registered subscriber in the **Registered Subscribers** list and click **Remove**.

8.3 Configuring Command Sources

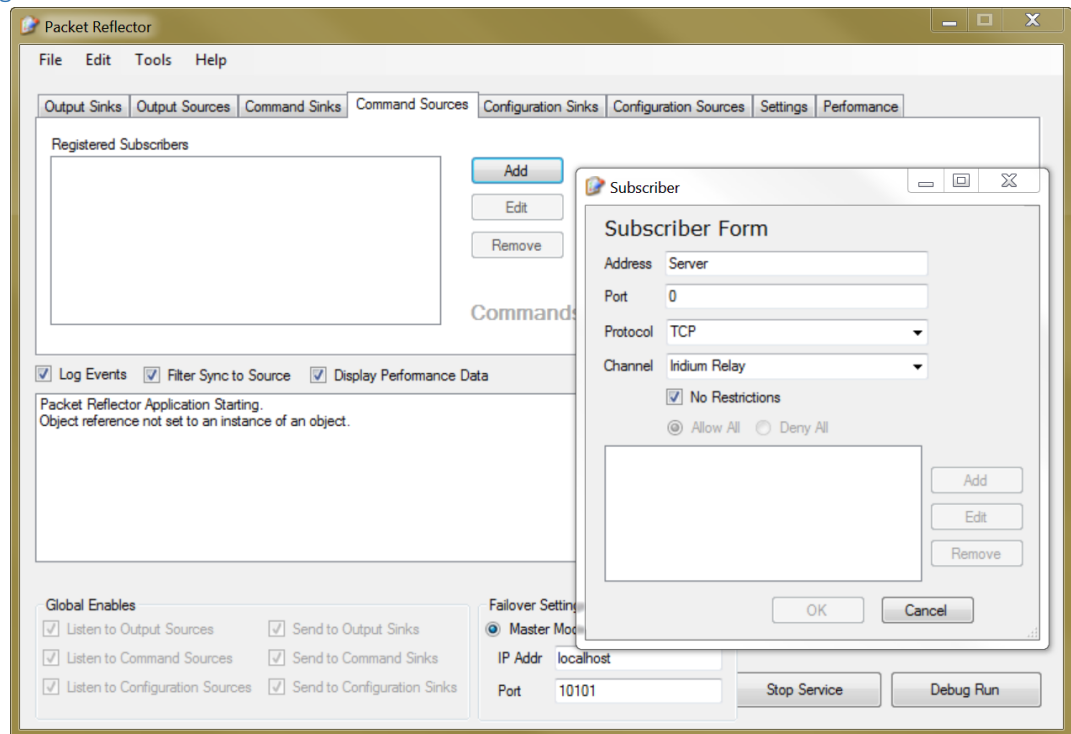
Packet reflector command sources are subscribers registered to send command data packets to packet reflector command sinks. When you click on the **Command Sources** tab, the **Registered Subscribers** list appears in the configuration window. Registered subscribers can be added, edited, or removed.

8.3.1 Adding Registered Subscribers

To add a registered subscriber:

1. Click **Add** and the Subscriber Form will appear.

Adding a Registered Subscriber



2. Enter the **Address** (IP address or Fully Qualified Domain Name) of the subscriber.
3. Enter the **Port** used to access the subscriber.
4. Select the data transmission protocol (TCP or UDP) to be used from the **Protocol** drop-down menu.
5. Select the data transmission channel to be used from the **Channel** drop-down menu. There are 7 preconfigured options and 4 custom options, as follows:

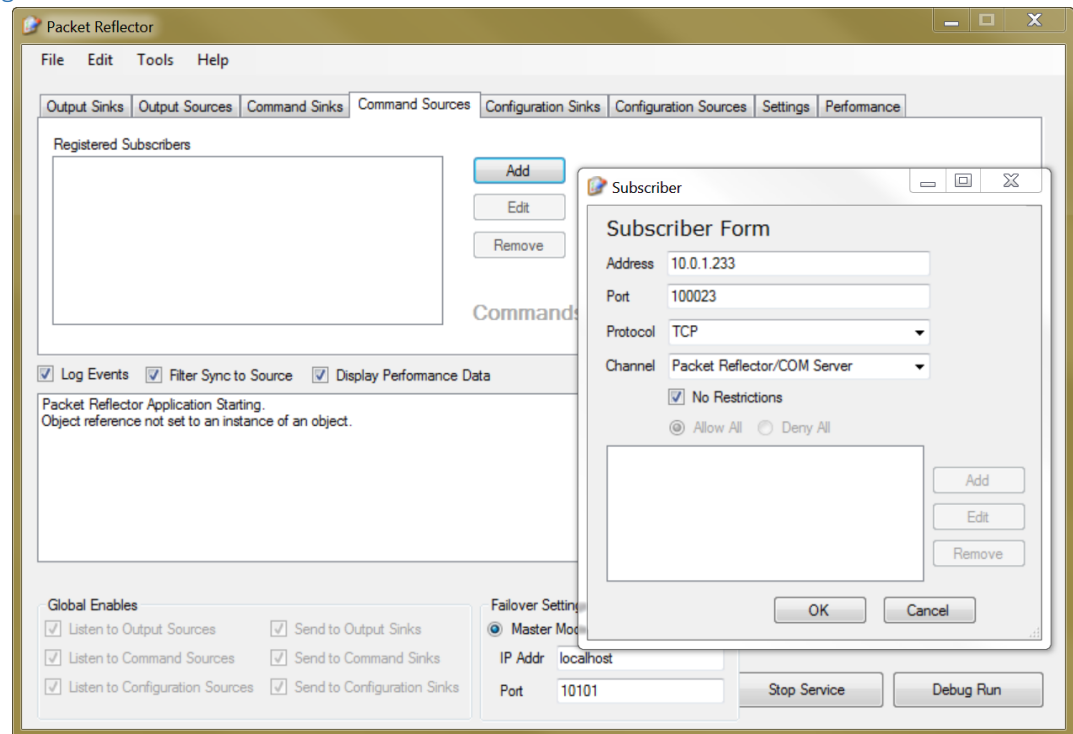
- Packet Reflector/COM Server

- **Iridium Relay**
- **XBee Relay**
- **Serial Relay**
- **WiFi Relay**
- **Alt Iridium Relay**
- **Iridium EMSS Relay**
- **Custom Relay Type 7**
- **Custom Relay Type 8**
- **Custom Relay Type 9**

• Custom Relay Type 10

- The **No Restrictions** check-box is selected by default. If you do not want to restrict the Wave Glider communication channels command packets can be transmitted over, click **OK** and the new unrestricted subscriber will be added to the **Registered Subscribers** list under the **Command Sources** configuration tab on the packet reflector Home Screen.

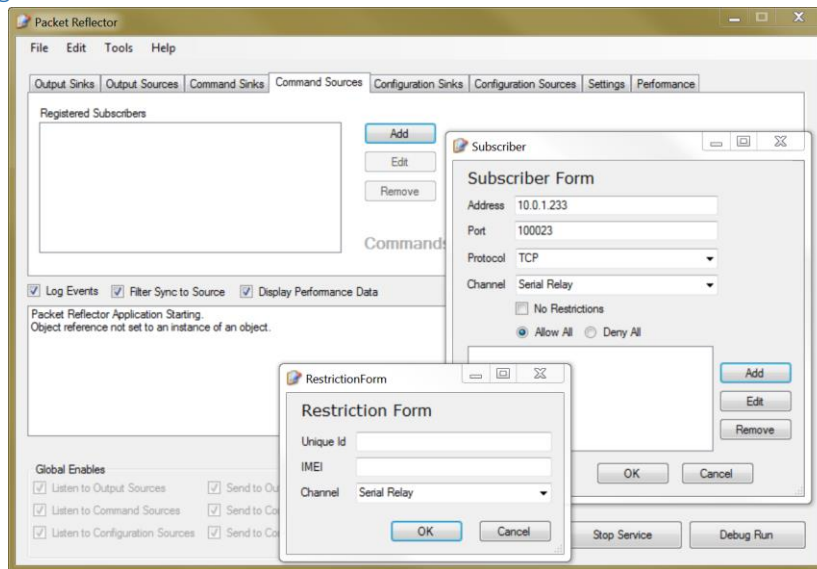
Adding a Registered Subscriber - No Restrictions



The following steps explain how you can configure restrictions to limit the Wave Glider communication channels that can receive command packets from the subscriber:

