

GRIDSMART®

**USERGUIDE
V19.12**

VERY IMPORTANT!

PLEASE READ PRIOR TO INSTALLING VERSION 19.12

GS₂'s must first be updated to 6.9. Legacy Processors (LPs) are not supported.

IMPORTANT NOTE: When upgrading from version 6.9 of the GS₂ software, any passwords used in the client to publish configuration changes **WILL NOT BE CONVERTED**. This is due to a necessary change in the password hashing scheme used. Any future upgrades will preserve usernames and passwords along with all other settings.

The following changes apply to all updates after 6.9 and should be noted before applying the update:

- To publish you must supply a username. The default publish user is "publish" and default password is "aldis#world9".
- Beginning with v19.10 the System will utilize a captive user account. This user account is unable to modify the network settings, NTP Server Settings or anything system related. **THESE FUNCTIONS CAN ONLY BE DONE** through the GS₂ Device Manager with ADMIN access. The default ADMIN user is "admin" and default password is "admin".
- Default passwords will now prompt to be changed on first log in. It is highly recommended you secure the password in a secure location or password vault.
- Support for VNC has been removed. Remote access is available via RDP.
- Support for connections via HTTP have been removed. All connections will now use HTTPS (TLS1.2 SSL)

LOSING THE PASSWORD TO THE ADMIN ACCOUNT WILL RESULT IN THE INABILITY TO MAKE CHANGES TO THE GS₂ PROCESSOR. Contact support for assistance.

Changelog

19.12 (2020)

PREREQUISITES: GS₂'s must first be updated to 6.9. Legacy Processors (LPs) are not supported.

CRITICAL NOTE ABOUT THE UPDATE: This update will take a longer time to complete than most prior releases, up to 15 minutes depending on the Processor. It includes both low-level firmware updates as well as security updates to the underlying operating system. Upon reboot, it may take several minutes for the system to start up while the operating system updates are applied, with both the STATUS and CAMSTAT LEDs flashing during this time. **DO NOT DISRUPT THE SYSTEM DURING THIS TIME.**

NEW: Introduces centralized user management by integration with Microsoft Active Directory or LDAP.

NEW: Streams is now offered separately from the Performance Plus module so that systems without data licenses can still be used with third-party video management systems that support RTSP 2.0.

NEW: Adds the ability to dynamically edit phase-to-channel mappings in the device manager.

NEW: Provides capability in the Device Manager to enable ICMP Echo (ping) to support certain video management systems.

NEW: Adds a new Factory Reset function to the Device Manager that is compliant with California SB-327.

NEW: Provides ability to change the system name in the Device Manager.

NEW: Adds temperature logging and modem signal strength logging to the Diagnostic menu in the Device Manager.

SECURITY: Removes support for HTTP connections. All transport communications are now done using TLS1.2 (SSL).

IMPROVEMENT: Adds a new Control Panel to the Device Manager to streamline the UI.

IMPROVEMENT: Adds ability to view portions of log files in the Device Manager.

IMPROVEMENT: Reduces false detections in some left-turn zones (correspondingly in right-turn zones in left-side driving locales).

IMPROVEMENT: Improves turn type classification when departing vehicles executed a second turn after departing the intersection.

IMPROVEMENT: Improves loss of visibility detection in certain foggy situations.

IMPROVEMENT: Improves performance in nighttime rainy conditions.

IMPROVEMENT: Reduces false detection rate of bikes in the box.

FIX: Resolves rare issues that could cause the computer vision engine to restart.

FIX: Resolves bug that inadvertently disabled zone extensions.

NOTICE: This release removes VNC support as previously noted in the 19.10 changelog. Remote access can still be made available via RDP if enabled in the Device Manager.

Windows Patches

- **[KB3162835]**(<https://support.microsoft.com/en-us/help/3162835>) - June 2016 DST and time zone update for Windows
- **[KB4054566]**(<https://support.microsoft.com/en-us/help/4054566>) - Microsoft .NET Framework 4.7.2 for Windows 8.1, Windows RT 8.1, and Windows Server 2012 R2
- **[KB4345424]**(<https://support.microsoft.com/en-us/help/4345424>) - Improvements and fixes - Windows 8.1 and Server 2012 R2
- **[KB4556853]**(<https://support.microsoft.com/en-us/help/4556853/windows-8-1-kb4556853>) - May 12, 2020â€™KB4556853 (Security-only update)
- **[KB4540725]**(<https://support.microsoft.com/en-us/help/4540725/servicing-stack-update-for-windows-8-1-rt-8-1-and-server-2012-r2>) - Servicing stack update for Windows 8.1, RT 8.1, and Server 2012 R2: March 10, 2020



Welcome to GRIDSMART!

GRIDSMART is your eye in the sky for actuation and data collection at intersections and on highways. Our unique solution tracks cars, trucks and bicycles while recording turning movements, vehicle counts, incidents and classifications. The GRIDSMART software, commonly referred to as the Client, lets you manage intersections in real-time. The Client is typically installed on a laptop and used to configure the GRIDSMART Processor on-site during installation. If your cabinet is on a network, the Client can

remotely access your system to view and configure sites, replay recorded video, calls and phases, generate reports and email alerts.

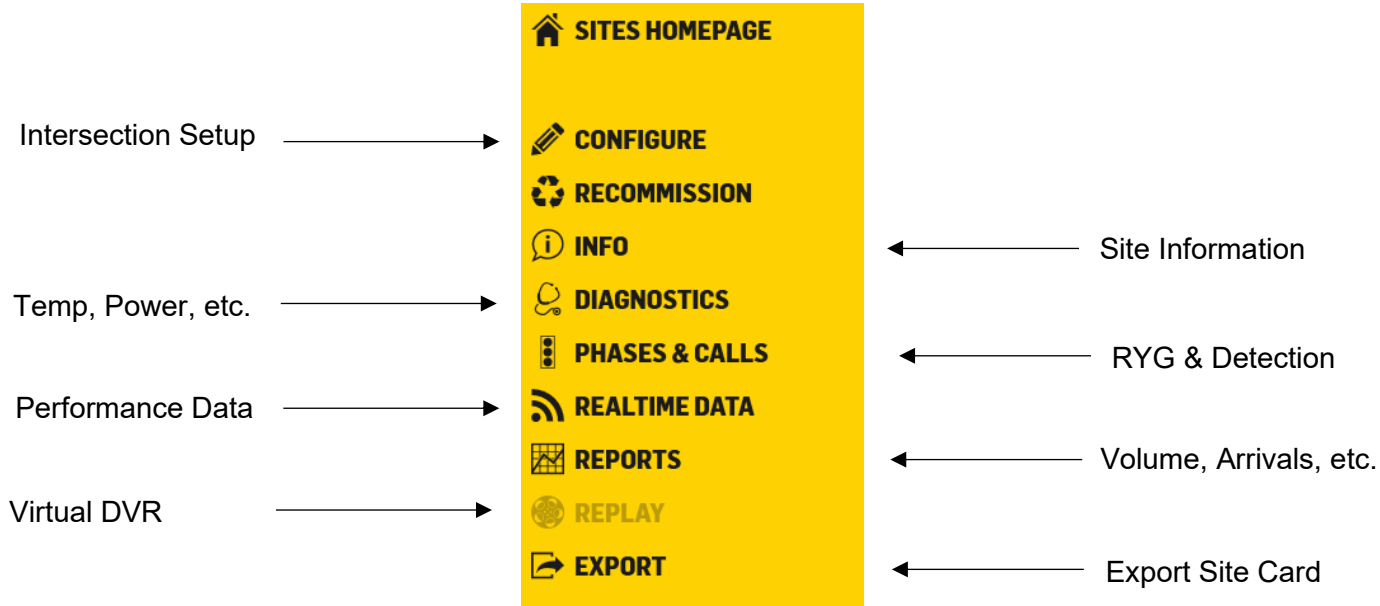
Your GRIDSMART system ships with an unlimited number of Client licenses, so feel free to install it on any number of computers in your office or traffic operations center.

Configuration changes made with the Client are easily undone. Nothing affects the operation of your site until you explicitly publish your changes. Even then, you can easily revert a site to a previous configuration, or even reset the GRIDSMART Processor to its original factory settings.



Quick Reference

Site Menu



View Toolbar

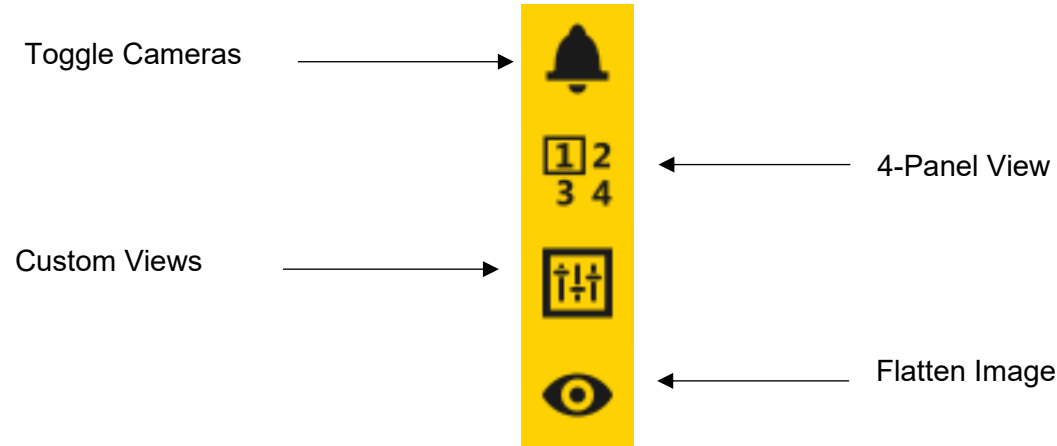


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1.0 Client Installation & Configuration

1.1 Download the Client

Download the latest version of the GRIDSMART Client from GRIDSMART Cloud.

1. Open a web browser and visit gridsmart.com/support.
2. Sign in to GRIDSMART Cloud or click Sign Up to create a new account.
3. Click the Support dropdown, then click Downloads.

Welcome to GRIDSMART® Cloud, the online support center for [GRIDSMART](#) installers and customers.

[Log In](#)

Need an account? [Sign Up](#)

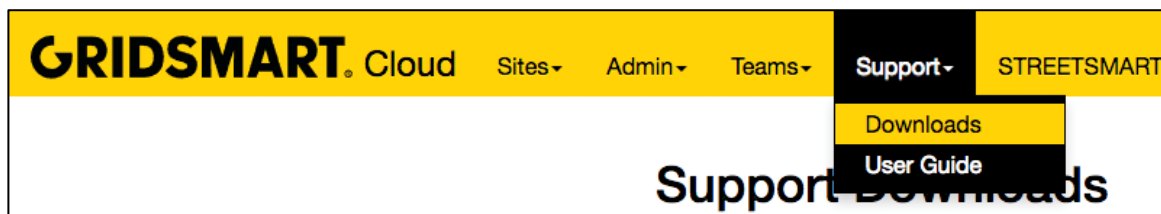
Forgot your password? [Reset Password](#)

Want to talk? Call us at +1 866.652.5347

Or email us at support@gridsmart.com

Just want the [User Guide](#)?

Here, you can always access the [GRIDSMART User Guide](#). When you log in above, you can access all your backed up site configurations from the GRIDSMART Client as well as the support downloads.



4. Select the Update Stick or the Client Installer that matches your system and download the file.

Support Downloads

[Changelog](#)

Firmware Update Notice

DO NOT UNPLUG OR MANIPULATE THE SYSTEM DURING AN UPDATE. Updates for GS2 may often include firmware updates that put the system into a special programming mode. All front panel LEDs will go dark and the fan will operate loudly at its highest speed. This is expected. After roughly 30 seconds, the fan will return to normal speed. The phase LEDs will turn all red as the system exits the special programming mode and then all green when the update is complete.

Releases

19.3

Name	Description
v19.3 Update Stick	Processors must be a GS2 running GRIDSMART 6.9 Firmware or later to be updated. Download, unzip the archive, and then put the extracted contents (folder aldus and GridSmartClientInstaller.exe) at the root level of a freshly formatted USB stick.

6.9

Name	Description
v19.3 Client Installer x64	Download and then double-click the *.exe to install. Fully backward-compatible, including Publish, with Processors running GRIDSMART 4.0 or later. This installer is for x64 computers only.
v19.3 Client Installer x86	Download and then double-click the *.exe to install. Fully backward-compatible, including Publish, with Processors running GRIDSMART 4.0 or later. This installer is for x86 computers only.

1.2 Install the GRIDSMART Client



Stay connected to the Internet while you install the Client on your laptop or desktop computer. The GRIDSMART Client is already installed on the GRIDSMART Processor. Please do not install the Client or any other software on the Processor.

Double-click the Setup Program or MSI Installer to open the GRIDSMART Client Setup.



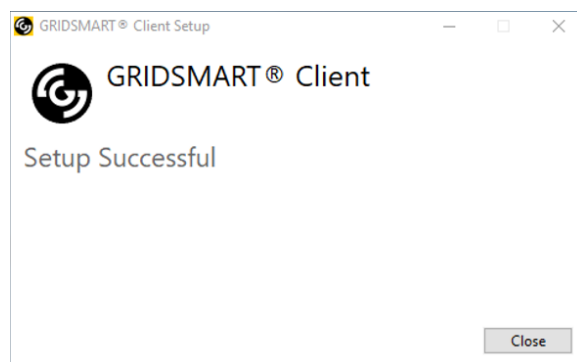
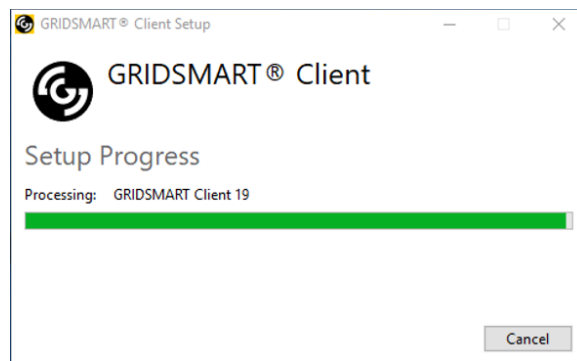
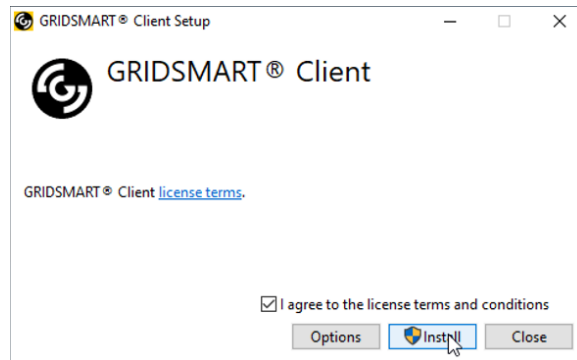
Accept the Terms and Conditions, then click Install.

The setup program creates shortcuts to the GRIDSMART Client on your Start Menu and Desktop.

A progress bar indicates the setup status.



A system restart may be required to complete the installation.

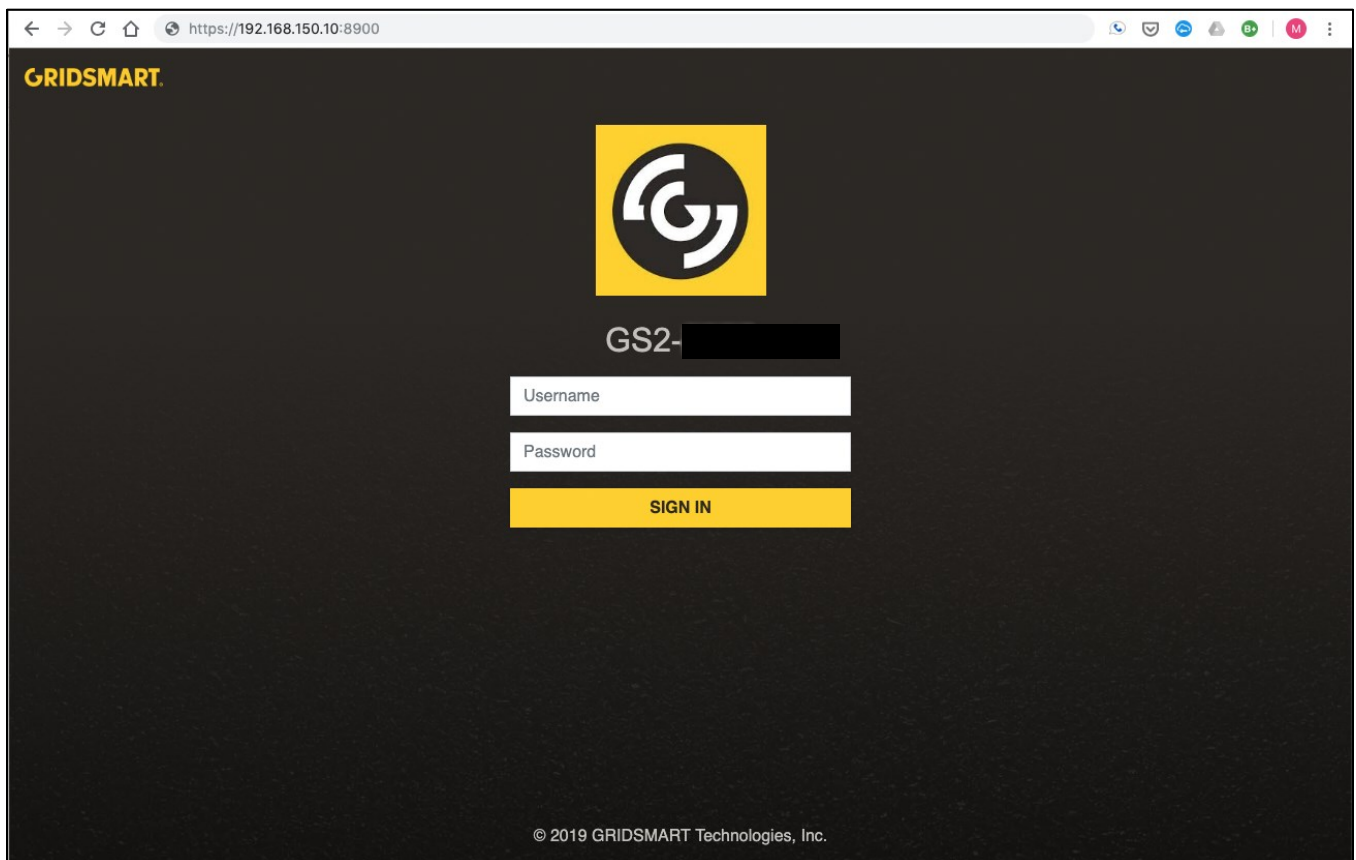


2.0 GS₂ Device Manager

Basic device configuration such as network, date/time, user management, and NTP is now done only via browser, providing a device-focused, secure alternative to the Client. Also, through this interface, you can configure network/security settings, date/time, and location without requiring a connected camera.

The GRIDSMART device manager is accessible via web browser, when connected to the processor laptop port, at **https://192.168.150.10:8900**. There is also a link on the Processor desktop if you are connected via RDP.

Beginning in 19.12 factory default systems will not have any default users or passwords. You will be prompted to set these during initial configuration.



The screenshot shows a web browser window with the address bar displaying `https://192.168.150.10:8900`. The page has a dark background. In the top left corner, the word "GRIDSMART." is written in yellow. In the center, there is a yellow square logo containing a stylized white "G" with a circular arrow. Below the logo, the text "GS2-" is followed by a blacked-out device ID. Underneath, there are two white input fields labeled "Username" and "Password". A yellow "SIGN IN" button is positioned below the password field. At the bottom center of the page, the copyright notice "© 2019 GRIDSMART Technologies, Inc." is visible.

2.1 Cameras

This is the landing page when you log into the device manager. From here you can see the serial number, Software version, control type and location of the Processor you are connected to. The Cameras Page displays connected cameras, 1frame/5sec. The Auto-refresh may be turned off by toggling the switch on the bottom right. This will also include a Diagnostic read out of frames/sec historically. If there is a problem you will see a red or yellow indicator next the trouble area.

2.2 Phase Mapping

The Phases view of the GRIDSMART Device Manager will show the current Phases and Channel Groups. From this view, pre-configured Flashing Yellow Arrow (FYA) mode maps (A-L) can be set on the Processor, allowing the FYA states to be recognized, logged in archived data, and displayed in the Client. For non-standard scenarios, GRIDSMART can help generate a custom channel map you can push to the device in the Device Manager. Zones can be configured for FYA in the Client when the processor uses mapped FYAs

2.3 Diagnostics

This will give you an overview of system functionality, the ability to download logs or send logs to the GRIDSMART Cloud, view modem status, and advanced network information.

The screenshot shows the GRIDSMART web interface with the 'Diagnostics' menu item selected. The 'Overview' tab is active, displaying a table of system information. The top navigation bar shows 'Serial # GS2-', 'Version 19.12', 'Cabinet TS2', and 'Location'. The user is logged in as 'admin'.

Parameter	Value
HostName	GS2-
Serial Number	GS2-
HardwareId	
Version	19.12 (20.04.29)
Up Time	0 Day(s); 0 Hour(s); 3 Min(s); 20 Sec(s)
Current Time	05/06/2020 11:16:05
TimeZone	Central Standard Time
DNS	Not Working
Cloud	Enabled
HeartBeat Metrics	
Modem Type	UBlox
Modem Status	Enabled
Signal Strength	Unknown
CPU Temp	35C

Buttons: Refresh, Advanced...

The Logs tab allows you to send logs to GRIDSMART or download directly to your system.

The screenshot shows the GRIDSMART web interface with the 'Diagnostics' menu item selected. The 'Logs' tab is active, displaying instructions and buttons for log management. The top navigation bar shows 'Serial # GS2-', 'Version 19.12', 'Cabinet TS2', and 'Location'. The user is logged in as 'admin'.

Overview | **Logs** | Modem

Instruct the GS₂ to upload diagnostic logs to GRIDSMART Cloud.

