EAN-RTSP

PN: EAN-RTSP

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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 use various commercial off-the-shelf media players and VMS (Video Management System) software to stream video from the RTSP server running on either the 1500-OEM or 3000-OEM systems. Most video client examples use VLC. For more complex tasks, FFmpeg/FFplay or GStreamer can be used.

1.1 Associated Documents

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-Encoding: Outlines SightLine's encoding capabilities and library support of motion imagery standards for streaming video and metadata. Includes a list of known working software and hardware decoders.

EAN-Video Management Software - Reviews third party Video Management Software (VMS) packages that connect and receive video from SightLine products.

Interface Command and Control (IDD): Describes the native communications protocol used by the SightLine Applications product line. The IDD is also available as a local download on the Software Download page

EAN-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.)

1.2   SightLine Software Requirements

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

1.3 Application Bit Requirements

The functions described in this EAN require Application Bits (app bits) purchased from SightLine. App bits reside on the hardware unit and are enabled with a license file provided by SightLine at initial unit purchase or during a license upgrade process. License files use a hardware ID that is applicable to a specific hardware serial number. For questions and upgrade support contact SightLine Sales.

Table 1: Application Bits Requirement Table

Function	Minimum Software Version	Required Application Bit(s)
1500-OEM RTSP support	2.22.xx	IP Encoding. 0x0004
3000-OEM RTSP support	2.24.xx	IP Encoding. 0x0004

1.4 Third Party Software

[VLC media player](#): Used to display video.

FFplay Media Client: Included in the Panel Plus application folder.

The RTSP server from SightLine Applications is compatible with other RTSP clients including VMS (Video Management Systems) compliant with [RFC 2326](#).

1.5   Feature Overview

RTSP	IP Network Protocols
- RTP MJPEG - RTP H.264 - RTP MPEG2-TS H.264 + Metadata - RTP MPEG2-TS MPEG-4 + Metadata	- UDP and TCP Packets - Unicast Streaming - Multicast Streaming - Multiple Unicast Streaming - TCP Tunneling - RTCP
Streaming	**Clients**
1 camera stream (1500-OEM) 2 camera streams (3000-OEM) **Multiple Display Options** - Picture-In-Picture - Side-By-Side - Zoom to Track - False Color - Digital Pan, Tilt, Zoom, and Rotation	8 simultaneous connections (1500-OEM) 16 simultaneous connections (3000-OEM) 8 sessions for Net0, 8 sessions for Net1 **On Screen Display (OSD)** - Text - Shapes - Customer Logo / Watermark
Authentication	**Keep Alive**
Digest Authentication	RTSP Keep alive timeout is set to 120 seconds

1.6   Definitions

SLA Hardware:	Any number of OEM hardware products available from SightLine Applications such as the 1500-OEM and 3000-OEM.
RTSP Server:	SLA hardware will host an RTSP server that will handle client connections and translate RTSP requests into actionable video streaming by VideoTrack.
RTSP Client:	Remote software which communicates with the RTSP Server to negotiate the streaming video session.
VideoTrack:	The video processing software from SightLine Applications that runs on SLA hardware.
Panel Plus:	The PC user interface from SightLine used for configuring and testing SLA hardware. Its intent is to introduce SightLine Command and Control Protocol (FIP) that can be implemented in the client's software. Panel Plus is a stand-in for any other client such as an auto-pilot or ground control station that can be used to control the SLA hardware.
VMS:	Video Management System

1.7   RTSP Overview

RTSP (Real Time Streaming Protocol) allows a media client such as VLC to request streaming video in a variety of formats from a server such as the 1500-OEM. The RTSP client and RTSP server negotiate the destination port and video format, but actual streaming of video is done by another service (VideoTrack on the 1500-OEM and 3000-OEM), typically using the RTP streaming protocol over UDP. An introduction to the RTSP protocol can be found on Wikipedia. Detailed and authoritative information is available from RFC 2326.

1.7.1   How it Works

The SightLine RTSP Server will startup automatically on power up of the hardware and will listen for inbound connections on port 554. Before clients can connect, system administrators use Panel Plus to configure the video encoding parameters, such as codec (MJPEG, H.264) and other parameters such as quality, frame rates, and image size.

To view the video, operators will use a simple standard URL: `rtsp://<<ip address>>`, where the IP address is the unique address for the SLA-Hardware. The video client will then handle all the connection details behind the scenes communicating with the SightLine RTSP server.

ⓘ **IMPORTANT:** RTSP sessions are not recommended for applications where there is active gimbal control because of the additional latency introduced by the RTSP session.

