GRIDSMART®

USERGUIDE
v23.2.1

23.2.1 Changelog

PREREQUISITES: Gridsmart Processors MUST first be updated to 22.2 or later.

CRITICAL NOTE ABOUT THE UPDATE: This update will take less than 10 minutes to complete. 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.

When the update is complete, it will be indicated in two ways:
- The phase LEDs on the front of the processor will all turn green.
- The Web App displays a progress bar during the update that will show that the update has completed, and the system is rebooting.

NEW: Adds support for FE3 cameras shipped after 7/14/2023.

IMPROVEMENT: Improves bike count accuracy and reduces false alarms due to improperly classifying non-bikes as bikes in box detection zones.

RESOLVED:
- Corrects integration with Genetec Security Center to support the GS3 for viewing camera feeds. For more information see: GRIDSMART GS3 Integration with Genetec Security Center
- A problem where volume totals for multi-day reports did not match the sum of the rows that make up the column.
- A problem where cameras that were not configured and had been disconnected from the GRIDSMART processor for longer than 5 minutes remained visible on the Cameras page of the Web App.
- A problem where an offline camera did not show the yellow “?” and instead showed a black image with activated zones.
- An issue where BIU4 did not appear in the Desktop App Phases & Calls view for TS2 sites.
- An issue where a GS3 in a factory default state showed “Continue to Login” before it was possible to do so. For more information see: GS3 Start Up Process
- A problem where the behavior of the status lights of a GS3 in a factory default state did not match those of a GS2. After powering on either processor, both status LEDs should blink amber until the admin password has been applied.
- A problem where cameras aren't power cycled when a GS3 is restarted.
- An issue where, after a period, the web app became unavailable, and an Apache "Service Unavailable" error page was shown instead.
- A problem on GS3s where logs failed to download when the configured DNS server's IP address is unreachable. Logs will download regardless of the status of the DNS server.

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, bicycles, and pedestrians while recording turning movements, vehicle counts, incidents and classifications. The Gridsmart App lets you manage intersections in real-time. The App 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 App can remotely access your system to view and configure sites, replay recorded video, view calls and phases, generate reports and email alerts. Your Gridsmart system ships with an unlimited number of App licenses, so feel free to install it on any number of computers in your office or traffic operations center.

Configuration changes made with the App 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.

Starting with 21.3, Gridsmart introduced two new options for the Gridsmart System, Gridsmart Protect and Gridsmart High Capacity.

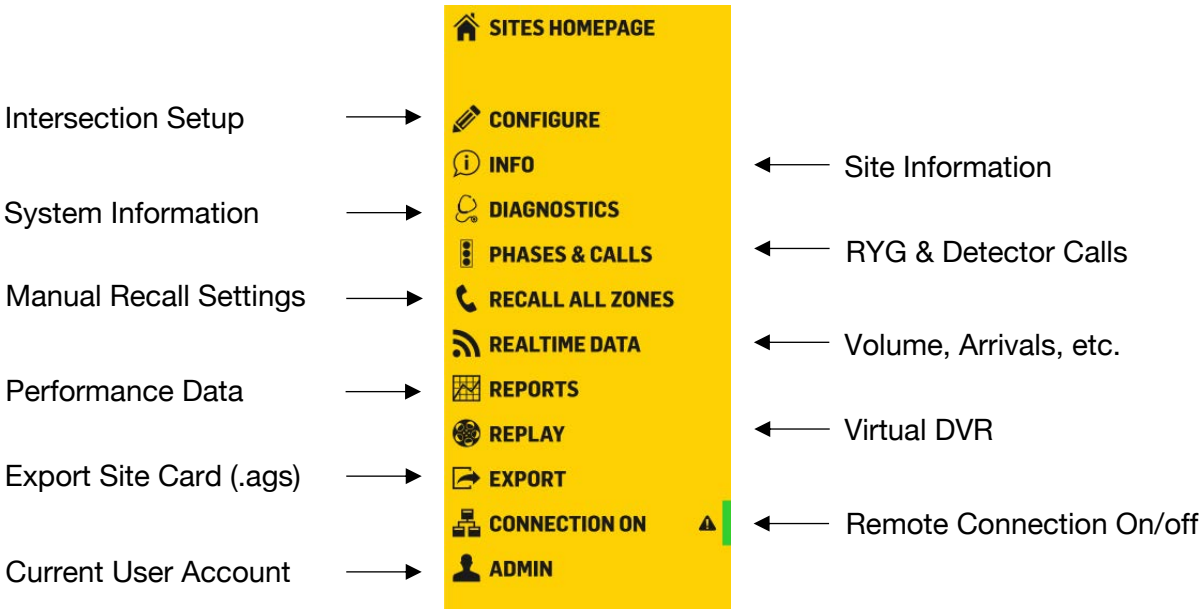
Gridsmart Protect is a software option for the Gridsmart System that keeps vulnerable road users (VRUs) safe by providing touchless pedestrian actuation on the curb and tracking pedestrians and bicyclists as they enter, travel through, and exit the intersection.

Gridsmart High Capacity is a new option to enable the ability to record video directly to the hard drive of the Processor. The high-capacity storage supports on-board video recording and playback via the device manager up to 1.6 TB of video can be stored.

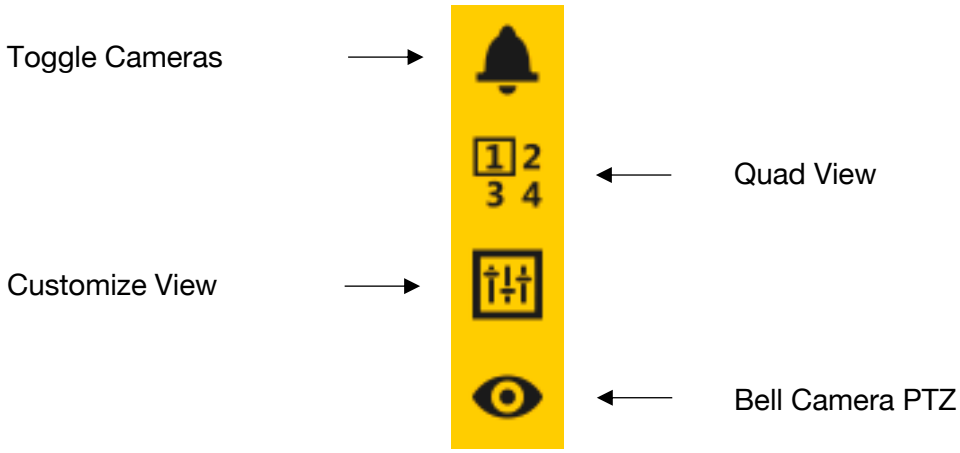
In both cases the user guide will call out features available to each option. You can also find product data sheets on our support site at **https://support.Gridsmart.com**

Quick Reference

Site Menu



View Toolbar



Bell Camera

Gridsmart Processor

Gridsmart App

TABLE OF CONTENTS

23.2 CHANGELOG **2**

WELCOME TO GRIDSMART! **3**

QUICK REFERENCE **5**
1.0 APP INSTALLATION & CONFIGURATION **11**

1.1 DOWNLOAD THE GRIDSMART APP **11**
1.2 INSTALL THE GRIDSMART APP **12**

2.0 GRIDSMART PROCESSOR DEVICE MANAGER **13**

2.0.1 DEFAULT CREDENTIALS 14
2.0.2 ACCESSING THE FACTORY DEFAULT GRIDSMART PROCESSOR 14
2.1 CAMERAS **15**
2.2 PHASE MAPPING **15**
2.3 DIAGNOSTICS **16**
2.4 SETTINGS **17**
2.4.1 NETWORK SETTINGS 17
2.4.2 CERTIFICATES 18
2.4.3 APP/API 19
2.4.4 GRIDSMART CLOUD 20
2.4.5 STATIC ROUTES 21
2.4.6 ENABLING PING 22
2.4.7 SNMP 22
2.4.8 NETWORK RESET 23
2.4.9 STREAMS 23
2.4.10 SOFTWARE UPDATE 25
2.4.11 ADVANCED SETTINGS 25
2.4.12 DATE/TIME SETTINGS 26
2.4.13 LOCATION SETTINGS 26
2.4.14 MODULES 27
2.4.15 USER MANAGEMENT 27
2.4.16 LDAP SETTINGS 28
2.4.17 SECURITY AUDIT 29
2.4.18 REMOVABLE MEDIA 29