[Send Diagnostics to GRIDSMART Cloud](#)

Download logs from processor. (This may take a few minutes.)

[Download Logs](#)

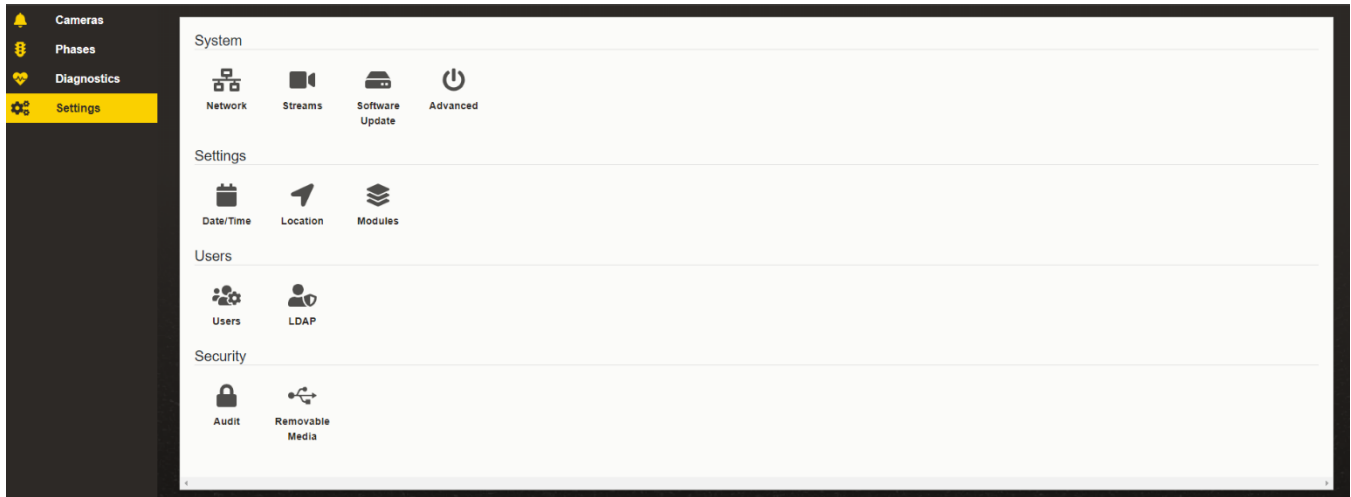
Advanced...

The Modem tab allows you to see the status of the Modem

The screenshot shows the GRIDSMART web interface with the 'Diagnostics' menu item selected. The 'Modem' tab is active, displaying a table of modem information. The top navigation bar shows 'Serial # GS2-', 'Version 19.12', 'Cabinet TS2', and 'Location'. The user is logged in as 'admin'.

Parameter	Value
Modem Type	UBlox
Modem Status	Enabled
Signal Strength	Unknown
Model	
Firmware	15.90
Id	

2.4 Settings (Control Panel)



2.4.1 Network

Select the Network tab to configure the GS₂ for your network.

Network
Certificates
Client/API
GRIDSMART Cloud
Static Routes
ICMP (Ping)
Reset

☐ Use DHCP

Network Address

Netmask

Gateway

DNS
8.8.8.8

NTP Server
pool.ntp.org
Sync Time

* NTP server can't be manually set when "Use GRIDSMART Cloud" and "Use Modem" are both selected in GRIDSMART Cloud settings.

Apply Changes
Cancel

2.4.2 Certificates

GRIDSMART provides a self-signed SSL certificate to enable an encrypted connection. GRIDSMART recommends users install their own signed SSL certificate. Do not use wild card certificates.

The screenshot shows the 'Certificates' tab in the GRIDSMART configuration interface. It displays a self-signed SSL certificate issued by 'GRIDSMART Engineering' to 'GRIDSMART Engineering' in Knoxville, TN, US. The certificate expires on January 11, 2047 (in 27 years) and was issued on August 27, 2019. A yellow 'Change Certificate' button is located at the bottom left of the certificate details.

2.4.3 Client/API

Here you can configure the ports used to communicate.

The screenshot shows the 'Client/API' tab in the GRIDSMART configuration interface. It contains two input fields: 'API Port' with the value '8902' and 'Configuration UI Port' with the value '8900'. Below the fields are 'Apply Changes' and 'Cancel' buttons.

2.4.4 GRIDSMART Cloud

In order for GS₂ to communicate to GRIDSMARTCloud.com, Port 443 MUST be open and have outbound access to api.gridsmart.com.

The screenshot shows the 'GRIDSMART Cloud' tab in the GRIDSMART configuration interface. It features a checkbox 'Use GRIDSMART Cloud' which is checked. Below it, there are two radio button options: 'Allow GRIDSMART to use my network (disables modem)' and 'Use modem', with 'Use modem' selected. To the right, there is a 'Connectivity' section showing 'Status: Not checked' and a 'Check Connection' button. At the bottom left are 'Apply Changes' and 'Cancel' buttons.

2.4.5 Static Routes

[Network](#) [Certificates](#) [Client/API](#) [GRIDSMART Cloud](#) [Static Routes](#) [ICMP \(Ping\)](#) [Reset](#)

Static Routes

Network Address	Netmask	Gateway
No static routes configured		

[Apply Changes](#) [Cancel](#) [+ Add Route](#)

2.4.6 Enabling Ping

[Network](#) [Certificates](#) [Client/API](#) [GRIDSMART Cloud](#) [Static Routes](#) [ICMP \(Ping\)](#) [Reset](#)

Control whether or not your processor will respond to ICMP echo requests (i.e. ping) by enabled or disabling ICMP

[Enable ICMP](#)

2.4.7 Network Reset

[Network](#) [Certificates](#) [Client/API](#) [GRIDSMART Cloud](#) [Static Routes](#) [ICMP \(Ping\)](#) [Reset](#)

Restore network configuration to factory defaults.

[Reset Network Configuration](#)

Restore Client/API ports to default and load the default certificates

[Reset Client/API Settings](#)

Reset Network Configuration:

Erases user defined network settings and sets the network to DHCP.

Reset Client/API Settings:

- sets API Port to 8902
- sets Configuration UI Port to 8900

2.4.8 Streams

RTSP URLs

Reset

Streams RTSP URLs

2.4.8.1 Streams Reset

RTSP URLs

Reset

Reset RTSP streams

Reset Streams

2.4.9 Software Update

Upload a binary file provided by GRIDSMART. Once the file has been uploaded, you will be asked to confirm the update before it is installed.

Update File

Choose file

Browse

Upload Update File

2.4.10 Advanced Settings

Reboot

Factory Reset

Change Hostname

Reboot the entire system, taking the GS₂ offline for up to several minutes while performing a full restart.

Reboot System

2.4.10.1 Factory Reset

Reboot

Factory Reset

Change Hostname

⚠ WARNING: Resetting your processor **cannot be undone** and will result in **data loss**.

Performing a full factory reset will result in data loss and will require your processor to be completely reconfigured before it can be returned to service.

Network ports will also be disabled. As a result, you must have physical access to configure the processor by connecting to the laptop port on the device's front panel.

☐ I understand the effects, including data loss, of resetting this processor to its factory default settings.

Factory Reset

2.4.10.2 Factory Reset

Here you can change the host name of the GS₂ to allow for various network needs

Reboot

Factory Reset

Change Hostname

System Hostname

GS2-1097

Enter a name you want to appear as the system's hostname on your network.

Apply Changes

Cancel

2.4.11 Date/Time settings

Here you can set the Date and Time. Every GS₂ ships with Eastern Time as default.

Device Date/Time

May 06, 2020 12:32 pm

Manually Set Date/Time

Device Time Zone

(UTC-06:00) Central Time (US & Canada) ⌵

This timezone observes daylight saving time.

Update time zone

Cancel

Need to change the NTP Server? [Edit NTP in Network Settings](#)

2.4.12 Location Settings

Here you can add location settings. This can be configured prior to installation.

Location

Street 1

 ⓘ

You must provide a street name

Street 2

 ⓘ

You must provide a street name

Postal Code

 ⓘ

You must provide postal code

City

 ⓘ

City is required

State

 ⓘ

State is required

County

Country

Latitude

Longitude

☒ Right-side driving

☐ Metric units

Apply Changes

Cancel

2.4.13 Modules

This allows licenses to be uploaded or synced as needed.

Module	Expires	Activated	Upload a new license	
PEDESTRIAN	Never	Aug 24, 2018	Choose a license XML file <input type="button" value="Browse"/>	
PERFORMANCE +	Never	Aug 24, 2018	<input type="button" value="Upload License"/>	<input type="button" value="Sync Licenses"/>
ALERTS	Never	Aug 24, 2018		
COUNTS	Never	Aug 24, 2018		
REALTIMEDATA	Never	Aug 24, 2018		

2.4.14 Users

A new feature that allows the Processor Admin to create new users and assign roles based on needs.
Note: A 'publish' username and password is required to Publish changes to a GRIDSMART Site.

Accounts
Device

Username	Role	Description		
aldis	readonly	default user		
publish	publish	publish account		
admin	admin	admin account		

Add New User

Refer to Section 4.2 for more details.

2.4.14.1 Device Access settings

This will be used to activate the local user account on the GS₂ as well as RDP access

Accounts
Device

Access to the device desktop, including the onboard GRIDSMART Client, is only available with the "GRIDSMART" Captive User account. The "GRIDSMART" Captive User account can also be used for remote access via Remote Desktop Protocol (RDP).

☒ Allow device access with the "GRIDSMART" Captive User account

☐ Enable RDP for remote access

Manage Password

Apply changes
Cancel changes

2.4.15 LDAP Settings

This allows configuration of LDAP for the GS₂ Processor.

LDAP
Trusted CA Certificate
Export

Configure Lightweight Directory Access Protocol (LDAP) to manage users on your processor.

☐ Enable LDAP

Apply Changes
Cancel
Import settings...

2.4.15.1 Trusted CA Certificate

This will be used to import the CA Certificate.

LDAP

Trusted CA Certificate

Export

No certificate present

Change Certificate

2.4.15.2 LDAP Settings Export

LDAP

Trusted CA Certificate


Export

Download LDAP configuration for your GS₂, which can be imported on other GS₂ processors.

Export LDAP Config

2.4.16 Security Audit

This screen is a Self-Audit of the GS₂. The Self-Audit function provides an easy way to ensure the equipment is as secure as possible. You can make changes by clicking the recommendation.

 Insecure	Setting	Status	Recommendation
	Default admin password changed	✖	Change passwords for default users
	Default publish password changed	✖	Change passwords for default users
	Default aldis password changed	✖	Change passwords for default users
	USB drives disabled	✖	Disable USB drives
	ICMP requests disabled	✔	—
	GRIDSMART captive user disabled	✖	Disable GRIDSMART captive user
	VNC disabled	✔	—
	RDP disabled	✔	—
	L1/L2 Cloud Connection	✔	—
	Using GRIDSMART Cloud	✔	—
	Using HTTPS for client connection	✔	—
	Default certificate changed	✖	Install a signed certificate

2.4.17 Removable Media

This allows you to enable or disable the USB ports on the GS₂

Enable or disable access to USB drives, including update sticks and hard drives, on the processor.

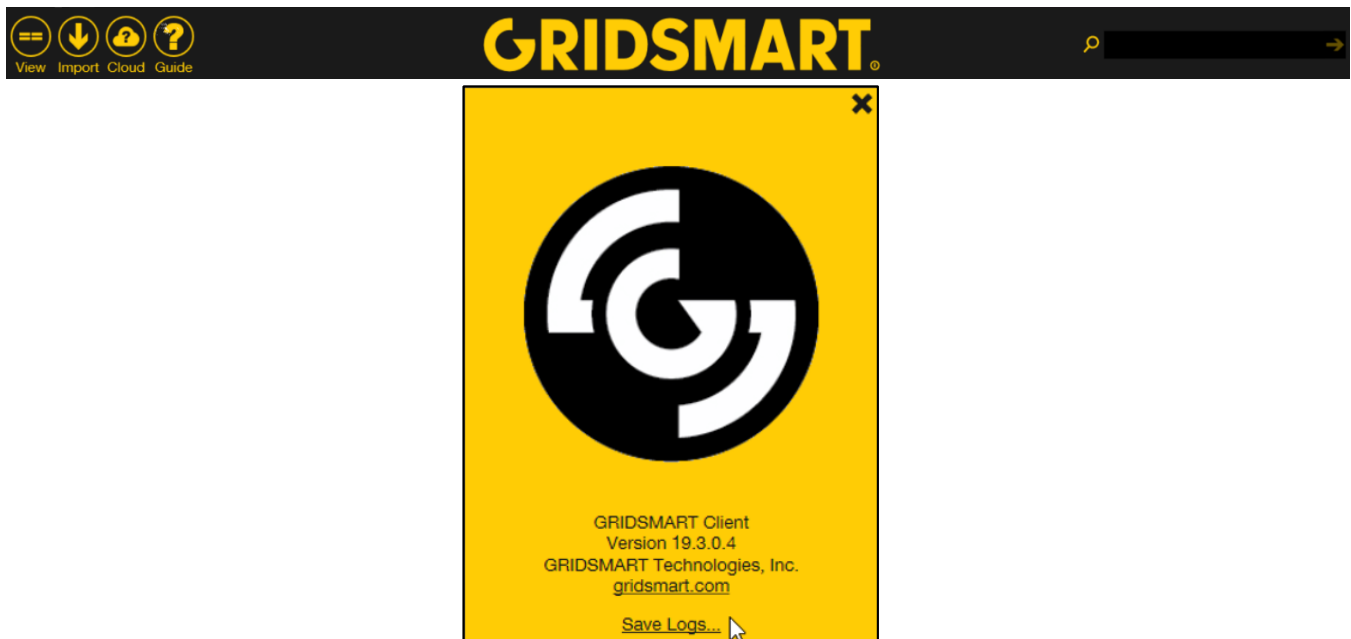
Disable USB Drives

3.0 Site Cards and the Sites Homepage



The Sites Homepage appears after you launch the GRIDSMART Client. A Site Card represents an individual intersection, and the Sites Homepage displays a Site Card for each of your known sites. Additional Site Cards appear on the Homepage after you connect or import new sites.

GRIDSMART Client logs may be collected by clicking “GRIDSMART” in the Client. These may be requested by Support to help diagnose issues. Once you have the zip file attach it to an email and send it to support@gridsmart.com



3.1 Site Cards

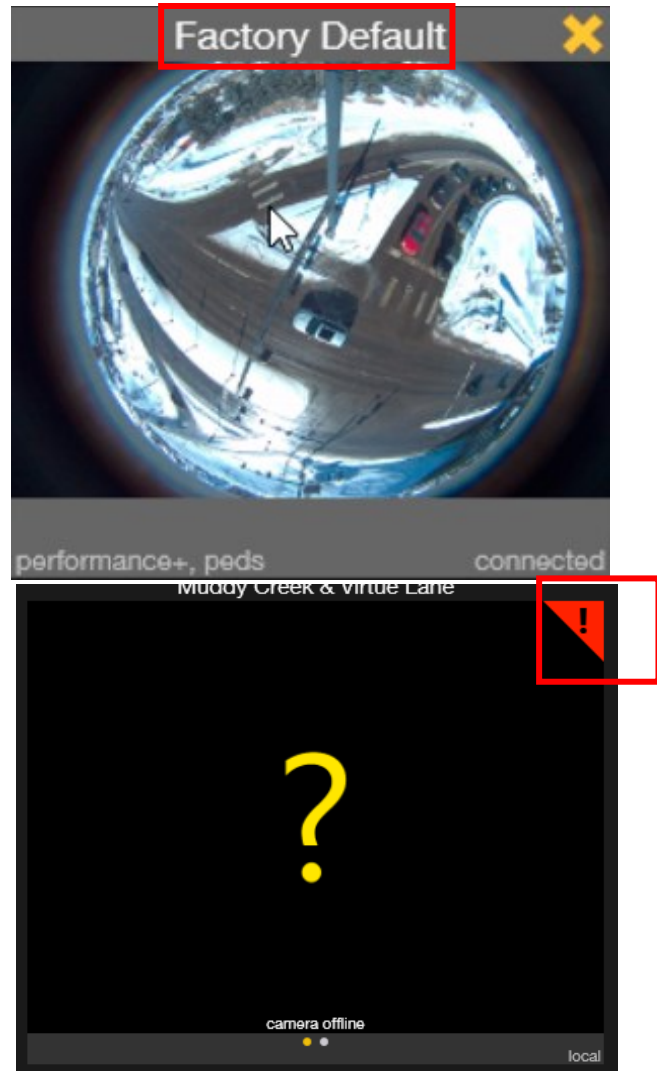
The Sites Homepage only displays one card the first time you configure a GRIDSMART system; the Factory Default card.

If you are locally connected to the GRIDSMART Processor (Laptop Port), the Site Card appears at the top center of the Homepage.

The Processor cannot see this new Camera. The Site is connected, but the Camera is offline.

To remove a site from your Homepage, click the Yellow X in the upper right-hand corner of the card.

A yellow “!” indicates a new Camera has been found. A red “!” is camera offline or failed connection (which overrides yellow in the event you have both a new camera and an offline camera).



Open a Site

To open a site, click the appropriate Site Card on the Sites Homepage.

You can also use the search bar in the upper right-hand corner of the Sites Homepage to search your sites by street, city, state, postal code or IP address.



Site Cards display on the Homepage if the Client previously connected to the site and the IP address of the corresponding GRIDSMART Processor has not changed.

Site View Manager

Click the View button on the top left of the homepage to toggle a new view. Next, select the site you want to view.



Site Image View



Lightweight View

17 AVE & 50 ST	320 & West Chester Pike	320 & West Chester Pike	Barbur Blvd & Capitol	Bernard & Gordon
Cherahala & Hardin Valley	Cherahala & Hardin Valley	Factory Default	Freedom & Commonwealth	Glenn & Gay

Detail View

Site	Serial #	Location	Endpoint	Connection
17 AVE & 50 ST	GS2-2721	Calgary, Alberta		
320 & West Chester Pike	GS-U5-20126	Broomall, PA		
320 & West Chester Pike	GS-U5-4924	Broomall, PA	Show	Off
Barbur Blvd & Capitol	GS2-3171	Portland, OR		
Bernard & Gordon	GS-U5-5521	Kelowna, BC		
Cherahala & Hardin Valley	GS2-3963	Knoxville, Tennessee	Show	Off
Cherahala & Hardin Valley	GS2-2987	Knoxville, TN	Show	On

To configure a new site, select the larger, Factory Default site card at the top of the Sites Homepage or different card on the page.

3.2 Site View Modes

Fisheye

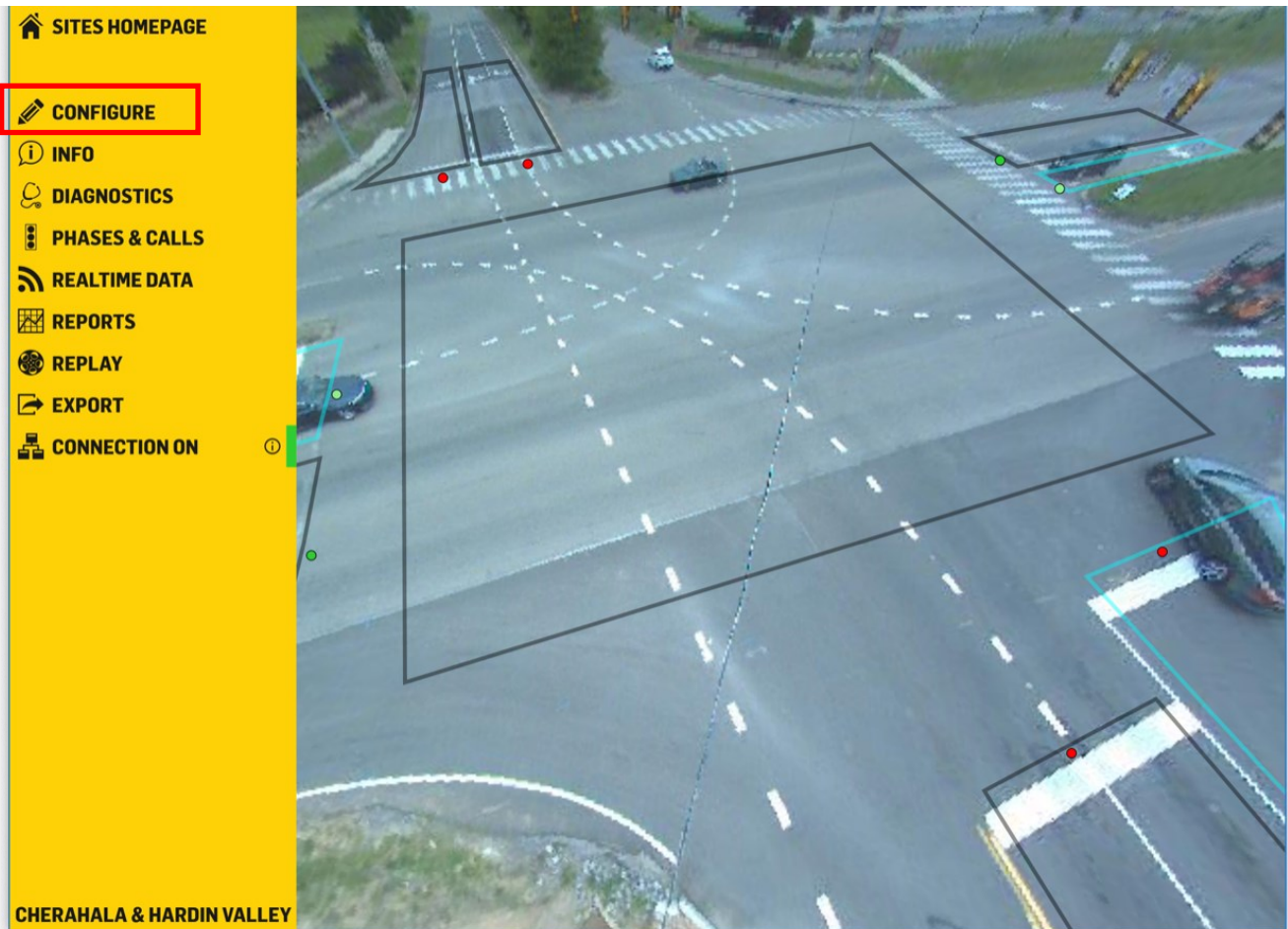


Flattened





3.3 Configure a New Site from the Factory Default Setup

Launch the Client and click the Factory Default Site Card. The Site Menu appears when the mouse hovers over the left-hand side of the Site View screen.



