



SightLine
APPLICATIONS

EAN-Ground Control Stations

PN: EAN-Ground-Control-Stations

9/17/2018



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Alerts

The following notifications are used throughout the document to help identify important safety and setup information to the user:

 **CAUTION:** Alerts to a potential hazard that may result in personal injury, or an unsafe practice that causes damage to the equipment if not avoided.

 **IMPORTANT:** Identifies crucial information that is important to setup and configuration procedures.

 *Used to emphasize points or reminds the user of something. Supplementary information that aids in the use or understanding of the equipment or subject that is not critical to system use.*



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1 Overview

This document describes how to configure the 1500-OEM or 3000-OEM video processors for sending out a RTP-H264 video stream for the Mission Planner and QGroundControl.

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1.1 Associated Documents:

[Panel Plus User Guide](#): Provides descriptions of all the settings in the Panel Plus application. (Located in the Panel Plus application in the *Help* menu.)

[EAN-Startup Guide 1500-OEM](#): Describes steps for connecting, configuring, and testing the 1500-OEM video processing board on the 1500-AB accessory board.

[EAN-Startup Guide 3000-OEM](#): Describes steps for connecting, configuring, and testing the 3000-OEM video processing board on the 3000-IO interface board.

[EAN-GStreamer-Decoder](#): Describes how to configure settings to stream H.264 video data to a host system. Describes how to configure GStreamer to decode and display the stream.

1.2 Software Compatibility

Windows 7, 8, or 10 required for use with the Panel Plus software.

1.3 Hardware Compatibility

Standard Ethernet network connection to the SightLine hardware.

1.4 SightLine Firmware and Software Requirements

Mission Planner and QGroundControl (QGC) are mutually exclusive in their use. They both provide flight control and mission planning capabilities. It is assumed these software packages are installed on a PC separate from SightLine's Panel Plus software which is used to configure the 1500-OEM or 3000-OEM.

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- Panel Plus software and firmware versions: Firmware version 2.23.0 or higher - [download](#)
- QGroundControl - [download](#). QGroundControl has implemented its own GStreamer build for displaying video within the application. It is not required to download and install GStreamer separately.
- Mission Planner - [download](#). Mission Planner does require a separate installation of the GStreamer software. The supported version is the 1.5.2 release 32-bit build (do not install the 64-bit).
- [GStreamer](#) 32-bit Encoder/Decoder version 1.5.2 - [download](#). The recommended version for GStreamer is 1.5.2 release 32-bit build. Other versions may support these configurations and examples. Consult the software documentation for more information on supported GStreamer versions.
- [VLC Player](#) - optional software used for testing of video streams - [download](#).

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2 Video Streaming Configuration Steps

To configure the 1500-OEM or 3000-OEM, connect to the board using Panel Plus software. Follow the steps below to define the outbound video stream:

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1. Open the Panel Plus software and connect to the OEM board.

IMPORTANT: The Panel Plus software version should match the firmware version running on the board.

2. Go to the *Compression* tab and verify that video in Panel Plus is displaying.
3. In the RTP section, select *RTP H.264* (radio button).
4. Enter the destination IP address of the PC running Mission Planner or QGroundControl software.
5. Enter the destination port of 5600. This is the default listen port for both Ground Control Station (GCS) applications.
6. Click the *Send* button, and then click the *Start Streaming* button to begin sending the RTP stream to the destination host system.