1.7.2   RTSP Requests and Features

The RTSP server running on SLA-boards supports sending the video stream in different formats. Consult the client software documentation for any specific formatting requirements for the video payload. The SightLine Hardware can be configured to deliver video in the following formats for use with RTSP:

- RTP-H.264: H.264/AVC encoded video stream

- RTP-MPEG2-TS H.264: H.264 encoded video stream within an MPEG2 Transport Stream

- RTP-MPEG2-TS MPEG-4: MPEG4 encoded video stream within an MPEG2 Transport Stream

- RTP-MJPEG: MJPEG (Motion JPEG) video stream

These types of encoded payloads will need to be selected prior to establishing RTSP sessions with the video processing board. Panel Plus is used to select the desired encoded video payload format.

By default, OEM boards will send out video encoded as H.264 in an elementary stream inside an MPEG2 Transport Stream. The client software may already support this format. This is a MISB (Motion Industry Standards Board) requirement for UAV video streams. For more information refer to the EAN-Encoding document or go to the MISB website.

📄 *SightLine hardware is designed as a live streaming encoder. The RTSP server does not currently support a pause option.*

1.8   Before Starting

Use the EAN-Startup Guide 1500-OEM or the EAN-Startup Guide 3000-OEM to setup the SLA hardware and confirm that video and Ethernet communications are functioning. For the purposes of examples shown in this EAN, the following IP addresses are used:

PC: 192.168.0.23 **1500-OEM:** 192.168.0.115 **3000-OEM:** 192.168.0.24

2   Configuring 1500-OEM for RTSP Sessions

This section describes how to set up the 1500-OEM to send the selected RTP payload for a RTSP session through VLC media player client. The following steps will reference the Panel Plus software.

1. Connect to the board using the Panel Plus application.

2. Go to the *Compression* tab.

3. In the RTP section select one of the four encoded payload options. In this example, *RTP H264* is selected. Click *Send*.


📄 *It is not required to set an IP address or Port for a remote client. They will be set when the RTSP client connects.*

If streaming to Panel Plus, encoding, transport and general performance can be verified using the onscreen statistics.

📄 *To save the settings to the parameter file, from the main menu » Parameters » Save to Board.*

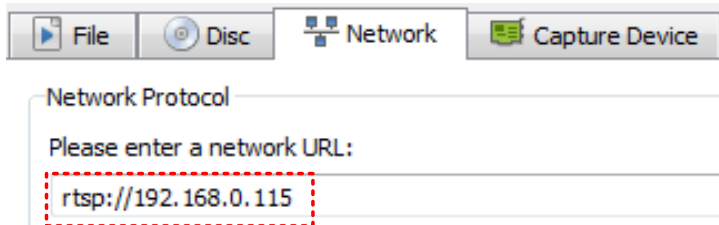4. Close the Panel Plus application. Click *No* in the dialog window.
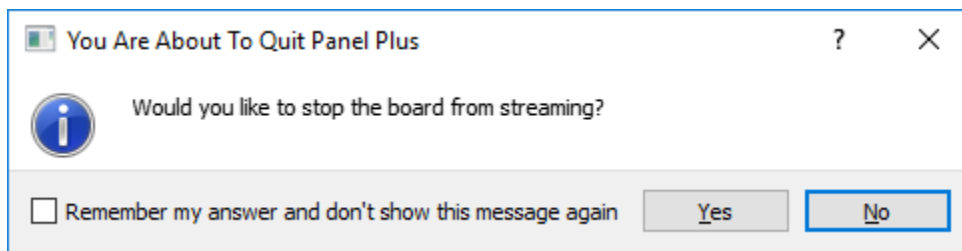
5. Load the RTSP client and enter the IP address of the 1500-OEM board. In this example, VLC media player is the RTSP client requesting a session.

6. Launch the VLC media player and using the main menu, select *Media\Open Network Stream*. In the URL field use the following syntax:

rtsp://<ip-address-of-SLA-board>

7. Click *Play* to begin the connection.

8. The VLC media client will negotiate with the 1500-OEM RTSP server to establish a session.

9. If authentication is enabled VLC will pop up the authentication dialog box. Enter the login and password in the login prompt as configured in the RTSP server.
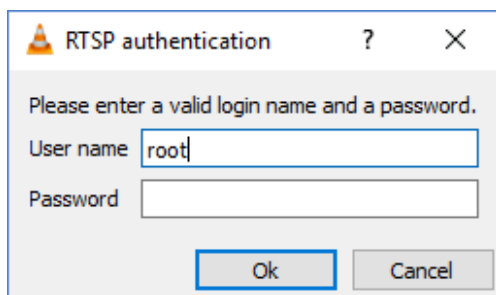
10. To avoid the login prompt, by-pass the username and password directly in the URL by using the following syntax:

rtsp://<login>:<password>@<ip-address>

Example: The username is *admin*. The password is *bls_345*. The following URL can be used with the user name and password to avoid the login prompt:

rtsp://admin:bls_345@192.168.1.15

11. If authentication is successful or authentication is disabled, the video will start streaming from the RTSP server. If video is not streaming, refer to the Troubleshooting section.