3.0 THE GRIDSMART APP **29**

3.1 Site Cards and the Sites Homepage 30
3.2 Site Cards 32
3.3 Site View Modes 33
3.4 Configure a New Site from the Factory Default Setup 34

4.0 SITE CONFIGURATION 37

4.1 Road Masks 37
4.2 Vehicle Zones 38
4.3 Object Masks 42
4.4 Wrong Way Driving Zones 43
4.5 Crosswalk Zones 45
4.6 Pedestrian Wait Zones 46
4.7 The Box 46
4.8 Factory Default and Reset Configuration 48
4.9 Quad View 48
4.10 Phases and Calls 48
4.11 Make or Clear Calls on Operating Zones 49
4.11.1 Recall All Zones 49
4.11.2 Place Calls zone by Zone 49
4.12 Recommission a Factory Default Processor 50

5.0 PUBLISH 51

5.1 Security – Admin, Publish and Read-only 51
5.2 Learning Mode 51
5.3 Make Changes to a Site Configuration 51
5.4 Unpublished Changes 52
5.5 Publish History 52

6.0 REVERT 53
7.0 SITE INFO 54
8.0 MODULES 55

8.1 Gridsmart Data Modules and Features 55
8.2 Description of Alerts 55
8.3 Adding a Module 56

9.0 REPORTS 57

9.1 Downloading PERFORMANCE DATA with the App 57
9.2 Collecting PERFORMANCE DATA with a USB Storage Device 58

9.3 Generating Reports **59**
9.3.1 Report – Turning Movement Counts 61
9.3.2 Report – Vehicle Classification 62
9.3.3 Report – Incidents Report 63
9.3.4 Report – Incidents Excel Output 63
9.3.5 Report – Volume 64
9.3.6 Report – Green/Red Occupancy 65
9.3.7 Report – Percent Arrivals On Green/Red 65
9.3.8 Report – Speed 66
9.3.9 Report – Raw Data Export 66
9.3.10 Report - UTDF Turning Movement export 67
9.3.11 Report – Pedestrian Crosswalk Counts 68
9.3.12 Bicycle Turning Movement 69
9.4 Auto Reports **70**

10.0 ALERTS **70**
11.0 REPLAY **72**

11.1 Record and Review Images and/or Performance Data **73**

12.0 GRIDSMART API **74**
13.0 STREAMING H.264 STREAMS VIA RTSP **74**

13.1 Gridsmart STREAMS Requirements **75**
13.1.1 RTSP URLS in Gridsmart App **75**
13.1.2 RTSP URLS in Device Manager 76
13.1.3 Testing STREAMS Using VLC 76

14.0 SUPPORT **77**

14.1 Send a Site to Gridsmart Support for Review or Assistance **78**
14.2 External hard Drive **78**
14.3 Import and Use a Modified Site **78**
14.4 Remote Connection **79**
14.5 Upgrade a Gridsmart Processor with an Update Stick **79**
14.6 Diagnostics **80**
14.6.1 Diagnostics through the Gridsmart App 80
14.6.2 Device manager Diagnostics 80
14.7 Replace a Camera **81**
14.8 Uninstall or Repair the Gridsmart App **81**
14.9 Remote Support **81**
14.10 Methods of Contact **82**

APPENDIX A -GRIDSMART PROCESSOR NETWORKING AND SECURITY 83

INTRODUCTION 83
1.0 MODES OF OPERATION 83
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 PROCESSOR WITH SOFTWARE RELEASE 19.3 OR HIGHER CONTAINS A FEATURE RICH SET OF SECURITY FEATURES INCLUDING: 84
2.0 OTHER CONSIDERATIONS 85
2.1 MONITORING THE GRIDSMART PROCESSOR 85
2.2 FIREWALL PORTS 85
2.3 PRIVATE LAN CONNECTION (LAPTOP PORT) 85
3.0 NETWORK CONFIGURATIONS - BEST PRACTICES 86
4.0 CASE STUDY FOR USING STATIC ROUTES: 87

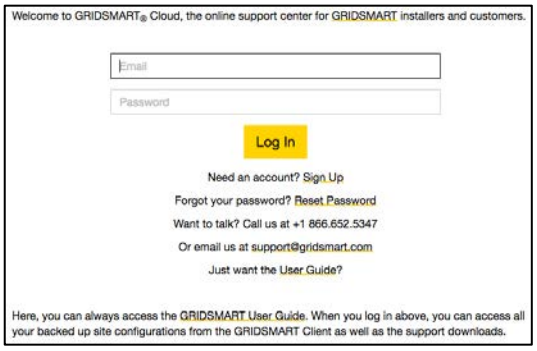
FAQS 89

1.0 App Installation & Configuration

1.1 Download the Gridsmart App

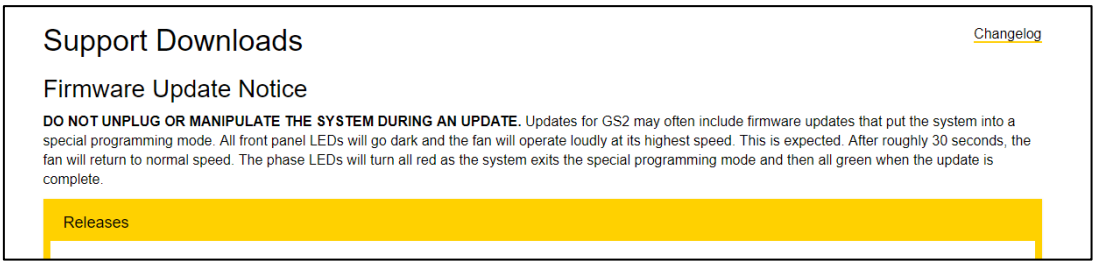
Download the latest version of the Gridsmart App from Gridsmart Cloud.

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. Once signed in, click the Support dropdown, then click Downloads.

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

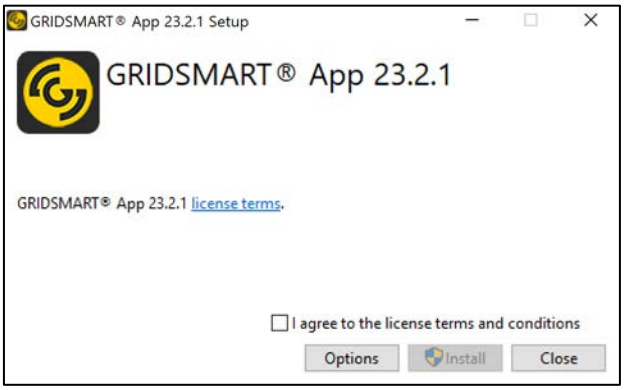


1.2 Install the Gridsmart App

Stay connected to the Internet while you install the Gridsmart App on your laptop or desktop computer.

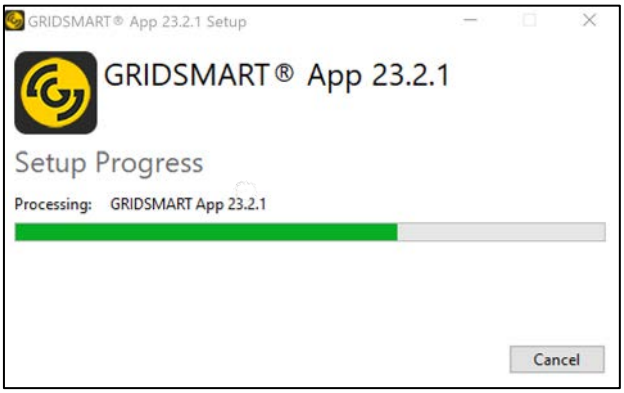
Double-click the Setup Program or MSI Installer to open the Gridsmart App Setup.