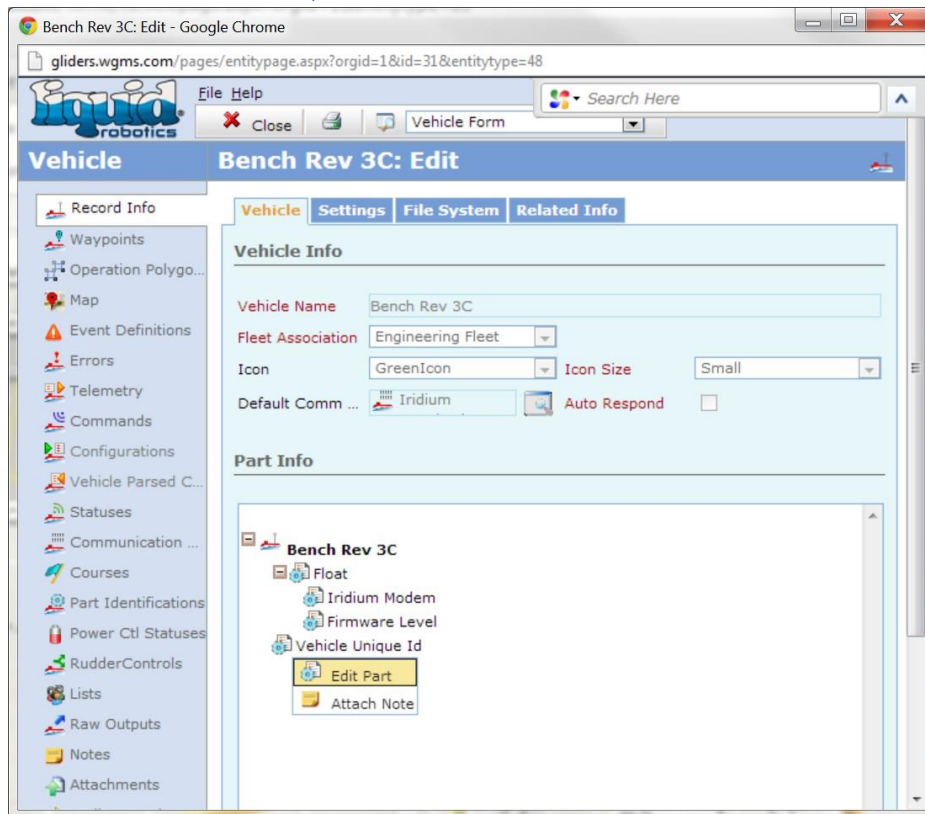
- If you want to limit the Wave Glider communication channels that can receive command packets, deselect the **No Restrictions** check-box, select the **Allow All** radio button, and click **Add**. The **Restriction Form** will appear.

Adding a Registered Subscriber - Restricted Allow All



8. Enter the **Unique Id** for the Wave Glider that you want to restrict command packets transmissions to. You can find this information in the **Vehicle Info** screen on eWGMS - click **Vehicle Unique Id**, then click **Edit Part** and the **Part Info** screen will appear. Enter the vehicle **Serial Number** from the **Part Info** screen into the **Unique Id** field in the **Restriction Form**.

Wave Glider Vehicle Info - Vehicle Unique Id



Vehicle Unique Id - Part Info

Vehicle Unique Id: Edit - Google Chrome

gliders.wgms.com/pages/EntityPage.aspx?orgid=1&id=1834&entitytype=49&parenttype=48&parentid=31&vehicleid=31

Part **Vehicle Unique Id: Edit**

Record Info
Sub Parts
Audit Records
Notes

Part Info

Part Name: Vehicle Unique Id

Parent Part: Revision:

Build Date: Expected Life T...:

Part Number: Remaining Life...:

Serial Number: 1094795585 LR Serial Num...:

Type: Unique Id Vehicle Bench Rev 3C

Manufacturer T...: Not Specified

Related Information

Owner: Organization: Gliders

Created On: 201... 15:3... Updated On: 201... 21:...
Created By: System Admin Updated By: System Admin

9. Enter the International Mobile Station Equipment Identity (**IMEI**) that identifies the Iridium modem on the Wave Glider that you want to restrict command packet transmissions to. You can find this information in the **Vehicle Info** screen on eWGMS - click **Iridium Modem**, then click **Edit Part** and the **Part Info** screen will appear. Enter the Iridium modem **Serial Number** from the **Part Info** screen into the **IMEI** field in the **Restriction Form**.

Wave Glider Vehicle Info - Iridium Modem

Bench Rev 3C: Edit - Google Chrome

gliders.wgms.com/pages/entitypage.aspx?orgid=1&id=31&entitytype=48

Vehicle Form

Vehicle **Bench Rev 3C: Edit**

Record Info

Waypoints

Operation Polygo...

Map

Event Definitions

Errors

Telemetry

Commands

Configurations

Vehicle Parsed C...

Statuses

Communication ...

Courses

Part Identifications

Power Ctl Statuses

RudderControls

Lists

Raw Outputs

Notes

Attachments

Vehicle **Settings** **File System** **Related Info**

Vehicle Info

Vehicle Name: Bench Rev 3C

Fleet Association: Engineering Fleet

Icon: GreenIcon

Icon Size: Small

Default Comm ...: Iridium

Auto Respond: ☐

Part Info

Bench Rev 3C

- Float
- Iridium Modem
- Veh

Edit Part

Attach Note

Iridium Modem - Part Info

Iridium Modem: Edit - Google Chrome

pacx.wgms.com/pages/EntityPage.aspx?orgid=1&id=319&entitytype=49&parenttype=49&parentid=318&vehicleid=31

Part Form

Part **Iridium Modem: Edit**

Record Info

Sub Parts

Audit Records

Notes

Part

Part Info

Part Name: Iridium Modem

Parent Part: Float

Revision:

Build Date:

Expected Life Time: 0 minutes

Part Number:

Remaining Life Ti...: 0 minutes

Serial Number: 300025010508020

LR Serial Number:

Type: Iridium Modem

Vehicle: Bench Rev 3C

Manufacturer Type: 9522B

Related Information

Owner:

Organization: Gliders

Created On: 2008/... 19:15...

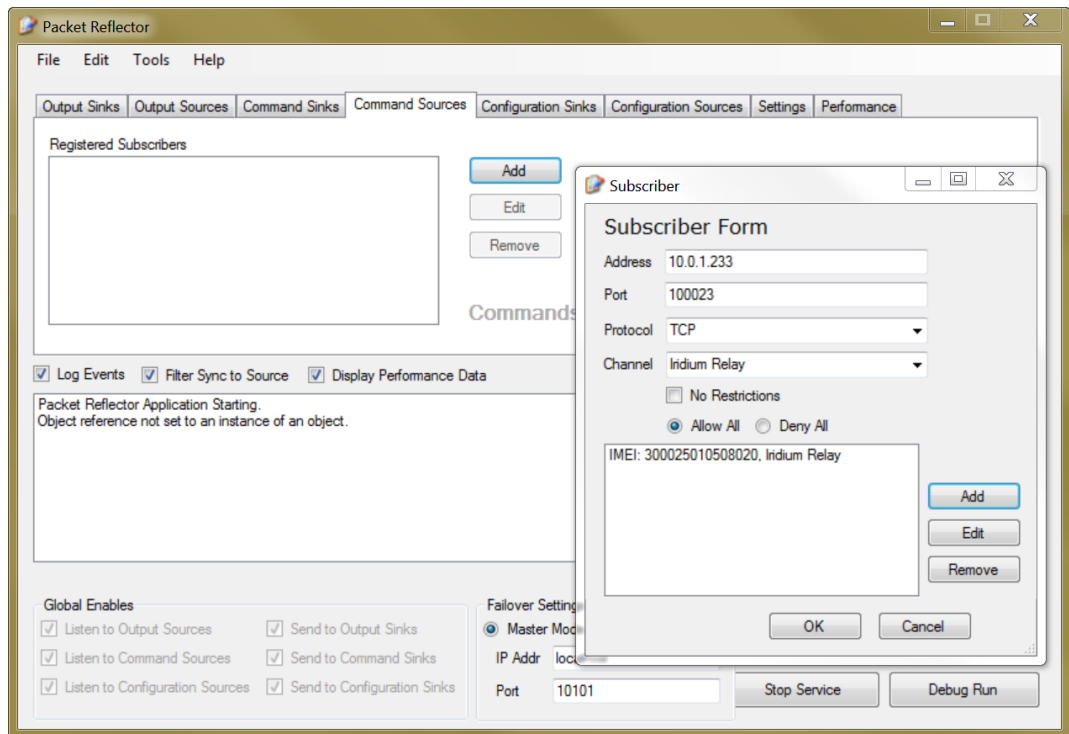
Updated On: 2011/... 23:52...

Created By: System Admin

Updated By: Jim Kirklin

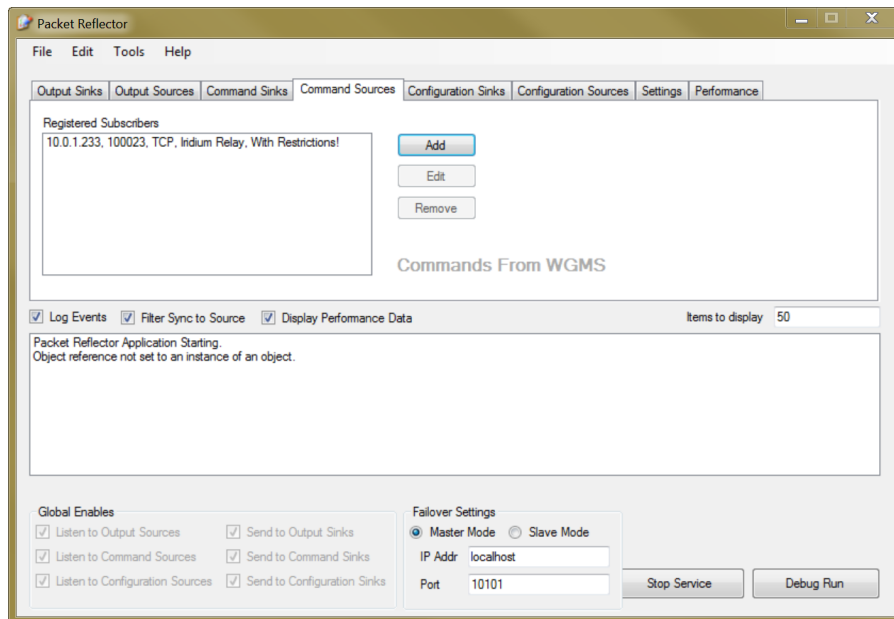
10. Select the Wave Glider communication Channel that you want to receive command packets over. There are 7 preconfigured options and 4 custom options, however, only the **Packet Reflector/COM Server** data transmission channel is supported when restricting command source subscribers. You must select the **Packet Reflector/COM** Server option.
11. Click **OK** on the **Restriction Form** and the Wave Glider communication channel will be added to the **Subscriber Form** as an allowed command source.