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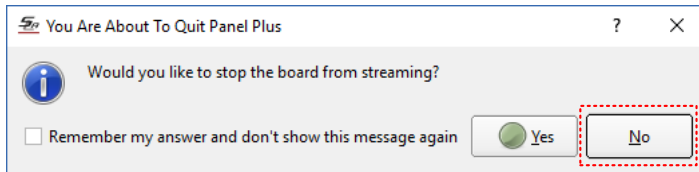
The screenshot shows the 'Compression' tab in the Panel Plus software. The 'CODEC / TRANSPORT' section has 'RTP' selected with 'RTP H.264' chosen via a radio button (indicated by a red arrow). The 'MPEG2-TS' section has 'H.264' selected. Under 'Output Properties', 'Frame Step' is 1, 'Down Sample' is 1, 'Output Frame Size' is 'Out=In', 'Quality' is 80, and 'Foveal' is 0. The 'H.264 Profile' is 'Baseline', 'Bit Rate' is 2.500 Mbps, 'I-Frame Interval' is 30 frames, 'Block Refresh' is 0 frames, 'Slice Refresh Size' is 0 rows, 'Deblocking' is 'Filter all edges', and 'Bit Rate Control' is 'Constant'. A 'Save Output Settings' button is present. In the 'Streaming' section, 'IP Address' is 192.168.1.69 (indicated by a red arrow) and 'Port' is 5600 (indicated by a red arrow). The 'Use My IP - Unicast' button is selected, and the 'Send' button (indicated by a red arrow) is highlighted. The 'Start/Stop All Nets' checkbox is unchecked.

Figure 1: Configure streaming for Mission Planner or QGC

To make the settings the default configuration for the OEM and stream to the selected GCS software at start-up, save the parameters to the board (main menu » Parameters » Save to board).



7. Close Panel Plus and click the *No* button to stop streaming. The board will continue to send the RTP stream to the destination IP address.



3 Configuring QGroundControl Software

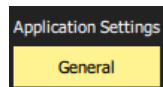
This software will be the easiest to setup, given an internal implementation of the GStreamer software. After installing the QGroundControl software, the default configuration attempts to open a video stream (using their embedded GStreamer) on a designated network port (5600). Video streaming configuration can be done with no autopilot hardware connected.

To setup and configure the QGroundControl Software:

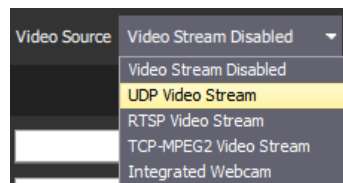
1. Startup an RTP stream from the OEM video processing board using the steps above.
2. Download and install the QGroundControl software. Follow their documentation for installing the software. Tested using v3.4.4
3. Start the QGroundControl software.
4. Configure QGroundControl from the toolbar by clicking on



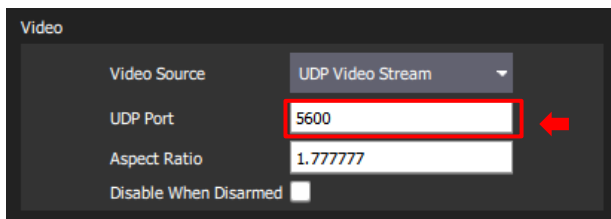
5. Under **Application Settings**, select **General** (default)



6. In the configuration window, scroll down to the **Video** section(scroll bar may not be obvious by default)
7. Use the pulldown menu to select UDP Video Stream




8. Update the UDP Port to match the UDP port specified in Panel Plus above.

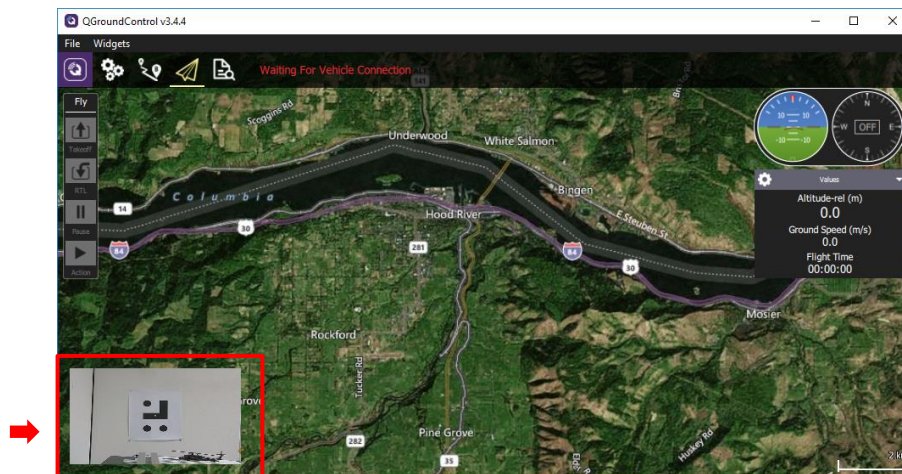


Must match streaming port in Panel Plus




9. Select the  in the menubar to return to main QGC window

NOTE: By default, the OEM board video stream will be displayed in a small window, located in the bottom left portion of the main application screen.