Click the Configure pencil on the Site Menu to start the setup wizard.

-  You must have a Camera connected to the Processor and have a picture to see the Configure option
-  You are now able to perform basic configuration on your GS2 via the GRIDSMART Device Manager.

Location

Enter the site location information.
For U.S. and Canadian sites, the Postal Code automatically populates the City, State, County, Latitude and Longitude fields.

If you are outside the US and Canada, manually enter the Latitude and Longitude.

The screenshot shows the 'Location' configuration screen. At the top, there are four tabs: 'Location', 'Control', 'Date/Time', and 'Modules'. The 'Location' tab is active. Below the tabs, there are input fields for 'Postal Code' (37932), 'City' (Knoxville), 'Country' (USA), 'Street 1' (Cherahala), 'County' (Knox), 'Latitude' (35.92), 'Street 2' (Hardin Valley), 'State' (Tennessee), and 'Longitude' (-84.2). There are also checkboxes for 'Metric' and 'Left Side Driving', both of which are currently unchecked. A 'Close' button is located at the bottom right of the screen.

Control

The Control Mode will be automatically selected based on the installed Option Card, TS1, TS2 or ITS.

Generally, TS1 mode will also be used for 170/2070 and SCATS configurations.

The SCATS (Sydney Coordinated Adaptive Traffic System) option is available in the Control settings for TS1 sites licensed for the Performance Module.

BIU and SIU selections can be made at the time you draw the zones and assign outputs.

The screenshot shows the 'Control' configuration screen. At the top, there are four tabs: 'Location', 'Control', 'Date/Time', and 'Modules'. The 'Control' tab is active. Below the tabs, there are settings for 'Cabinet Type' (TS1, TS2, ITS), 'SCATS' (On, Off), 'Max Recall Default' (On, Off), and 'Delete Stationary After' (a slider set to 'Never'). A 'Close' button is located at the bottom right of the screen.

Date and Time

Select the Date, Time and the Time Zone. The factory default is Eastern Time (US & Canada).



Date and time are important parameters for the Engine and must be set correctly for the site location.

The Processor will automatically adjust the time to the configured time server.

The screenshot shows a web interface with a dark grey background. At the top, there are four tabs: 'Location', 'Control', 'Date/Time', and 'Modules'. The 'Date/Time' tab is selected. Below the tabs, there are two dropdown menus. The first is labeled 'Date and Time' and shows 'Tuesday, April 30, 2019 3:55:01 PM'. The second is labeled 'Time Zone' and shows '(UTC-05:00) Eastern Time (US & Canada)'. Below these menus, there is a yellow text link that says 'Please explain this to me ...'. At the bottom, there is a black button with the word 'Close' in white.

North Heading and Camera Height

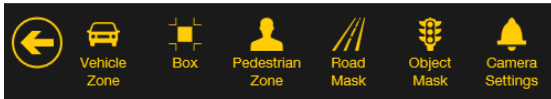
Set the North heading. Stand beneath the Camera with a compass and identify a structure in the North heading line of site. Click and drag the North arrow to point to that structure.

Measure the Camera height from the bottom of the camera housing to the roadway. Use the slider to set the correct height. We recommend at least 30 feet.

Click Okay.

The screenshot shows a web interface with a dark grey background. At the top, there is a title bar that says 'Fisheye Camera'. Below the title bar, there is a text instruction: 'Drag the arrow to point to geographic North and drag the slider to indicate the height of the camera above the road.' Below the instruction is a fisheye camera view showing a street intersection. A yellow arrow points to a building in the distance, labeled 'North'. Below the camera view, there is a slider control labeled 'Height 30 ft'. At the bottom, there are three buttons: 'Back' (with a left arrow), 'Okay' (in a black box), and 'Next' (with a right arrow).

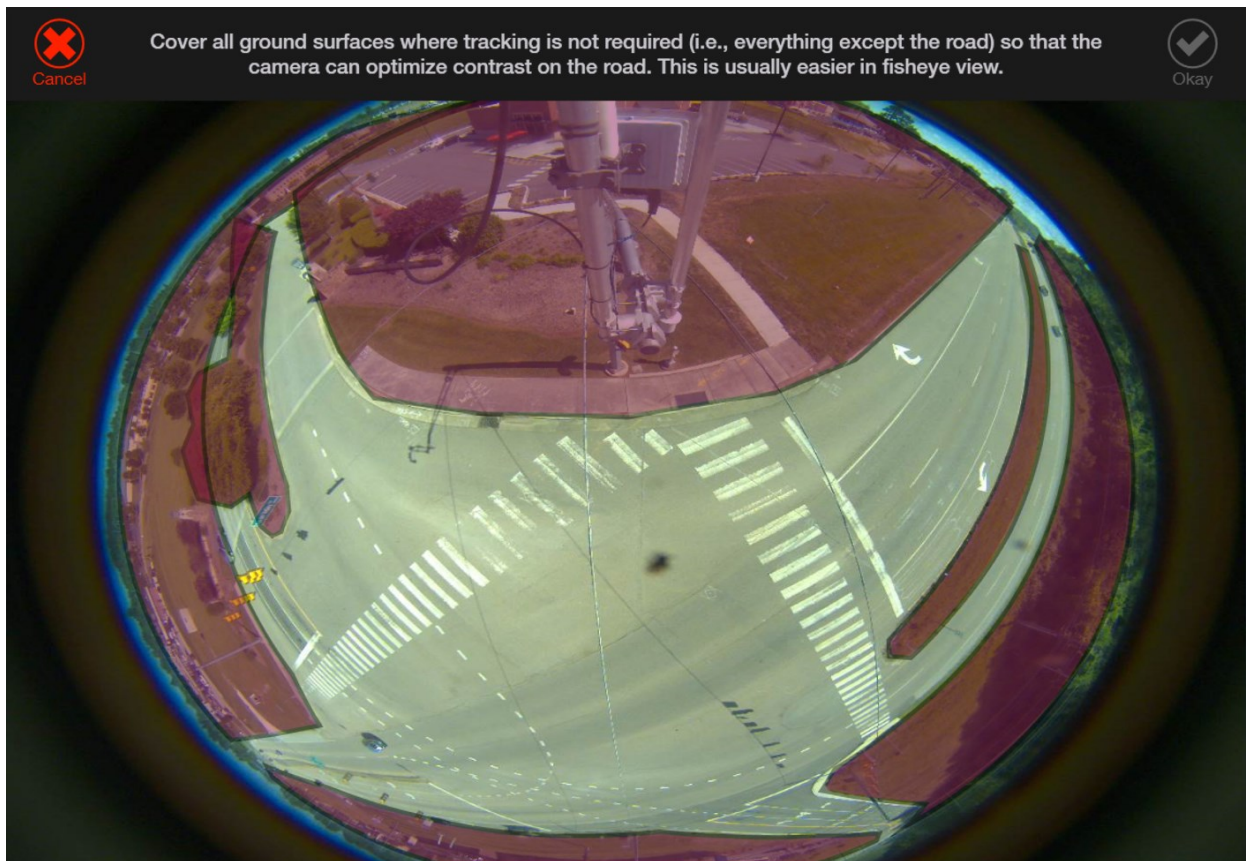
4.0 Site Configuration



Use the Top Menu bar on the Site View screen to add and configure zones and masks.

4.1 Road Masks

1. Road Masks eliminate areas that do not require object tracking (i.e., everything except the road). You may find it easier to create masks in the Fisheye view.
2. Click Road Mask on the Top Menu bar.
3. Place the cursor at the edge of the roadway, then click to place the starting point.
4. Click around the edge of the area to be covered, bringing the cursor back to the starting point.
- 5.



- 6.
7. Hover the cursor over the green starting point until the cursor turns into a pencil, then click the pencil to close the mask area.
8. Click Okay to complete.
9. Continue masking out all other areas.

4.2 Vehicle Zones

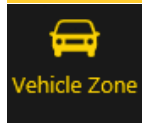
A Vehicle Zone is the basic vehicle detection region. When you assign an output to a Vehicle Zone, GRIDSMART sends a signal to the controller when a vehicle is present within the zone. Zones also collect vehicle data for Reports and Alerts.

Vehicle Zone recommendations:

1. Zones should be 3-4 car lengths.
2. Maintain a distance of 1-2 feet between each zone.
3. Zones should cover the entire movement region regardless the number of lanes.

Create a Vehicle Zone

Click the Configure pencil, then click the Eye icon.
Click the Vehicle Zone icon.



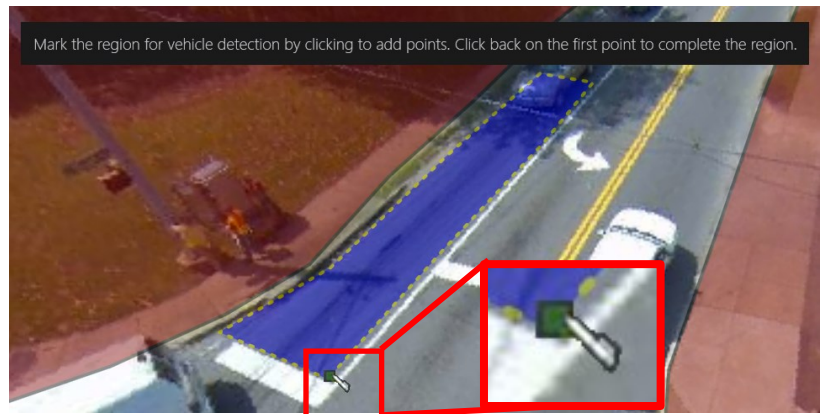
In flattened mode, the image becomes a virtual pan-tilt-zoom. Pan and zoom the image to the area where the zone will be created.



Draw the Vehicle Zone

Mark the region for vehicle detection by clicking to add points.

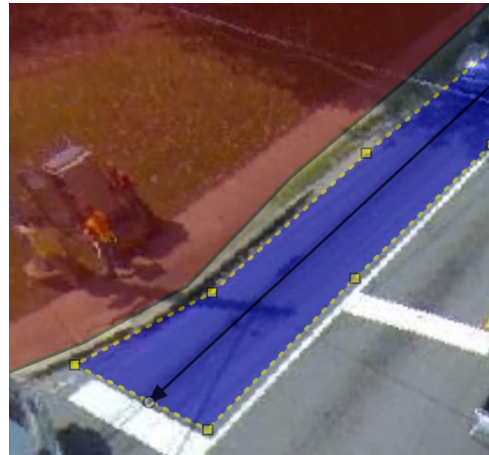
Click back on the first point to complete the zone.



Set the Flow Direction

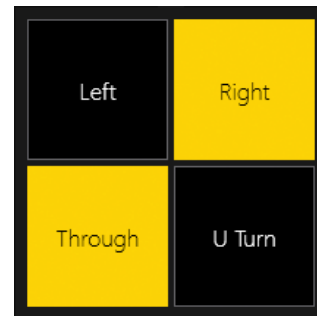
Left click the front of the directional flow arrow.

Drag the arrow to indicate the flow of traffic.



Turns

Select valid turns from the Vehicle Zone.



Phase

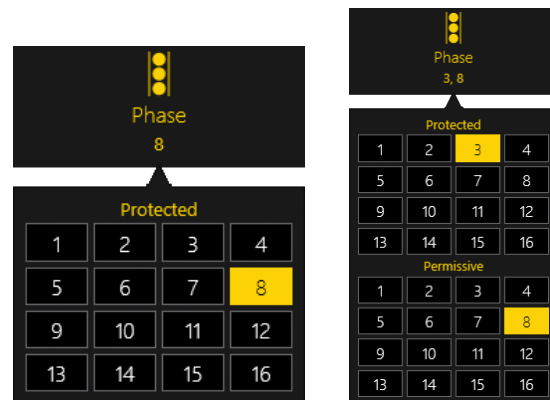
Click the phase(s) associated with the Vehicle Zone.

Left turn zones can be Protected, Permissive or Protected/Permissive.

Only assign phases to zones that are located at the stop line and physically connected to the light state phase.



Do not assign phases to a setback/advanced detector zone.



Output: TS1 / BIU / SIU

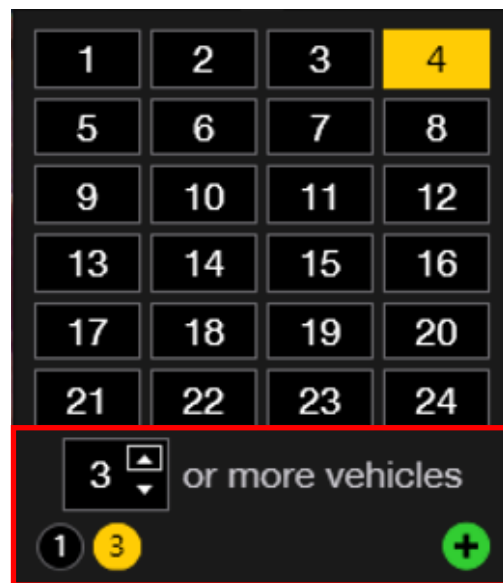
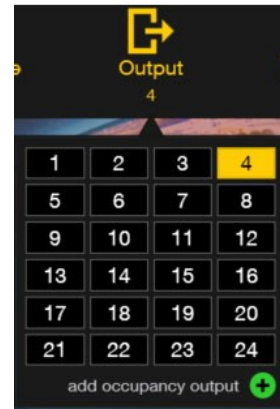
The output, or call, identifies the channel that the vehicle detector will send a signal to when activated. GRIDSMART supports Presence Mode only.

Multiple outputs may be assigned.

Occupancy Based Outputs can also be assigned.

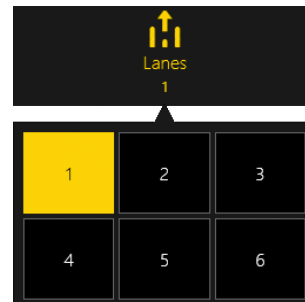
Occupancy-Based Outputs can be configured while creating zones. To Start, click the Green Plus icon under the output option for the zone. Select the number of cars desired (up to 6) for the new output. You can now add up to 6 different outputs for each zone.

The zone will only become active when there are the set number of vehicles in the zone.



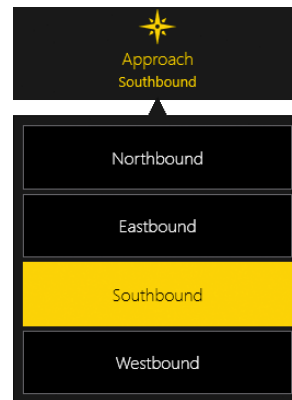
Lanes

Assign the number of lanes covered by the zone.



Approach

The Reports module aggregates vehicle data based on the approach direction.



Options

Zone Name appears in the Reports module.

Extension extends a call to the controller in seconds.

Delay suspends the call to the controller in seconds (only during a red sequence).

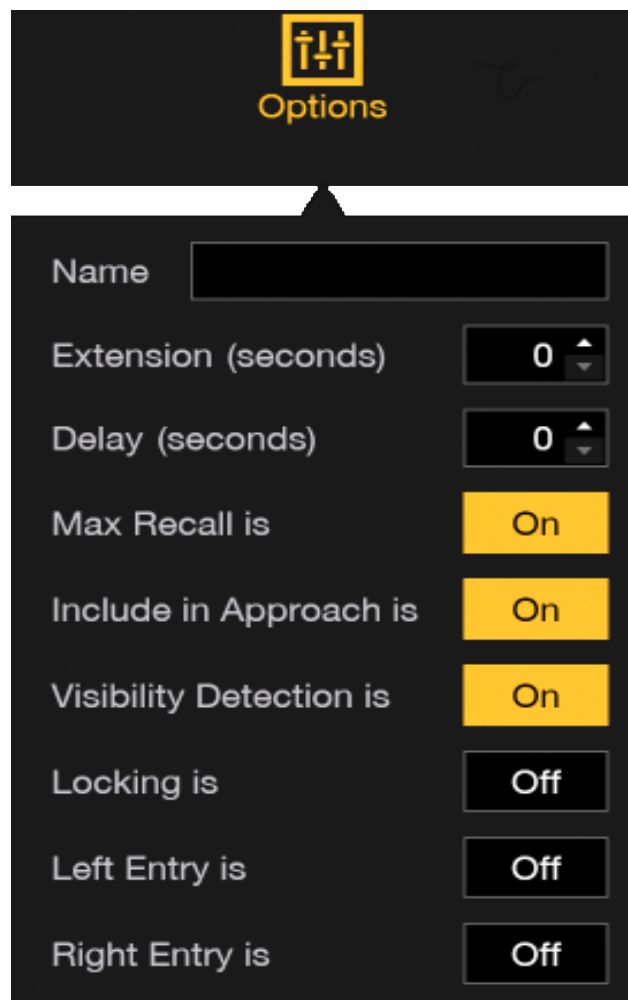
Max Recall is a failsafe. When On, the zone is placed in constant call during learning mode or a system failure event. When Off, the call only persists until the phase is serviced by a green sequence.

Include in Approach logs vehicle Counts. Usually Off for setback zones.

Visibility Detection is a threshold mechanism that enables the system to detect fog, glare or other similar events. If the Visibility Detection exceeds the threshold, a constant call is placed until the event clears.

Locking places a call to the controller until the phase receives a Green.

The **Left and Right Entry** options allow the user to specify if a side zone entry should activate the detector. This is used for driveway exits at or near the stop line where vehicles may not travel in the direction of the flow arrow.



4.3 Object Masks

Draw Object Masks to cover objects that block or interfere with the camera view of the ground or road.

Object Masks are very important; moreover, they eliminate objects that may result in false calls (signal heads, mast arms); disrupt the image contrast because they are highly reflective (Luminaire heads, poles, mast arms); emit light at night (lighted signage).

To create Object Masks, click Object Masks on the Top Menu bar and follow the same instructions in the Road Masks section.

Unmasked signals:



Signals masked out:

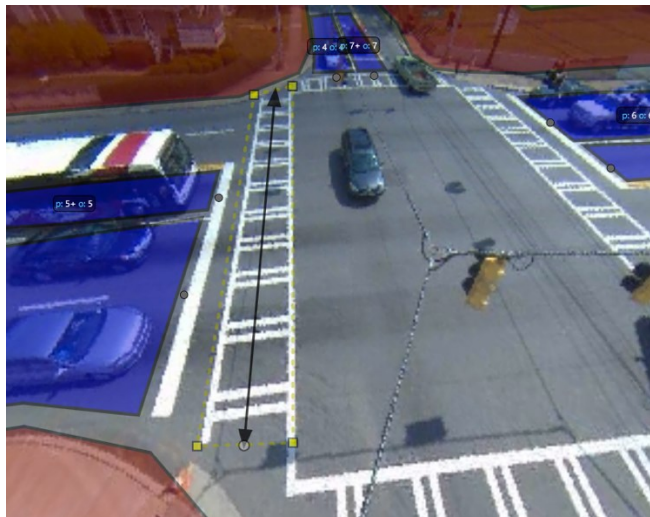


4.4 Pedestrian Zones

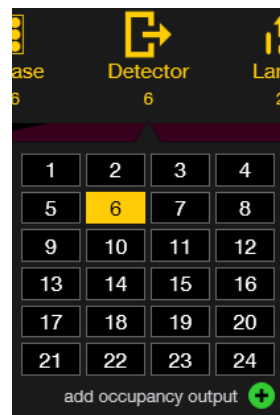
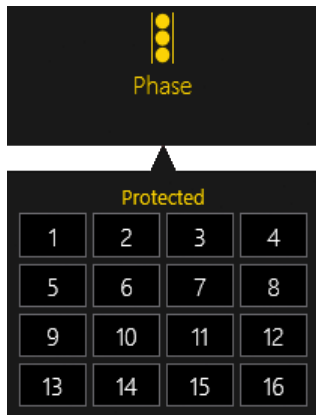


A Pedestrian Zone detects bi-directional pedestrian movement in crosswalks. Outputs signal the controller, or other devices, of pedestrian activity in the intersection.

1. Click the Pedestrian icon from the Top Menu bar.
2. Place the cursor at or near the corner of the crosswalk. Cover the detection zone by clicking around the area, then return to the starting point to close the zone.
3. Set the direction of crossing.