Adding a Restriction to the Subscriber Form



12. Click **OK** on the **Subscriber Form** and the new allowed subscriber will be added to the **Registered Subscribers** list under the **Command Sinks** tab on the packet reflector Home Screen.

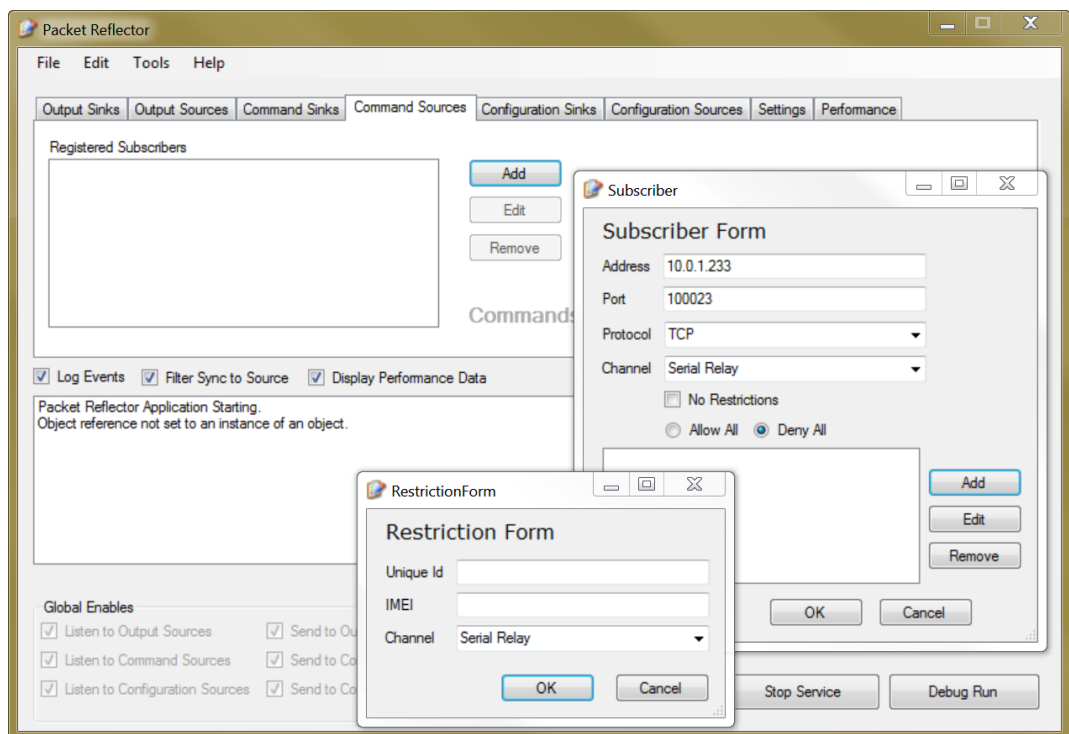
Adding a Restricted Subscriber



The following steps explain how you can configure restrictions to prevent the Wave Glider from receiving command packets over specific communications channels:

13. If you want to prevent the Wave Glider from receiving command packets over one or more specific communications channels, deselect the **No Restrictions** check-box, select the **Deny All** radio button, and click **Add**. The **Restriction Form** will appear.

Adding a Registered Subscriber - Restricted Deny All



14. Enter the **Unique Id** for the Wave Glider that you want to restrict command packet transmissions to. You can find this information in the **Vehicle Info** screen on eWGMS - click **Vehicle Unique Id**, then click **Edit Part** and the **Part Info** screen will appear. Enter the vehicle **Serial Number** from the **Part Info** screen into the **Unique Id** field in the **Restriction Form**.

Wave Glider Vehicle Info - Vehicle Unique Id

The screenshot shows the 'Bench Rev 3C: Edit' page in the eWGMS application. The page has a sidebar with various navigation options like 'Record Info', 'Waypoints', 'Operation Polygons', 'Map', 'Event Definitions', 'Errors', 'Telemetry', 'Commands', 'Configurations', 'Vehicle Parsed C...', 'Statuses', 'Communication...', 'Courses', 'Part Identifications', 'Power Ctl Statuses', 'RudderControls', 'Lists', 'Raw Outputs', 'Notes', and 'Attachments'. The main content area is titled 'Bench Rev 3C: Edit' and has tabs for 'Vehicle', 'Settings', 'File System', and 'Related Info'. The 'Vehicle' tab is active, showing 'Vehicle Info' and 'Part Info' sections. The 'Vehicle Info' section includes fields for 'Vehicle Name' (Bench Rev 3C), 'Fleet Association' (Engineering Fleet), 'Icon' (GreenIcon), and 'Icon Size' (Small). The 'Part Info' section lists components: 'Bench Rev 3C', 'Float', 'Iridium Modem', 'Firmware Level', and 'Vehicle Unique Id'. The 'Vehicle Unique Id' component is highlighted with an 'Edit Part' button.

Vehicle Unique Id - Part Info

The screenshot shows the 'Vehicle Unique Id: Edit' page in the eWGMS application. The page has a sidebar with navigation options like 'Record Info', 'Sub Parts', 'Audit Records', and 'Notes'. The main content area is titled 'Vehicle Unique Id: Edit' and has tabs for 'Part' and 'Related Info'. The 'Part' tab is active, showing 'Part Info' and 'Related Information' sections. The 'Part Info' section includes fields for 'Part Name' (Vehicle Unique Id), 'Parent Part', 'Revision', 'Build Date', 'Expected Life T...', 'Part Number', 'Remaining Life...', 'Serial Number' (1094795585), 'LR Serial Num...', 'Type' (Unique Id), 'Vehicle' (Bench Rev 3C), and 'Manufacturer T...' (Not Specified). The 'Related Information' section includes fields for 'Owner', 'Organization', 'Created On' (201... 15:3...), 'Updated On' (201... 21:1...), 'Created By' (System Admin), and 'Updated By' (System Admin).

15. Enter the International Mobile Station Equipment Identity (**IMEI**) that identifies the Iridium modem on the Wave Glider that you want to restrict command packet transmissions to. You can find this information in the **Vehicle Info** screen on eWGMS - click **Iridium Modem**, then click **Edit Part** and the **Part Info** screen will appear. Enter the Iridium modem **Serial Number** from the **Part Info** screen into the **IMEI** field in the **Restriction Form**.

Wave Glider Vehicle Info - Iridium Modem

The screenshot shows the eWGMS web interface in Google Chrome. The browser address bar shows the URL: `gliders.wgms.com/pages/entitypage.aspx?orgid=1&id=31&entitytype=48`. The page title is "Bench Rev 3C: Edit". The left sidebar contains a navigation menu with items: Record Info, Waypoints, Operation Polygo..., Map, Event Definitions, Errors, Telemetry, Commands, Configurations, Vehicle Parsed C..., Statuses, Communication ..., Courses, Part Identifications, Power Ctl Statuses, RudderControls, Lists, Raw Outputs, Notes, and Attachments. The main content area has tabs for "Vehicle", "Settings", "File System", and "Related Info". The "Vehicle" tab is active, showing "Vehicle Info" and "Part Info" sections. The "Vehicle Info" section contains fields for "Vehicle Name" (Bench Rev 3C), "Fleet Association" (Engineering Fleet), "Icon" (GreenIcon), "Icon Size" (Small), "Default Comm ..." (Iridium), and "Auto Respond" (checkbox). The "Part Info" section shows a tree view with "Bench Rev 3C" expanded, containing "Float", "Iridium Modem", and "Veh". The "Iridium Modem" part is selected, and a context menu is open with options "Edit Part" and "Attach Note".

Iridium Modem - Part Info

The screenshot shows a web browser window titled "Iridium Modem: Edit - Google Chrome" with the URL `pacx.wgms.com/pages/EntityPage.aspx?orgid=1&id=319&entitytype=49&parenttype=49&parentid=318&vehicleid=31`. The page has a "Part Form" tab and a "Part" section. The "Part Info" section contains the following fields:

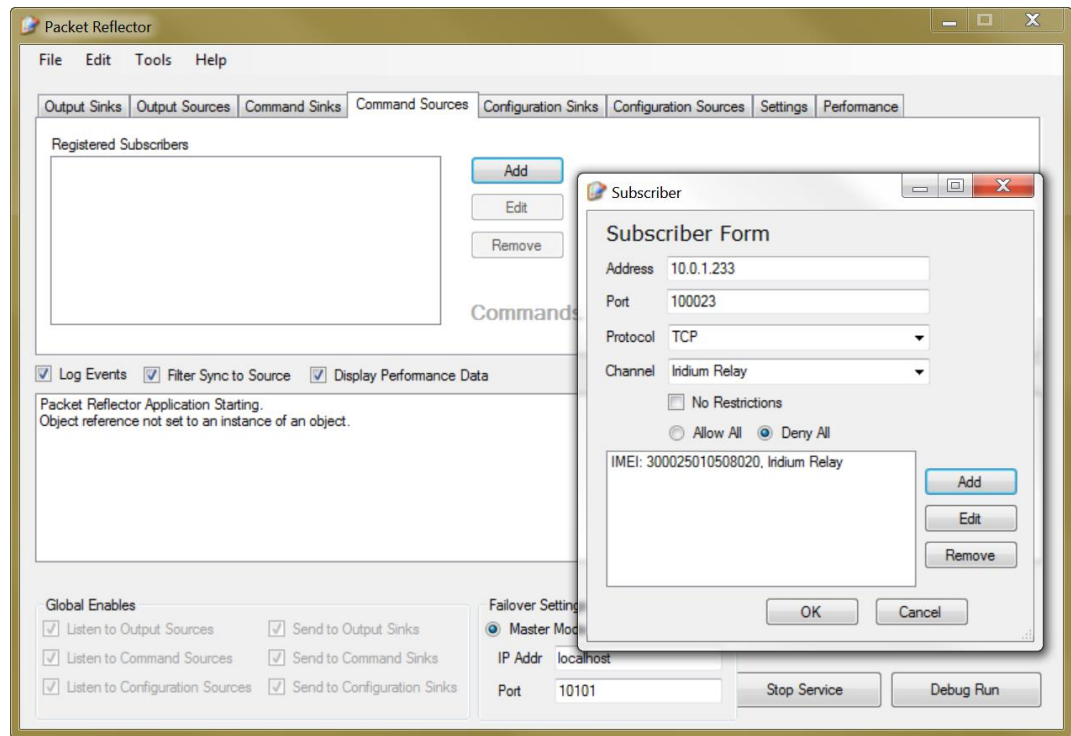
- Part Name: Iridium Modem
- Parent Part: Float
- Revision:
- Build Date:
- Expected Life Time: 0 minutes
- Part Number:
- Remaining Life Ti...: 0 minutes
- Serial Number: 300025010508020
- LR Serial Number:
- Type: Iridium Modem
- Vehicle:
- Manufacturer Type: 9522B

The "Related Information" section contains the following fields:

- Owner:
- Organization: Gliders
- Created On: 2008/... 19:15...
- Updated On: 2011/... 23:52...
- Created By: System Admin
- Updated By: Jim Kirkin

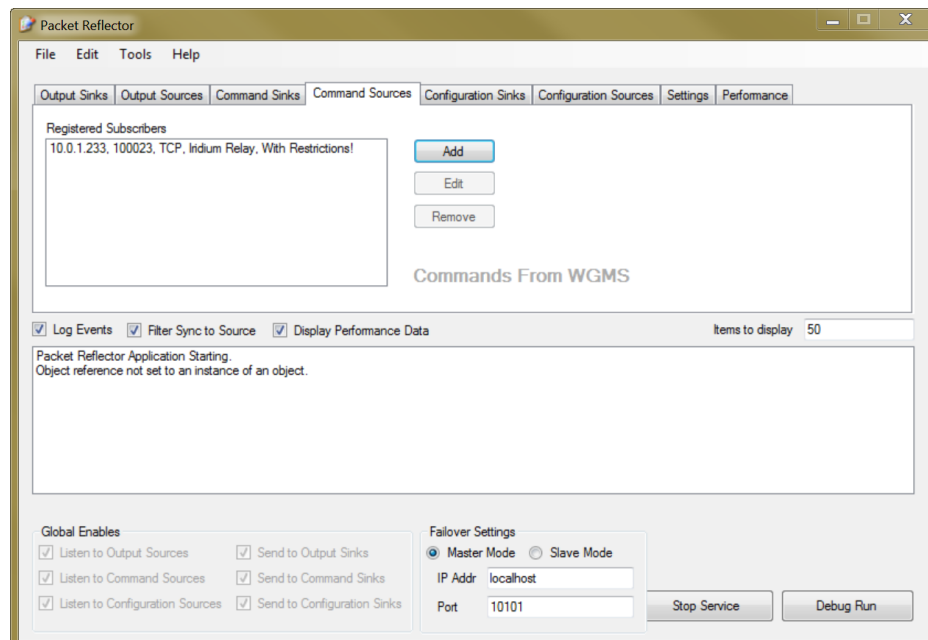
16. Select the Wave Glider communication channel that you do not want to receive command packets over. There are 7 preconfigured options and 4 custom options, however, only the **Packet Reflector/COM Server** data transmission channel is supported when restricting command source subscribers. You must select the **Packet Reflector/COM Server** option.
17. Click **OK** on the **Restriction Form** and the Wave Glider communications channel will be added to the **Subscriber Form** as a denied command source.

Adding a Restriction to the Subscriber Form



18. Click **OK** on the **Subscriber Form** and the new restricted subscriber will be added to the **Registered Subscribers** list under the **Command Sources** tab on the packet reflector Home Screen.

Adding a Restricted Subscriber



8.3.2 Editing Registered Subscribers

To edit a registered subscriber:

1. Select a subscriber in the **Registered Subscribers** list and click **Edit** - a **Subscriber Form** containing the configuration parameters for the selected subscriber will appear.
2. Make edits to the **Address**, **Port**, **Protocol**, and **Channel** fields, as needed.
3. If the **No Restrictions** check-box is selected and you do not need to add any restrictions to the subscriber configuration, click **OK** and the edited subscriber will be added to the **Registered Subscribers** list under the **Command Sources** tab on the packet reflector Home screen.

If you need to add or edit restrictions to limit the Wave Glider communications channels that the subscriber can send data to, perform the following steps:

4. Deselect the **No Restrictions** check-box, select the **Allow All** radio button, and click **Add**. The **Restriction Form** will appear.
5. Make edits to the **Unique Id**, **IMEI**, and **Channel** fields, as needed.
6. Click **OK** on the **Restriction Form** and the allowed Wave Glider communication channel will be added to the **Subscriber Form**.
7. Click **OK** on the **Subscriber Form** and the edited restricted subscriber will be added to the **Registered Subscribers** list under the **Command Sources** tab on the packet reflector Home Screen.

If you need to add or edit restrictions to prevent command packets from being received over specific Wave Glider communications channels, perform the following steps:

8. Deselect the **No Restrictions** check-box, select the **Deny All** radio button, and click **Add**. The **Restriction Form** will appear.
9. Make edits to the **Unique Id**, **IMEI**, and **Channel** fields, as needed.
10. Click **OK** on the **Restriction Form** and the denied Wave Glider communication channel will be added to the **Subscriber Form**.
11. Click **OK** on the **Subscriber Form** and the edited restricted subscriber will be added to the **Registered Subscribers** list under the **Command Sources** tab on the packet

reflector Home Screen.

8.3.3 Removing Registered Subscribers

To delete a registered subscriber from the packet reflector configuration, select a registered subscriber in the **Registered Subscribers** list and click **Remove**.

8.4 Configuration Sinks

The **Configuration Sinks** tab is not used with current Wave Glider models. Do not make any configuration settings under this tab.

8.5 Configuration Sources

The **Configuration Sources** tab is not used with current Wave Glider models. Do not make any configuration settings under this tab.

8.6 Settings

The information necessary for eWGMS and Wave Gliders to communicate through the packet reflector is configured from the **Settings** tab.

8.6.1 Setting up a Packet Reflector

1. To set up an instance of the packet reflector, click **Settings** from the packet reflector Home screen to open the **Settings** tab.

Settings Tab

Packet Reflector

File Edit Tools Help

Output Sinks Output Sources Command Sinks Command Sources Configuration Sinks Configuration Sources **Settings** Performance

Server URL

Email

Password

Org Internal Name

Packet Reflector Name Virtual Relay Port

Packet Reflector Address

☒ Log Events ☒ Filter Sync to Source ☒ Display Performance Data Items to display 50

Packet Reflector Application Starting.
Object reference not set to an instance of an object.

Global Enables

☒ Listen to Output Sources ☒ Send to Output Sinks

☒ Listen to Command Sources ☒ Send to Command Sinks

☒ Listen to Configuration Sources ☒ Send to Configuration Sinks

Falover Settings

☒ Master Mode ☐ Slave Mode

IP Addr

Port

2. In the **Server URL** field, enter the URL for the eWGMS system that stores the packet reflector settings and the WSDL (web services API definition - /webservices/entityAPI.asmx).
3. Enter the email address for the packet reflector administrator in the **Email** field.
4. Enter the eWGMS password associated with the email address from Step 3 in the **Password** field.
5. Enter the internal name for your eWGMS organization in the **Org Internal Name** field, in most cases this will be set to **liquidr**.
6. Enter the name for the packet reflector you are setting up in the **Packet Reflector Name** field.
7. Enter the IP address for the packet reflector you are setting up in the **Packet Reflector Address** field.
8. Enter the virtual relay port number in the **Virtual Relay Port** field. For a single server machine enter 643. For a dedicated server configuration enter 443.
9. Click **File** -> **Save To File** on the Windows Menu Bar to save the packet reflector configuration file on your system.

Click the **Save to eWGMS** button to save the packet reflector configuration in

eWGMS. Other Items under the packet reflector **Settings** tab:

- **Retrieve from eWGMS Button** - Click on **Retrieve from eWGMS** to select a packet reflector configuration you want to retrieve to run or to edit.
- **Settings Button** - Typically the **Settings** button is not used, however under certain circumstances it can be used to edit the Machine Name. Consult with Liquid Robotics support before making any changes using the **Settings** button.
- **Get/Flush Clients** - Click **Get Clients...** to display a list of subscribers that are in **Encrypted Communication** mode (only when the packet reflector is running).

When the packet reflector is running it caches encryption clients. Clients can be flushed one at a time. Scroll in the clients window to select a client you want to remove, then highlight the client name and click **Flush Client...** When a client has been flushed, the subscriber is forced to re-fetch the encryption keys from eWGMS.