3   Configuring 3000-OEM for RTSP Sessions

This section describes how to set up the 3000-OEM to send the selected RTP payload for a RTSP session through VLC media player client.

The 3000-OEM board can output two network streams. These streams are assigned to logical networks: *Network 0* and *Network 1.* RTSP clients can establish sessions on either of these network channels. When using *Network 1*, the 3000-OEM must be configured with Panel Plus.

1. Open the Panel Plus application and connect to the 3000-OEM board.

2. Go to the *Compression* tab.

3. In the top *Output* section, select the *Output Frame Size* for the session.

4. In the *RTP* section select one of the two available encoded payload options, and then click *Apply*. The alternate options will be grayed out. In this example, *RTP H264* is selected.

    📄 *Do not set an IP address or Port for a remote client. Only set these to the host PC if the video stream is viewed in Panel Plus*

5. Go to the *Multi Camera* tab. Using the radio buttons to assign the preferred camera to either *Network 0* or *Network 1*. In this example, *Camera 0* is assigned to *Network 0*.

    📄 *When making changes save the parameter file to the board as needed. Main menu » Parameters » Save to Board.*

6. Load the RTSP client and enter the IP address of the 3000-OEM board. In this example, the board has been assigned IP the address of 192.168.0.24. The VLC media player is the RTSP client requesting a session.

7. Launch the VLC media player and using the main menu, select *Media\Open Network Stream*. In the dialog box provided use the following syntax:

   rtsp://<ip-address-of-SLA-board>/<Network>

   The network designation is either *net0* or *net1*. For example:

   Network Protocol
   Please enter a network URL:
   rtsp://192.168.0.24/net0

   📄 *Network designations allow choosing either of the logical outbound networks support by 3000-OEM.*

8. Another client can stream simultaneously from *Network 1* by using the *net1* designation. For example:

   Network Protocol
   Please enter a network URL:
   rtsp://192.168.0.24/net1

9. Click *Play* to begin the connection.

10. The VLC media client will negotiate with the 3000-OEM RTSP server to establish a RTSP session.

11. If authentication is enabled, VLC will pop up the authentication dialog box. Enter the login and password in the login prompt as configured in the RTSP server.

   ⚠ RTSP authentication   ?   ✕
   Please enter a valid login name and a password.
   User name root
   Password
             Ok   Cancel

12. To avoid the login prompt, by-pass the username and password directly in the URL by using the following syntax:

   rtsp://<login>:<password>@<ip-address>/<Network>

   Example: The user name is *admin* and password is *bls_345*. The following URL can be used with the user name and password to avoid the login prompt:

   rtsp://admin:bls_345@192.168.1.15/net1

12. If authentication is successful or if the authentication has been disabled, the video will start streaming from RTSP server. If the video is not streaming, refer to the Troubleshooting section.

4 Joining Multicast Sessions Through RTSP

RTSP can join to an existing multicast session if the multicast session is configured through Panel Plus for a network.

To join a multicast session through RTSP:

1. Open the Panel Plus application and connect to the 1500-OEM or 3000-OEM. See the 1500-OEM Startup Guide or the EAN-Startup Guide 3000-OEM for connection instructions

2. Follow the steps in the previous sections to configure the network and camera.

3. Go to the *Compression* tab and click *Use Multicast*. In the IP Address window enter the multicast address and port if it is different than the default multicast address and port shown.

4. Click *Send* to begin streaming. The video should start rendering in the Panel Plus display window.

5. Launch the VLC media player.

6. From the main menu select *Media\Open Network Stream*. In the URL field use the following syntax:

   rtsp://<ip-address-of-SLA-board>/<Network>

7. The network designation is either *net0* or *net1*, for example:

The Video should start streaming in the VLC media player.

📄 *Starting a unicast session (RTSP URL) or joining a multicast session are the same. RTSP URL should always use the IP Address of the board and not the multicast address given in Panel Plus. Terminating RTSP multicast session will only terminate the RTSP session. The SLA hardware will continue to stream to the multicast address. Panel Plus should be used to terminate the multicast streaming by either clicking the Stop Streaming button or switching to Unicast session in the Compression tab.*

5   RTSP Commands

The RTSP server in the SLA hardware supports the following RTSP methods (commands): OPTIONS, DESCRIBE, SETUP, PLAY, GET_PARAMETER, SET_PARAMETER, and TEARDOWN.

6   RTSP Authentication

RTSP server supports Digest Authentication mechanism based on RFC 2069. Currently RTSP Server does not support Basic Authentication. Digest Authentication applies MD5 hash function to the username and password before sending them over the network.

RTSP Authentication is disabled by default. It can be enabled through a command line argument while starting RTSP Server.