4. Select the Protected Pedestrian Phase and Output.

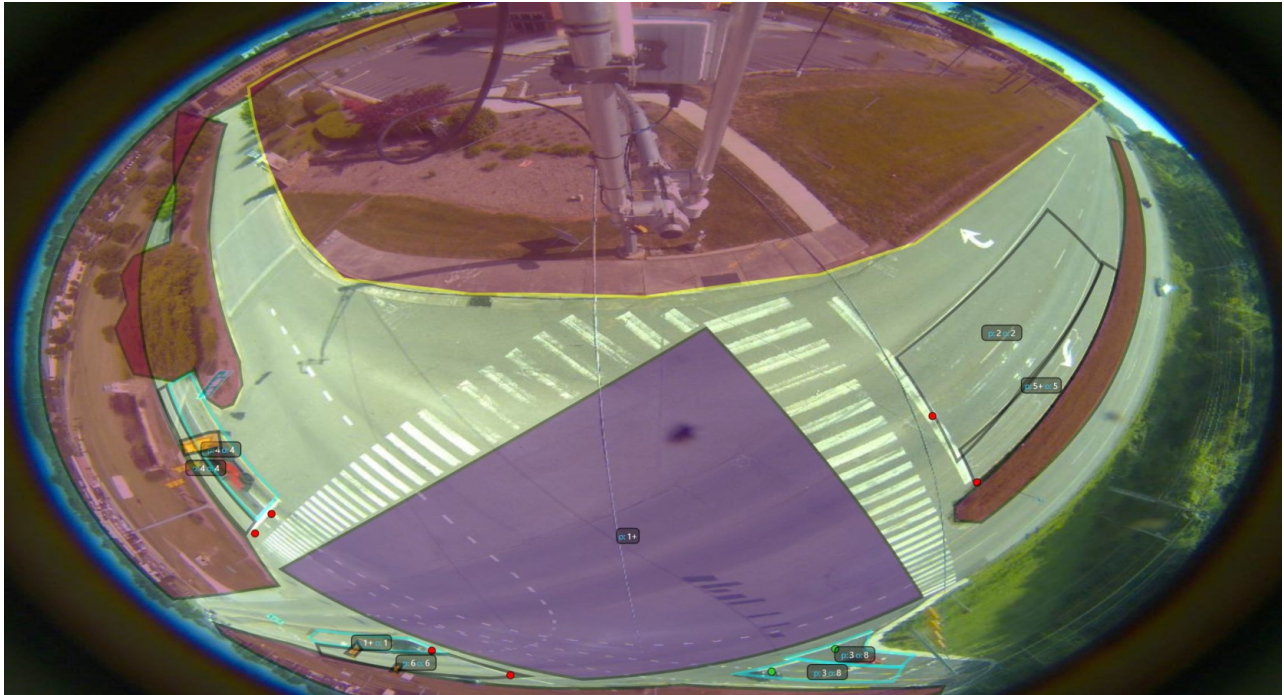


5. Select Alerts and Options as needed.


4.5 The Box

The Box was created to allow extensions for bicycles and/or vehicles entering the intersection.


1. Click The Box on the top menu bar.
2. Place the cursor at the middle of the intersection, then click to place the starting point.
3. Cover the detection zone by clicking around the area, then return to the starting point to close the zone.



4. Select the Extension Outputs for Bikes and Vehicles.


Extension Outputs

Bikes		Vehicles	
1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16
17	18	19	20
21	22	23	24


Extension Outputs

Bikes		Vehicles	
1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16
17	18	19	20
21	22	23	24

4.5 Factory Default and Reset to Factory

GRIDSMART Processors ship from the factory in the original “default” state, and the Site Card is labeled Factory Default. Resetting a Processor erases all configurations and history.



Reset to Factory cannot be performed remotely. You must either run the GRIDSMART Client on the Processor or run the Client on a laptop directly connected to the Processor through the local port.

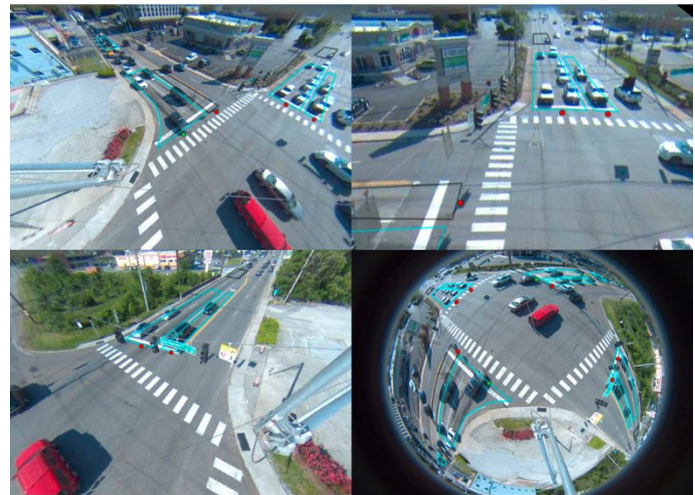
Reset to Factory appears on the Site Configuration screen and requires Publish level privileges for the site.

1. Launch the GRIDSMART Client. The large Site Card appears as the Local Site on your Sites Homepage.
2. Click the Site Card to enter the Site View screen.
3. Click the Configure pencil on the Site Menu.
4. Click Revert on the Site Configuration screen, then click Reset to Factory.
5. Authenticate with the Publish password, then click Reset to Factory to complete the process.

Reset to Factory does not remove the original Site Card from the Sites Homepage. If you no longer need the old Site Card, you can safely delete it by clicking the yellow X in the upper right-hand corner of the card.

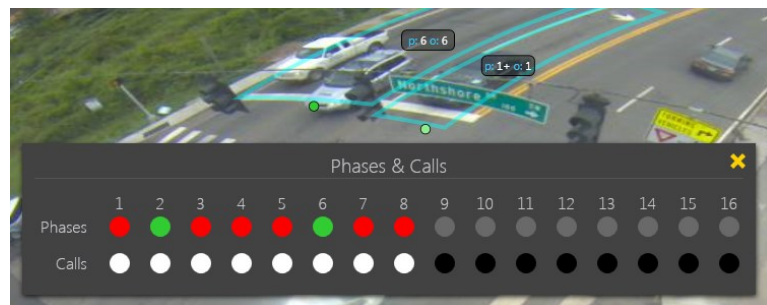
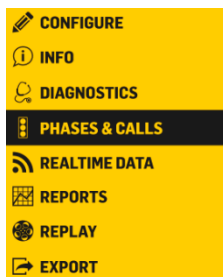
4.6 Quad View

In Quad View, each of the four panels can display cameras in Fisheye view, pan-tilt-zoom view, and rectilinear view for traditional cameras.



4.7 Phases and Calls

Click the Traffic Signal icon in the Site Menu to display phases and calls during when viewing live, connected sites or during replay.



4.8 Make or Clear Calls on Operating Zones

To make or clear calls on operating zones, you must have connectivity to the site or be running the GRIDSMART Client on the Processor. You must also have Admin or Publish level privileges.


1. Click to select a Site Card from the Sites Homepage.
2. Move the mouse pointer into a zone and directly above the phase/output label. The phase/output label content changes to action/info icons represented by a gear icon, info icon and alerts icon respectively.

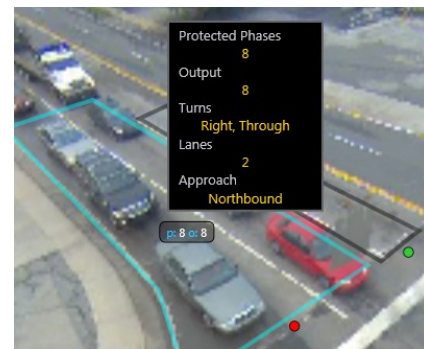


3. Click the Gear to open the Call and Clear buttons.
4. Click Call to activate a call on the zone. Click Clear to clear a call from the zone. You are required to authenticate with your username and password the first time you call or clear any zone. Calls are not placed for two seconds when cleared in this manner. The zone will not reactivate until a new vehicle enters the zone or a vehicle already in the zone moves.



For zones with designated phases, calls will persist until the light receives a green. Without a designated phase, calls will persist for 10 seconds.

Click  to see zone phase information:



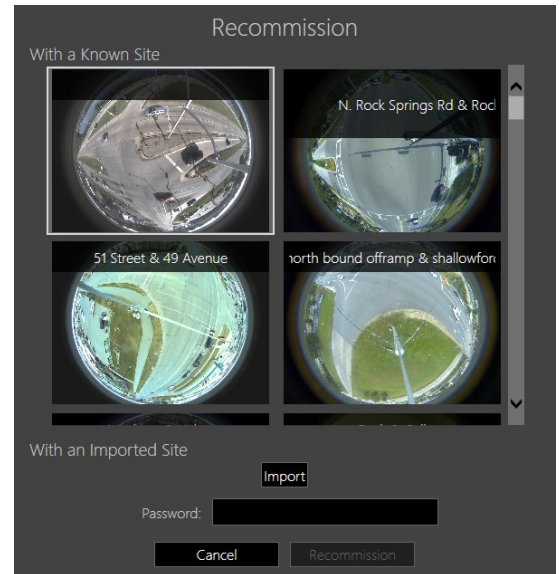
4.9 Recommission a Factory Default Processor



(Only appears on Factory Default systems)

To replace a Processor at an existing GRIDSMART site, use the Recommission feature.

1. Click the Recommission icon.
2. Authenticate with Admin or Publish credentials.
3. Select a Site Card to use with the new Processor, or, click Import to browse for the appropriate Site Card.
4. The Factory Default Processor will be configured with the selected Site configuration.



5.0 Publish

Publishing sends changes made in the GRIDSMART Client into live operation on the corresponding GRIDSMART Processor.



The Publish icon appears in the upper right-hand corner of the Site Configuration view when you have unpublished changes. You must enter a username and password to Publish along with a brief description of the changes made.

Changes can be reviewed and/or reverted using the [Revert](#) feature.

All changes must be published to the Processor to be implemented.

The Publish method has changed as we migrate towards improved security. To publish by default, if still using HTTP, you must type “publish” for the username and then “aldis#world9” for the password. We strongly encourage that the administrator of the Processor creates appropriate user credentials.

5.1 Security – Admin, Publish and Read-only

Starting in Version 19.12, a GS₂ Processor that has been factory reset has no default passwords. For the device to be functional, a system administrator password must be set by connecting to the laptop port.

To change passwords, please refer to the Appendix - GS₂ Networking & Security.

There are three levels of security permissions within the GRIDSMART Client: Admin, Publish and Read Only. These user account types can be managed locally, on the GS₂, or by using new LDAP option introduced in 19.12.

5.2 Learning Mode

After the initial configuration Publish, system reboot, Engine restart, or adding or replacing cameras, the GRIDSMART Processor will enter Learning Mode for the first four to six minutes of system operation. The Processor operates in recall mode while the GRIDSMART Engine learns the scene.

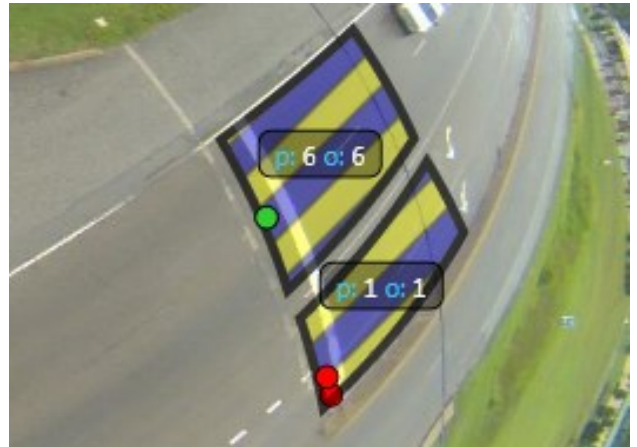
5.3 Make Changes to a Site Configuration

Changing a site configuration is similar to configuring a new site as described in the [Factory Default](#) section.

1. Launch the GRIDSMART Client.
2. Click the appropriate Site Card on the Sites Homepage. The Site View screen appears.
3. Click the Configure icon on the Site Menu to enter the Site Configuration screen.
4. Make the desired changes.
5. Click Publish on the Site Configuration screen. If you are connected to the site, your changes are immediately placed into live operation after entering your username and password.

5.4 Unpublished Changes

Unpublished changes are site modifications, made in the Client, that have not yet been put into operation. Unpublished mask and zone changes are indicated with a hash mark fill pattern in the Site View screen. The Sites Homepage displays a hash mark fill pattern on Site Cards with unpublished changes.



Click Publish on the Site Configuration screen to save your changes.

5.5 Publish History

Publish History		
Date	Who	What
4/23/2015 10:24 AM	wHynds	Changed all System Events Alert
4/22/2015 6:11 AM	jrp	changed all systems alert
2/20/2015 9:18 PM	MT	Added Permissive phase to...
10/27/2014 8:00 AM	jrp	Added system alert to Software
10/27/2014 7:59 AM	irn	Added Alerts Module to license

Publish History displays all previously published changes made to a site configuration. Click the Info icon on the Site Menu to see the date, time, username and description of the changes.

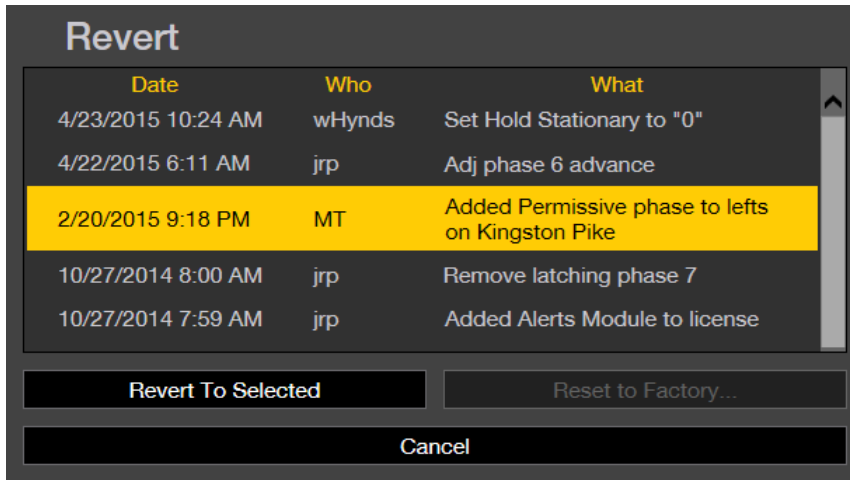
Publish History is also displayed in the Revert panel on the Site Configuration screen.

6.0 Revert



The Revert feature returns the GRIDSMART Processor to any previously published configuration.

1. To open the Revert panel, click the Configure pencil on the Site Menu, then click Revert to Selected.



2. Select a previously published configuration, then click the Revert to Selected button.
3. You must Publish a reverted configuration for it to take effect.

The current operational configuration is listed at the top of the Revert list. Revert to this configuration to remove any unwanted unpublished changes.

7.0 Site Info

Click the Info icon on the Site View screen to display location settings, including control settings, installed modules, cameras and publish history.

Location Settings
Cherahala &
Hardin Valley
Knoxville
Tennessee 37932
35.92 -84.2

Serial # GS2-3963
Site Id 9de954a3-05bb-471e-9b7a-a06874f890ff
License Id 00E04B60BC16
IP Address 10.33.0.2
Date/Time 5/2/2019 1:17:17 PM
(UTC-05:00) Eastern Time (US & Canada)

Control Settings
Full Control
TS1

Cameras

Proto RL
257°/ 28 ft
Rectilinear

NE FE
37°/ 32 ft
Fisheye

Modules
Performance+

[Show GRIDSMART API](#)


Publish History

Date	Who	What
5/1/2019 5:43 PM	publish	removed box vehicle extension output
5/1/2019 1:57 PM	publish	
5/1/2019 1:54 PM	publish	
5/1/2019 1:54 PM	publish	
5/1/2019 1:52 PM	publish	

8.0 Modules

GRIDSMART offers add-on software modules that create your one-of-a-kind solution. Modules are independently licensed on each Processor and appear on the intersection Site Card.

8.1 GRIDSMART Data Modules

FEATURE	Performance	Performance Plus
Client Reports		
Standard Reports		
Volume	X	X
Turning Movement Count	X	X
Vehicle Classification	X	X
Incident	X	X
Raw Export	X	X
Performance Reports		
Seven Day Volume	X	X
Green Occupancy	X	X
Red Occupancy	X	X
Percent Arrivals on Green	X	X
Percent Arrivals on Red	X	X
Speed	X	X
Auto Reports	X ¹	X ³
GRIDSMART.cloud Reports	X ¹	X ³
Alerts²		
All System Events	X ¹	X ³
Loss of Visibility	X ³	X ³
Volume Exceeded	X ³	X ³
Loss of Green (Flash)	X ³	X ³
Zone Activated	X ³	X ³
H.264 Streams	 (Ctrl) ▾	X ^{1,4}
Minute by Minute Display	X ¹	X ¹
Vulnerable Road Users	With 19.10 VRU's are included with no Module needed. ⁴	
Pedestrian Crosswalk Detection		
Bicycle Clearance Extensions		

KEY

1 Requires WAN connectivity.

2 Alerts are delivered via email upon occurrence. Events shown in GRIDSMART Cloud are updated once daily, not upon occurrence.

3 Requires External Antenna or WAN connectivity.

4 Requires GS₂ Processor.

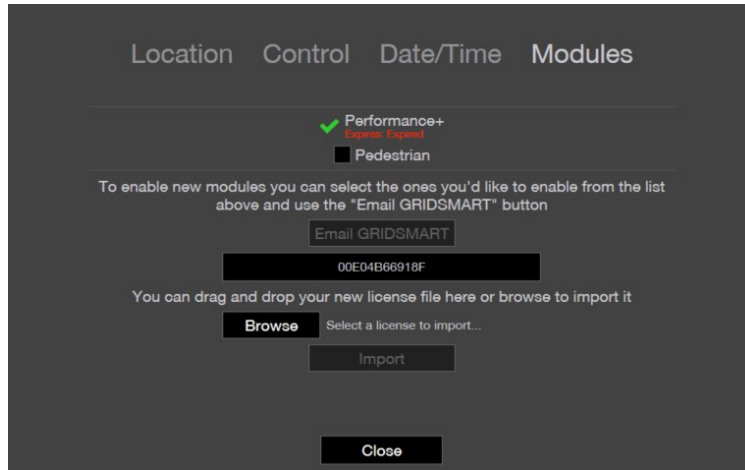
8.2 Description of Alerts

All System Events	On system events such as Publish, startup, IP address change, Camera offline/online.
Loss of Visibility	When the camera visibility is lost for any zone. Includes snapshot.
Volume Exceeded	When the site volume exceeds a set amount.
Flash (Loss of Greens)	When the intersection is suspected to be in flash.
Zone Activated	When a zone is activated. Can be used for wrong-way detection.

For a detailed description on how to set up Alerts refer to section 10.

8.3 Adding a Module

1. Launch the GRIDSMART Client and click the appropriate Site Card.
2. Click the Configure pencil, then click Site Settings.
3. Click the Modules tab.
4. You can load your module to the GS2 Processor by clicking Browse. Once the license file is visible next to Browse, click Import. You are also able to drag your license file from File Explorer into the Modules view.
5. Publish your changes after the license files have been imported.



Note. If the GRIDSMART Processor is communicating to GRIDSMARTCloud.com, the license will be synced automatically.

You can now manage Modules on the GS₂ by opening the Device Manager.

Module	Expires	Activated
PEDESTRIAN	Never	Aug 24, 2018
PERFORMANCE +	Never	Aug 24, 2018
ALERTS	Never	Aug 24, 2018
COUNTS	Never	Aug 24, 2018
REALTIMEDATA	Never	Aug 24, 2018

Upload a new license

Choose a license XML file Browse

Upload License Sync Licenses

9.0 Reports

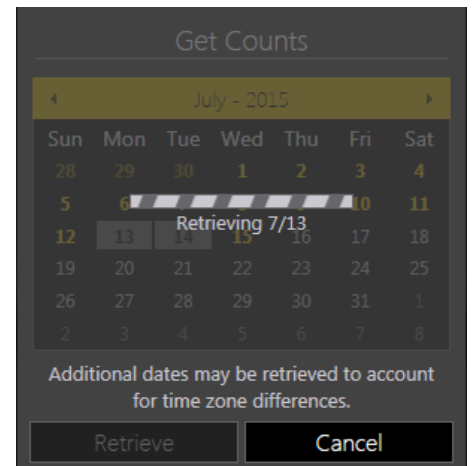
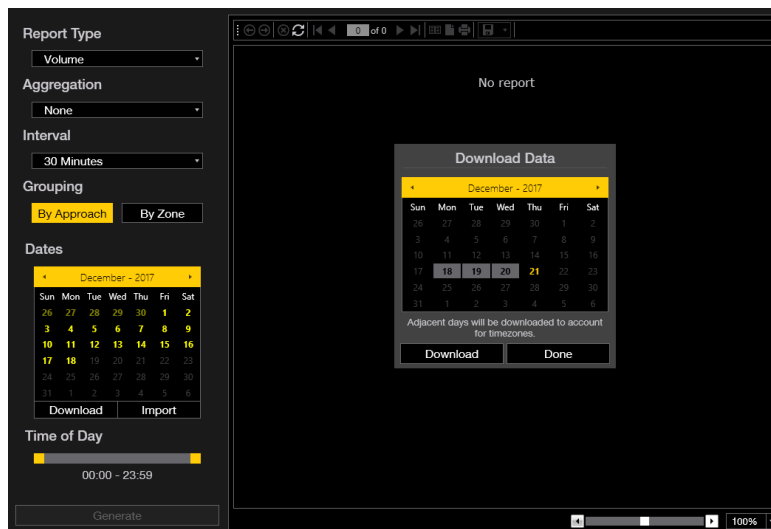
REPORTS

With the PERFORMANCE and PERFORMANCE PLUS Modules, GRIDSMART automatically logs vehicle counts for at least one year. Counts are stored on a first in, last out basis.

9.1 Downloading PERFORMANCE DATA with the Client

When connected to a site either locally or remotely, use the GRIDSMART Client to retrieve count data.

1. Click the appropriate Site Card on the Sites Homepage.
2. Click the Reports icon on the Site Menu.
3. On the Reports Screen, click the Download button under the calendar on the left. In the calendar that appears in the middle of the window, select one day or several days of data to retrieve.
4. Click the Download button under the middle calendar, then Done once the data has been downloaded. It may take a while to retrieve data over slow connections.



9.2 Collecting PERFORMANCE DATA with a USB Storage Device

Note: This will only work if the USB sync is enabled in the Device Manager.

1. Begin with a freshly NTFS-formatted USB storage device or with a Data Stick or Drive that you have already used with GRIDSMART.
2. Ensure that there is enough free space on the device for your needs.
3. Connect the USB storage device to a USB port on the GRIDSMART Processor. Observe the front panel.
4. Images and other data – including counts for systems with the Data Module – are automatically copied onto the device. For large capacity devices (>128GB), images will be stored at approximately 5-10 images per second until the drive is full. For small capacity devices, images will be stored at approximately one image per second for only three minutes.
5. Once you have collected the data you need, and the Processor front panel indicates that it is safe to do so, disconnect the USB device from the Processor. This USB device is now a GRIDSMART Data Stick or Drive.
6. Connect your Data Stick or Drive to the computer where you intend to use the GRIDSMART Client for reporting.
7. Launch the Client, select the Site Card for your site of interest and then click Reports (chart icon) on the Site Menu.
8. The count data from your Data Stick or Drive will be automatically synchronized with your Client and available for use in the Reports Screen as indicated by highlighted dates in the calendar.