Accept the Terms and Conditions, then click Install.



The setup program creates shortcuts to the Gridsmart App on your Start Menu and Desktop.

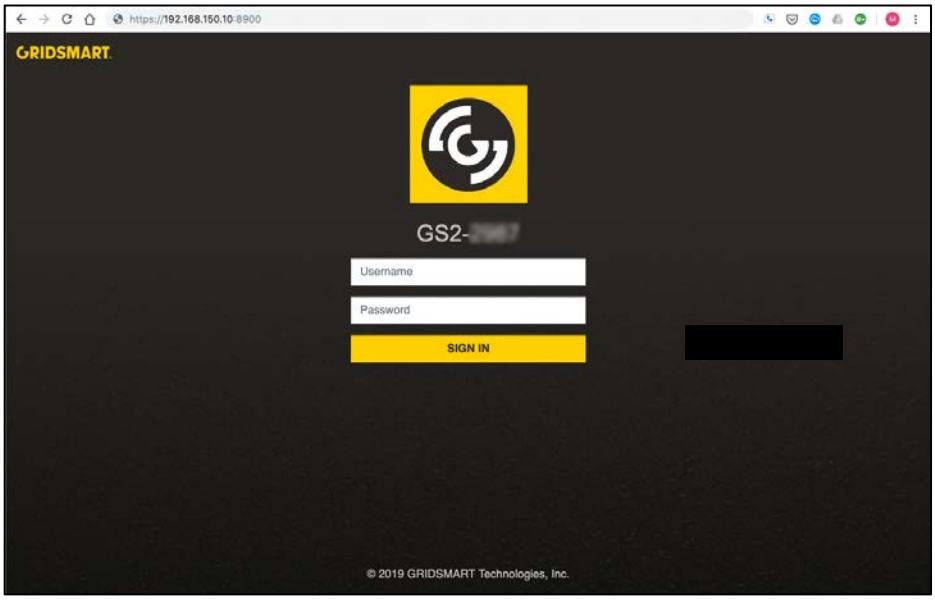
A progress bar indicates the setup status.



A system restart may be required to complete the installation.

2.0 Gridsmart Processor 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 App. Also, through this interface, you can configure network/security settings, date/time, and location without requiring a connected camera.
The Gridsmart device manager performs best with the Chrome web browser over your network or connected directly to the processor laptop port, Microsoft Edge is not recommended. Use https://192.168.150.10:8900 while connected to the laptop port or https://[ip address of Processor]:[port]. There is also a link on the Processor desktop if you are connected via RDP.



The Gridsmart Processor 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 in the browser. Gridsmart recommends users install a signed SSL certificate from a reputable certificate authority. 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."

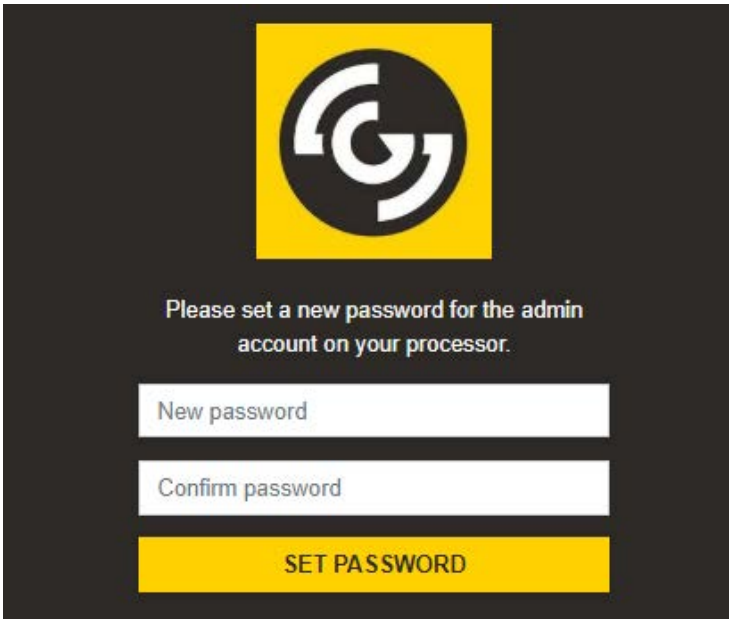
2.0.1 Default Credentials

A Gridsmart 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. Once the password is created, you can start configuration of your Processor.

Note. Only the laptop port is active in a Factory Default state.

2.0.2 Accessing the Factory Default Gridsmart Processor

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

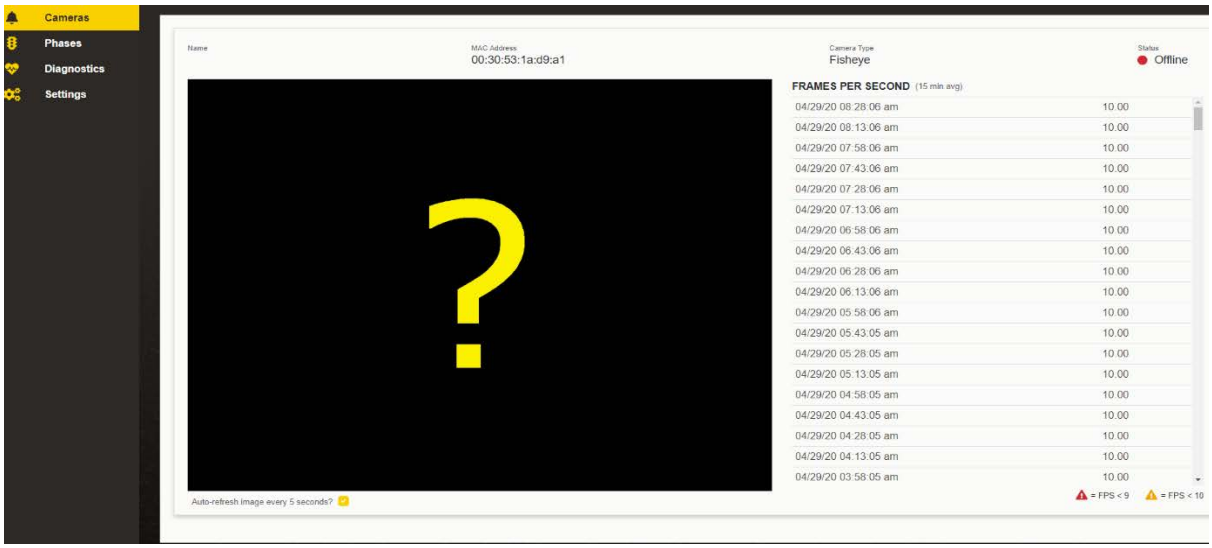


Choose a new password for the **admin** account and click on **Set Password.** Be sure to remember this password – without it, you will lose access to the Gridsmart Processor!

After setting the admin password, the software will restart, and the login screen will be displayed. With the username “admin” and the new password, you can log into the system. Once this is done, you can add new users and configure your Gridsmart Processor.