8.6.2 Editing Packet Reflector Settings

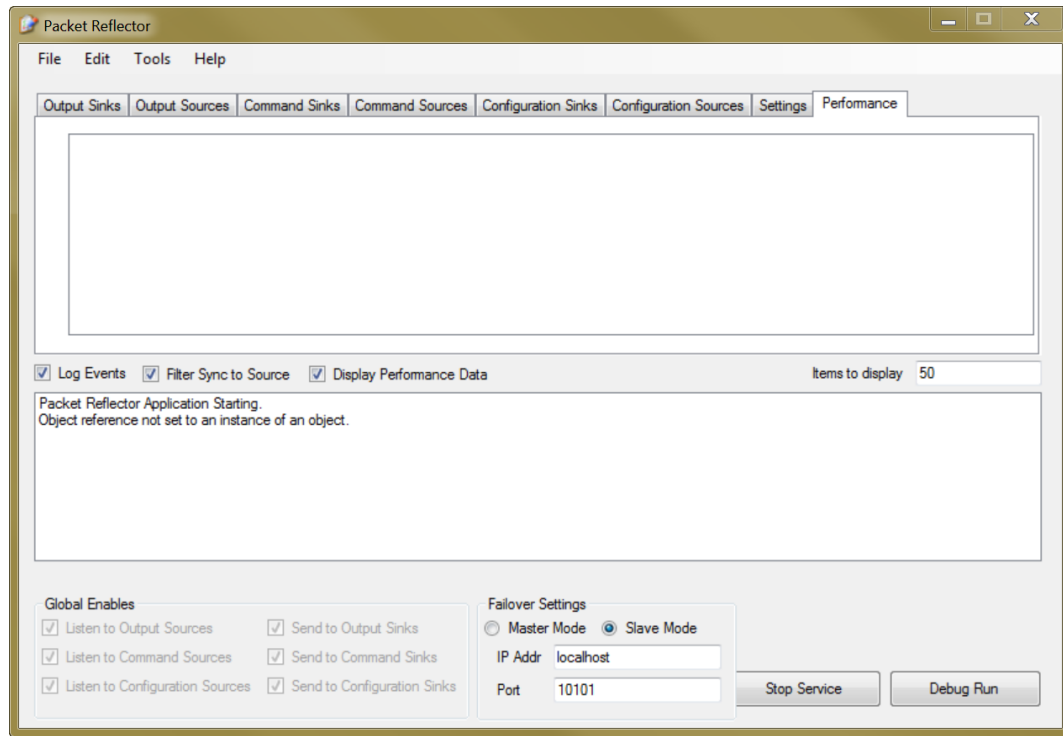
To edit an existing packet reflector configuration:

1. From the Settings tab on the Home screen, select a packet reflector configuration file:
 - By clicking **File** -> **Open** from the Windows Menu Bar and selecting the packet reflector configuration file you want to open.
 - By clicking on **Retrieve from eWGMS** under the **Settings** tab on the Packet Reflector Home screen and selecting the packet reflector configuration you want to retrieve.
2. Click **Settings** to populate the fields in the Settings tab with the settings for the packet reflector you selected for editing.
3. Edit the settings fields that you want to change, then click save the edited packet reflector configuration.

8.7 Performance

The **Display Performance Data** check-box in the Home Screen Log window must be selected if you want performance data to be displayed under the **Performance** tab in the Home Screen Configuration window. When the **Display Performance Data** check-box is selected and you click the **Performance** tab on the Home Screen, the Performance window appears displaying the queue depths for packets on all subscriber.

[Performance Window](#)



Section 9: Communication Server

9.1 Overview

The comms or communication server collects all incoming data packets, processing that data, and is responsible for extracting waiting commands for the Gliders. The Comm server interacts with the API server and the Packet Reflector.

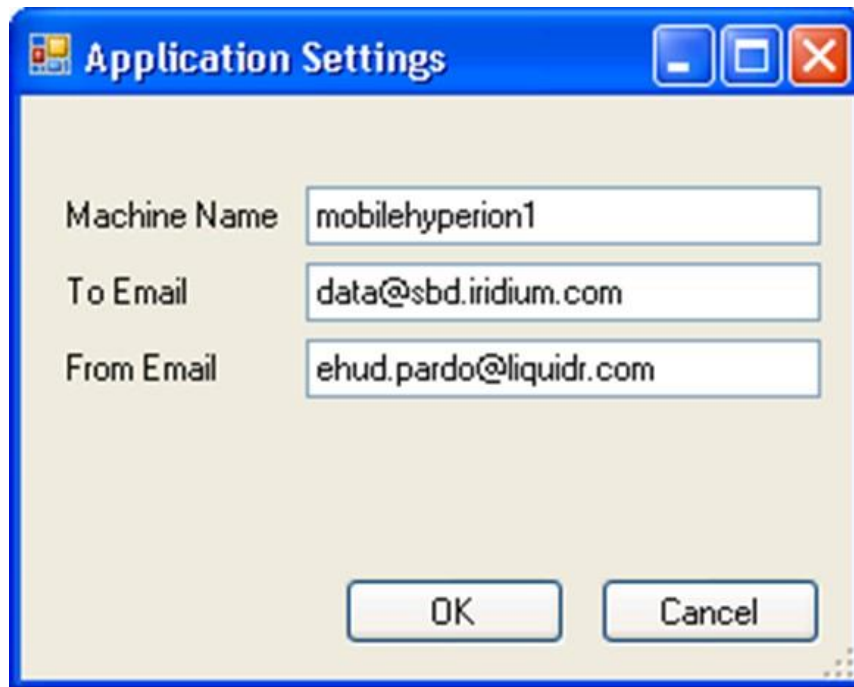
9.2 Configuration

The COM Server links a Packet Reflector to eWGMS. Since the COM Server uses TCP/IP to communicate with both the Packet Reflector and eWGMS, it is possible for each of these applications to run on a separate computer. For convenience, the LRI eWGMS installer installs the COM Server on the same system as the eWGMS Kernel. The configuration steps that follow assume that default configuration. Contact LRI for guidance, if you want a different configuration.

The COM Server code consists of a configuration UI and a separate module that runs as a Windows service. The installer deployed the service but did not start it. In this installation step you will run the configuration UI to initialize the COM Server settings and start the COM Server service. Note that the COM Server is a eWGMS internal application which is distinct from a communications relay. The COM Server sits between a Packet Relay and a eWGMS Kernel. A communications relay sits between a Wave Glider and a Packet Reflector.

Start the COM Server from the Windows Start menu; click **Start** → **All Programs** → **COM Server**. The following configuration dialog box will appear.

COM Server Application Settings Dialog Box



Machine Name – The name of the server hosting the Com Server.

To Email – Should be left unmodified.

From Email – Should be changed to the email address of the administrator for eWGMS, such as webadmin@example.com [mailto:webadmin@example.com]. Remember that you may have changed it from the default in the preceding installation step.

Click **OK** to confirm the settings and launch the COM server. The COM Server window will appear.

COM Server Window

To configure the COM server, enter:

Server URL – Typically you would replace the domain name (mobilehyperion1 in the example) with your actual domain name.

Email – Replace “ehud.pardo@liquidr.com” with the administrator’s email address (such as webadmin@example.com), and replace the password field with the administrator’s user password.

Organization – Enter the “Org Internal Name” obtained from the Organization Description Dialog. Do not use the “public” name displayed on the Dashboard UI. For more information see the *Editing Organizational Information and Settings* section in the *Administrative Tasks - Settings Page* chapter of the *eWGMS User Guide*.

Click the **Listen** button to start the Com Server. Now you can minimize or close the configuration window.

Section 10: eWGMS Web Server

10.1 Overview

The eWGMS Web servers’ hosts eWGMS website. It is website that user’s access to command or see the data returned from the gliders, etc. Customer’s eWGMS training is centered on this website.

10.2 Configuration

Install default IIS configuration from Windows Server “add features”. Each site that is added to the IIS server should be converted to an application. (right click, create application)

Section 11: eWGMS Data Service Administration

11.1 Installation

- Copy extracted (.zip) files to IIS Server maintaining the folder structure
 - **Example:** C:\inetpub\wwwroot\WDS\

11.2 Configuration

- Web.config
 - Database
 - Default location is: C:\inetpub\wwwroot\WDS\web.config
 - applicationSettings/eWGMSDataService.Properties.Settings/setting/value
 - change IP address and/or credentials only
- NLog
 - Default location is: C:\Projects\logs
 - Default location of configuration file: C:\inetpub\wwwroot\WDS
 - To change the default location of the log file storage:
 - Open C:\inetpub\wwwroot\WDS\Nlog.config
 - Change instances of **fileName="c:\Projects\logs\\${appName}\\${appName}.log"**
 - Replace the file path before the \$

11.3 Backup

- Backup existing files into an existing folder outside of IIS with a date stamp
 - **Example:** Backup (copy) C:\inetpub\wwwroot\WDS*. * to C:\IISBak\WDS\051721
 - Each successive backup should have a date stamp on folder. If multiple on the same day, suffix the folder name with _2, _3, etc.

11.4 Update

- Backup files before updating
- Download .zip file (accessed via network share or box.com, etc.)
- Extract the zip file and copy the contents to the IIS directory
 - Example C:\inetpub\wwwroot\WDS\
 - Replace All files
 - Do not replace web.config unless specifically requested.