9.3 Generating Reports

Once the Counts have been downloaded or synced to the Client, click the Reports icon and choose your options.

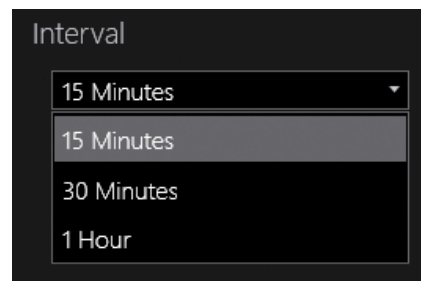
Select the Report Type.



A dropdown menu with a dark background and white text. The menu is open, showing a list of report types. The top item is 'Turning Movement Count' with a small downward arrow to its right. Below it are 'Volume', 'Seven Day Volume', 'Length Classification', 'Incident', 'Green Occupancy', 'Red Occupancy', 'Percent Arrivals on Green', 'Percent Arrivals on Red', 'Speed', and 'Raw Export'.

- Turning Movement Count
- Volume
- Seven Day Volume
- Length Classification
- Incident
- Green Occupancy
- Red Occupancy
- Percent Arrivals on Green
- Percent Arrivals on Red
- Speed
- Raw Export

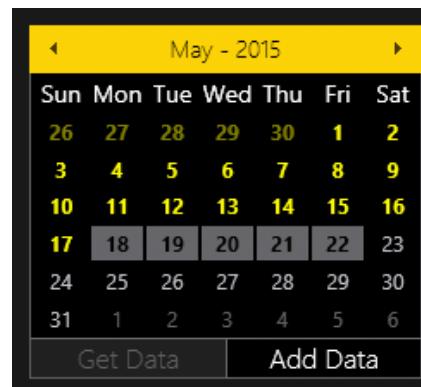
Select the Interval.



A dropdown menu with a dark background and white text. The menu is open, showing a list of intervals. The top item is '15 Minutes' with a small downward arrow to its right. Below it are '15 Minutes', '30 Minutes', and '1 Hour'.

- 15 Minutes
- 15 Minutes
- 30 Minutes
- 1 Hour

Click a date or drag the cursor to highlight a date range.

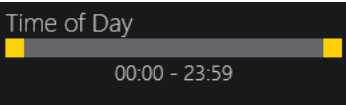
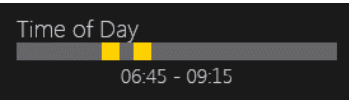


A calendar interface for May 2015. The header shows 'May - 2015' with left and right navigation arrows. The calendar grid shows days of the week (Sun, Mon, Tue, Wed, Thu, Fri, Sat) and dates. The dates 1 through 31 are displayed. The date 18 is highlighted with a dark background. Below the calendar grid are two buttons: 'Get Data' and 'Add Data'.

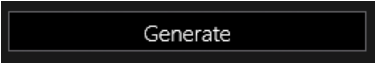
Sun	Mon	Tue	Wed	Thu	Fri	Sat
26	27	28	29	30	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	1	2	3	4	5	6

Get Data Add Data

Use the slider to specify the Time of Day.



Click Generate.



Use the header to Browse, Print, or Export pages.



Click the disk to save the report as:

1. PDF
2. Excel

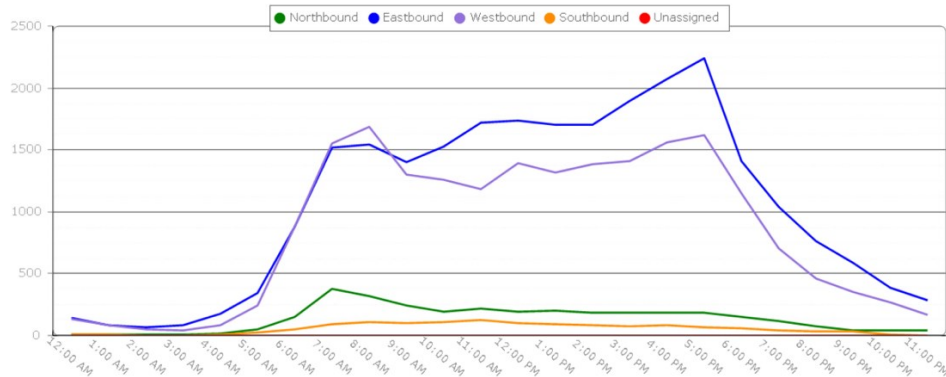
9.3.1 Report – Turning Movement Counts

GRIDSMART

Turning Movement Counts

Intersection: Daniels Pkwy & Cross Creek Blvd
Date: Monday, August 04, 2014

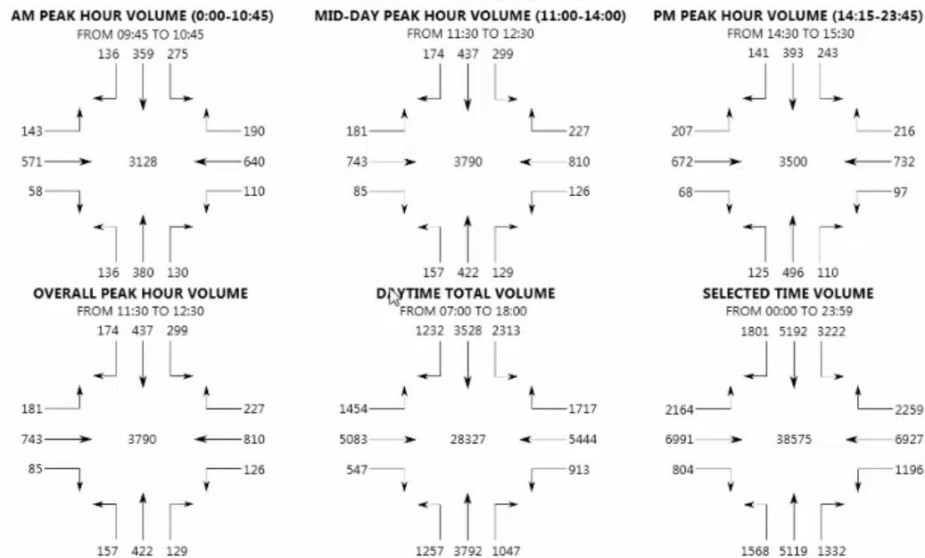
	Right	Through	Left	UTurn	Total
Northbound	929	83	2186	3	3201
Southbound	640	184	485	0	1309
Eastbound	553	23412	1343	0	25308
Westbound	440	18872	939	16	20267
Unassigned	0	0	0	0	0
Total	2562	42551	4953	19	50085



GRIDSMART

Turning Movement Counts

Intersection: Kingston Pk & Northshore
Date: Thursday, July 03, 2014



2 of 4

9.3.2 Report – Vehicle Classification

Use the sliders under Edit Bins to define customized vehicle length bins. Bin names can be changed by clicking on the name of the bin.

Report Type

Vehicle Classification

Edit Bins

Length Bins

Bin 1 0 - 9 ft

Bin 2 10 - 23 ft

Bin 3 24 - 35 ft

Bin 4 36 - 51 ft

Bin 5 52 - 73 ft

Defaults

Okay

GRIDSMART

Vehicle Classification Counts

Intersection Hardin Valley & Cherahala
Date Tuesday, June 02, 2015

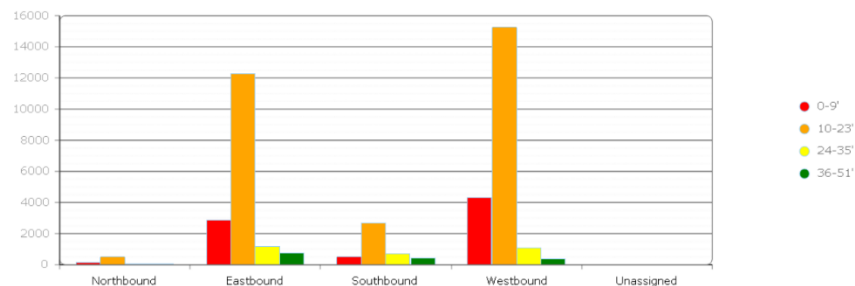
	Northbound				Southbound				
	0-9'	10-23'	24-35'	36-51'	0-9'	10-23'	24-35'	36-51'	0-9'
11:30 AM	4	20	2	2	6	54	11	6	26
11:45 AM	2	15	4	1	11	46	16	6	22
12:00 PM	6	26	1	0	12	63	13	8	28
12:15 PM	3	17	4	4	8	59	9	11	27
12:30 PM	4	16	3	1	7	36	5	5	29
12:45 PM	3	14	0	1	6	36	5	4	26
1:00 PM	1	16	3	1	5	43	7	5	20
1:15 PM	5	10	3	2	4	44	13	4	27
1:30 PM	3	10	5	0	6	59	17	11	34
1:45 PM	2	15	3	1	3	36	9	4	24
2:00 PM	4	6	2	1	4	29	8	9	32
2:15 PM	4	5	3	0	7	30	13	7	24
Total	41	170	33	14	79	535	126	80	319

GRIDSMART

Vehicle Classification Counts

Intersection Hardin Valley & Cherahala
Date Tuesday, June 02, 2015

	Northbound	Southbound	Eastbound	Westbound	Unassigned	Total
0-9'	117	497	2844	4303	0	7761
10-23'	478	2717	12280	15233	0	30708
24-35'	79	662	1202	1090	0	3033
36-51'	38	456	745	354	0	1593
Total	712	4332	17071	20980	0	43095



9.3.3 Report – Incidents Report

GRIDSMART

Intersection Kingston Pk & Northshore
Date Monday, July 13, 2015

Incident Report

	Northbound	Southbound	Eastbound	Westbound	Total
Illegal Turn	14	6	13	19	52
Red Light	201	153	43	121	518

Exits on Red

	Northbound	Southbound	Eastbound	Westbound	Total
11:30 AM	109	87	25	58	279
12:30 PM	92	66	18	63	239
Total	201	153	43	121	518

Illegal Turns

	Northbound			Southbound			Eastbound			Westbound		
	R	T	L	R	T	L	R	T	L	R	T	L
11:30 AM	0	6	0	0	2	1	0	8	0	0	8	2
12:30 PM	0	8	0	0	0	3	0	5	0	0	8	1
Total	0	14	0	0	2	4	0	13	0	0	16	3

9.3.4 Report – Incidents Excel Output

A1	:	<div><div><div></div><div></div><div></div></div><div><div></div><div></div><div></div></div><div><div></div><div></div><div></div></div></div>	10/26/2012									
	A	B	C	D	E	F	G	H	I	J	K	
1	10/26/2012	11:45.2	29505	1	ILLEGAL_LEFT	32.0511	0	T6	61	PG	SR	
2	10/26/2012	17:07.3	29827	1	ILLEGAL_LEFT	32.0552	0	T0	20	PG	SR	
3	10/26/2012	21:18.8	30078	1	ILLEGAL_LEFT	30.6899	0	T3	20	PG	SR	
4	10/26/2012	22:40.8	30160	4	ILLEGAL_LEFT	52.4821	0	T0	16	PG	S	
5	10/26/2012	30:14.0	30614	1	ILLEGAL_LEFT	29.6204	0	T0	17	PG	SR	
6	10/26/2012	30:59.8	30659	1	ILLEGAL_LEFT	37.7162	0	T2	55	PG	SR	
7	10/26/2012	31:20.7	30680	8	ILLEGAL_RIGHT	33.7939	0	T0	7	PG	S	
8	10/26/2012	32:03.9	30723	10	ILLEGAL_LEFT	48.3713	0	T0	11	PG	S	
9	10/26/2012	34:42.1	30882	2	ILLEGAL_RIGHT	32.044	0	T1	19	PG	LS	
10	10/26/2012	45:09.5	31509	1	ILLEGAL_LEFT	25.169	0	T1	20	PG	SR	
11	10/26/2012	50:46.5	31846	1	ILLEGAL_LEFT	30.6881	0	T6	73	PG	SR	
12	10/26/2012	53:43.3	32023	2	ILLEGAL_RIGHT	27.1043	0	T0	19	PG	LS	
13	10/26/2012	58:54.9	32334	1	ILLEGAL_LEFT	25.1757	0	T1	21	PG	SR	
14												

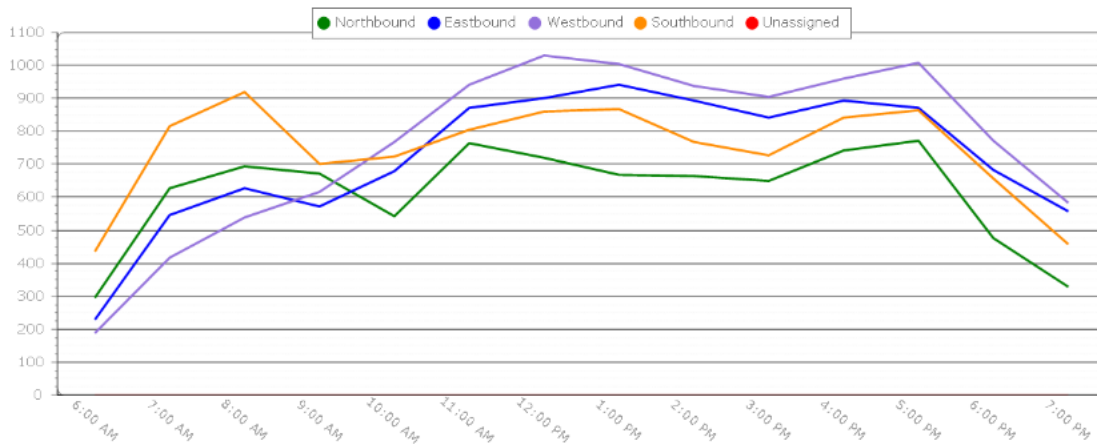
9.3.5 Report – Volume

GRIDSMART

Volume Report

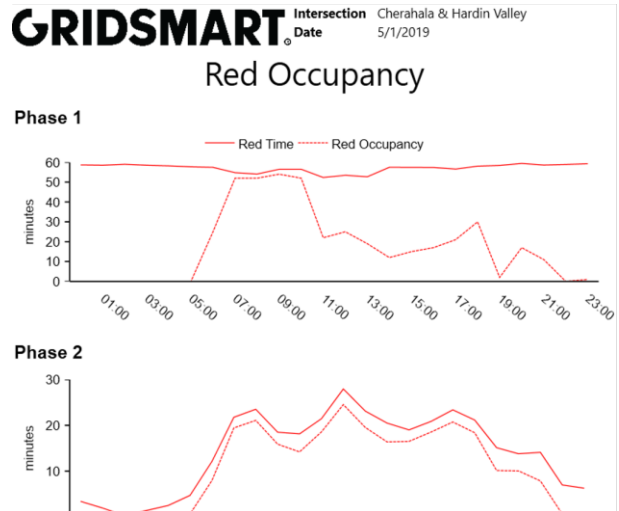
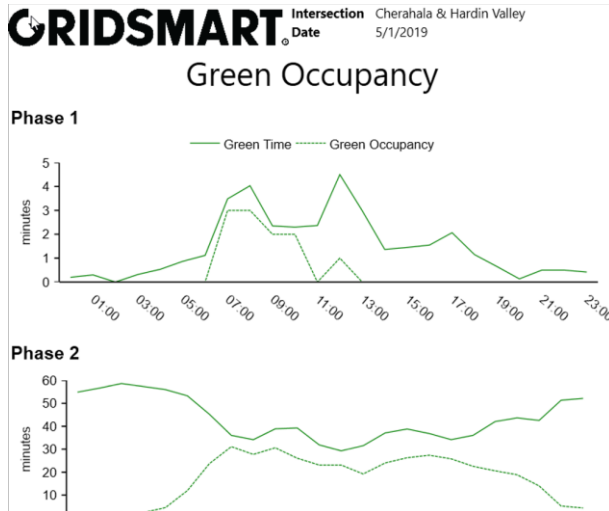
© Intersection Kingston Pk & Northshore
Date Monday, July 13, 2015

	Total
Northbound	8603
Southbound	10434
Eastbound	10106
Westbound	10663
Unassigned	0
Total	39806

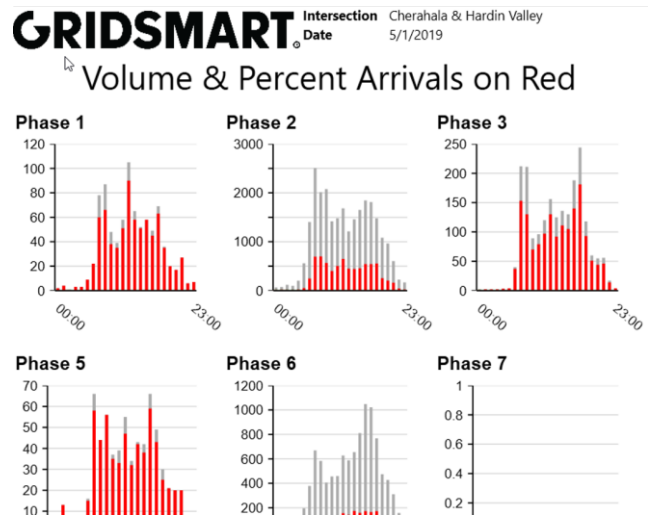
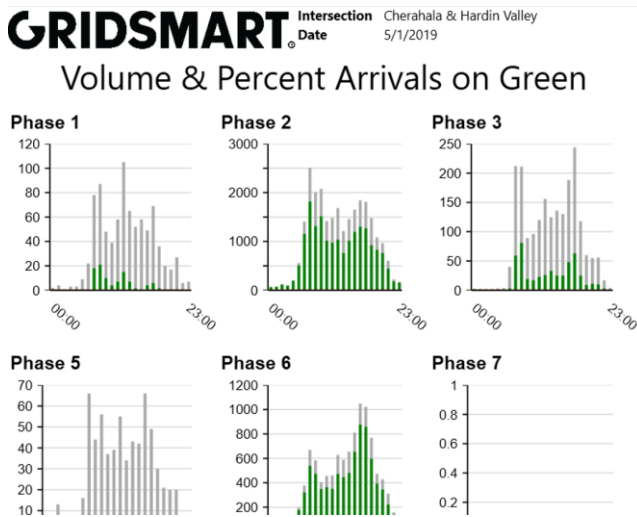


	Northbound	Southbound	Eastbound	Westbound	Total
6:00 AM	294	435	228	187	1144
7:00 AM	626	814	548	417	2405
8:00 AM	693	919	629	540	2781
9:00 AM	672	703	572	618	2565
10:00 AM	542	723	681	768	2714
11:00 AM	763	803	870	940	3376
12:00 PM	719	859	900	1029	3507
1:00 PM	667	866	942	1003	3478
2:00 PM	663	766	894	938	3261
3:00 PM	648	729	840	903	3120
4:00 PM	741	840	893	959	3433
5:00 PM	773	865	870	1008	3516
6:00 PM	475	656	683	770	2584
7:00 PM	327	456	556	583	1922
Total	8603	10434	10106	10663	39806

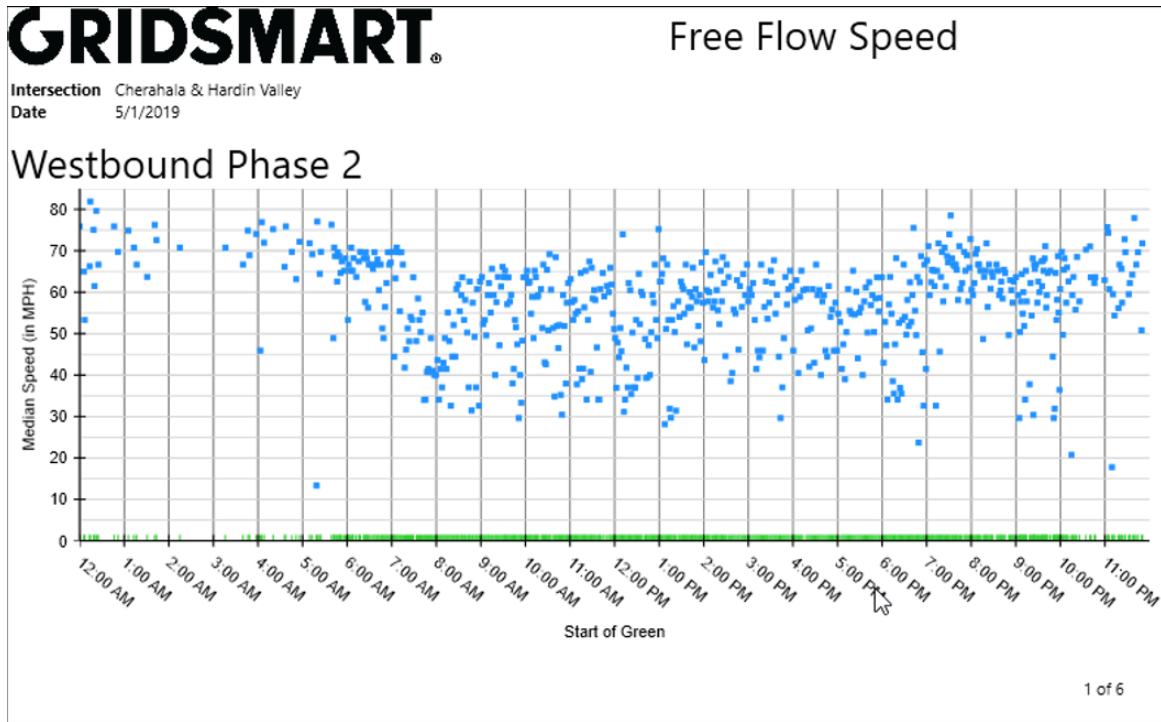
9.3.6 Report – Green/Red Occupancy



9.3.7 Report – Percent Arrivals On Green/Red



9.3.8 Report – Speed



9.3.9 Report – Raw Data Export

Creates a CSV file with raw count data.