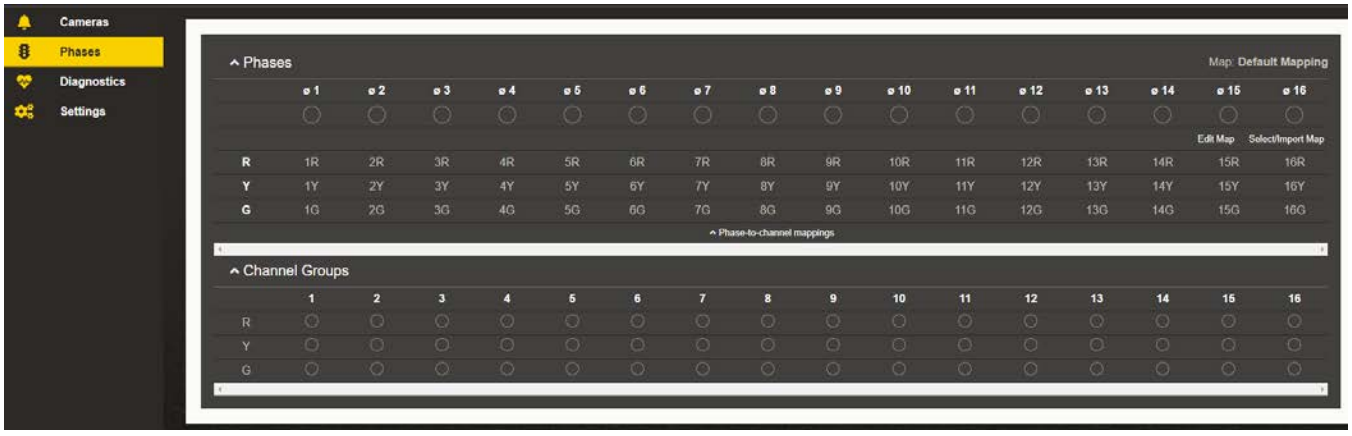
2.1 Cameras

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 App. 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.
If the cameras are not communicating the following will be displayed.
****Advanced Cameras will not function with Gridsmart Protect.**



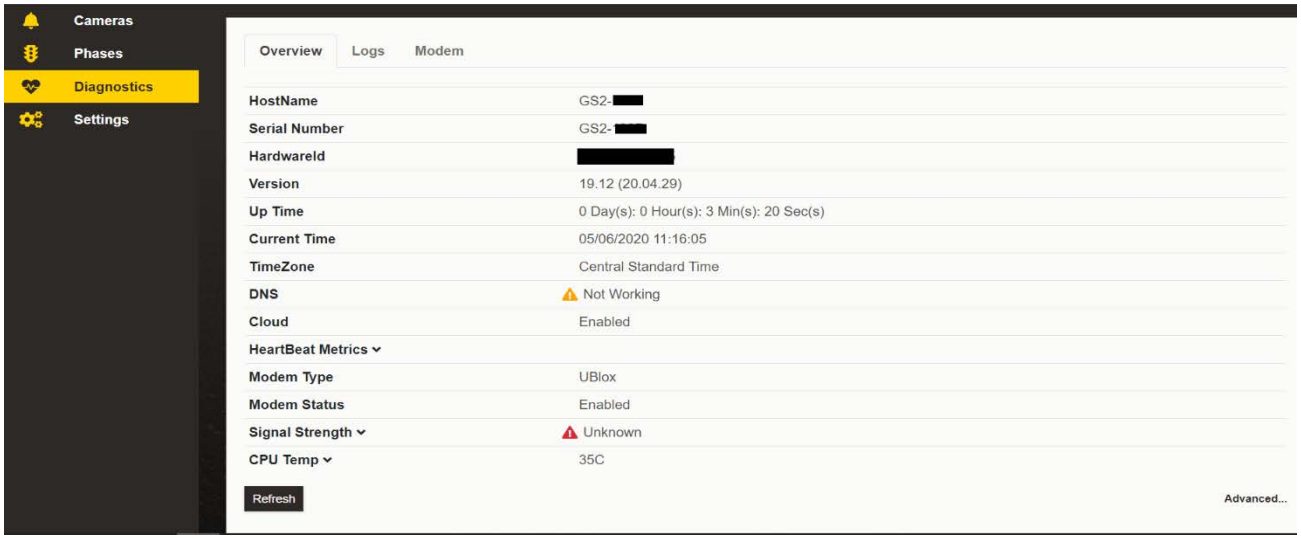
2.2 Phase Mapping

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 App. 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 App when the processor uses mapped FYAs.

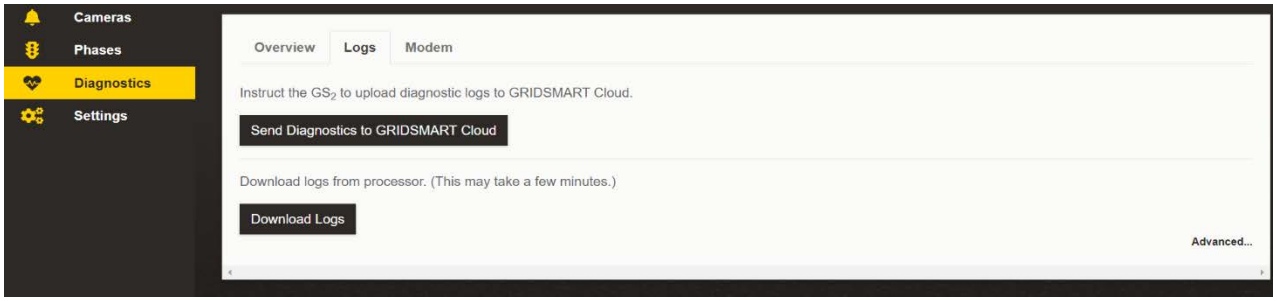


2.3 Diagnostics

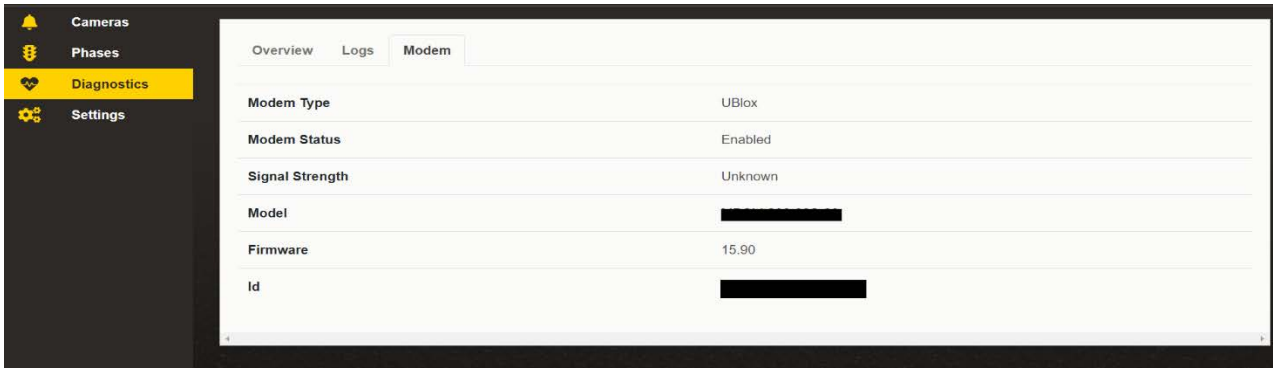
The Diagnostics page will give you an overview of system functionality, the ability to download logs or send logs to the Gridsmart Cloud, view modem status, and advanced network information.