6.1   Procedure Overview

Step 1:   Create / Modify Password File

Step 2:   Enable RTSP Authentication

Step 3:   Copy files to target SLA hardware

Step 4:   Reboot SLA hardware

Step 1: Create / Modify Password File

The password file should be named *.htpasswd* and have multiple entries corresponding to different users. Each entry in the password file should use the following syntax:

<username>:<realm>:MD5(username, realm, password)

Example 1:   Assume the following information for Username and Root.

Username: Root:
Realm   *Sla_rtspserver*
Password   *root*

.htpasswd entry: *root:sla_rtspserver:54a6205c85e92a26699dc2c1184e887d*

The md5 hash can be generated online using http://www.md5.cz/ or http://onlinemd5.com/ .

Online generator md5 hash of a string

md5 (root:sla_rtspserver:root)

hash darling, hash!

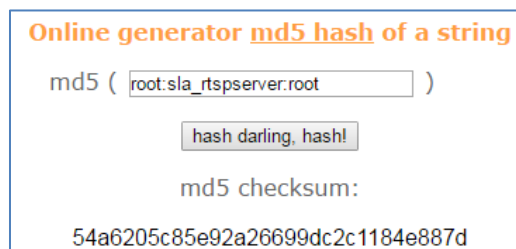md5 checksum:

54a6205c85e92a26699dc2c1184e887d

Figure 1: MD5 Online Hash Generator

📄 *Onlinemd5 generates in upper case. Convert into lower case before writing into .htpasswd file.*

Example 2:

Username: *admin*

Password: *bls_345*

Realm: *sla_rtspserver*

MD5 (*admin:sla_rtspserver:bls_345*): *66b7f77eb8d65ece28a3a36ad2ba8736*

.htpasswd entry: *admin:sla_rtspserver:66b7f77eb8d65ece28a3a36ad2ba8736*

Step 2: Enable RTSP Authentication

Format to enable authentication:

<path to rtsp executable>/<rtspMain> -a <path to password file> <realm to use>

Example: */rtspMain -a /root la_rtspserver*

In the above example:

- *rtspMain*   rtsp executable
- */root/*   path where *.htpasswd* is in the file system
- *sla_rtspserver*   Realm to be used

Realm: A string that identifies the username and password. This string should contain the name of the host performing the authentication and indicate the collection of users who have access.

Example: *registered_users@gotham.news.com or sla_rtspserver*.

Realm should be specific to the customer or product. Digest authentication uses Realm to group usernames and passwords.

Step 3: Copy Files to Target SLA Hardware

Use FileZilla, or equivalent utility to copy files to designated SLA hardware.

1500-OEM destinations: */root/.htpasswd, and /etc/rc.d/rc.local*

3000-OEM destinations: */home/root/.htpasswd, and /home/root/sla3000_init.sh*

The 3000-OEM file system is normally read-only. Before copying to it, use the SLA-3000 Upgrade Utility to make the file system writable. From the menu, go to *File » Advanced » Make Writable*. The file system will return to read-only on the next reboot.

Step 4: Reboot SLA Hardware

RTSP authentication is now enabled.

7 Generating SDP File Using Panel Plus

1. Open the Panel Plus application and connect to the 3000-OEM / 1500-OEM board.

2. Go to the *Compression* tab.

3. In the *CODEC / TRANSPORT* section, select one of the four encoded payload options. In this example, *RTP H264* is selected.

4. In the *Output Properties* section, select the *Output Frame Size* for the session.

   📄 *When input field changes have been detected in the Compression tab the Send button will turn red. Click the Send button to send the changes to the board.*

5. Click *Export SDP File*. This will generate an SDP file and will save it to a user designated folder.

   📄 *If the configuration is not valid, the following error window opens.*
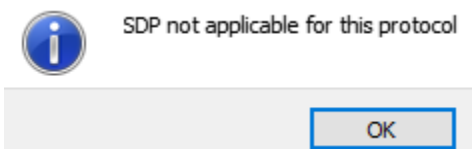
6. Use the generated SDP file in VLC or other players to stream the video.

8   Additional Configurations for VLC

8.1   Improving Latency

VLC Media player can cause a lag in the video frames being displayed due to internal buffering.