A1													

9.4 Auto Reports



Automatically email reports to a group of contacts on a schedule. Beginning in 19.12 this functionality is included as part of the Performance Module and requires a connected Processor.

1. Launch the GRIDSMART Client and click on the appropriate Site Card.
2. Click the Configure pencil to open the Site Configuration screen.
3. Click the Auto Reports icon in the upper right-hand corner of the Site Configure screen, then click New.
4. Set the desired report parameters, then click Next.
5. Enter the recipients' email addresses or select them from the list of known contacts.
6. Publish your changes.

10.0 Alerts



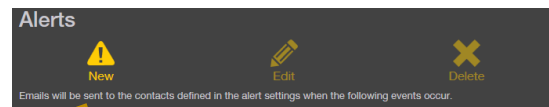
An Alert will email a user-defined set of contacts when the GRIDSMART Processor detects certain events.

Site Alerts include All System Events, Loss of Visibility, Volume Exceeded and Flash (Loss of Greens). All System Alerts are included with your GRIDSMART system and do not require the Alerts Module.

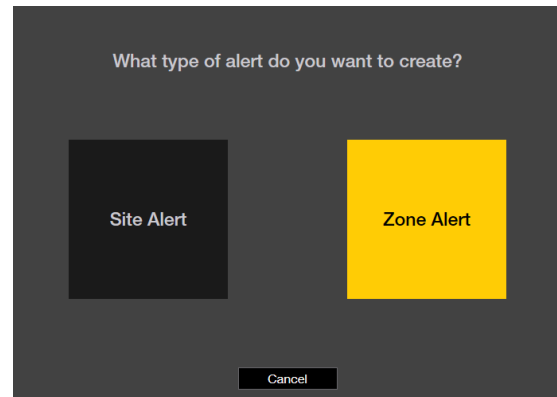
Zone Alerts include Volume Exceeded and Zone Activated, where Zone Activated alerts can be used to detect wrong way travel or breakdown lane occupancy.

To create an Alert, click the Configure pencil on the Site Menu, then click Alerts in the upper right-hand corner.

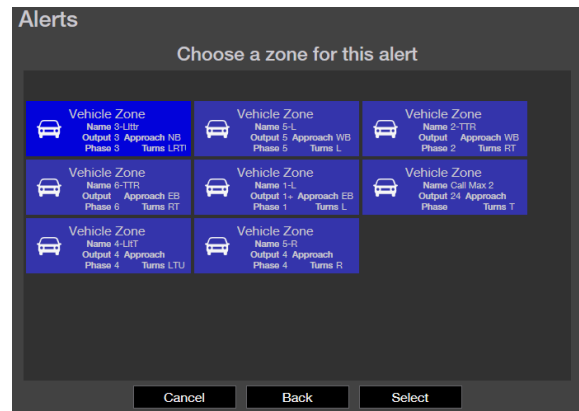
Click New.



Click Site Alert or Zone Alert.

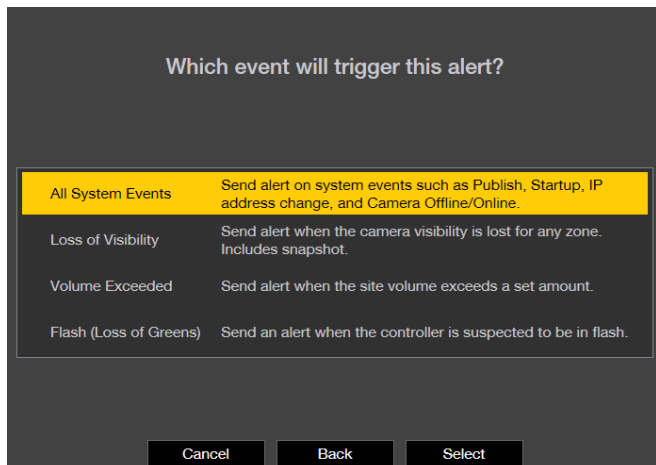


If you are creating a Zone Alert, choose a vehicle zone, then click Select.



Choose an event to trigger the alert, then click Select.

The intersection is determined to be in flash if twelve seconds pass without the GRIDSMART system receiving any green lights from the controller.



Add users to notify. Enter a new email address or select from a list of your existing contacts.

Optionally add an alert name. The name defaults to the event type.

Enter the maximum volume for Volume Exceeded alerts.

Select an approach for Site Alerts.

Use the slider to indicate the active time period.

Zone Activated alerts are generally used for breakdown lane or wrong way detection.

Camera images are attached to the email. Up to twelve emails will be sent per hour.

Publish your changes.

All System Events

optional alert name

alert@bestcity.gov x add contact

support@gridsmart.com

Cancel Back Next

Volume Exceeded

Lunch volume exceeds 6000

6000

add contact

All Approaches

All Approaches

Northbound

Eastbound

Southbound

Westbound

11:30 Active Time 13:30

Alerts

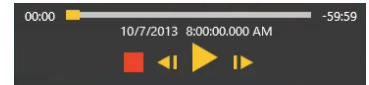
Be Careful!

This will send an alert with an image every time the zone is activated, up to 12 times per hour. It should only be used for rare zone activations such as a wrong way zone or breakdown lane zone.

11.0 Replay



The Replay feature enables playback of data (images, phases, calls) acquired from a GRIDSMART Processor by connecting a Data Stick or Drive. The Replay function (movie reel icon) is accessible on the Site Menu.



1. Connect the Data Stick or Data Drive to your GRIDSMART Client computer, then launch the Client.
2. Click the appropriate Site Card, then click Replay from the Site Menu. The Select Data to Display window opens.
3. Click Select the Day and Hour of data from the connected Data Drive. Or Browse to a images Folder if not using the original data drive.
4. Use the playback controls to review the data. Press the red Stop button when you have finished.

Fisheye View
Replay



Quad View
Replay



11.1 Record and Review Images and/or Performance Data

Note: This will only work if the USB sync is enabled in the Device Manager.

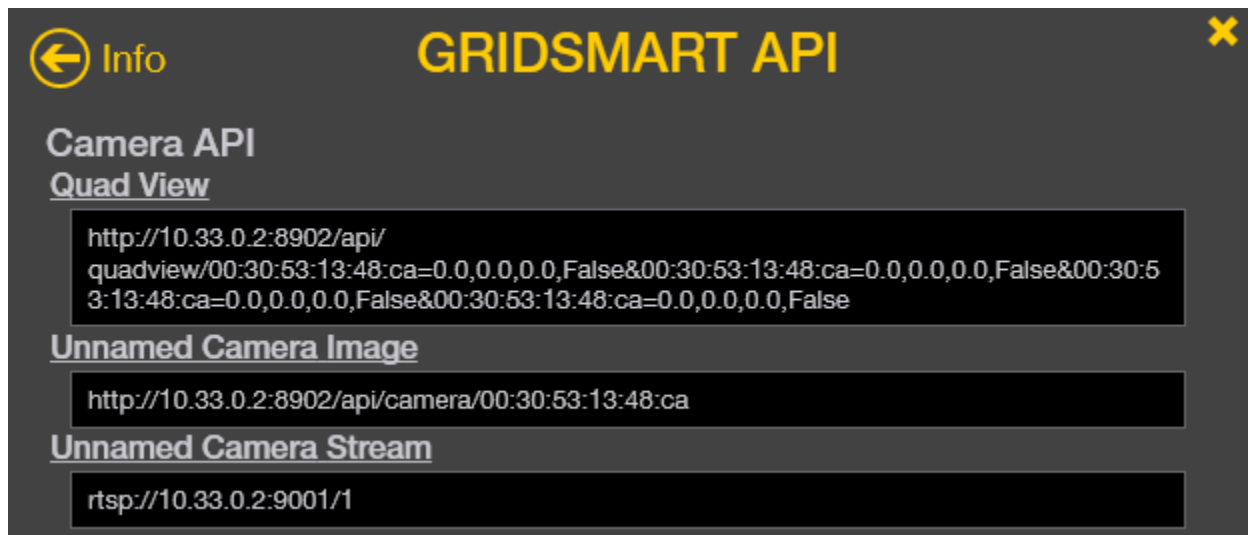
1. Begin with a freshly NTFS-formatted USB storage device obtained from GRIDSMART Support or a Data Stick or Drive that you have previously used with GRIDSMART.
2. Ensure that the device has enough free space to support your needs. A single Fisheye Camera requires approximately 100 GB per day.
3. Connect the USB storage device to a USB port on the GRIDSMART Processor and observe the front panel. Images and other data, including logs and counts, are automatically copied onto the device. On large capacity devices (>128GB), images are stored at a rate of 5-10 images per second until the drive is full. On small capacity devices, images are stored at approximately one image per second for three minutes only.
4. After collecting the data, disconnect the USB storage device from the Processor. This storage device is now a GRIDSMART Data Stick or Data Drive.

12.0 GRIDSMART API

The GRIDSMART Application Programming Interface (API) retrieves data and images from GRIDSMART Processors using HTTP or HTTPS. To view examples of the camera API calls, click Info, on the Site Menu, then click Show GRIDSMART API.

With the API, you can:

1. See live single camera images in a web browser
2. Automate the retrieval of Counts and Realtime data.
3. View site history, current configuration and camera status.
4. And much more...



The screenshot shows a web interface titled "GRIDSMART API" with a back arrow and "Info" link. It lists three API endpoints:

- Camera API Quad View**: `http://10.33.0.2:8902/api/quadview/00:30:53:13:48:ca=0.0,0.0,0.0,False&00:30:53:13:48:ca=0.0,0.0,0.0,False&00:30:53:13:48:ca=0.0,0.0,0.0,False&00:30:53:13:48:ca=0.0,0.0,0.0,False`
- Unnamed Camera Image**: `http://10.33.0.2:8902/api/camera/00:30:53:13:48:ca`
- Unnamed Camera Stream**: `rtsp://10.33.0.2:9001/1`

See the [API documentation](#) on the GRIDSMART Support Portal for more details.

13.0 Streaming H.264 streams via RTSP

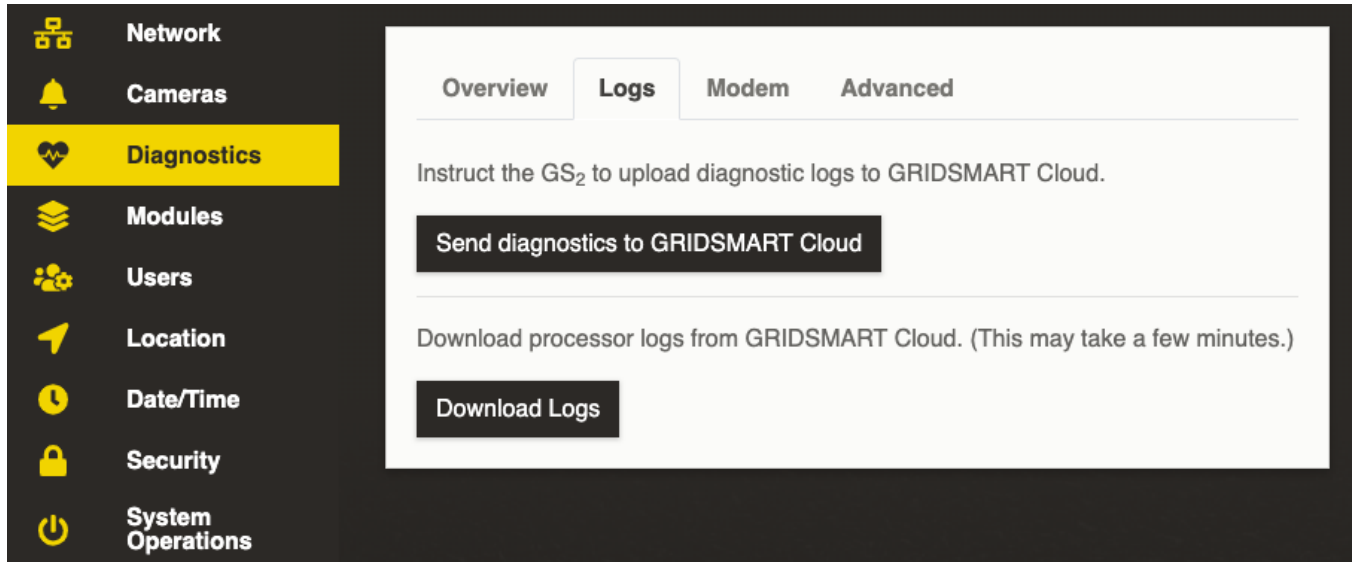
Streaming is now possible with the purchase of a Performance Plus module and with a high-speed connection to the GS₂ Processor and video management or network video system software and/or hardware. The customer and/or customer's vendor are responsible for de-warping the images, if desired, as well as for integration into their existing system. GRIDSMART will supply instructions for accessing the streams.

1. Streams are 10 frames per second (FPS) for both Bell and Traditional Cameras.
2. The image resolution for a Bell Camera is 1280 X 960 while the Traditional Camera is 640 X 480.
3. Each Bell Camera stream requires approximately 10Mb/s and each Traditional Camera stream requires approximately 5 Mb/s.
4. You can access the streaming link by going to the GRIDSMART API and finding the Stream Link. To open the API Panel, click Info, on the Site Menu, then click Show GRIDSMART API. From here you will see the Stream link that can be copied.
5. Port 9000 – 9007 MUST be open.

14.0 Support

Before contacting GRIDSMART Support, please prepare the following:

1. Diagnostic logs collected through the Device manager.
Sent to GRIDSMART through the cloud or downloaded to your local machine by clicking the corresponding button in the Device Manger.



2. Export your site configuration AGS file and Client Logs.

There are several ways to get support -

1. Go to support.gridsmart.com, log in and click create ticket
2. Email GRIDSMART Support
3. Email your regional GRIDSMART Field Application Engineer.

Three ways to contact GRIDSMART Support:

Email: support@gridsmart.com

Web: support.gridsmart.com

Phone: +1 866 652 5347

14.1 Send a Site to GRIDSMART Support for Review or Assistance

If you would like GRIDSMART Support to review your site configuration, you can easily Export a site from the GRIDSMART Client and email it to GRIDSMART Support as follows.

1. Launch the Client and click the appropriate Site Card.

2. Click the Export icon from the Site Menu.
3. Save the file with a valid Windows filename. Make sure the file has the GRIDSMART *.ags extension.
4. Email the *.ags file to GRIDSMART Support – support@gridsmart.com.

14.2 External hard Drive

A USB external hard drive can be used to collect and synchronize data and site configurations between GRIDSMART Processors and the Client. These USB devices must be formatted as NTFS volumes. Make sure there is enough free space on the drive before use. Otherwise, data may not be synchronized.

Please make sure to include timestamps for when the issue is occurring.

14.3 Import and Use a Modified Site

If you experienced problems with your site and requested GRIDSMART Support to review the site configuration, you will likely receive an email from GRIDSMART with your modified site configuration attached as a GRIDSMART *.ags file. Follow this procedure to review that configuration and put it into operation on your site.

1. Save the *.ags file from the email onto your hard drive.
2. Launch the GRIDSMART Client and click Import in the top right-hand corner of the Sites Homepage.
3. Navigate the Windows file system to find the *.ags file. Select the file and click Open.
4. The appropriate Site Card on the Sites Homepage will have a hash mark fill pattern indicating unpublished changes. Click that Site Card to enter the Site View screen.
5. Review the changes. If they are significant, these changes may be hard to visualize as the unpublished changes may significantly overlap the current published configuration.
6. Click the Configure pencil on the Site Menu to enter the Site Configuration screen. There you will be able to see the new configuration without seeing the existing configuration overlaid.
7. If you are connected to the site, you can Publish the changes.



14.4 Remote Connection

Support for VNC has been removed in 19.12, you can now use RDP to connect to the GRIDSMART System.

Remote Desktop Protocol (RDP) enables you to remotely access the GRIDSMART Client resident on the Processor as well as the Processor's Windows operating system. Contact Support for details on the captive user.

14.5 Upgrade a GRIDSMART Processor with an Update Stick

Note: This will only work if the USB sync is enabled in the Device Manager.

A GRIDSMART Update Stick is a zip file available for download from GRIDSMARTCloud.com. Extract the contents of the zip file to the root of a formatted USB flash drive before attempting to update a Processor.

1. If you have previously been using RDP, you must ensure that there are no windows or files open on the GRIDSMART Processor.
2. Disconnect everything from the GRIDSMART Processor except the camera(s), power cable and controller connections. You must disconnect your laptop and all network cables as well as any peripherals such as mouse, monitor and/or keyboard.
3. Insert the provided Update Stick into one of the USB ports.

GS₂ Processor

The front panel of the GS2 Processor will display stages of the update via the Call Lights and the Phase lights. Once the Call Lights are all on and Phase Lights are solid green, the update is complete, and the USB stick can be removed.

Once the update is complete, the GRIDSMART Processor will reboot. After several minutes, your site will return to normal operations.

You may now reconnect any previously disconnected peripherals or network cables.

14.6 Diagnostics

14.6.1 Diagnostics through the GRIDSMART Client

Open the GRIDSMART Client and connect to a site. In the left hand menu click the Diagnostics icon to see data for the current site.

Temperature and voltages displayed are updated every 30 seconds.

Select Extended Diagnostics to open the Device Manager for additional diagnostics.

Diagnostics	
Temp	118.4 F
Uptime	23.13:43:53
3.3 V	3.27
5 V	5.15
12 V	12
48 V	48.79
Serial #	GS2-2987
IP Address	10.33.0.3
Cabinet (SWC)	Shadow
EB ADC	Day
Expanded Diagnostics	

14.6.2 Device manager Diagnostics

This will give you an overview of network information, the ability to download logs or send logs to the GRIDSMART Cloud, view modem information, and advanced network information. The software will flag any areas of concern with warning icons.

GRIDSMART.

Serial # GS2- Version 19.12 Cabinet TS2 Location

admin

Cameras

Phases

Diagnostics

Settings

Overview Logs Modem

HostName	GS2-
Serial Number	GS2-
HardwareId	
Version	19.12 (20.04.29)
Up Time	0 Day(s): 0 Hour(s): 3 Min(s): 20 Sec(s)
Current Time	05/06/2020 11:16:05
TimeZone	Central Standard Time
DNS	⚠ Not Working
Cloud	Enabled
HeartBeat Metrics	
Modem Type	UBlox
Modem Status	Enabled
Signal Strength	⚠ Unknown
CPU Temp	35C


Refresh

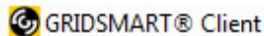
Advanced...

14.7 Replace a Camera

1. Disconnect the non-functioning camera from the GRIDSMART Processor, then connect the replacement camera.
2. Wait four minutes before continuing to the next step.
3. Connect to the Processor, launch the GRIDSMART Client, and then click the appropriate Site Card.
4. Click the Configure pencil on the Site Menu. The Site Configuration screen displays a Replace Cameras option.
5. Click Replace Cameras and proceed by pairing the zones from your missing camera with the images from your new camera. Configure the camera heading and height when prompted.
6. Adjust your zones and masks as needed.
7. Publish the changes.


14.8 Uninstall or Repair the GRIDSMART Client

1. Open Programs and Features by clicking the Start button , clicking Control Panel, and then clicking Programs and Features.
2. Select the GRIDSMART Client, then click Uninstall.



GRIDSMART Technologies, Inc

3. To repair the Client, click Repair. To remove the Client, click Uninstall.

 If you are prompted for an administrator password or confirmation, type the password or provide confirmation.

14.9 Remote Support

To request remote support from a GRIDSMART Support Technician, please call 866-652-5347. A Support Technician will provide details on how to begin a remote support session.

14.10 Methods of Contact

At GRIDSMART, your satisfaction is our top priority. We value your feedback and want to hear from you.

Please stay in touch!

Thank You

Twitter: <https://twitter.com/GRIDSMARTTech>

Facebook: <https://www.facebook.com/pages/Gridsmart/906447382729795?ref=hl>

Vimeo: <https://vimeo.com/gridsmart>

YouTube: https://www.youtube.com/channel/UC6Cyj0ORFNOAI3rno2u6_xQ

LinkedIn: <https://www.linkedin.com/company/gridsmarttech/>

Support: <https://support.gridsmart.com>

Three ways to contact GRIDSMART Support:

Email: support@gridsmart.com

Web: support.gridsmart.com

Phone: +1 866 652 5347

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gridsmart.com

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MADE IN THE USA

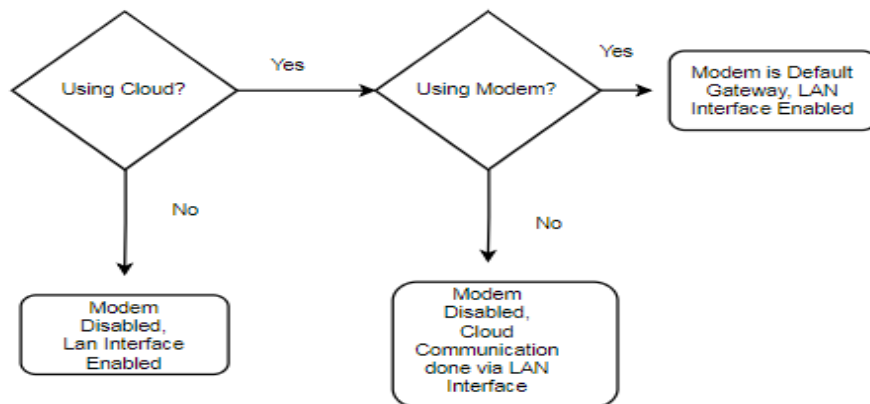
GS₂ Networking and Security

Introduction

The GRIDSMART GS₂ Processor is an enterprise appliance that has the flexibility to operate in a variety of network configurations. Starting in 19.3, the GRIDSMART Device Manager utility has been added to allow configuration of and management of the GS₂ device without the need to have a camera attached to the Processor. The utility is used to configure both network and security settings as well as perform basic troubleshooting.