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



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



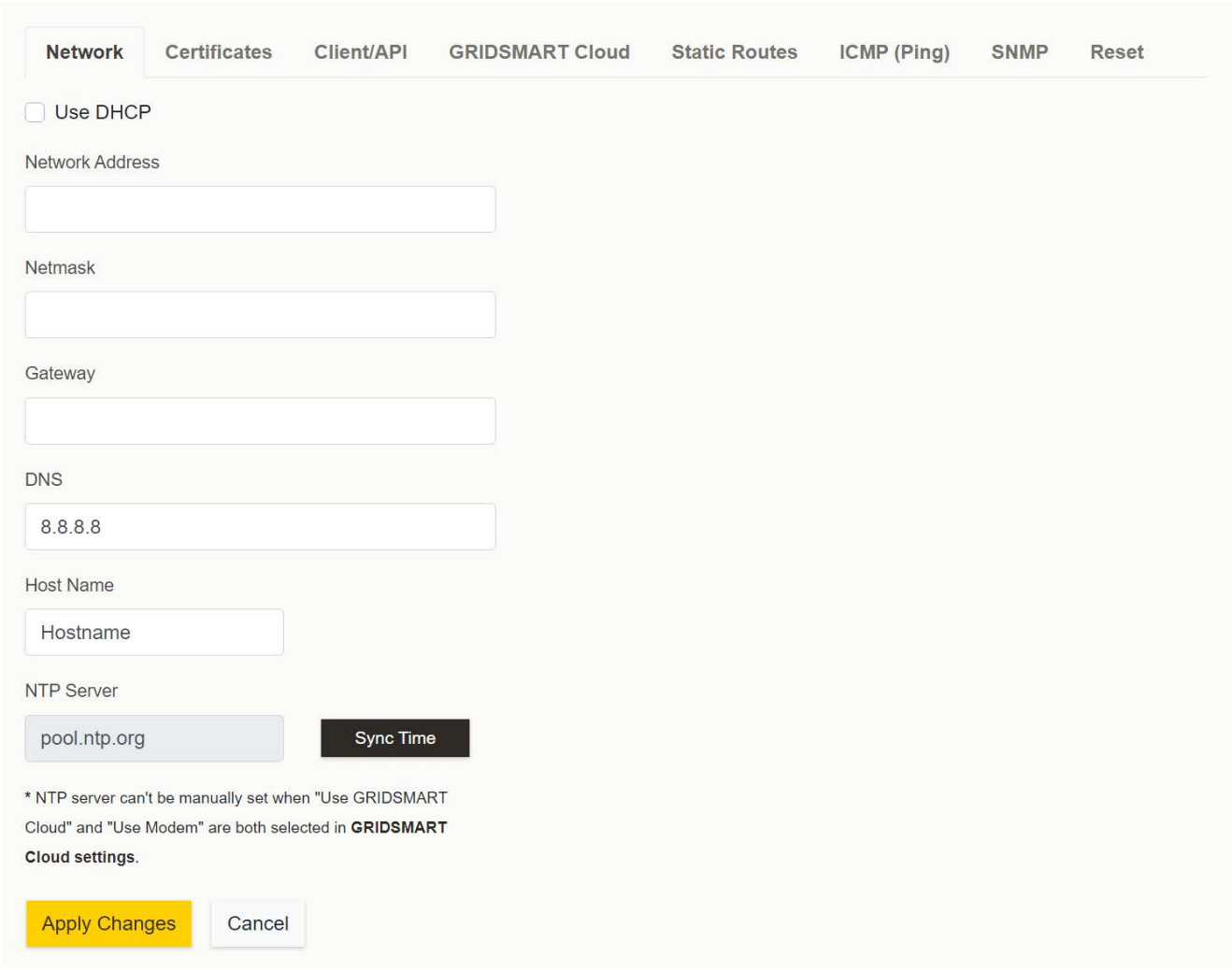
2.4 Settings

2.4.1 Network Settings

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

All Network settings for the Processor **must be done in the 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 Device Manager, navigate to 'Network' → 'Network' and deselect 'Use DHCP' to enter a static address. If you select a static address and want to use Gridsmart Cloud, 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".



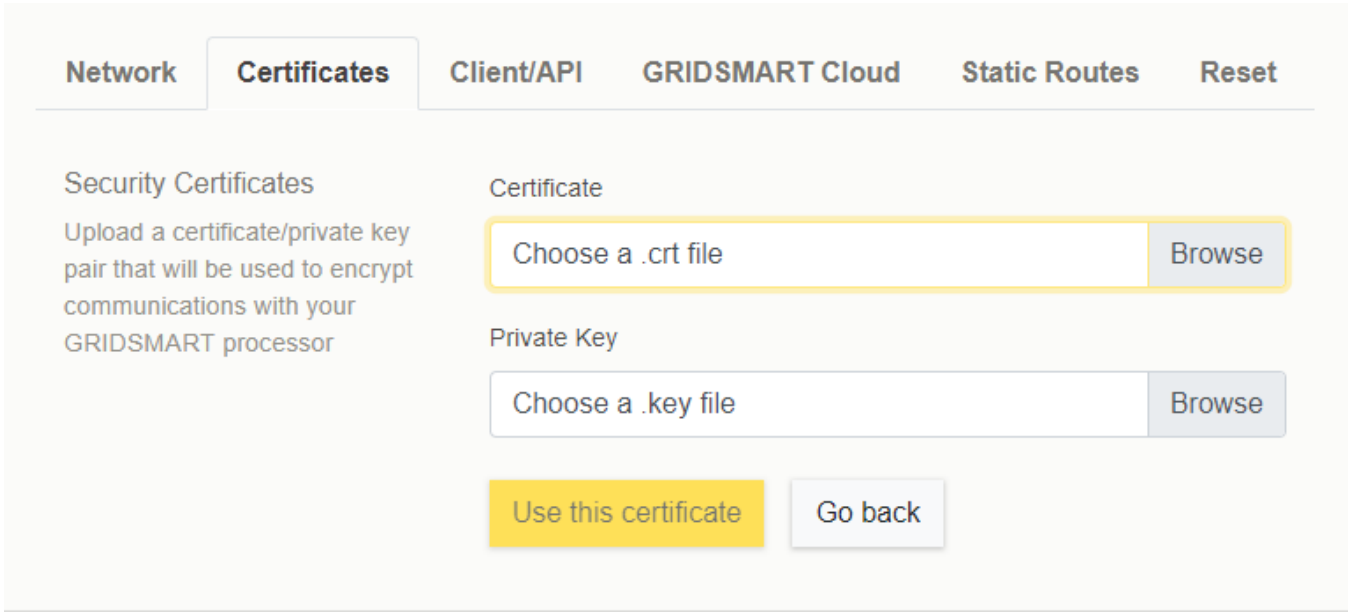
2.4.2 Certificates

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

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

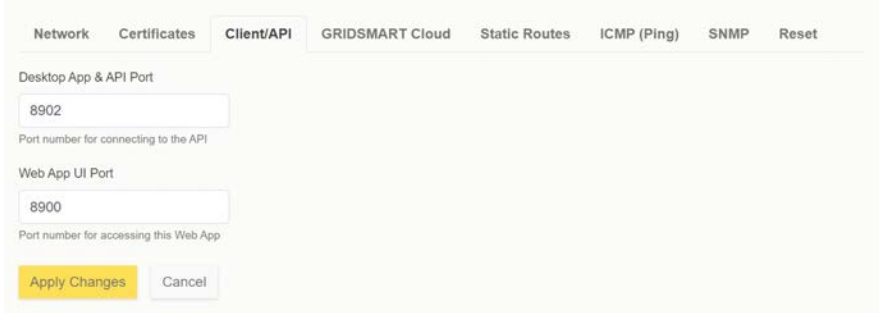
Gridsmart recommends users install a signed SSL certificate from a reputable certificate authority.

NOTE: Ensure .crt and .key files are backed up, as they are not saved within configuration (AGS) being uploaded to Gridsmart Cloud. Do not use a wild card certificate. Each certificate should contain a unique private key file. Any certificates loaded are digitally validated before they are applied to the Processor.



2.4.3 App/API

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



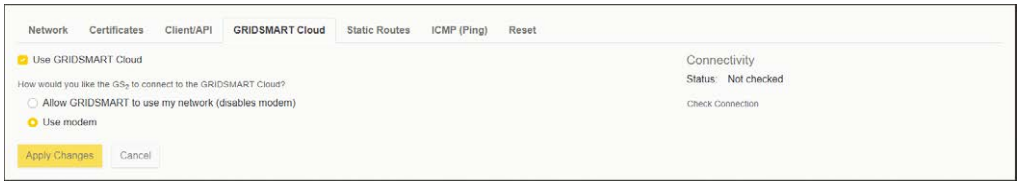
If you use a different port number, you must specify it by using the search bar in the top right corner using a URL format in the App.

2.4.4 Gridsmart Cloud

There are two ways to connect to the Gridsmart Cloud. This includes the LAN Network (preferred method) or the cellular modem. Optionally 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 Gridsmart Processor 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.