11.5 Troubleshooting

- Default
 - If any issues with the deployment, revert back to the backup – copy and replace into original folder
 - Server will initially compile new files when updated. This may cause a delay of 3 to 5 seconds for the service requests.
 - Contact customer support

Section 12: eWGMS Command Service Administration

12.1 Installation

- Copy extracted (.zip) files to IIS Server maintaining the folder structure
 - **Example:** C:\inetpub\wwwroot\eWGMSCommandService\

12.2 Configuration

- Web.config
 - Database
 - Default location is: C:\inetpub\wwwroot\ eWGMSCommandService \web.config
 - applicationSettings/eWGMSDataService.Properties.Settings/setting/value
 - change IP address and/or credentials only
- NLog
 - Default location is: C:\Projects\logs
 - Default location of configuration file: C:\inetpub\wwwroot\eWGMSCommandService
 - To change the default location of the log file storage:
 - Open C:\inetpub\wwwroot\eWGMSCommandService\Nlog.config
 - Change instances of **fileName="c:\Projects\logs\\${appName}\\${appName}.log"**
 - Replace the file path before the \$

12.3 Backup

- Backup existing files into an existing folder outside of IIS with a date stamp
 - **Example:** Backup (copy) C:\inetpub\wwwroot\eWGMSCommandService*. * to C:\IISBak\eWGMSCommandService\051721
 - Each successive backup should have a date stamp on folder. If multiple on the same day, suffix the folder name with _2, _3, etc.

12.4 Update

- Backup files before updating
- Download .zip file (accessed via network share or box.com, etc.)
- Extract the zip file and copy the contents to the IIS directory
 - Example C:\inetpub\wwwroot\eWGMSCommandService\
 - Replace All files
 - Do not replace web.config unless specifically requested.

12.5 Troubleshooting

- Default
 - If any issues with the deployment, revert back to the backup – copy and replace into original folder
 - Server will initially compile new files when updated. This may cause a delay of 3 to 5 seconds for the service requests.
 - Contact customer support

Section 13: SQL Data Base Servers

13.1 Overview

eWGMS uses Microsoft SQL Server which is hosted on this machine. eWGMS is compatible with several versions of MS SQL Server.

13.2 Configuration

The SQL servers are pre-configured in a “Always on High Availability” group. As such the two servers are kept in synchronization. If the primary database fails, the secondary database will assume all duties. For failover. Please see the Microsoft documentation for managing SQL services.

<https://docs.microsoft.com/en-us/sql/relational-databases/sql-server-guides?view=sql-server-ver15>

Section 14: Active Directory Server

14.1 Overview

An eWGMS instances uses Microsoft’s Active Directory Domain services for account management access the collection of eWGMS servers. While not mandatory to run eWGMS, this makes the system easier to manage.

14.2 Configuration

Please see the Microsoft documentation for managing Active Directory Services.

<https://docs.microsoft.com/en-us/windows-server/identity/ad-ds/manage/ad-ds-simplified-administration>

Section 15: RUDICS Administration

Iridium RUDICS is used for Over the Horizon (OTH) gramlet transfer between the Virtual Payload and the OTH acoustic workstation. The gramlet transfer process is controlled using the OTH workstation with commands on eWGMS.

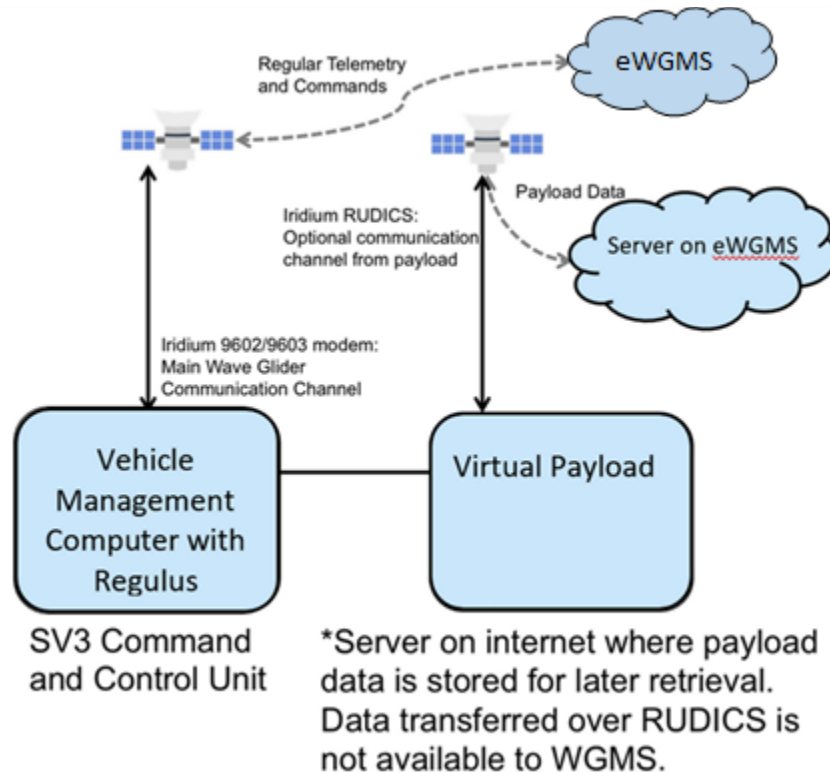
15.1 RUDICS Overview

RUDICS is an Iridium service that may be used to send data on the virtual payload to a server available on eWGMS. RUDICS does not replace the Wave Glider’s SBD Iridium service, which is used to communicate commands and telemetry between the vehicle and eWGMS. RUDICS is a separate, higher bandwidth (and thus higher powered) path for transferring virtual payload data to a shoreside server.

The data transferred over RUDICS to the eWGMS server is not available on the eWGMS GUI, Data Service, Command Service, etc. The data instead goes to a server in eWGMS which is accessible on the OTH workstation via a file mount.

RUDICS operates from a higher power modem, generally capable of transferring approximately 16 to 20 Kilobytes (KB) per minute. A RUDICS session of around 10 minutes transfers 200KB of data, but the length of the session and the data rate may vary greatly depending on many factors including sea state and Iridium satellite locations.

The virtual payload can be configured to automatically call in over RUDICS at different rates (e.g., once an hour or once every 4 hours) although more frequent usage requires more power. When a RUDICS session starts, the RUDICS modem is powered on, and data is transferred. When a RUDICS session is complete, the RUDICS modem is powered off. On average the RUDICS modem draws 2.5W when in use.



15.2 Accessing RUDICS Server

The RUDICS server is a part of the eWGMS setup and can be accessed using the following IP address:

- **Internal:** 192.168.88.40
- **External:** unique to customer configuration

There are two user accounts on the server:

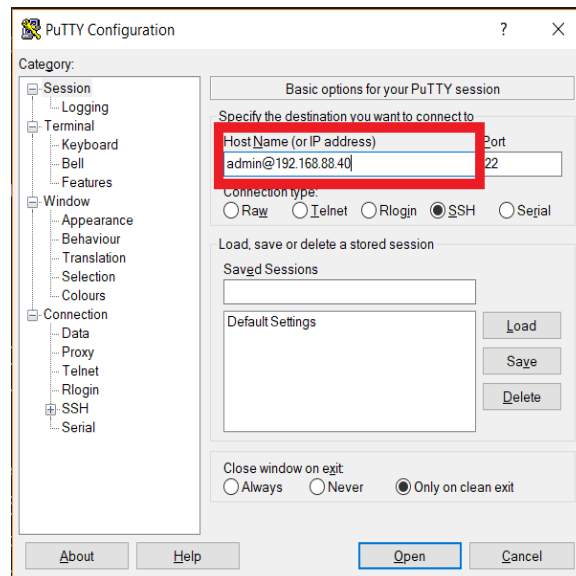
- **admin:** This is the account that can be used to add/delete other user accounts along with general system maintenance.
- **aswgcs:** This is the account that the Wave Gliders and the OTH workstation transfer data to.

Authentication to the server is key based, i.e., the client's identity is confirmed using public and private keys. The steps on how to generate a key pair and add the public key to a user account will be described in [Generating a Key](#) and [Adding a Key](#) respectively.

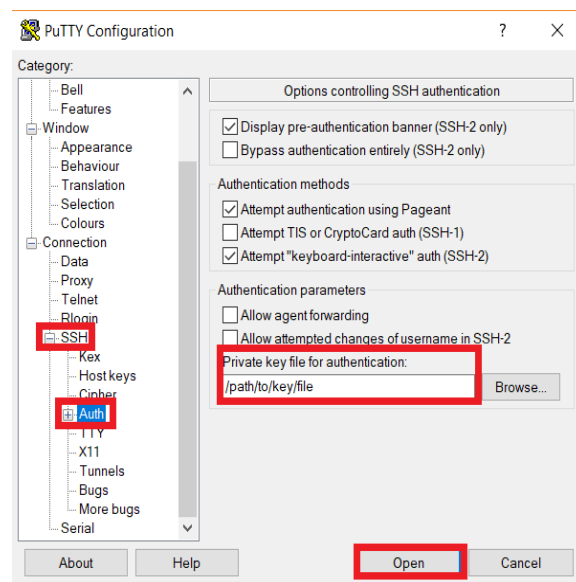
Windows

For this example, we'll be using PuTTY. PuTTY is a free and open-source terminal emulator, serial console and network file and can be downloaded [here](#).