1.0 Modes of Operation

The GS₂ Processor can run in a standalone “off network” configuration or be connect to a Local Area Network (LAN) along with the GRIDSMART Cloud. The GRIDSMART Cloud is a platform that can be used to automatically backup configuration changes, upload data and diagnostic logs, download license keys, provide access to software patches, updates, automatic reports, alerts and other system information. GRIDSMART is committed to continue to expand the capability of the GRIDSMART Cloud. For Processors without customer network connectivity, a built-in cellular modem can be used to interconnect with the GRIDSMART Cloud. When enabled, the modem operates a private APN using a non-public facing IP address which only allows outbound connections that are limited to specific ports required for use by the Processor.



In addition to the modem, the Processor has a 100Mbps Ethernet Interface that can also be used to connect the Processor to a Local Area Network (LAN). The above diagram shows the combination of connection options available. The GRIDSMART cameras are connected to the GS₂ Processor on a private LAN that is optimized specifically for transmission of video to the GS₂ Processor.

1.1 Security Features

One of the key emphasis of the software release was to provide many of the security features requested and required today in the enterprise computing environment. To maintain backwards compatibility many of the security features are disabled by default. The GRIDSMART GS₂ Processor with software release 19.3 or higher contains a feature rich set of security features including:

- The GS₂ Device Manager is a new application for easy configuration of network and security settings, user management and advance diagnostics.
- HTTPS connectivity for Client and API connections using TLS V1.2
- HTTPS signed URLs for communication with the GRIDSMART Cloud.
- Support for Signed SSL Certificates on the Processor.
- Role based user management system with three distinct user roles (Admin, Publish and View Only) that can be easily managed and assigned as required by the organization.
- Secure centralized user management using Microsoft Active Directory or Open LDAP.
- Security Self-Auditing Tool within the GS₂ Device Manager.
- Signed Updates using a SHA-2 digital signature to ensure that the updates are GRIDSMART genuine.
- New ability to enable/disable connections to the Processor so they are only available when they are needed.
- Ability to enable/disable certain operations to USB drives until they are needed.
- An Updated Operating System Patching System that contains updates for each software release.
- A dynamically configured application firewall with specific rules for inbound and outbound services required.
- Processor Data encrypted at rest.
- Extensive Audit Logging of all security related functions, system access and system configuration changes.

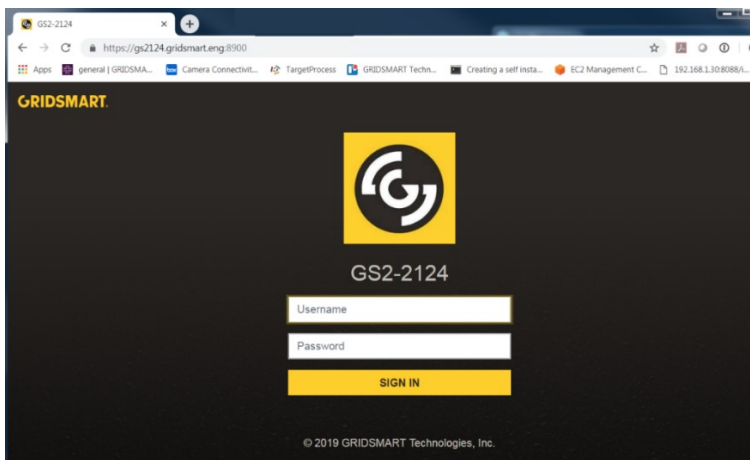
In addition to these features, the GS₂ process undergoes intense penetration testing during each software cycle to ensure vulnerabilities are minimized as much as possible.

2.0 GS₂ Device Manager

2.1 Connecting to Device Manager

The GS₂ Device Manager is a web application and will run on most modern browsers. The site will work with Internet Explorer but will have limited functionality. It currently is not designed to work on a mobile platform, but this will be supported in a future version of this utility. To access the GS₂ Device Manager open a browser and enter.

[https://\[ip address of GS2\]:\[port\]](https://[ip address of GS2]:[port])



If you are connected through the laptop port, access will be done using the following URL:

<https://192.168.150.10:8900>

The GS₂ Device Manager uses Transport Layer Security Version (TLS) version 1.2 (formally known as Secure Socket Layer or SSL) for all communication. System configuration and changes must be done by a user that has the “admin” role. Initially during installation of the system, a self-signed SSL certificate will get generated with GRIDSMART Engineering as the Certificate Authority. Because of this there will be a warning message. This can be ignored. The traffic being transmitted to the Processor is encrypted but the certificate on the Processor cannot be verified. Once a signed certificate is installed you will see the “key” in the upper right-hand corner of the URL pane as shown in the example login screen above.

From the Processor desktop you can also access the GS₂ Device Manager by clicking on the following icon.

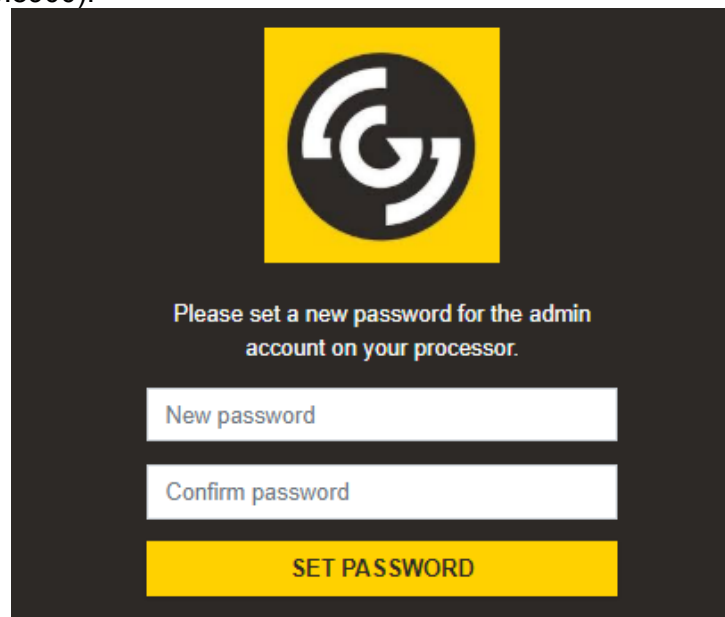


2.1.1 Default Credentials

Starting in Version 19.12, a GS2 Processor that has been factory reset has no default passwords. In order for the device to be functional, a system administrator password must be set by connecting to the laptop port.

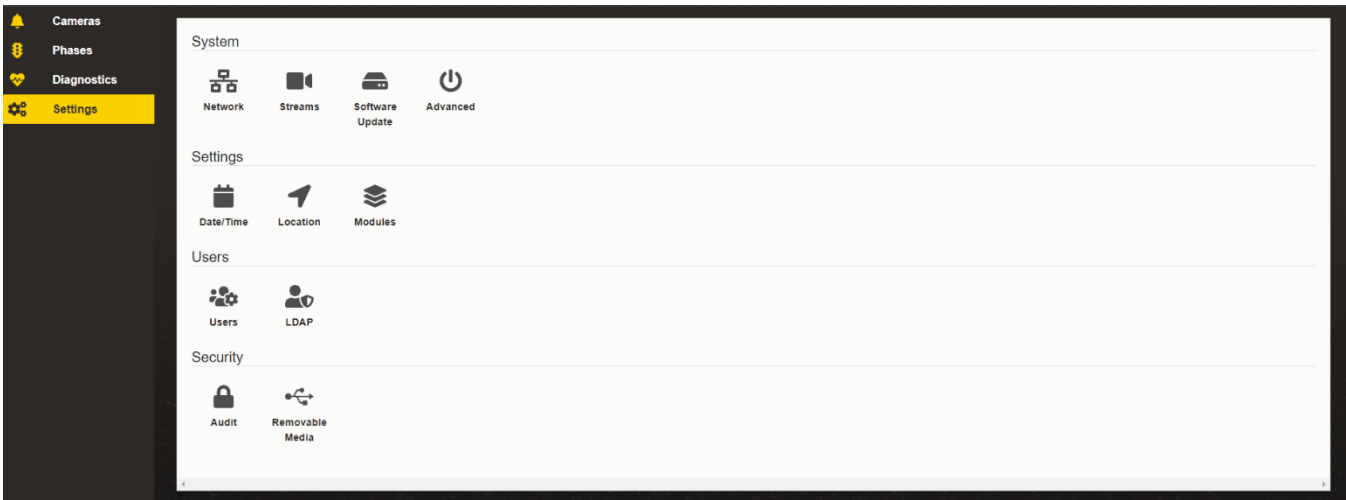
2.1.2 Accessing the GS2 after a Factory Reset

Connect to the laptop port and go to the local address for the GS2 device manager (<https://192.168.150.10:8900>).

The screenshot shows a web interface for setting a password. At the top is the GridSmart logo, which consists of a stylized 'G' inside a circle, set against a yellow square background. Below the logo, the text reads: "Please set a new password for the admin account on your processor." There are two input fields: the first is labeled "New password" and the second is labeled "Confirm password". Both fields are white with a light gray border. Below these fields is a yellow button with the text "SET PASSWORD" in black capital letters.

Choose a new password for the **admin** account and click on **Set Password**. Be sure to remember this password – without it, you will lose access to the GS2! You should be brought to the regular login screen where you will use the **admin** account with the new password you just set. Once this is done, you can add new users and configure your GS2.

2.2 Control Panel



2.3 Network Settings

The GS₂ Processor supports a variety of network configurations including DHCP, static IPV4 addressing, and static routes. The GS₂ Processor does not support IPV6.

All Network settings for the Processor **must be done in the GS₂ Device Manager**. Any changes done outside of the utility are not supported and could lead to unstable Processor operation. This includes connection to devices on the private 192.168.150.0 network as well as any configuration or modification of any camera settings.

By default, the public interface is set to DHCP. In the GS₂ Device Manager, go to 'Network' → 'Network' and deselect 'Use DHCP' to enter a static address. If you select a static address, you must make sure the DNS server is working. Once you have applied changes, you can verify DNS is working by checking the DNS status on the "Advanced Diagnostic Page".

DNS Working
True

Network
Certificates
Client/API
GRIDSMART Cloud
Static Routes
ICMP (Ping)
Reset

☐ Use DHCP

Network Address

Netmask

Gateway

DNS

NTP Server

* NTP server can't be manually set when "Use GRIDSMART Cloud" and "Use Modem" are both selected in GRIDSMART Cloud settings.

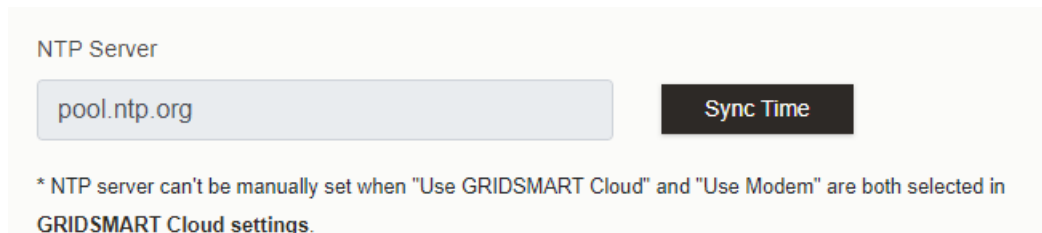
Apply Changes
Cancel

For static addressing, enter an IP address, net mask and DNS address. The gateway is optional. The NTP server can be updated if the modem is not enabled. If the modem is enabled NTP settings will be default to an NTP server reachable on the Private Cellular APN. **Modifying any of these settings outside the GS₂ Device Manager will void your support warranty and could cause the system operation to become unstable.**

2.3.1 Keeping Time

In order to have consistent reporting and audit logs it is essential the GS₂ Processor time be accurate. The preferred way to do this is using NTP. If the modem is configured for use (default setting) the NTP server cannot be updated. (See Section on configuring GRIDSMART Cloud for more details). This is done to make sure a known NTP server is reachable from the modem. The NTP client on the Processor will automatically synchronize time daily but this can be also forced using the “Sync Time” button on the Network tab. The time can be verified on the “Diagnostic” page.

In the GS₂ Device Manager go to ‘Network’ → ‘Network’ and you will find where you can enter an NTP server as a domain or IP address, or request a time sync. Once you have entered your NTP server, select Apply Changes.



NTP Server

pool.ntp.org

Sync Time

* NTP server can't be manually set when "Use GRIDSMART Cloud" and "Use Modem" are both selected in GRIDSMART Cloud settings.

2.4 Client/API Settings

You can change the default port used by the client and the GS₂ Device Manager. If you have site cards in the client, they will default to use the default port number of 8902.



Network Certificates Client/API GRIDSMART Cloud Static Routes ICMP (Ping) Reset

API Port

8902

Port number for connecting to the API

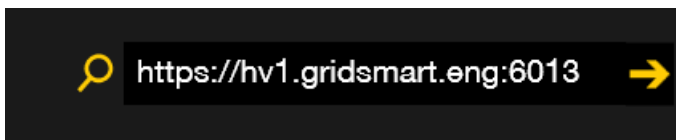
Configuration UI Port

8900

Port number for accessing this configuration utility

Apply Changes Cancel

If you use a different port number, you must specify it by using the search bar in the top right corner using a URL format in the client.



2.5 Importing a signed SSL Certificate

The GS₂ Processor will generate a “GRIDSMART” self-signed certificate during the update. Since the certificate is not signed by a Certificate Authority, it will not be validated by your web browser. If you have a signed certificate you can load it into the Processor, and a warning will not be issued when accessing the GS₂ Device Manager or the GRIDSMART Client software.

In the GRIDSMART Device Manager, go to ‘Network’ → ‘Certificates’ and select ‘Change Certificate’.

The screenshot shows the 'Certificates' tab in the GRIDSMART Device Manager. It displays a self-signed certificate issued by 'GRIDSMART Engineering' in Knoxville, TN, US. The certificate expires on January 11, 2047 (in 27 years) and was issued on August 27, 2019. A yellow 'Change Certificate' button is visible at the bottom left of the certificate details.

You will be brought to a page where you can browse and select the corresponding .crt and .key file to import.

NOTE: The .crt and .key files ARE NOT BACKED as part of the configuration to the GRIDSMART cloud. As a best practice it is recommended not to use a wild card certificate. Each certificate should contain a separate private key. Any certificates loaded are digitally validated before they are applied to the processor.

The screenshot shows the 'Certificates' tab in the GRIDSMART Device Manager. It displays the 'Security Certificates' section with the instruction: 'Upload a certificate/private key pair that will be used to encrypt communications with your GRIDSMART processor'. There are two input fields: 'Certificate' with a 'Choose a .crt file' button and a 'Browse' button, and 'Private Key' with a 'Choose a .key file' button and a 'Browse' button. At the bottom, there are two buttons: 'Use this certificate' (yellow) and 'Go back' (grey).

2.6 Routing Considerations

For the most part the routing setup on the GS₂ processor is straightforward. There are a few caveats to understand and consider before you deploy your system.

When the modem is enabled it is the default gateway (0/0 route) for the processor. The WAN interface will have a 0/0 route but at a higher metric, so the modem is always preferred for outbound traffic. If this is not desired, then the modem can be disabled, or static routes can be used for routes that need to be accessed with the local area network. (See the Case Study Section for a real-life example of how this might work)

Standalone devices with no external connectivity can be setup with modem only access. In this mode, all traffic will be routed to the Cloud except for DNS, and NTP traffic.

In summary:

- The modem is the default gateway with the lowest metric and the preferred outbound connection when enabled.
- The Network LAN interface has a higher metric and will not route default traffic. If the modem is disabled all outbound traffic is routed across the Network LAN.
- DNS and NTP services must be reachable for the unit to function properly.
- Use the Diagnostic tools in the GS₂ Device Manager to ensure they are working.

2.7 Adding Static Routes

For Networks with multiple subnet and routed VLANs, static routes can be used in conjunction with the modem to ensure subnets are reachable from the GS₂ Processor. Setting up static routes should be done by a qualified networking professional who has knowledge of the local network setup.

Network
Certificates
Client/API
GRIDSMART Cloud
Static Routes
ICMP (Ping)
Reset

Static Routes

Network Address	Netmask	Gateway
No static routes configured		

Apply Changes
Cancel
+ Add Route

2.8 GRIDSMART Cloud

As stated earlier, there are two ways to connect to the GRIDSMART Cloud. This includes the LAN Network (preferred method) or the cellular modem. Optionally starting in 19.3 there is an option to disable the GRIDSMART Cloud. While we do not recommend this, if you do not wish to have your processors connect to the GRIDSMART Cloud you should disable it in the GS₂ Device Manager, so no attempts are made to connect. Even if the antenna is not connected, the processor will attempt to connect to the GRIDSMART Cloud unless it is disabled in the GRIDSMART Device Manager.

2.8.1 Using your network to connect to GRIDSMART Cloud

In the GRIDSMART Device Manager, go to 'Network' → 'GRIDSMART Cloud' and select 'Allow GRIDSMART to use my network (disables modem)'

2.8.2 Using the modem to connect to GRIDSMART Cloud

If you wish to use the modem be sure to connect the antenna using best practices described in the installation guide and verify the signal strength on the modem diagnostic page.

Overview Logs Modem	
Modem Type	UBlox
Modem Status	Enabled
Signal Strength	Unknown
Model	MPCH-L200-03S-00
Firmware	15.90
Id	N/A

In the GRIDSMART Device Manager, go to 'Network' → 'GRIDSMART Cloud' and select 'Use modem'. To verify connection to the GRIDSMART Cloud click on "Check Connection" to verify the network is properly configured. If the Connectivity Status shows a green check mark, the processor is connected to GRIDSMART Cloud.



If you do not get a green check mark, check the following:

- Network Settings. Verify the IP address is correct. Use the Diagnostic page to verify the address is set properly.
- Cloud Settings. Verify Cloud is enabled.
- Verify the Modem is working. (if applicable). Check the antenna and signal strength.
- Verify DNS is working. Check the DNS Status on the "DIAGNOSTICS OVERVIEW" page.
- More Advanced Diagnostics can be done on the "ADVANCED DIAGNOSTIC PAGE"

2.9 Restoring to Factory Default Network Settings:

In the GRIDSMART Device Manager, go to 'Network' → Reset and select the appropriate option.



2.10 Checking Cameras

The GRIDSMART Device Manager allows configuration of the processor without any cameras connected. It can also be used to do basic camera troubleshooting without having to use the GRIDSMART Client. This tool is meant only for troubleshooting and only refreshes the camera image every 5 seconds. For slow connections this can be disabled using the yellow toggle button on the bottom right of this screen. To stream video, use the STREAMS function which allow H.264 video to be delivered over a RTSP stream.

If the cameras are not communicating the following will be displayed.

GRIDSMART Serial # GS2 Version 19.12 Cabinet TS2 Location

Cameras

Phases
Diagnostics
Settings

Name: MAC Address: 00:30:53:1a:d9:a1 Camera Type: Fisheye Status: Offline

FRAMES PER SECOND (15 min avg)

04/29/20 08:28:06 am	10.00
04/29/20 08:13:06 am	10.00
04/29/20 07:58:06 am	10.00
04/29/20 07:43:06 am	10.00
04/29/20 07:28:06 am	10.00
04/29/20 07:13:06 am	10.00
04/29/20 06:58:06 am	10.00
04/29/20 06:43:06 am	10.00
04/29/20 06:28:06 am	10.00
04/29/20 06:13:06 am	10.00
04/29/20 05:58:06 am	10.00
04/29/20 05:43:05 am	10.00
04/29/20 05:28:05 am	10.00
04/29/20 05:13:05 am	10.00
04/29/20 04:58:05 am	10.00
04/29/20 04:43:05 am	10.00
04/29/20 04:28:05 am	10.00
04/29/20 04:13:05 am	10.00
04/29/20 03:58:05 am	10.00

Auto-refresh image every 5 seconds?

= FPS < 9 = FPS < 10

2.11 Diagnostics

The GRIDSMART Device Manager provides extensive diagnostic information that can be used to troubleshoot a processor. It also allows the ability to download diagnostics data or send them automatically to the GRIDSMART Cloud.

GRIDSMART Serial # GS2- Version 19.12 Cabinet TS2 Location

admin

Cameras Phases **Diagnostics** Settings

Overview Logs Modem

HostName	GS2-
Serial Number	GS2-
HardwareId	
Version	19.12 (20.04.29)
Up Time	0 Day(s): 0 Hour(s): 3 Min(s): 20 Sec(s)
Current Time	05/06/2020 11:16:05
TimeZone	Central Standard Time
DNS	⚠ Not Working
Cloud	Enabled
HeartBeat Metrics	▼
Modem Type	UBlox
Modem Status	Enabled
Signal Strength	⚠ Unknown
CPU Temp	35C

Refresh Advanced...

2.12 Modules

The GRIDSMART Device Manager allows the ability to sync licenses from the GRIDSMART Cloud or manually load them.






Module	Expires	Activated
PEDESTRIAN	Never	Aug 24, 2018
PERFORMANCE +	Never	Aug 24, 2018
ALERTS	Never	Aug 24, 2018
COUNTS	Never	Aug 24, 2018
REALTIMEDATA	Never	Aug 24, 2018

Upload a new license

Choose a license XML file

2.13 User Management

Users can be added in the GRIDSMART Device Manager. When HTTPS is enabled, users will be granted privileges based on their roles.

Accounts		Device	
Username	Role	Description	
aldis	readonly	default user	 
publish	publish	publish account	 
admin	admin	admin account	
Add New User			

It is highly recommended to change the default passwords and to assign each user an account based on the role they are expected to perform. The “admin” account cannot be deleted from the processor. Starting in 19.10 users will be prompted to change the default passwords.

2.14 Manually setting the clock and Time Zone.

Device Date/Time

May 06, 2020 12:32 pm

Manually Set Date/Time

Device Time Zone

(UTC-06:00) Central Time (US & Canada)

This timezone observes daylight saving time.