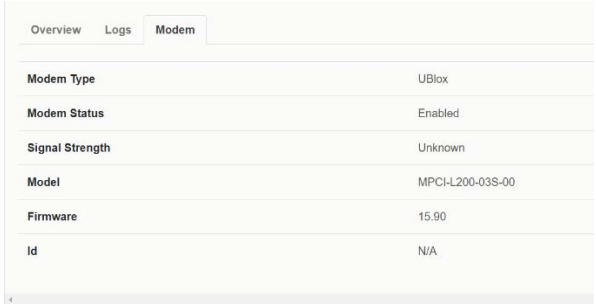
2.4.4.1 Using your network to connect to Gridsmart Cloud

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



2.4.4.2 Using the modem to connect to Gridsmart Cloud

The Connectivity License must be installed to connect via the internal 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.



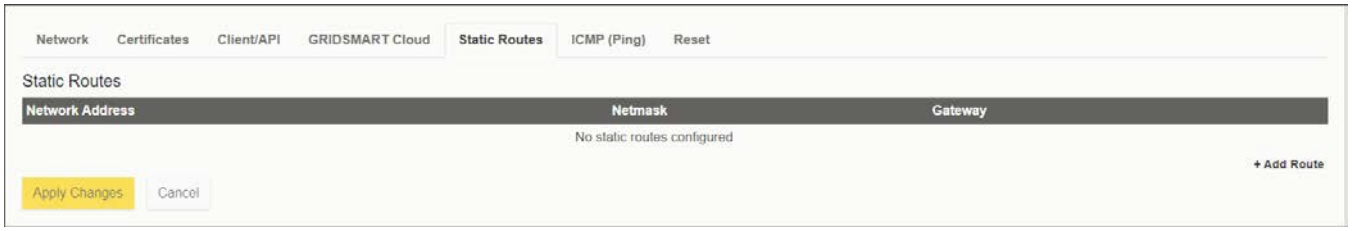
In the Gridsmart Device Manager, go to 'Network' → 'GRISDMART Cloud' and select 'Use modem'. To verify connection to the Gridsmart Cloud click on "Check Connection" to verify the network is properly configured. If the Connectivity Status shows a green check mark, the processor is connected to Gridsmart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

2.4.5 Static Routes

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



2.4.5.1 Routing Considerations

For the most part the routing setup on the Gridsmart 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)

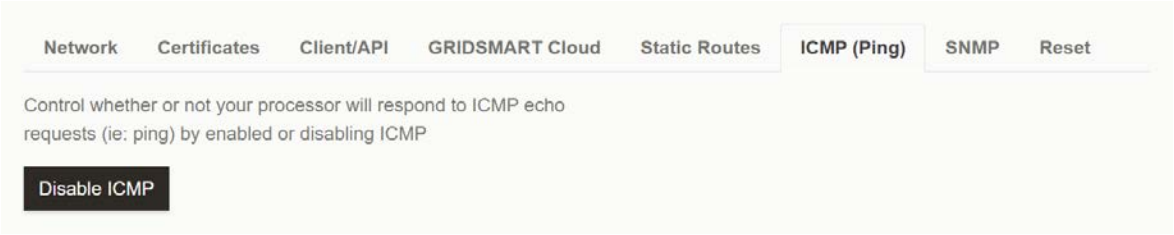
Standalone devices with no external connectivity can be setup with modem only access. In this mode, all traffic will be routed to the Cloud except for DNS, and NTP traffic.

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 Gridsmart Processor Device Manager to ensure they are working.

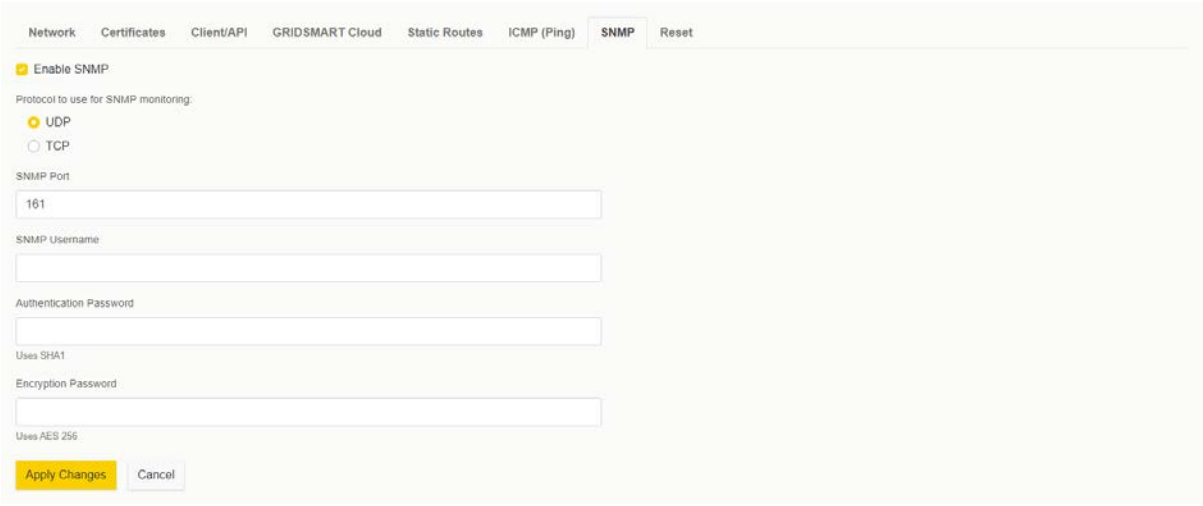
2.4.6 Enabling Ping

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



2.4.7 SNMP

Beginning with version 20.10, SNMPv3 may be used to monitor devices and can provide information such as device name and uptime data.



Username – The username used to connect to the SNMP agent running on the PROCESSOR
Authentication Password – Password used to verify the user's identity
Encryption Password – Password used to encrypt traffic over SNMP

2.4.8 Network Reset

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

Reset Network Configuration:
Erases user defined network settings and sets the network to DHCP.

Reset App/API Settings:

