

TREK

HOSC PAYLOAD ETHERNET GATEWAY (HPEG)

USER GUIDE



January 2020

Approved for Public Release; Distribution is Unlimited.

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1 Welcome

The Telescience Resource Kit (TReK) is a suite of software applications and libraries that can be used to monitor and control assets in space or on the ground.

The TReK HPEG application provides the capability to access the Huntsville Operations Support Center (HOSC) Payload Ethernet Gateway (HPEG) service.

1.1 Getting Started

Start with the Introduction which provides an application overview. Next, try the Quick Start Guides for “How Tos” for common functions. For help with details, reference the Details section. See the FAQ and Troubleshooting section for helpful hints and solutions to the common “gotchas”.

2 Technical Support

If you are having trouble installing the TReK software or using any of the TReK software, please contact us for technical assistance:

TReK Help Desk E-Mail, Phone & Fax:

E-Mail: trek.help@nasa.gov
Telephone: 256-544-3521 (8:00 a.m. - 4:00 p.m. Central Time)
Fax: 256-544-9353

If you call the TReK Help Desk and you get a recording please leave a message and someone will return your call. E-mail is the preferred contact method for help. The e-mail message is automatically forwarded to the TReK developers and helps cut the response time. The HOSC Help Desk (256-544-5066) can provide assistance as needed and is available 24x7.

3 Introduction

The TReK HPEG application provides the capability to access the Huntsville Operations Support Center (HOSC) Payload Ethernet Gateway (HPEG) service. The HPEG service provides access to payloads onboard the International Space Station (ISS) using standard network protocols and services. Services supported include:

- Ping over ICMP
- Hypertext Transfer Protocol Secure (https) over TCP on port 443
- Remote Desktop (rdp) over TCP on port 3389
- Secure Shell (ssh) over TCP on port 22
- CCSDS File Delivery Protocol (cfdp) over UDP on port 4560

- Delay Tolerant Network (dtm) over TCP on a configured port

Note: In the event this list does not match the Payload to Generic User Interface Definition Document (PGUIDD) SSP 50305, the information in the PGUIDD takes precedent.

Access to these services is based on HOSC account privileges.

The general sequence of events when using HPEG is as follows:

- Establish VPN session with HOSC.
- Establish a Login Session with the HOSC using the TReK HOSC Login application.
- Start the TReK HPEG application.
- Push the Configure button to configure the application.
- Push the Activate button to activate the HPEG service.
- Once the HPEG service is active, start a session with your destination (payload).
- Use the Ground Proxy IP address returned to communicate with your payload using other products such as the TReK CFDP application, Remote Desktop, a console command line to ssh, etc.
- When finished Deactivate and Exit.

The interface between the TReK HPEG application and the HOSC is shown in Figure 1.

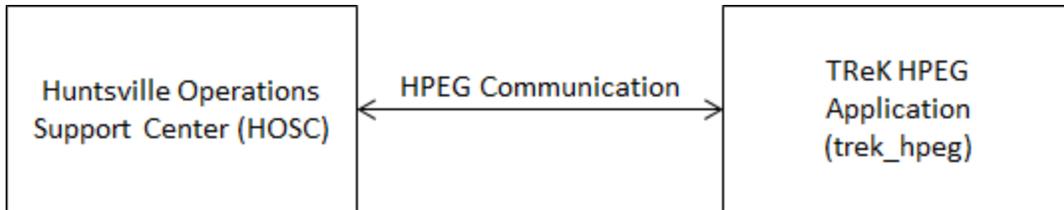


Figure 1 TReK HPEG/HOSC Communication

Figure 2 shows the standard IP communication that is possible between ground applications and flight applications once HPEG services have been started.



Figure 2 Standard IP Communication

4 Overview of the User Interface

4.1 Main Window

The main window is shown in Figure 3. The Message area is a dock window that you can float or dock. To float a dock window, use your left mouse button to click and hold the title area while dragging the window to another area of the screen. To dock, use the title bar to drag the dock window over the main window and drop.