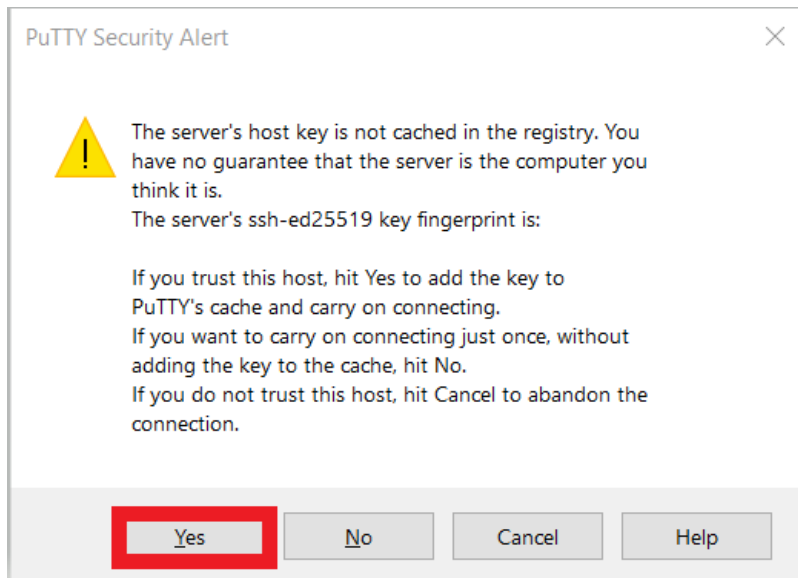
- Open PuTTY and enter the username and IP address.



- Expand the SSH tab and select Auth. Add the path to the private key file. Then click Open.



- If it's the first-time logging into the server from a computer, a window along the lines of the screenshot below will pop-up. Click Yes to cache the server host key and to not see this security alert again.



Linux / Mac

- Open a Terminal and run the following command:

```
ssh -i /path/to/key/file <user>@<ip_address>
```
- If it's the first-time logging into the server from a computer, a prompt along the lines of the screenshot below will appear. Type `yes` to cache the server host key and to not see this prompt again.

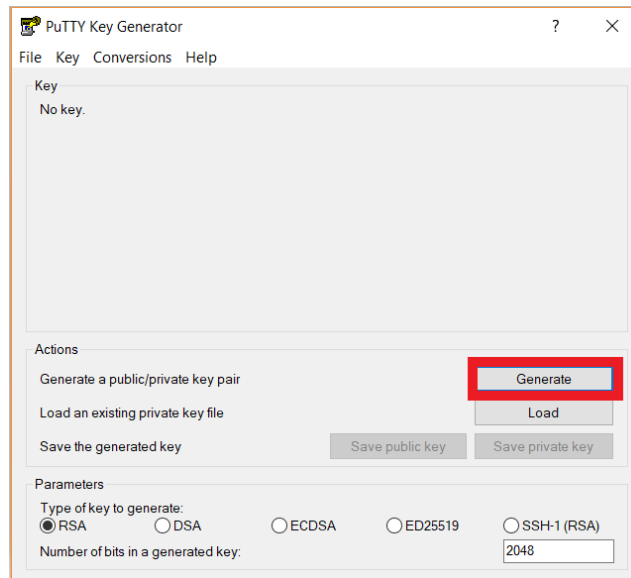
```
The authenticity of host '192.168.88.40' can't be established.  
ECDSA key fingerprint is SHA256:<key_name>.  
Are you sure you want to continue connecting  
(yes/no/[fingerprint])? yes  
Warning: Permanently added '192.168.88.40' (ECDSA) to the list of  
known hosts.
```

15.3 Generating a Key

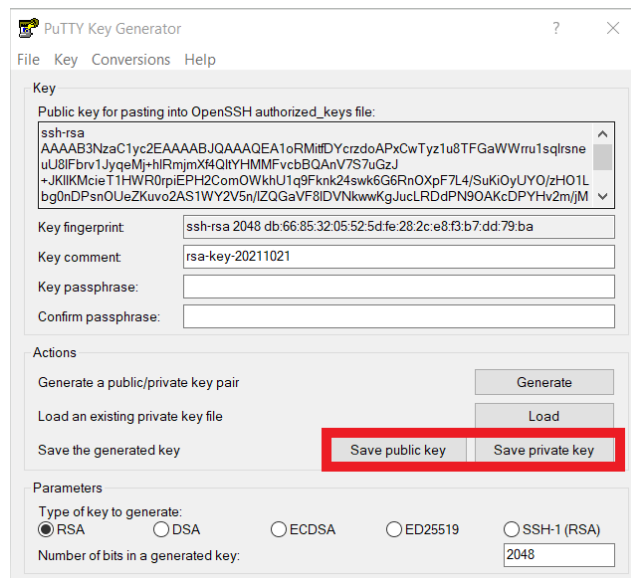
To give another person access to the RUDICS server or to add another Wave Glider a public key must be added. First, let us look at how to generate a keypair.

Windows

- Open the PuTTYgen application and generate a public/private key pair.



- Save the public and private key to a location on the computer (you can add a passphrase if you wish).



Linux / Mac

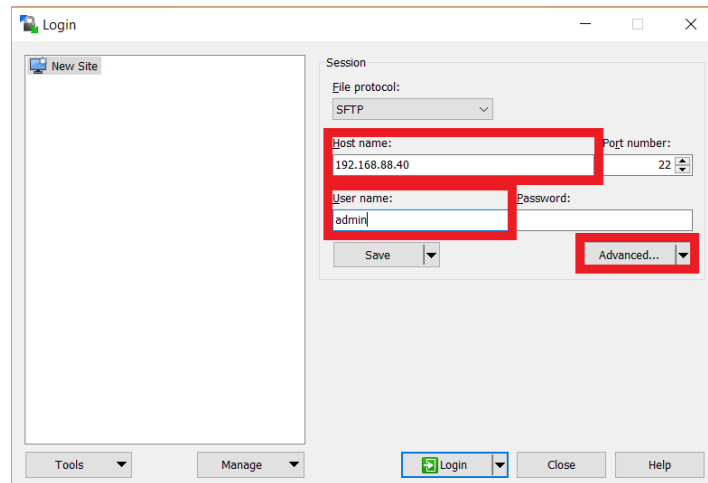
- Open a Terminal and run the following command:
`ssh-keygen -t rsa -N '' -f /path/to/where/the/key/will/be/saved`
`<<< y`

15.4 Adding a Key

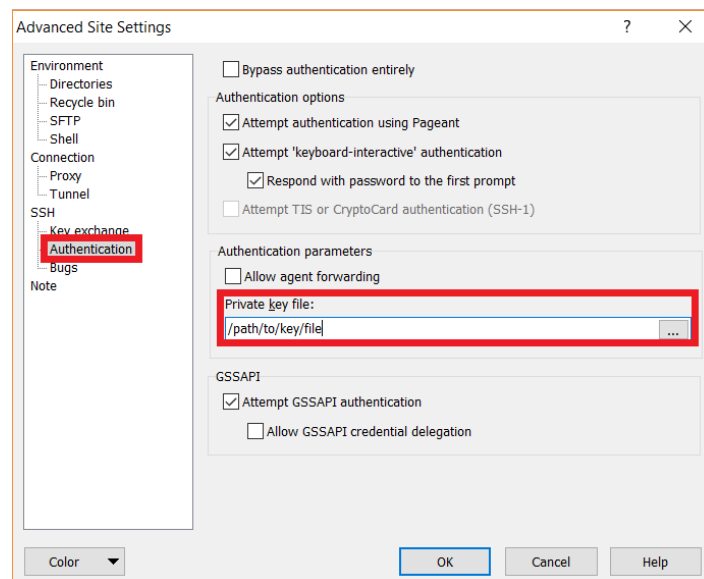
Once a keypair has been generated, the public key needs to be transferred to the RUDICS server and updated.

Windows

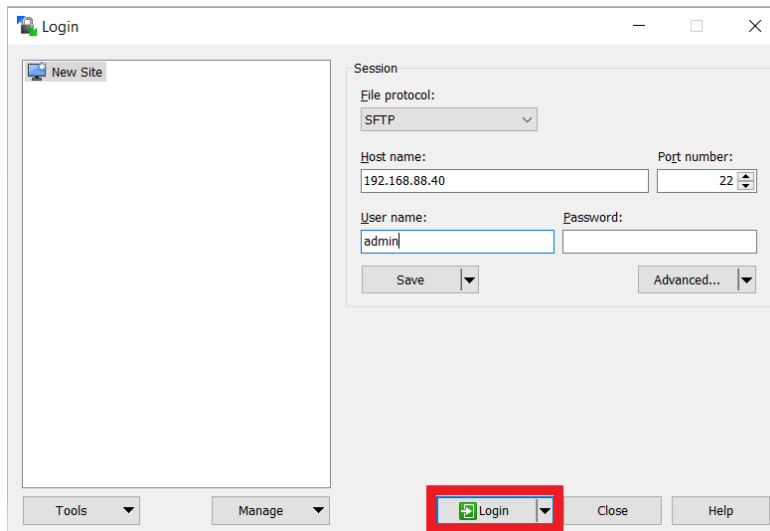
- For this example, we are using WinSCP (download [here](#)), but any scp client such FileZilla, FireFTP, PSCP, etc. can be used.
- Open WinSCP and fill in the required fields, open the Advanced... window.