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

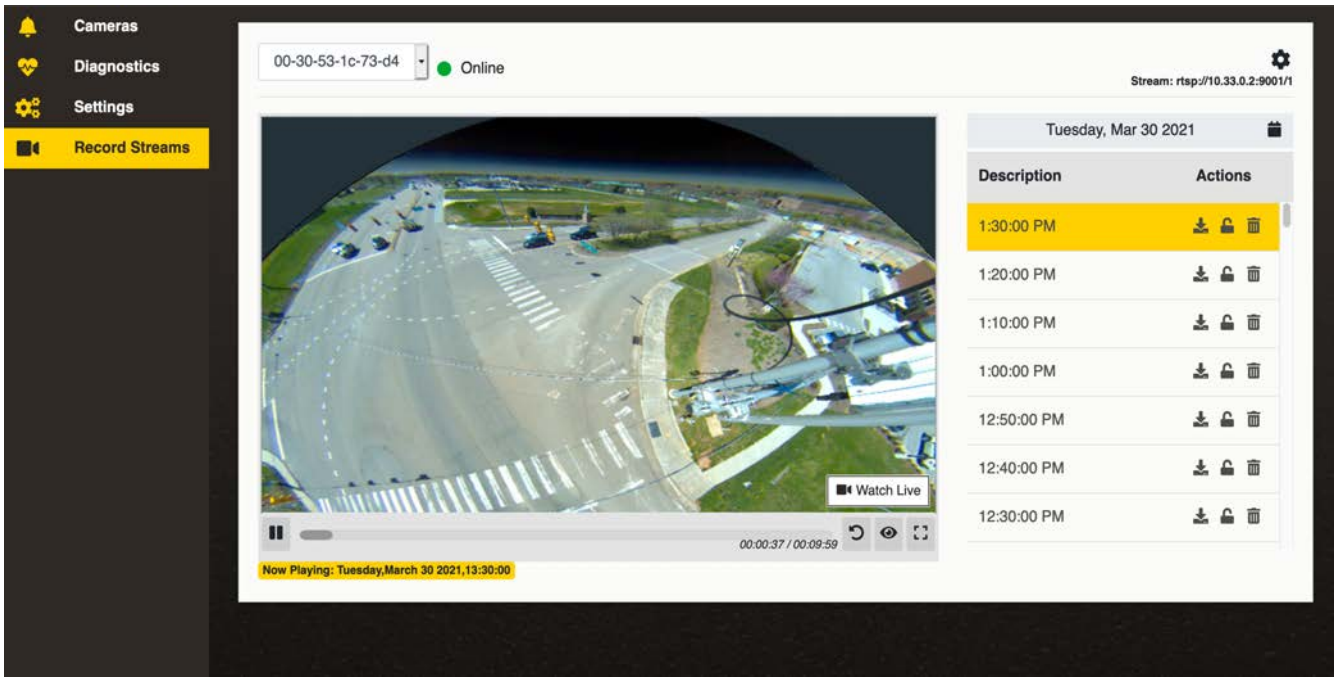
2.4.9 Streams

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

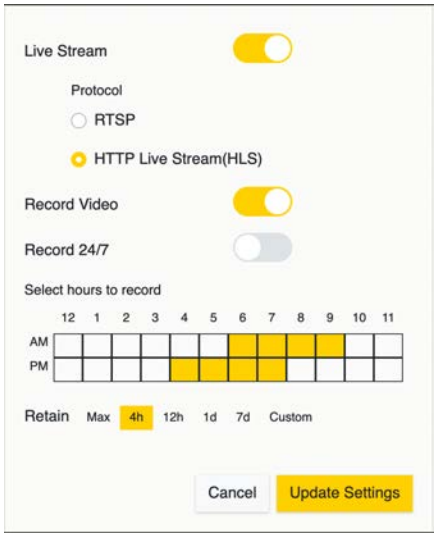
2.4.9.1 Streams Reset

2.4.9.2 Recording Streams

This functionality is available with the Gridsmart High Capacity option. This enables you to record up to 1.6 TB of video to the internal hard drive of the Gridsmart Processor.



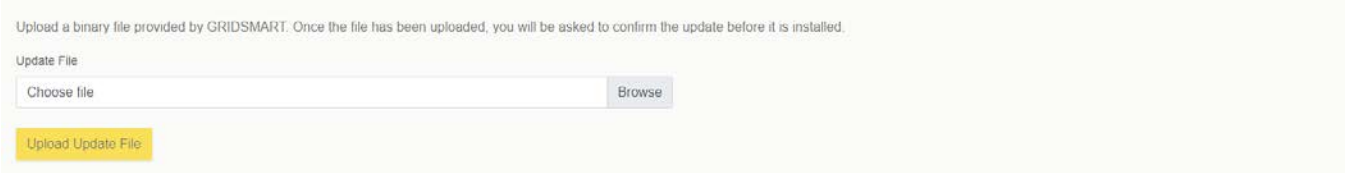
Record Streams controls



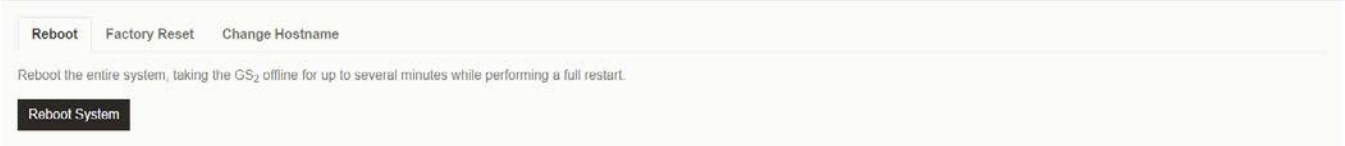
2.4.10 Software Update

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.

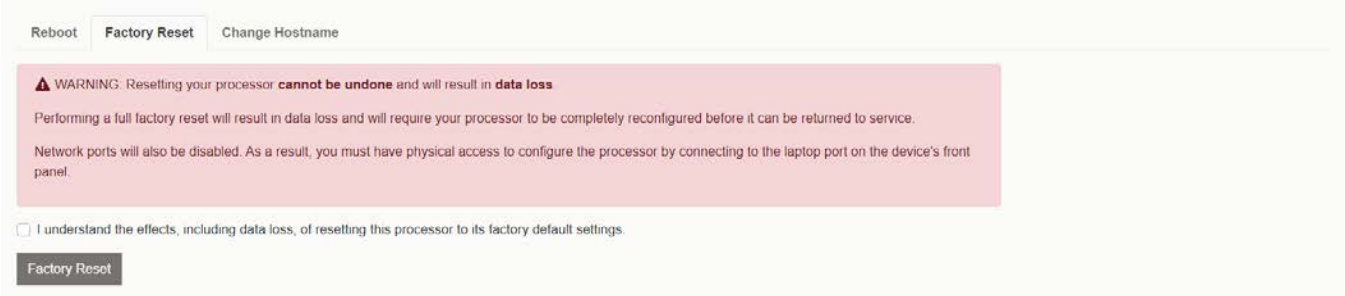
To update your Processor over the network, navigate to System Operations in the left-hand Menu. Click browse and find the update file in the folder you have previously unzipped. The file you will be looking for is a bin file located in the Update Stick folder.



2.4.11 Advanced Settings



2.4.11.1 Factory Reset



2.4.11.2 Factory Reset

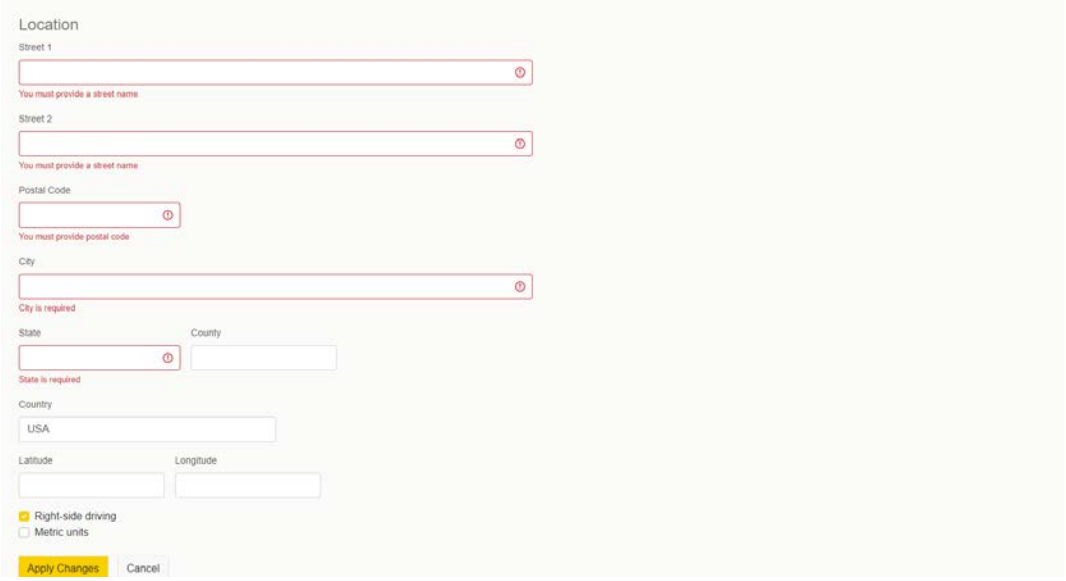
Here you can change the host name of the Gridsmart Processor to allow for various network needs

2.4.12 Date/Time settings

To have consistent reporting and audit logs it is essential the Gridsmart 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 App 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 Gridsmart 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.