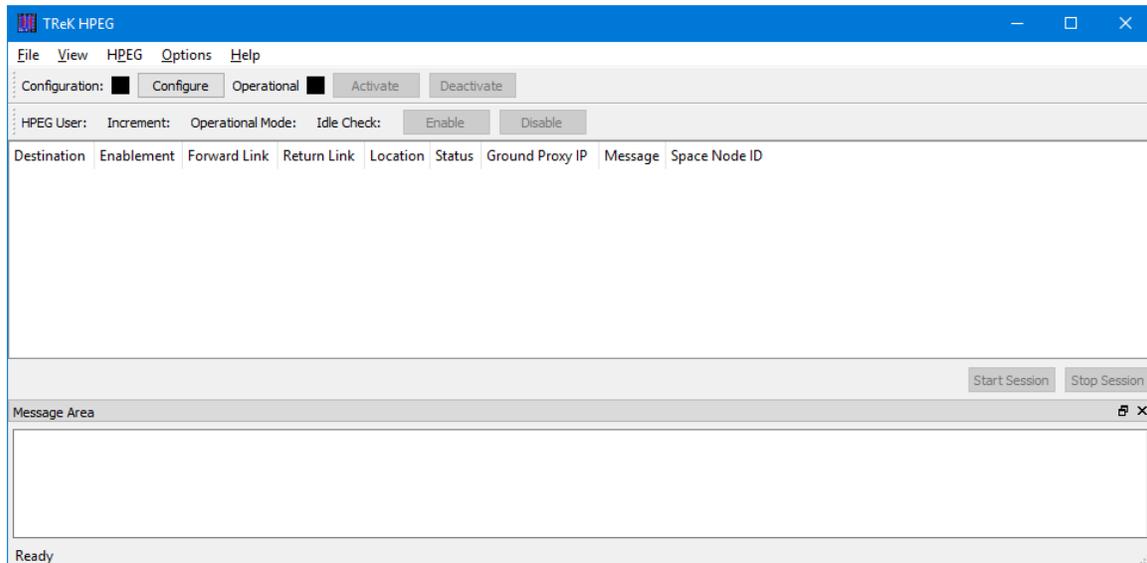


Figure 3 Main Window

Configuration Toolbar

The Configuration toolbar at the top of the window provides quick access to configure the application, activate, and deactivate the HPEG service.

HPEG Toolbar

The HPEG toolbar (located under the Configuration toolbar) provides quick access to HPEG Status and Configuration information. It also provides the capability to Enable and Disable the HPEG Idle Check capability.

Ground Node ID Toolbar

The Ground Node ID Toolbar (located under the HPEG toolbar when displayed) provides quick access to the Ground Node ID. If you do not have a Ground Node ID assigned, this toolbar will not be displayed. The Ground Node ID toolbar is only displayed when the HPEG service is active and a Ground Node ID is in use. This toolbar will also display Delay Tolerant Network information if you have access to this service.

HPEG

The HPEG area provides a list of “Destinations” you are authorized to access through the HPEG. Typically you will have one destination in the list – your payload. The HPEG area also provides “Start Session” and “Stop Session” buttons to start and stop an HPEG session for a selected destination. If you are authorized to use the CFDP service or the

DTN service, you will be assigned a Ground Node ID, and your payload onboard will be assigned a Space Node ID. These IDs correspond to CFDP Entity IDs (EIDs) needed by the CFDP protocol and the DTN node number when using DTN. If you are authorized to use the CFDP service or DTN service, you will be prompted to select your Ground Node ID during HPEG activation. It is possible to have more than one Ground Node ID assigned. In this case you will be prompted with a list and can select the Ground Node ID you would like to use for the session. If you are not authorized to use the CFDP service or the DTN service, you will not be prompted for a Ground Node ID and the Space Node ID field will always be empty.

If you are authorized to use the CFDP service or DTN service, you must select a Ground Node ID when prompted. If you select a Ground Node ID that is in use, you will be prompted again. If all Ground Node IDs are in use, you will need to free one of the Ground Node IDs so you can select one that is available or cancel the activation.

Message Area

The Message Area displays important information, warning and error messages. The message area can be cleared using the View menu.

4.2 Toolbars

There are three toolbars: Configuration, HPEG and Ground Node ID. The Configuration toolbar provides visual information about the state of the application and provides access to common application functions. The HPEG toolbar provides HPEG Configuration and Status information. The Ground Node ID toolbar provides access to the Ground Node ID selected during activation and DTN configuration information if you are authorized to use the DTN service.

4.2.1 Configuration Toolbar

The Configuration toolbar is shown in Figure 4. It can be used to configure the application, activate the HPEG service, and deactivate the HPEG service.