To reduce the latency in VLC:

1. Launch the VLC application.

2. Go to *Tools » Preferences » Input / Codecs.*

3. Set *Default Caching policy* to *Lowest latency*.

To reduce the Latency further:

1. Go to *Open Network Stream*.

2. Enable *Show more options*.

3. Change the caching amount in the drop down or edit the network caching option.
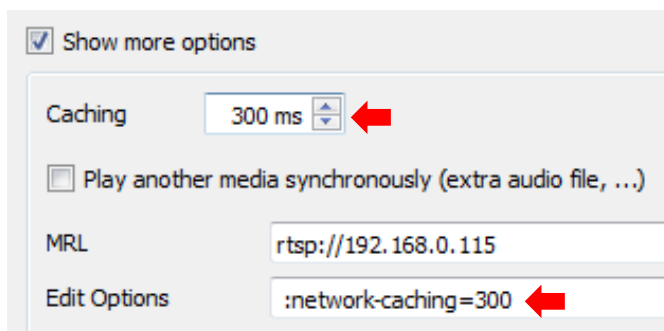
8.2   Bypass RTP Client Port

VLC may use same control port for all the instances of the application, which will allow only one VLC instance to receive the RTP stream. This behavior can be overridden by bypassing the RTP client port as an optional parameter in network streaming.

To set the RTP client port for network streaming:

1. In VLC, go to *Open Network Stream*.

2. Enable *Show more options*.

3. In *Edit options*, enter client port using the following syntax:

    rtp-client-port=<client_port to be used>
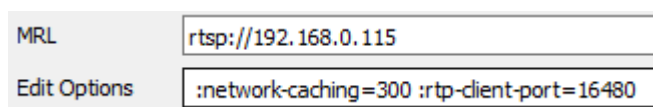
8.3   Enabling TCP Transport Mode

RTSP server supports TCP transport mode for streaming. RTP packets will be sent in the same RTSP connection instead of a separate UDP connection.

ⓘ **IMPORTANT**: Multicast support through RTSP is not available in TCP mode.

To enable TCP mode in VLC:

1. In VLC, go to *Tools » Preferences » Input/Codecs*.

2. Enable *RTP over RTSP (TCP)*.

Follow the configuration steps mentioned in previous sections to begin streaming to VLC.

To switch back to UDP mode:

1. In VLC, go to *Tools » Preferences » Input/Codecs*.

2. Enable *HTTP (default)* to switch to UDP streaming.

8.4   VLC Media Player with SDP File

In this method, VLC is a passive receiver of video being streamed by UDP. The SDP file sends the properties of the stream to the VLC so it can be properly interpreted.

This only works if -

-   the video is already streaming,

-   no other process (like Panel Plus) is reading the video,

-   the SDP file accurately describes the stream.

This section describes how to open the SLA video stream using a SDP (Session Description Protocol) file with the VLC media player.
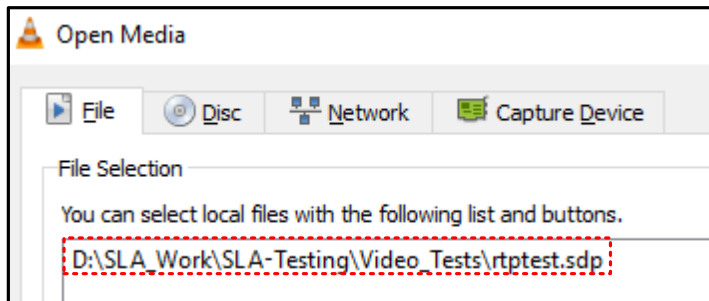
1. Using Panel Plus software, create a standard RTP output stream. Set the outbound UDP Port to 5400. Verify that the video can be seen in the Panel Plus display window.

2. Follow the steps in section 7 to generate an SDP file.

3. Close the Panel Plus application, and then click *No* in the prompt.
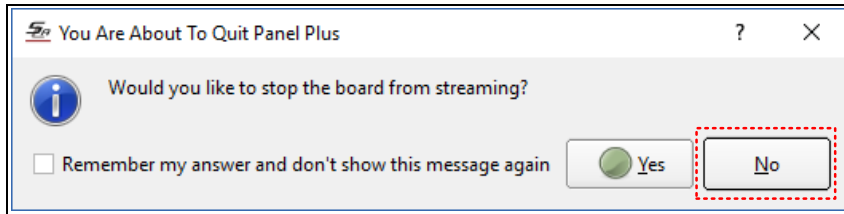
4. Start the VLC media player.

5. Use the main menu to open the file that was saved.

6. Click *Play* at the bottom of the window. VLC will then display the video stream in the display window.

9   Configuring RTSP Streaming in Media Players

SightLine supports many of the media players available that utilize RTSP streaming and RTP protocols. Procedures to configure RTSP/RTP streaming on other media players and VMS software are similar to VLC.
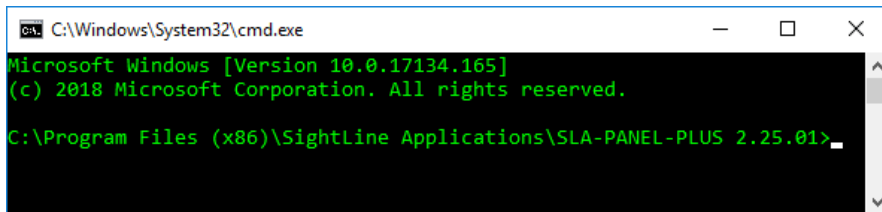
For both the 1500-OEM and the 3000-OEM, follow the same steps for setting the network configuration for testing the RTP output stream.