Live Video Stream

10. Clicking on the small video window will swap it with the main map view window. Clicking again on the small window will swap the main map view back.

 If the video stream is not visible, see the [Troubleshooting](#) section.

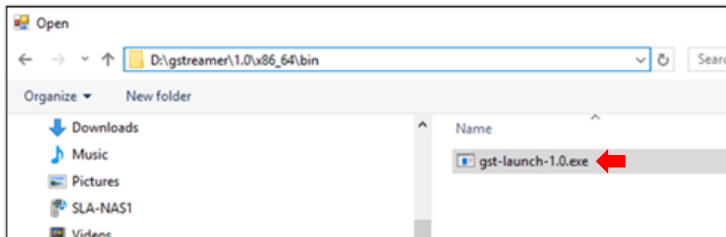
4 Configuring Mission Planner Software


This software requires that the GStreamer software be installed to decode/display video being streamed from the OEM board.

Follow the steps below for installing both applications:




1. Install the 32-bit version of the GStreamer application. See [EAN-GStreamer-Decoder](#) for detailed instructions for installing and validating GStreamer. Note the path to the installed binaries - `C:\gstreamer\1.0\x86\bin`.
2. Install the Mission Planner software following their installation procedures.
3. After the install is complete, load the Mission Planner software.
4. Start up the RTP video stream.
5. After the application loads, use CTRL-F to bring up the advanced configuration screen.
6. About midway down the right column, click the button labeled *gstream*.
7. (Depending on Mission planner version, this step may not be necessary.) Using the supplied file open selection, browse to the GStreamer executable (*gst-launch-1.0.exe*) and click *Open*.



 After the GStreamer application loads, video should be displayed in the top left navigation window. If the video is not displayed, try restarting Mission Planner. If video is still not displayed, see the Troubleshooting section for testing the video streaming with both GStreamer and VLC independently from Mission Planner or the QGroundControl software packages. This will confirm that the OEM board is properly configured and working.

5 Troubleshooting

The following sections cover troubleshooting issues related to streaming video to the GCS software packages in the previous sections. The VLC media player and GStreamer will be used to set up test cases to help determine where the issues are.

 Since there are many pieces to any streaming configuration, the scenarios below attempt to find issues by establishing connections, opening streams, and testing delivery of IP and RTP/UDP ports with the above applications.

5.1 Testing Using GStreamer and Mission Planner

In the below examples, GStreamer will be used to create an RTP stream for Mission Planner. This test ensures that Mission Planner and GStreamer are working correctly before introducing the OEM board into the system.

1. Open a command window and navigate to the GStreamer bin directory (by default `C:\gstreamer\1.0\x86\bin`).



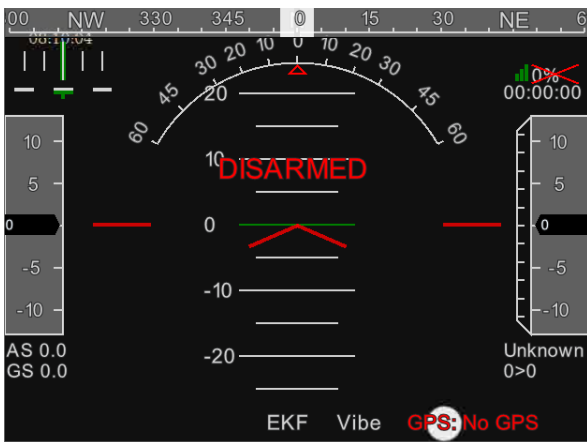
2. At the command prompt window paste in the following GStreamer pipeline command:

```
gst-launch-1.0 videotestsrc pattern=ball ! video/x-raw,width=640,height=480 ! clockoverlay !
x264enc ! rtph264pay ! udpsink host=127.0.0.1 port=5600
```