Figure 4 Configuration Toolbar

Configuration Status

When the Configuration status is black, this indicates the application has not been configured. When the Configuration status is green, this indicates the application has been configured and the HPEG service can be activated.

Use the Configure button to access the Configuration dialog to configure the application.

Operational Status

When the Operational status is black, this indicates the HPEG service is inactive. When the Operational status is purple, activation is in progress. When the Operational status is green, this indicates the HPEG service is active. The application must be properly configured before the Activate button will be available. The HPEG service must be active before the Deactivate button will be available.

Use the Activate button to activate the HPEG service. This will initiate all internal activities needed to prepare the application to support the HPEG service. If you need to reconfigure the HPEG application, deactivate the HPEG service, and then push the Configure button to reconfigure.

4.2.2 HPEG Toolbar

The HPEG toolbar is shown in Figure 5 and Figure 6. When the HPEG service is Inactive, the HPEG Toolbar will not contain any HPEG Status and Configuration information. When the HPEG service is activated, the HPEG Toolbar will display HPEG Status and Configuration information. For details about HPEG Status and Configuration information please reference Section 6.2. The HPEG Toolbar also provides the capability to Enable and Disable the HPEG Idle Check. This feature is only available when the HPEG service is active.

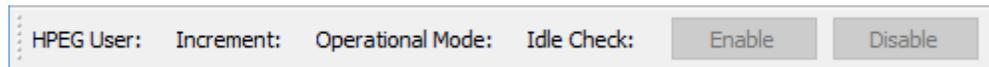


Figure 5 HPEG Toolbar



Figure 6 HPEG Toolbar Populated

4.2.3 Ground Node ID Toolbar

The Ground Node ID Toolbar is shown in Figure 7. This toolbar provides quick access to the Ground Node ID. If you do not have a Ground Node ID assigned, this toolbar will not be displayed. The Ground Node ID toolbar is only displayed when the HPEG service is active and a Ground Node ID is in use. If you are authorized to use the DTN service, the Ground Node ID Toolbar will also display DTN configuration information as shown in Figure 8.

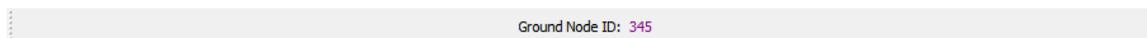


Figure 7 Ground Node ID Toolbar

Ground Node ID: 345 HOSC DTN Node Number: 65535 HOSC DTN Node IP Address: 192.168.100.101 HOSC DTN Node Port: 2014

Figure 8 Ground Node ID Toolbar with DTN Configuration Information

4.3 Menus

The HPEG application menus are: File, View, HPEG, Options, and Help. Each of these menus is described in more detail below.

File Menu

The File menu provides the capability to exit the application.

View Menu

The View menu provides the capability to clear the main window message area and show and hide the main window message area.

HPEG Menu

The HPEG menu provides the capability to configure the application, activate and deactivate the HPEG service, and show HPEG messages.

Options Menu

The Options menu provides access to the Messages dialog which can be used to display and filter application messages. Access to advanced settings is also available.

Help Menu

The Help menu provides access to on-line help and application version information.

5 Quick Start Guides

This section provides “How Tos” for common functions.

5.1 How to Configure the Application

The following steps describe the minimum necessary to configure the application. For additional information and details about the Configure dialog please reference section 6.1.

1. Push the Configure button to display the Configure dialog.
2. Enter the name of an active HOSC Login Session that was created using the TReK HOSC Login application.
3. Enter a Local IP Address.

Note: If you are connecting to the HOSC, enter the Office Mode IP Address returned by the HOSC VPN client in the Local IP Address field.

4. Enter a port number that may be used for communication between TReK and the HOSC about HPEG.
5. Push the OK button to save the configuration information and exit the dialog.

Note: If your site requires Firewall Network Address Translation, use the Firewall (NAT) tab to enter this information.

If the application is configured correctly, the Configuration status will be green.

5.2 How to Start and Stop the HPEG Service

This section describes how to start (activate) and stop (deactivate) the HPEG service.

1. Before the HPEG service can be started, you must configure the application. To learn more about this see section 5.1. The Configure status must be green before you can start the HPEG service.
2. To start the HPEG service, push the Activate button on the Configuration toolbar. The activation process will initiate a POIC login and request the HPEG service. If this is successful the Operational status will turn green, the HPEG toolbar will be populated with HPEG Configuration and Status information, and you will see a list of authorized destinations in the HPEG area.
3. To stop the HPEG service, push the Deactivate button.
4. When activating or deactivating important status and/or error messages will be displayed in the Main Window message area.