10 Using FFplay with RTSP

This section describes how to open the SLA video stream via RTSP and using FFplay media player. The FFplay executable is included in the Panel Plus installation folder.

1. Navigate to the SightLine Applications folder on the host PC hard drive.

2. Open the Panel Plus folder.

3. In the window address bar type CMD, and then press the Enter key to open a command prompt window.

```
C:\Windows\System32\cmd.exe                                    —    □    ×

Microsoft Windows [Version 10.0.17134.165]
(c) 2018 Microsoft Corporation. All rights reserved.

C:\Program Files (x86)\SightLine Applications\SLA-PANEL-PLUS 2.25.01>_
```

4. In the command window, type the following command:

   `FFPLAY rtsp://<enter-ip-address-here>:<port number>`

   Example: `FFPLAY rtsp://192.168.0.24:554`

   The video will be displayed in the FFplay media presentation window.

10.1 Using FFplay with SDP File

See the above section on using VLC with an SDP file. The same steps apply.

1. Select video format.

2. Create an SDP file.

3. Start streaming.

4. Exit Panel Plus as described above.

5. Assuming the SDP file is called rtp.sdp, launch FFplay by using the command:

   `<ffplay rtp.sdp>`

   Some versions of ffplay require additional arguments:

   `<ffplay -protocol whitelist file,udp,rtp rtp.sdp>`

   FFplay should launch a display window with the RTP video stream.

11 Streaming RTSP to Panel Plus

Panel Plus can be configured as an RTSP Client to receive video streams through RTSP protocol from SLA-boards. The procedure to configure Panel Plus as an RTSP Client and start streaming through RTSP protocol is outlined below.

1. Configure the cameras and connect to SLA Board through Panel Plus as described in Configuring 1500-OEM for RTSP Sessions or Configuring 3000-OEM for RTSP Sessions.

2. In the *Compression* tab choose the desired RTP Protocol. RTSP protocol mandates transport protocol as RTP.

3. Keep other settings in the *Compression* tab the same for regular streaming. Configuring IP and Port is not required for an RTSP streaming session.

4. Click *Stream RTSP URL* in the *Streaming* section.

5. Panel Plus will open a window with available streaming URLs, including RTSP based on current configuration in the *Compression* tab.

    Example 1:

    RTP setting: *RTP H.264*

    Chosen network: *Net0*

    IP of board: *192.168.1.157*
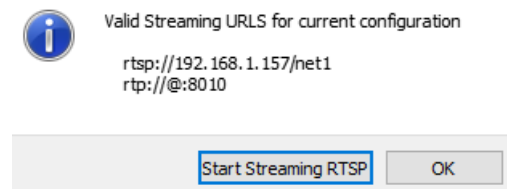
    Displayed dialog window:

Example 2:

RTP setting: *RTP TS-H.264*

Network: *Net1*

IP of board: *192.168.1.157*

Displayed dialog window:

📄 *The dialog window also shows a sample RTP URL that can be used with other players like VLC, which support RTP streaming.*

6. Click on *Start Streaming RTSP*.

    If the configuration is correct, Panel Plus will start rendering video through RTSP. If Panel Plus is already streaming, the video will be stopped and the RTSP session will start.

    Once the RTSP session is initiated. the *Compression* tab will show the local host address (127.0.0.1) and port number. It will be either 8008 or 8010. This indicates the RTSP session is initiated.

7. To stop the RTSP session, click on *Stream RTSP URL* in the *Compression* tab. If the RTSP is already streaming to Panel Plus it will show the *Stop Streaming RTSP* button.
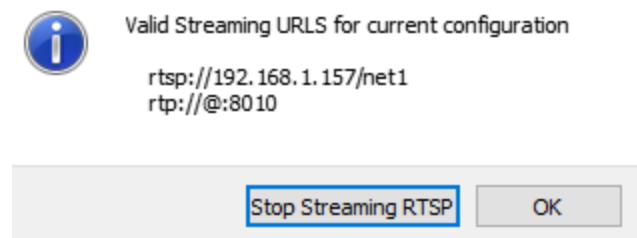
Click *Stop Streaming RTSP* to stop the RTSP session in Panel Plus.
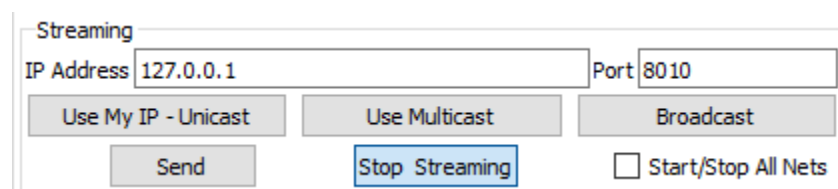
ⓘ **IMPORTANT:** This will stop all streaming sessions including any Media player (VLC) RTSP sessions from the same board to a different IP than the one running Panel Plus. Stopping through the streaming URL button and clicking the *Stop Streaming RTSP* button is the preferred method.