3. If GStreamer has been installed correctly the output in the command window should look like the following screen capture:

```
C:\gstreamer\1.0\x86\bin>gst-launch-1.0 videotestsrc pattern=ball ! video/x-raw,
width=640,height=480 ! clockoverlay ! x264enc ! rtph264pay ! udpsink host=127.0.
0.1 port=5600
Setting pipeline to PAUSED ...
Pipeline is PREROLLING ...
Redistribute latency...
Pipeline is PREROLLED ...
Setting pipeline to PLAYING ...
New clock: GstSystemClock
```

4. Once this pipeline is running, start Mission Planner and follow the steps outlined in [Configuring Mission Planner Software](#). If everything is working, the HUD should look like the following screen capture:



5. If Mission Planner does not show video in the HUD, enable the console output in Mission Planner using the following steps:
 - a) Open the help window and check the box *Show Console Window (restart)*.
 - b) Restart Mission Planner. The console window will stay open. This should show any issues with the GStreamer pipeline. An example of an incorrect installation of GStreamer is shown in the following screen capture:



```

HUD 5 hz drawtime 44 gl True
INFO MissionPlanner.Utilities.GStreamer - Found gstreamer C:\gstreamer\1.0\x86\bin\gst-launch-1.0.exe
INFO MissionPlanner.Utilities.GStreamer - Starting C:\gstreamer\1.0\x86\bin\gst-launch-1.0.exe -v udpsrc port=5600 buffer-size=300000 ! application/x-rtp ! rtph264depay ! avdec_h264 ! queue leaky=2 ! avenc_mjpeg ! queue leaky=2 ! tcpserver
ink host=127.0.0.1 port=1235 sync=false
INFO MissionPlanner.Utilities.GStreamer - _Start
WARNING: erroneous pipeline: no element 'avdec_h264'
INFO MissionPlanner.Utilities.GStreamer -
INFO MissionPlanner.Utilities.GStreamer - Stop

```

5.2 Testing Using GStreamer

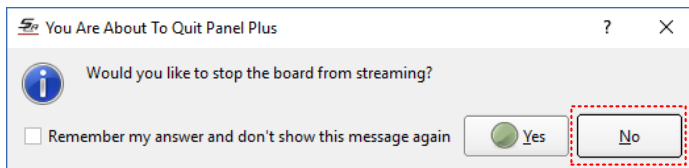
In the example below GStreamer is used to open an RTP stream sent for the OEM board. It has been tested with the 1.5.2 version. Other versions of the GStreamer application may require different settings.

Testing can also be done with the VLC media player using the SDP File. See the *VLC Media Player with SDP File* section in the [EAN-RTSP](#) document.

5.2.1 GStreamer Pipeline Test

The following steps cover how to open the OEM board video stream using a GStreamer pipeline in a command window.

1. Using Panel Plus software, create a standard RTP output stream and set the outbound Port to 5600. (The below pipeline uses this port number in the test string.)
2. Close Panel Plus. At the prompt, click the *No* button.



3. Open a command shell window.
4. At the command prompt window paste in the following GStreamer pipeline command:
`'gst-launch-1.0 udpsrc port=5600 ! application/x-rtp,media=video,clock-rate=90000,encoding-name=H264 ! rtph264depay ! avdec_h264 ! autovideosink fps-update-interval=1000 sync=false'`
5. Video will be displayed in a GStreamer D3D video sink internal display window.

5.3 Questions and Additional Support

For questions and additional support, please contact [Technical Support](#). Additional support documentation and Engineering Application Notes (EANs) can be found on the Support pages of the SightLine Applications [website](#).