5.3 How to Start a Session with a Destination

This section describes how to start a session with a destination.

1. The HPEG application must be configured and the HPEG service must be active.
2. Select an Inactive Destination in the HPEG area and push the Start Session button. This will send a request to the POIC to start a session for the destination. If this is successful, the destination's Status column will show Active and the Ground Proxy IP Address will be displayed in the Ground Proxy IP column. If you have a Space Node ID, it will be shown in the Space Node ID column. You will also see a message in the Message column indicating the status of your "Start Session" request.

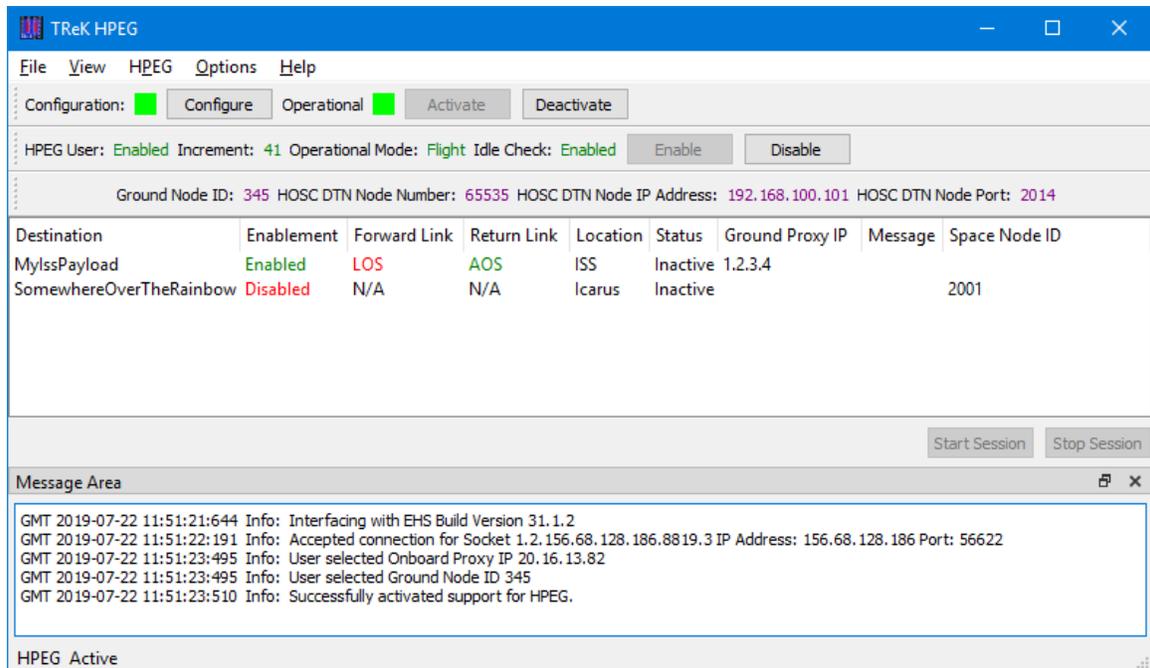


Figure 9 Inactive Destination

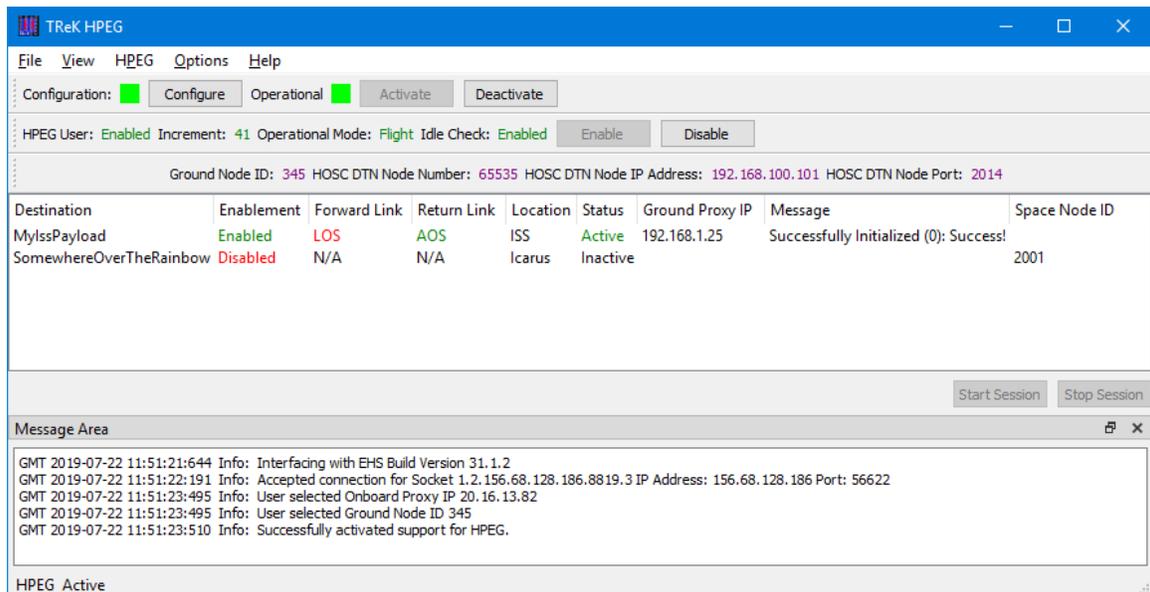


Figure 10 Active Destination

5.4 How to Stop a Session with a Destination

This section describes how to stop a session with a destination.

1. The HPEG application must be configured and the HPEG service must be active.
2. Select an "Active" Destination in the HPEG area and push the Stop Session button. This will send a request to the POIC to stop the session for that destination. If this is successful, the destination's Status column will show Inactive and the Ground Proxy

IP column will be blank. You will also see a message in the Message column indicating the status of your “Stop Session” request.