8. Switching to a regular streaming can be done by entering the IP and Port manually in *Compression* tab and clicking the *Send* button and the *Start streaming* button. This will restart the streaming session without RTSP.

   ⓘ **IMPORTANT:** RTSP streaming has no dependency on from which Network Panel Plus is receiving video. RTSP can start streaming from Network1 even though Panel Plus is set to receive video from Network 0 in the *Multicamera* tab.

   📄 RTSP Streaming through TCP mode is not supported through Panel Plus.

   📄 RTSP streaming is possible to Panel Plus from the board even if another media player is streaming from the same board through RTSP on the same PC.

12 Streaming Video Over the Internet

With 2.23 support of RTSP, video can be streamed over the internet. A simple network topology is shown in Figure 3.

Basic setup steps:

1. Configure the SLA hardware for RTP streaming.

2. Configure the router to allow port 554 forwarding to the SLA hardware.

3. Connect to the video client.
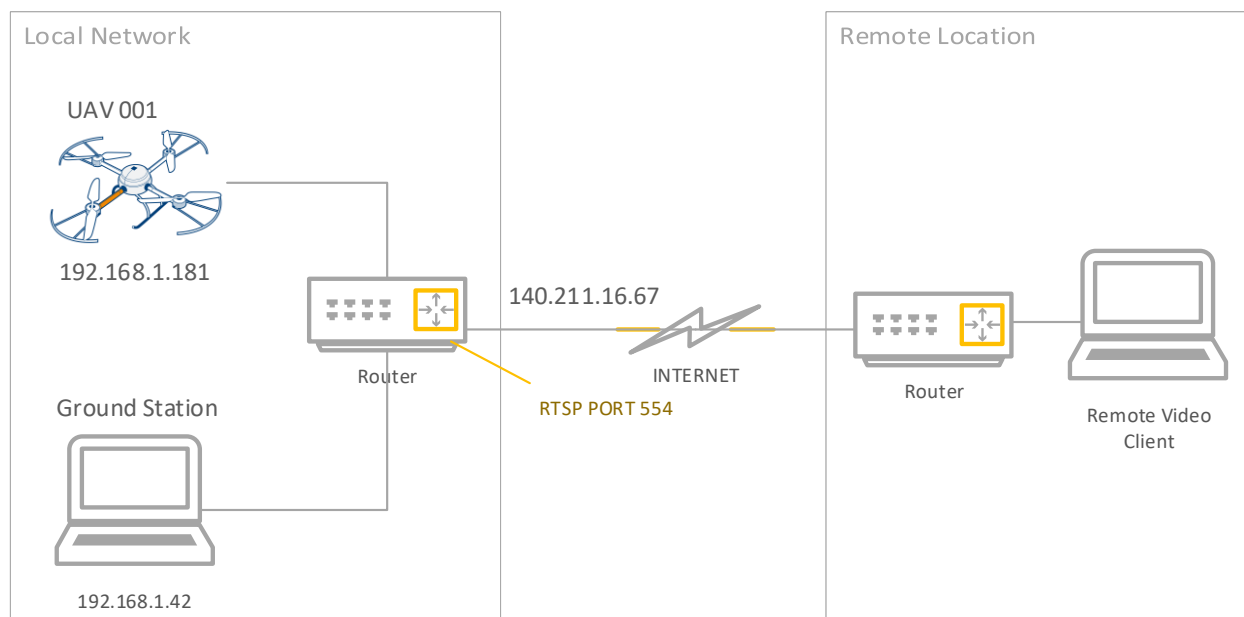
Figure 2: Simple Network Topology

📄 *Additional configuration steps may be necessary depending on how the network is setup.*

13 Configure the SLA Hardware

📄 *Detailed configuration information is covered in the previous sections.*

1. In the *Compression* tab of Panel Plus, select one of the RTP streaming modes.

```
┌─ CODEC / TRANSPORT ─────────────────────────────────────┐
│ RTP:          ○ MJPEG           ○ RTP MPEG2-TS MPEG4     │
│               ◉ RTP H.264       ○ RTP MPEG2-TS H.264     │
│                                                          │
│ MPEG2-TS:     ○ H.264           ○ MPEG4                  │
└──────────────────────────────────────────────────────────┘
```

2. Save the parameters to the board, *main menu » Parameters » Save to Board*.

3. In the bottom status bar of Panel Plus, note the IP address of the system. This will be used to configure the router in the next section.

```
Board: SLA3000_44bad4, 192.168.1.181 Firmware Ver: 2.24.1.20, temp:123°F
SVN Revision: 35035, Build Date: 4/18/2017, Build Time: 10:21:23 This PC: 192.168.1.91
```

13.1 Configure the Router

Configure the router to forward port 554 of your external IP address to port 554 of the SLA hardware. The example shown uses a COTS D-Link DIR-601 router. Consult your router documentation on how to configure the port forwarding function.