Update time zone


Cancel

Need to change the NTP Server? [Edit NTP in Network Settings](#)


2.15 Security Self Audit

As a best practice each GS₂ processor should be hardened as required by your organization. The Self Audit function provides an easy way to ensure you have met best practices. If a deficiency is detected it can be easily corrected by clicking on the recommendation.

Here we see a system that has not enabled HTTPS for the GRIDSMART client software and has VNC and the USB drive scanning enabled.

 Insecure	Setting	Status	Recommendation
	Default admin password changed	✗	Change passwords for default users
	Default publish password changed	✗	Change passwords for default users
	Default aidis password changed	✗	Change passwords for default users
	USB drives disabled	✗	Disable USB drives
	ICMP requests disabled	✓	—
	GRIDSMART captive user disabled	✗	Disable GRIDSMART captive user
	VNC disabled	✓	—
	RDP disabled	✓	—
	L1/L2 Cloud Connection	✓	—
	Using GRIDSMART Cloud	✓	—
	Using HTTPS for client connection	✓	—
	Default certificate changed	✗	Install a signed certificate

After these conditions were corrected the system indicates it has been hardened.

 Secure	Setting	Status	Recommendation
	Default admin password changed	✓	—
	Default publish password changed	✓	—
	Default aidis password changed	✓	—
	USB drives disabled	✓	—
	VNC disabled	✓	—
	L1/L2 Cloud Connection	✓	—
	Using GRIDSMART Cloud	✓	—
	Using HTTPS for client connection	✓	—
	Default certificate changed	✓	—

2.16 Remote Updates

Open a web browser. Go to gridsmart.com/support, click support then select downloads. Find the latest Version of the Update Stick. Once the Update Stick file has been downloaded unzip the file.

To update your Processor over the network, navigate to System Operations in the left-hand Menu. Click browse and find the update file in the folder you have previously unzipped. The file you will be looking for is a bin file located in the Update Stick folder.

Upload a binary file provided by GRIDSMART. Once the file has been uploaded, you will be asked to confirm the update before it is installed.

Update File

Choose file

Browse

Upload Update File

3.0 Other Considerations

3.1 Monitoring the GS₂

By default, the GS₂ will not respond to ICMP echo requests, i.e. ping. Starting in 19.12 ICMP Echo (ping) can be enabled through the Device Manager

3.2 Firewall Ports

The following ports should be reachable within the network for each GS₂ processor:

Inbound Ports

3389 TCP/UDP – Remote Desktop (Can be disabled)

8900 (default) – GS₂ Device Manager Port (Configurable)

8902 (default) – GRIDSMART API Port (Configurable)

9000-9009 – STREAMS Module using RTSP (9009 required for Genetec Support)

Note: ICMP is enabled for Inbound Access if ICMP is enabled in the device manager.

Outbound Ports

TCP 443 – Cloud

UDP 123 – NTP Service

UPD/TCP 53 – DNS

3.3 Accessing Video using STREAMS

GRIDSMART supports RTSP streams from the GRIDSMART cameras using the STREAMS module included in the *Performance+ module*. Any other method used to stream video from the cameras other than using the GRIDSMART client or STREAMS module voids the system warranty and WILL BE DETECTED and Disabled in a future release. Any unsupported Streaming methods will affect video processing and affect the operation of the intersection. Any connection of a device on the private Network other than a laptop used for field configuration violates the system warranty and is not supported.

3.4 GRIDSMART STREAMS Requirements

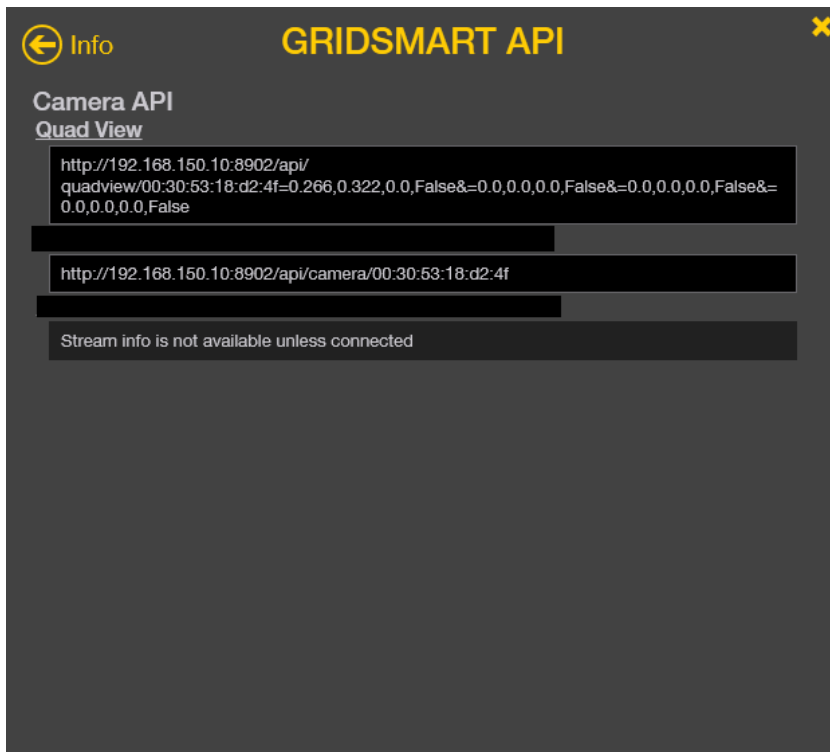
To setup STREAMS you must setup a static IP on the GS₂ processor. As a Best Practice it is recommend to setup a static IP on the processor with a DHCP reservation. See section 2.2 on how to configure a static IP address. Additionally, any client connecting to the video stream must be able to reach the GS₂ Processor on ports 9000-9009.

3.5 RTSP Endpoints

3.5.1 RTSP URLs in GRIDSMART Client

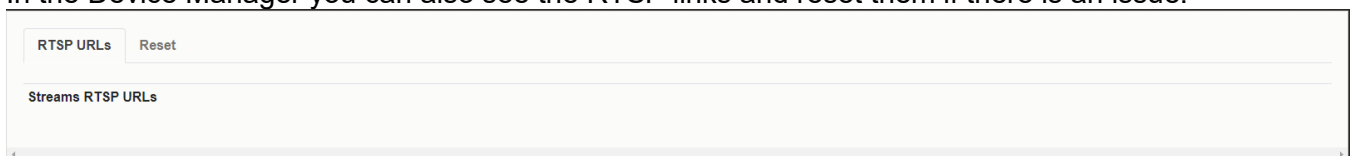
From the site's homepage menu in the GRIDSMART client, click Info. Ensure the Performance+ module is installed. If the Performance+ module is not installed, the RTSP endpoints will NOT be displayed.

Click on **Show GRIDSMART API** to bring up API endpoints. Your screen should look similar to the following screenshot, but the IP address should reflect what you set as your static IP.



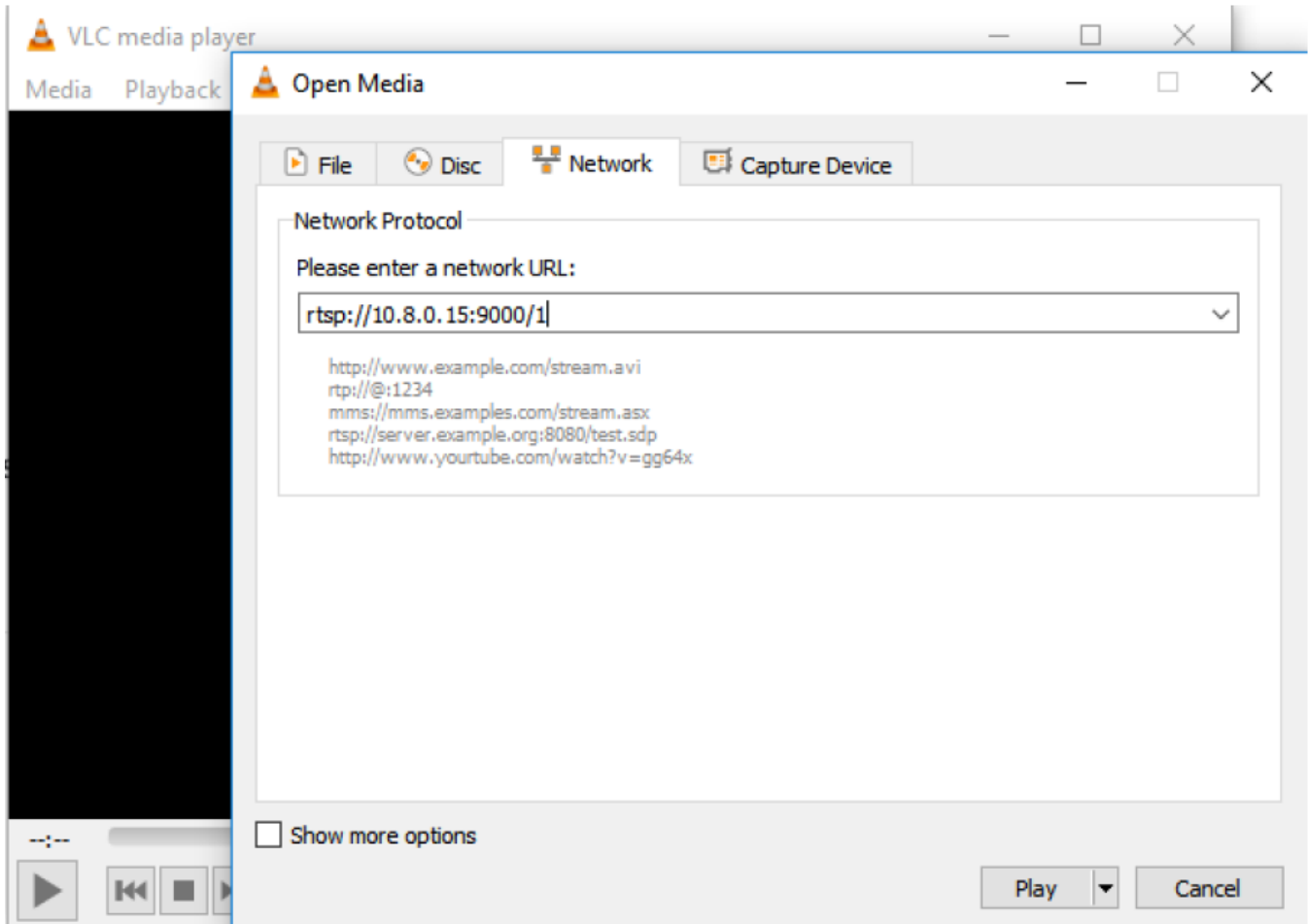
3.5.2 RTSP URLs in Device Manager

In the Device Manager you can also see the RTSP links and reset them if there is an issue.



3.6 Testing STREAMS Using VLC

VLC is a free open-source media player that supports RTSP. Install VLC on a client machine. Open VLC, then select menu Media→Open Network Stream and copy/paste the full Camera Stream URL as the network URL (ex. `rtsp://10.8.0.15:9000/1`).



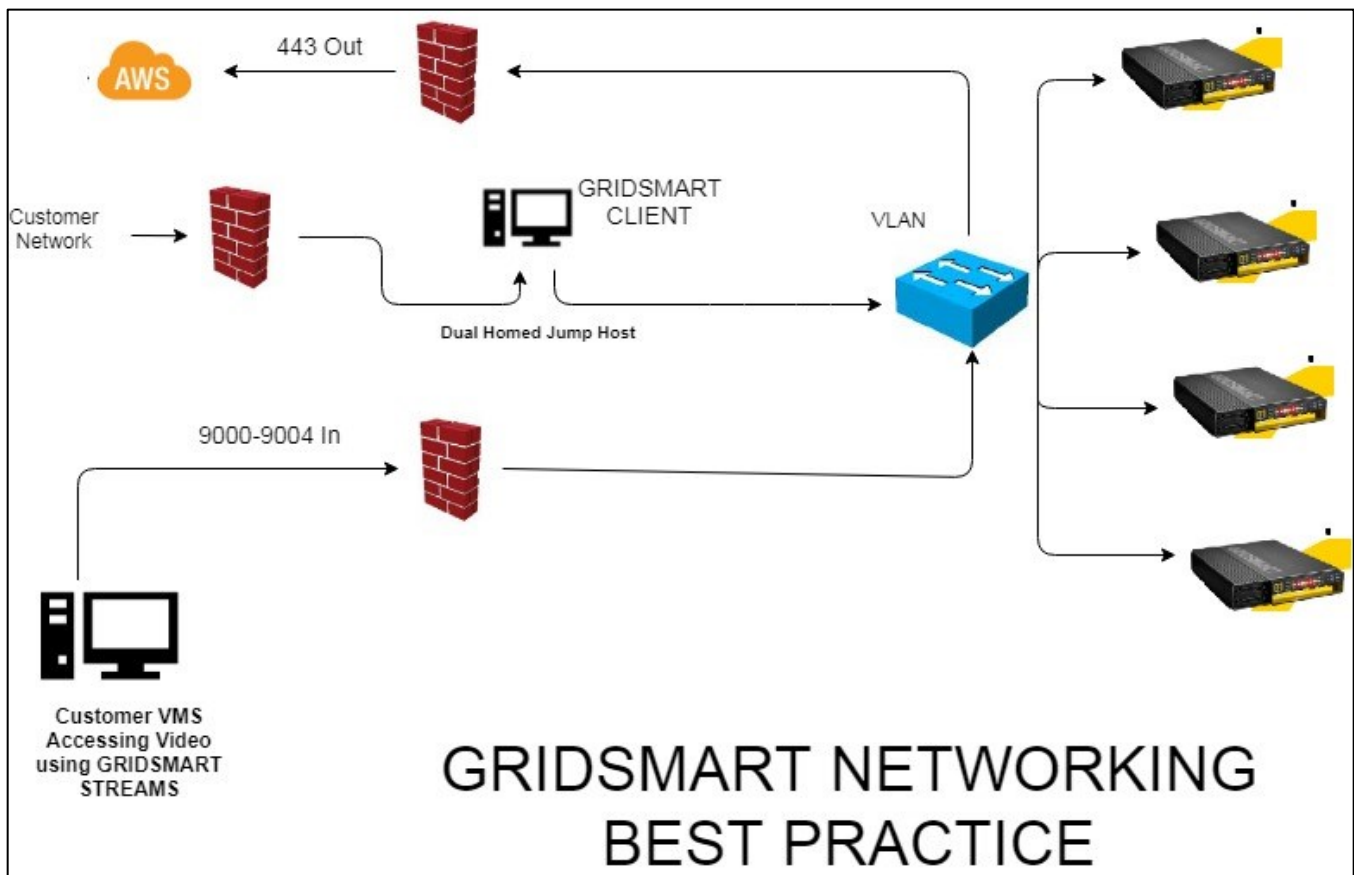
3.7 Private LAN connection (Laptop Port)

It is highly recommended, as a best practice, that any device connected via the Laptop port use IP address 192.168.150.250/32. Avoid using addresses in the ranges of 192.168.150.11 thru 192.168.150.19 and avoid using DHCP when possible. Any laptops connected to the laptop port should be used temporarily for configuration and removed as soon as the intersection is operating properly.

4.0 Network Configurations - Best Practices

As a best practice it is recommended connecting all GS₂ processors on a separate VLAN with a jump host client used to directly access the GS₂ processors. It is not recommended to use the GRIDSMART client for monitoring video. For video streaming and monitoring use the Streams Module.

DO NOT CONNECT a GS₂ Processor directly to the Internet on a public facing IP address.



5.0 Case Study for using Static Routes:

Consider the following example:

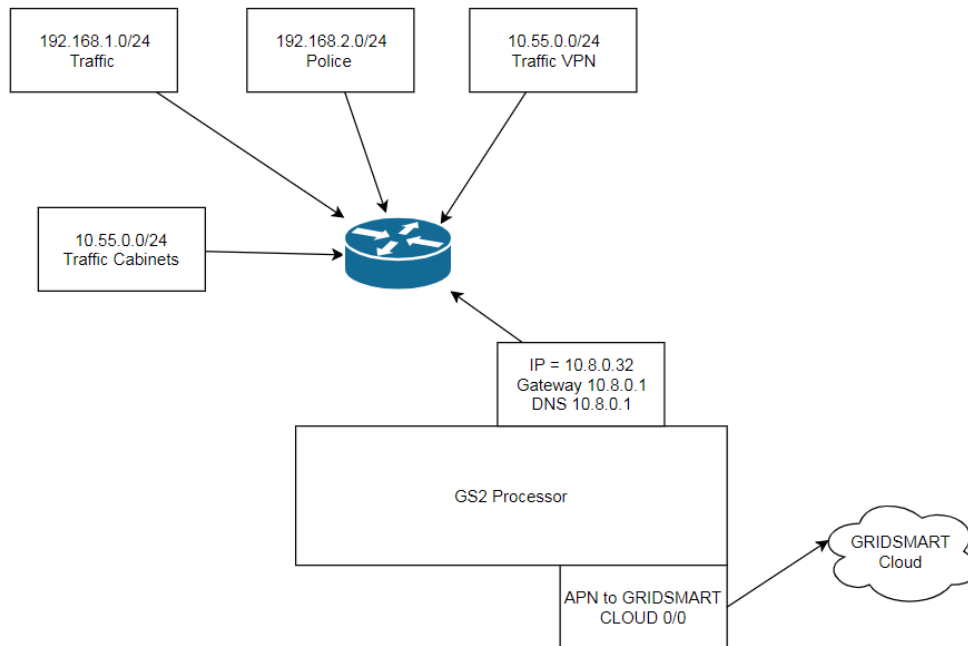
Local Area Network contains the following subnets:

Traffic Department: 192.168.1.0/24

Police Department: 192.168.2.0/24

Traffic VPN: 10.55.0.0/24

Traffic Cabinets: 10.55.0.0/24 (Router Address 10.8.0.1)



The connection to the traffic cabinet is done via 900 MHz radios running at 10Mbps.

The police department wishes to stream video to their operations center. The traffic department would like to upload configuration changes and send alerts using the GRIDSMART cloud. They have decided the modem can be used for cloud communications to save bandwidth instead of using the limited bandwidth of the radio. Additionally, the traffic department wants to access the GS₂ Processor to run reports and to make configuration changes from the local area network using the GRIDSMART Client software.

Since the modem is enabled on the GS₂ and the default route will be the modem, two static routes are needed on the GS₂ processor to allow traffic to the police and traffic department's network.

The Cloud configuration would be set as follows:

Network
Certificates
Client/API
GRIDSMART Cloud
Static Routes
Reset

☒ Use GRIDSMART Cloud

How would you like the GS₂ to connect to the GRIDSMART Cloud?

☐ Allow GRIDSMART to use my network (disables modem)

☒ Use modem

Connectivity

Status: ✔

Check Connection

Apply changes
Cancel changes

The static Routes would be setup as follows:

Network
Certificates
Client/API
GRIDSMART Cloud
Static Routes
Reset

Static Routes

Network Address	Netmask	Gateway		
192.168.2.0	255.255.255.0	10.8.0.1		
192.168.1.0	255.255.255.0	10.8.0.1		
10.55.0.0	255.255.255.0	10.8.0.1		

+ Add Route

Apply Changes
Cancel Changes

With this configuration, cloud traffic will be routed via the modem and all the stakeholders involved will have connectivity to the GS₂ processor.

FAQs

Q: Can antivirus/firewall software be installed on the GS₂ Processor?

A: No. GRIDSMART takes several measures to prevent malware/viruses from installing or running on processors, however it's important to clarify how we handle anti-virus software. Our software repositories are scanned continuously for viruses. All system images are built and provisioned in a sanitized environment on a dedicated private network. However, once a processor is in the field, no active anti-virus scanning is performed. This is because the processor needs to operate in real time to process video at an acceptable rate. Additionally, any storage device (e.g. thumb drives, hard drives) attached to the processor to collect images or install an update should be scanned before connecting to the processor.

Q: Does your system support any patch management software such as SCCM or Blade Logic?

A: No. The GS₂ is an embedded appliance. We cannot guarantee the GS₂ processor will work properly until the patch management software has undergone extensive testing. Patches are automatically included in software updates after they have been thoroughly tested.

Q: Is centralized user management support across multiple GS₂?

A: Yes. The GS₂ can be configured to use Microsoft Active Directory or Open LDAP for user management.

Q: Can Local user accounts be added to the operating system or can the system be part of a Domain?

A: No. The device is an embedded appliance and any system administration or management done on the processor voids the support warranty.

Q: Can I disable Cloud or the Modem on the GS₂ Processor.

A: Yes, using the GRIDSMART Device Manager.

Q: Can I do remote updates?

A: Yes, beginning with 19.3, use the GRIDSMART Device Manager to push updates to a networked GS₂ Processor. **Note, the GS₂ MUST be running 19.3 or later.**

Q: Is ICMP (Ping) enabled on the processor?

A: Starting in 19.12 ping can be enabled on the GS₂ Processor using the GRIDSMART Device Manager.

Q: I'm seeing a "Contact FAE" under Level 1/Level 2 Connection the Security Audit? What does this mean?

A: You may have an unsupported or outdated modem. Contact your FAE for more details. Go to <https://gridsmart.com/support/field-application-engineers/> to find your local FAE.

Q: Can I connect an NVR directly to the Private LAN segment?

A: No. This is not supported and violates the warranty. This could affect operation of the image processing algorithm. This may also not work in future releases of the software.

Q: Does the processor support SNMP?

A: Not at this time but SNMP V3 will be included in a future release.

Q: Can I access the GS₂ processor using the modem?

A: No. The modem is for outbound connections to GRIDSMART Cloud only.

Q: Can I do RTSP streaming without using the STREAMS module?

A: No. This is not supported and violates the warranty. This could affect operation of the image processing algorithm. This may also not work in future releases of the software.

Q: What NVRs do you support with STREAMS?

STREAMS will work with any RTSP Version 2.0 (RFC 7826) compliant software.