5.5 How to Enable and Disable the HPEG Idle Check

The Enable and Disable buttons on the HPEG toolbar can be used to control the HPEG Idle Check. If you disable the HPEG Idle check, you will not be prompted when your HPEG session has been idle for a HOSC configured amount of time.

6 Details

This section covers various application details.

6.1 Configuration

The HPEG Configuration dialog contains two tabs: General and Firewall (NAT). The General tab is used to provide information needed for TReK to communicate with the HOSC about HPEG. The Firewall (NAT) tab can be used to enter configuration information for locations using a firewall with network address translation.

6.1.1 General Tab

The General tab is shown in Figure 11. Each field is described below.

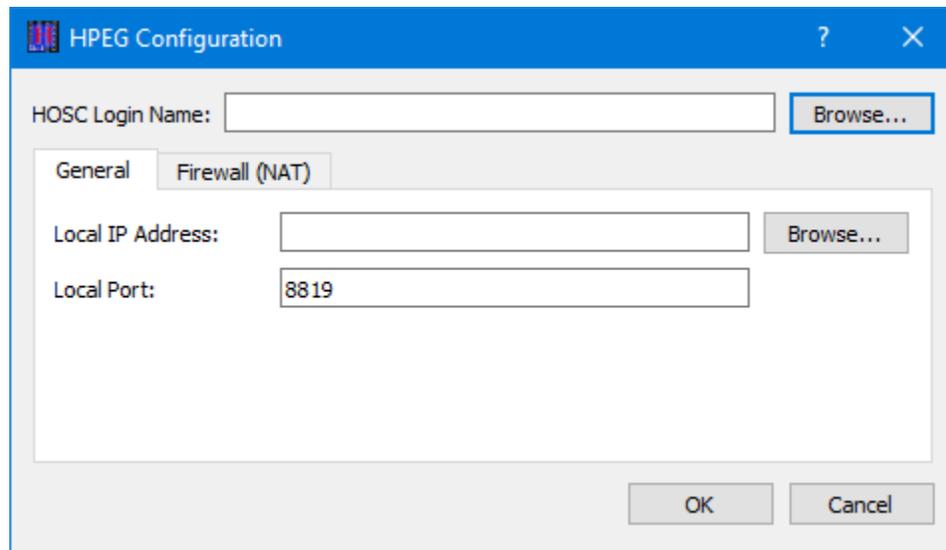


Figure 11 HPEG Configuration Dialog (General Tab)

HOSC Login Name

This field should contain the name of an active HOSC Login Session that was created using the TReK HOSC Login application. The Browse button can be used to view and select a HOSC Login Name.

Local IP Address

This field should contain your local IP address.

Port

A TCP socket is created to send and receive HPEG information between TReK and the HOSC. The Local IP Address and port are used to create this TCP socket.