1. Use a web browser to log on to the router, e.g., http://192.168.1.1

2. In the top navigation bar, click *Advanced*.

```
DIR-601  ///          SETUP          ADVANCED
```

3. Configure the port forwarding table.

Name		Public Port	Protocol
UAV_001	<< Application Name ▼	554	Both ▼
IP Address		Private Port	
192.168.1.181	<< Computer Name ▼	554	256

4. Save the settings. The router should now be configured to forward any inbound requests to the correct SLA hardware.

13.2 Connect Video Client

To connect the video client, you will need the public IP address of your router. In the example below, the publicly accessible IP address for this router is 140.211.16.67 (Figure 4). Optionally, use Google to find the public IP address of your router as shown in Figure 5.
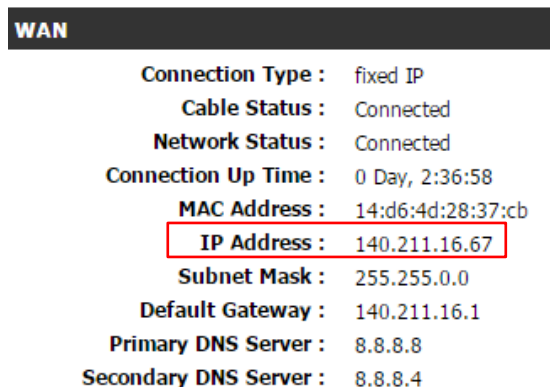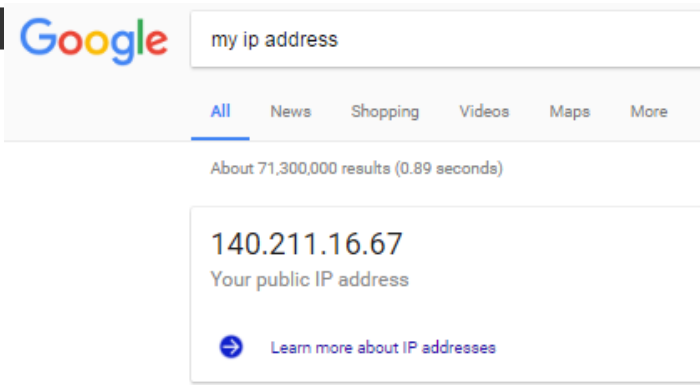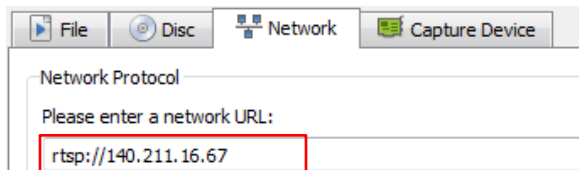

**Figure 3: Router IP Internet Address**

Figure 4: Google IP Address Search

For this example, the above IP address is used for the URL in the video client.

1. Open VLC media player from your remote location.

2. From the menu bar, go to *Media » Open Network Stream* (CTRL+N).

3. Enter the network URL for your location: *rtsp://140.211.16.67*

4. If the inbound port is changed, the port number can be added in the URL to be more specific.
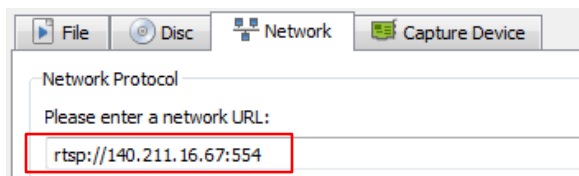
5. Once the above steps are complete, video should stream in the VLC media player.

14 Troubleshooting Streaming Issues

Connect to the target board again using Panel Plus and check network settings and compression protocols are correctly configured.

Check whether RTP port number (e.g., 5004) configured in Panel Plus or VLC media player is being used by any other process or service in the system. If it is being used, stop the service, and try again.

Example: The Windows media network sharing service on Windows 10 seems to use port 5004 and blocks VLC Media Player from getting the video stream.

✓ Use the Windows command line tool netstat to see all the ports.

✓ Check whether RTP port configured for the stream is an even number. RTP streaming will not work with an odd port number on some media players.

✓ Check whether client is configured to stream RTP over TCP.

✓ Verify the IP address, subnet mask, and Gateway are configured correctly for the network. Subnet m-s-match and missing or incorrect Gateway IP addresses are a common problem.

14.1 Questions and Additional Support

For additional issues and 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.