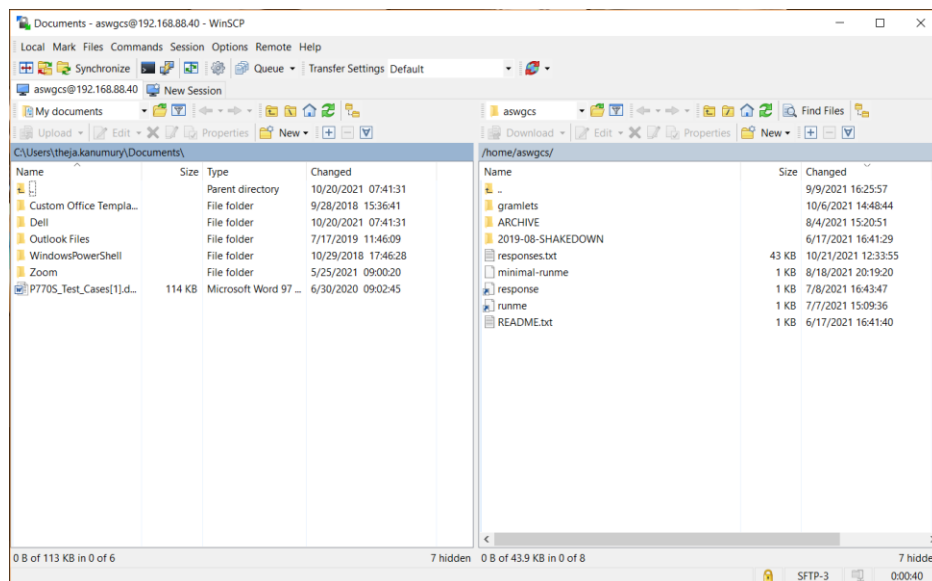
- In the Advanced... window go to Authentication, add the path to a key file that already works and click Ok.



- Click Login.



- Once the authentication is successful you should see something like the screenshot below. The left-hand side is the user computer while the right-hand side is the RUDICS server.



- On the left-hand side, navigate to the folder where the public key is saved.
- Double click on the 7 hidden in the bottom right corner to show all the hidden folders and open the .ssh folder.
- Drag the new public key from the left-hand side to the right-hand side.
- Exit WinSCP.
- Log into the RUDICS server following the steps listed in [Accessing RUDICS Server](#).
- Navigate to the '.ssh' folder and run 'updateauthorized'.

```
[aswgcs@rudics01 ~]$ cd .ssh/
[aswgcs@rudics01 .ssh]$ updateauthorized
```
- If a new key is added, you will see Changes Installed. Otherwise, you will see No changes.

Linux / Mac

- Open a Terminal and run the following command to transfer the new public key:
`scp -i /path/to/working/key/file /path/to/new/public/key/file
<user>@<ip_address>:~/.ssh/`
- Log into the RUDICS server following the steps listed in [Accessing RUDICS Server](#).
- Navigate to the '.ssh' folder and run 'updateauthorized'.
`[aswgcs@rudics01 ~]$ cd .ssh/
[aswgcs@rudics01 .ssh]$ updateauthorized`
- If a new key is added, you will see `Changes Installed`. Otherwise, you will see `No changes`.

15.5 Creating a New User

To create a new user on the RUDICS server follow the steps listed below.

- Depending on the computer's operating system, follow [Accessing RUDICS Server](#) to login as the admin user.
- Switch to the root account and run the command to create a new user.
`Last login: Thu Oct 21 20:52:49 2021 from 64.75.5.2
admin@rudics01:~$ sudo su -
Last login: Thu Oct 21 20:52:51 UTC 2021 on pts/0
[root@rudics01 ~]# /home/AdminTools/bin/makenewuser newUser`
- The admin public key will be copied to the new user.
- Depending on the computer's operating system, follow [Adding a Key](#) to add a key to the new user.

15.6 Viewing the Rudics Data

To view that data on the server and to keep track of disk usage follow the steps in [Accessing RUDICS Server](#) and login as the aswgcs user. The aswgcs user has the following file structure:

```
[aswgcs@rudics01 ~]$ ls -l
total 116
drwxrwxrwx. 5 aswgcs aswgcs    53 Oct  6 21:48 gramlets
-rwx-----. 1 aswgcs aswgcs   891 Aug 19 03:19 minimal-runme
-rw-r-----. 1 aswgcs aswgcs    52 Jun 17 23:41 README.txt
lrwxrwxrwx. 1 aswgcs aswgcs    24 Jul  8 23:43 response ->
/home/Tools/bin/response
-rw-rw-r--. 1 aswgcs aswgcs 44023 Oct 21 19:33 responses.txt
lrwxrwxrwx. 1 aswgcs aswgcs    13 Jul  7 22:09 runme -> minimal-runme
```

The gramlets directory itself has the following subdirectories.

```
[aswgcs@rudics01 ~]$ ls -l gramlets/
total 16
```

```
drwxr-xr-x. 3 aswgcs aswgcs 8192 Oct 12 22:41 archive
drwxr-xr-x. 2 aswgcs aswgcs 4096 Oct 27 19:57 artifact
drwxr-xr-x. 2 aswgcs aswgcs    6 Oct 27 19:57 incoming
```

All the data files are in the `gramlets` directory. The file size of the directory can be found by running the following command:

```
[aswgcs@rudics01 ~]$ du -sh gramlets/
1.4M gramlets/
```

The steps listed in [Adding a Key](#) can be used to transfer the data off the server to an external system for backup and maintenance purposes. For the Linux laptop, the command to offload the `gramlets` directory would be

```
scp -i /path/to/working/key/file -r <user>@<ip_address>:~/gramlets/
/path/to/where/data/will/be/saved
```

Section 16: [Appendix A: Disaster recovery and fail-over steps](#)

eWGMS instance nodes are configured to run on 2 physical servers, each of which is running VMware and hosting a series of virtual servers that are running the eWGMS software system. Combined, these two servers are considered a “Node”.

This installation a 2-node setup with 1 node being a primary, and the second node being a warm stand by. eWGMS communications services should not be run in parallel in this configuration because it will cause data integrity and command status issues.

Current set up has the virtual machines on Node 2 turned off (with 2 exceptions), and the failover procedure involves bringing the Node-2 virtual machines online and turning off the eWGMS services on Node 1.

Time required to switch over from one node to the other should be measured in minutes. Under optimal conditions, it could be completed in about 15 minutes.

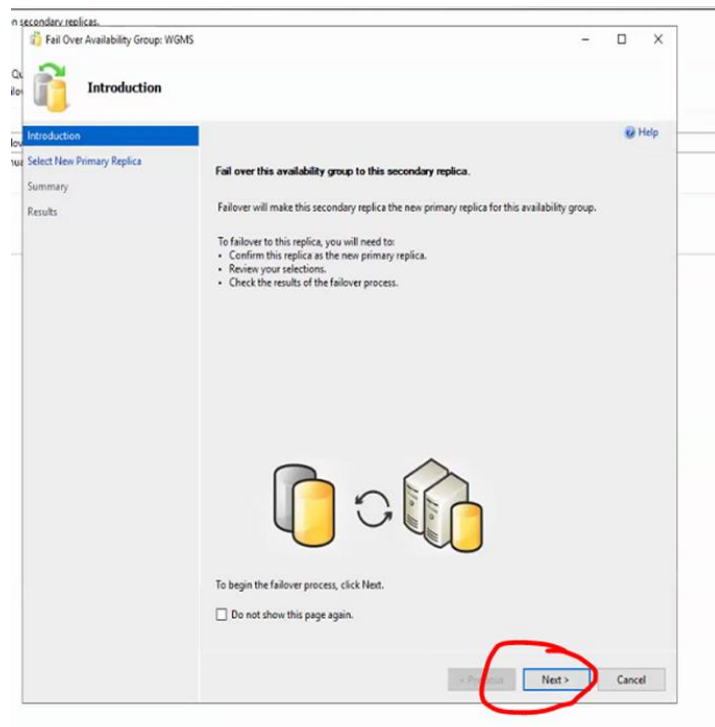
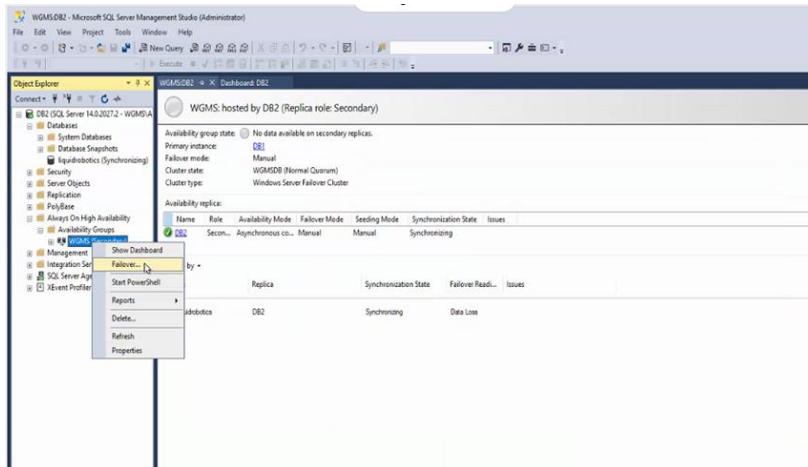
Most of the virtual machines on node 2 are configured to be identical to Node 1, including the IP address. The process to fail over is turning off the virtual machine(s) on node 1 and turning on the corresponding virtual machine on node 2.

Database Failover:

The SQL database is a special case. eWGMS runs its databases in a high availability clustered configuration. The secondary node is always on and kept in sync with the primary node. Should the primary node fail, the secondary node should immediately take over database responsibilities.

To manually force a database failover, these are the steps:

- Log into IP 192.168.88.32
- Open Microsoft SQL Server Management Studio on Database Server using the wizard.



[1] There are two servers running on Node 2 during normal operations. The Database server is running in a clustered failover mode. This second database instance cannot be accessed in this state, but it is remaining fully in sync with the primary database. i.e. There should not be any data loss at the database level.

Section 17: [Appendix B: External Services List](#)

The following list of external web links should be whitelisted in any firewall to ensure a full eWGMS user experience.

<https://www.opengis.net>

<https://api.geogarage.com>

<https://cordc.ucsd.edu>

<https://api.wunderground.com>

<https://www.opengis.net>

<https://maps.google.com>

<https://www.marinetraffic.com>

<https://maps.gstatic.com>