6.1.2 Firewall (NAT) Tab

The Firewall tab is shown in Figure 12. Each field is described below.

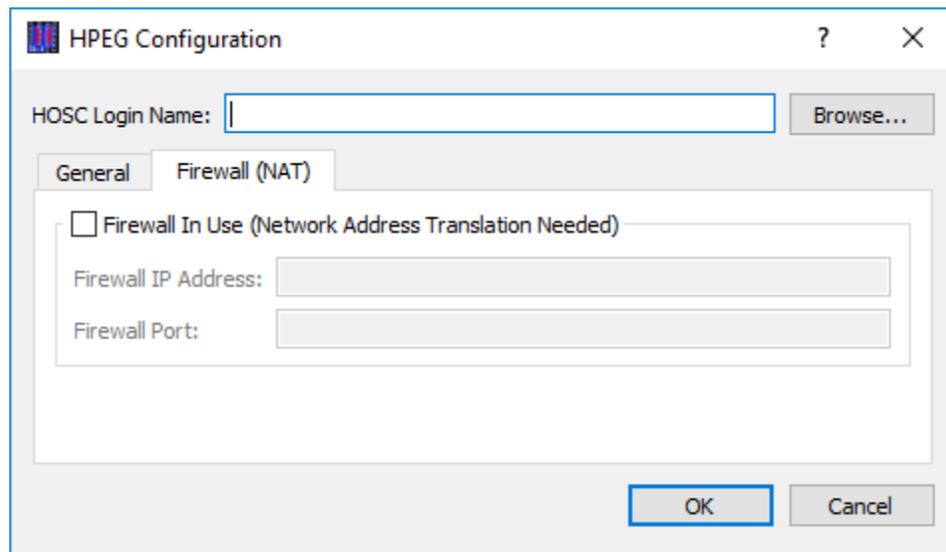


Figure 12 HPEG Configuration Dialog (Firewall Tab)

Firewall In Use (Network Address Translation Needed)

Check the “Firewall In Use” checkbox, if your location is using a Firewall with network address translation.

Firewall IP Address

The Firewall IP Address.

Firewall HPEG Port

The Port on the Firewall that should be used for HPEG traffic.

6.2 HPEG Configuration and Status

This section describes the items in the main window HPEG toolbar.

HPEG User

This indicates if your user account is Enabled or Disabled for HPEG.

Increment

This displays the increment you are logged into.

Operational Mode

This displays the operational mode you are logged into.

Idle Check

This indicates if the HPEG Idle Check is Enabled or Disabled. If you push the Enable button the Idle Check will be enabled. If you push the Disable button, the Idle Check will be disabled. If the Idle Check is disabled, the POIC will not monitor the HPEG sessions to determine if any have gone idle.

6.3 HPEG Messages

The HPEG Messages dialog is shown in Figure 13. It is available from the HPEG menu. This dialog displays HPEG messages associated with HPEG Destinations.

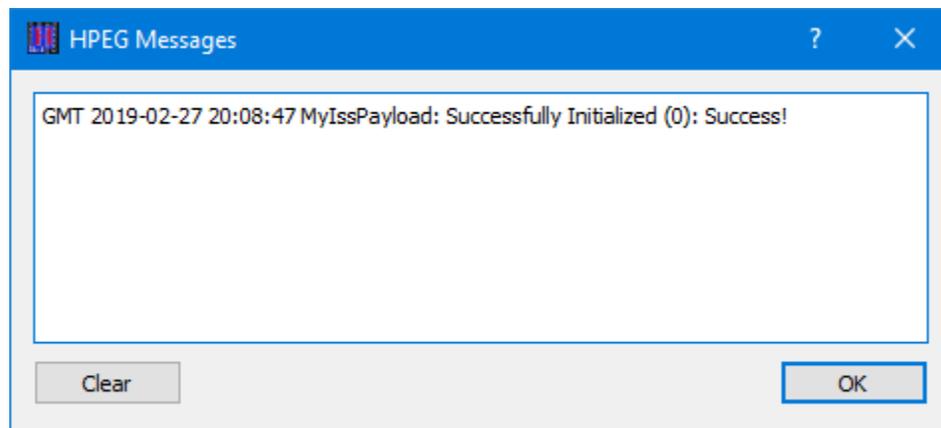


Figure 13 HPEG Messages

6.4 Application Messages

Various types of application messages are generated including information, progress, warning, error, and debug messages. Application messages are stored in memory and written to a temporary log file. The temporary log file is created on application initialization and exists as long as the application is running. It is deleted when you exit the application. The log file is located in the temporary directory provided by the operating system. Only a subset of messages are stored in memory while all messages are written to the temporary log file. The maximum number of application messages

stored in memory is controlled by the message storage setting in the Configure Messages dialog. Once the maximum is reached, older messages are deleted to make room for new messages. Setting the maximum value to a large number can impact application performance since it will increase the amount of memory used by the application. Setting this number too low can cause you to miss important messages. The application default was selected to protect against both of these scenarios. Messages stored in memory are displayed in the Main Window Message Area and the Messages dialog. The Messages dialog is shown in Figure 14. The Main Window message area only displays Info, Warning, and Error messages. The Messages dialog displays messages based on the display preferences defined in the Configure Messages dialog. By default, the Messages dialog will display information, progress, warning, and error messages. Columns in the Messages dialog can be sorted by clicking on the column header. The Messages dialog is available from the Options menu.

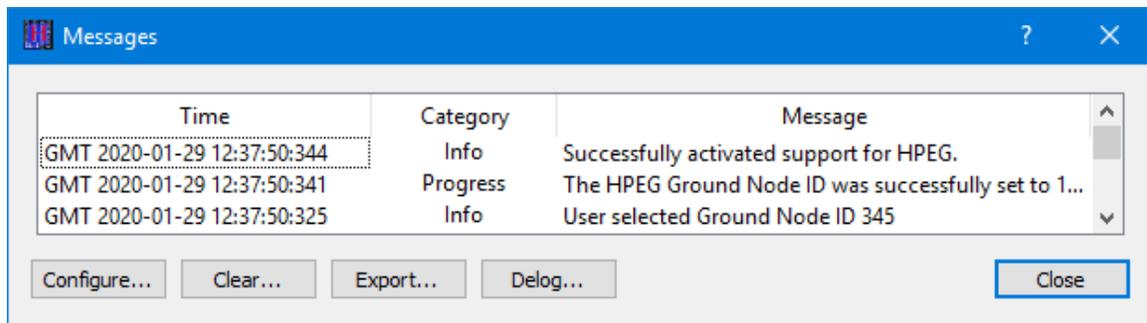


Figure 14 Messages Dialog

Configure

The Configure button provides access to the Configure Messages dialog shown in Figure 15. This dialog provides access to preferences associated with messages. Display preferences can be set to filter the types of messages (category) displayed in the Messages dialog. Export Preferences control how the time tag is added to the filename that is created when messages are exported. See the Export section for details. Message storage defines the maximum number of messages that will be stored in memory while the application is running. Once the maximum is reached, older messages are deleted to make room for new messages. The Set to Defaults button can be used to reset these properties to application defaults.

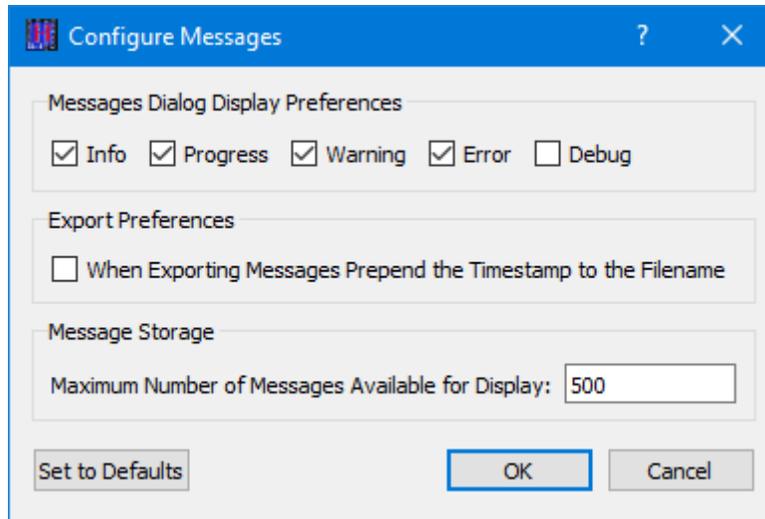


Figure 15 Configure Messages Dialog

Clear

The Clear button provides access to the Clear Messages dialog shown in Figure 16. This dialog provides two ways to clear application messages stored in memory. You can clear all the messages or clear selected messages. Once you clear messages, the messages are permanently deleted in all views (Main Window Message Area and the Messages dialog).

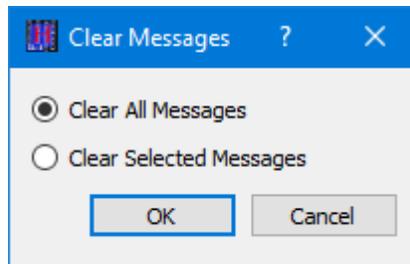


Figure 16 Clear Messages Dialog

Export

The Export button provides the capability to save all the application messages currently in memory to a file. When you push the Export button you will be prompted for a directory and filename. Export will save all messages in memory, not just the messages currently displayed in the Messages dialog (i.e. the Display Preferences are not applied). The name you provide for the file will be modified with a time tag that is added to the filename. The time tag indicates the time the file was closed. The default is to append the time tag to the filename. For example:

Filename Input: messages.txt
 Filename Output: messages_2017-05-07_13~03~28.txt

If you would like to prepend the time tag to the filename you can set this preference in the Configure Messages dialog. This would result in the following:

Filename Input: messages.txt
 Filename Output: 2017-05-07_13~03~28_messages.txt

Delog

The Delog button provides the capability to save all application messages generated since the application was started. Delog will retrieve the messages from the temporary log file. When you push the Delog button you will be prompted for a directory and filename. A timetag is not applied to the filename.

Filename Input: messages.txt
 Filename Output: messages.txt

6.5 Advanced Settings

The Advanced Settings dialog provides access to configure several advanced settings. The Advanced Settings dialog is shown in Figure 17.

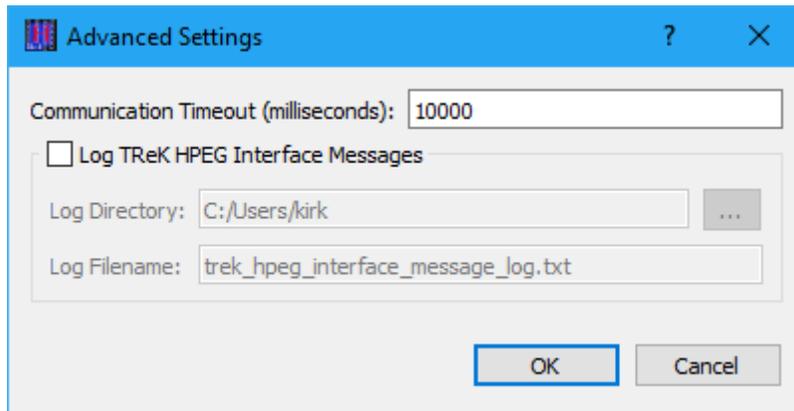


Figure 17 Advanced Settings Dialog

Communication Timeout

You can set the timeout value used in communication with the Huntsville Operations Support Center. It is unlikely there would ever be a need to modify this setting. The timeout value can only be modified when the HPEG service is inactive.

Log TReK HPEG Interface Messages

The TReK HPEG application provides the capability to log messages that are exchanged between the TReK HPEG application and the HOSC HPEG software to a file. This capability has been provided for troubleshooting purposes. Hopefully this is a feature you will never need to use. If you check the Log TReK HPEG Interface Messages

checkbox, the messages that are exchanged between the TReK HPEG application and the HOSC HPEG software will be written to the log file specified. Message Logging will start when the HPEG service is activated and stop if you uncheck the box or the HPEG service is deactivated. Once a log file exists, any new messages will be appended to the existing log file.

Log Directory

The Log Directory field should contain the absolute path to the directory where the log file should be written.

Log Filename

The Log Filename field should contain the name to use for the log file.

6.6 Application Settings

The HPEG application saves application settings each time you exit the application. The next time you run the application, the application will initialize with the previous settings. Only one set of settings are saved. If you run multiple instances of the application, the settings in the instance that is exited last will be saved. The following settings are saved:

- Application Window Size
- HPEG Port Entry
- Firewall In Use Selection
- Firewall IP Address Entry
- Firewall Port Entry
- Firewall HPEG Port Entry
- Configure Messages Selections
- Advanced Settings

7 FAQ and Troubleshooting

This section addresses Frequently Asked Questions and provides tips for troubleshooting common gotchas.

No FAQs Yet.