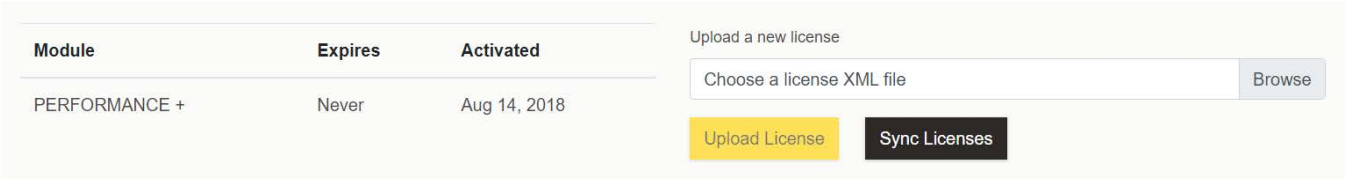
2.4.13 Location Settings

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



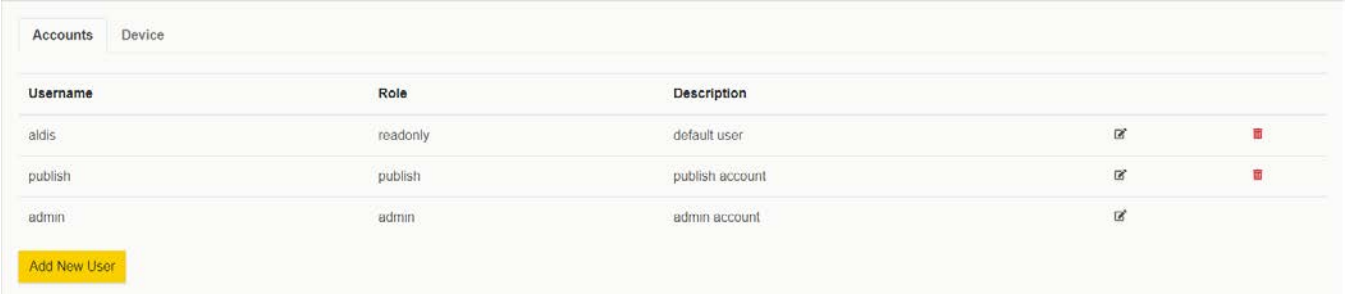
2.4.14 Modules

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



2.4.15 User Management

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



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.

2.4.15.1 Device Access settings

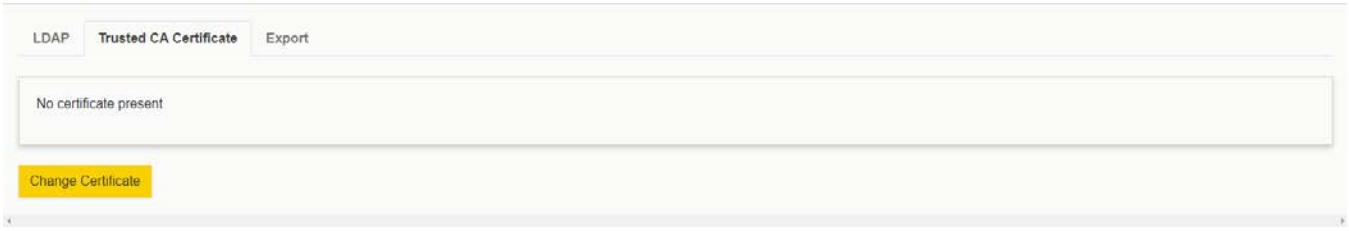
This will be used to activate the local user account on the Gridsmart Processor as well as RDP access

2.4.16 LDAP Settings

This allows configuration of LDAP for the Gridsmart Processor.

2.4.16.1 Trusted CA Certificate

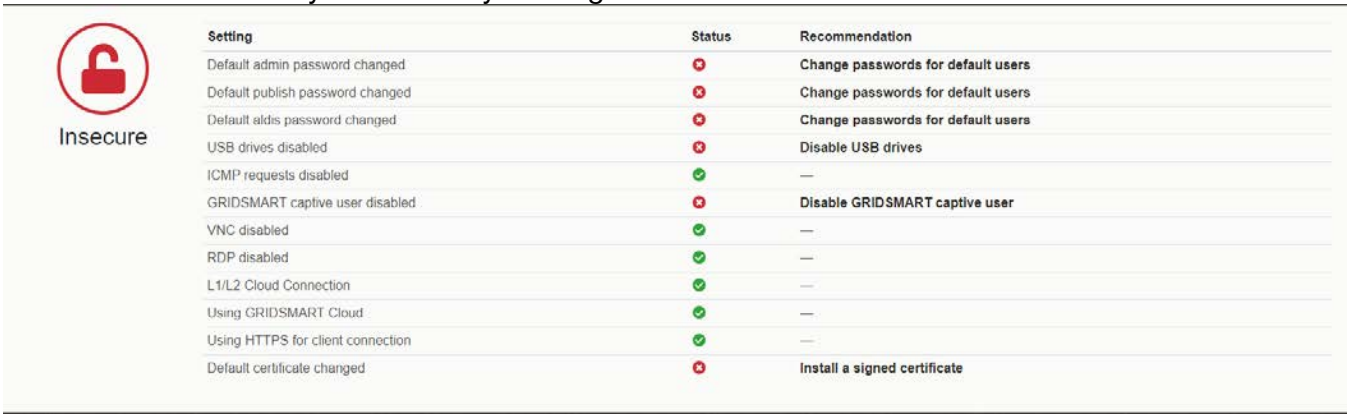
This will be used to import the CA Certificate.



2.4.16.2 LDAP Settings Export

2.4.17 Security Audit

As a best practice, each Gridsmart 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.



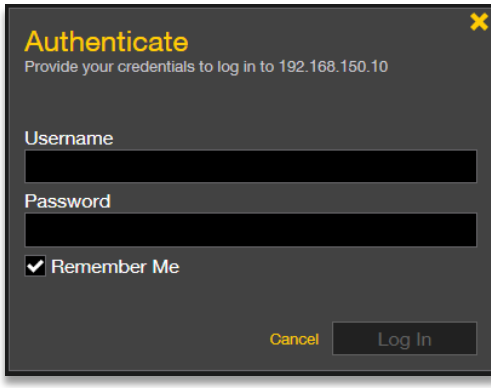
2.4.18 Removable Media

This allows you to enable or disable the USB ports on the Gridsmart Processor

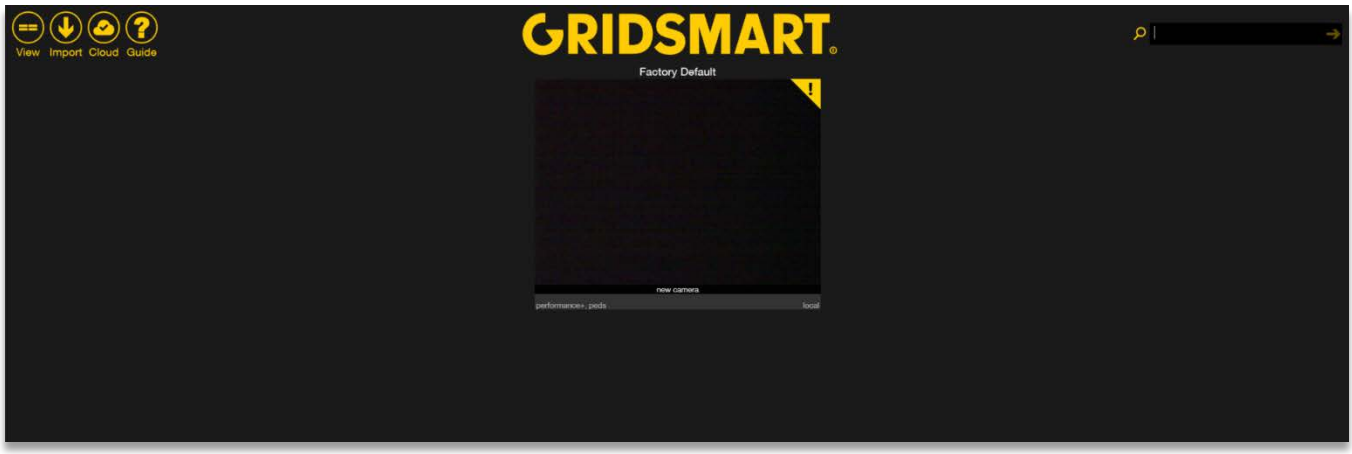
3.0 The Gridsmart App

When you first open the Gridsmart App you may be asked to authenticate to any system that can communicate to the App, whether that be over your network or via direct connection to the Laptop port.

Enter the appropriate user and password combination that was created in the device manager. Refer to section 2.4.15 for User Management information.



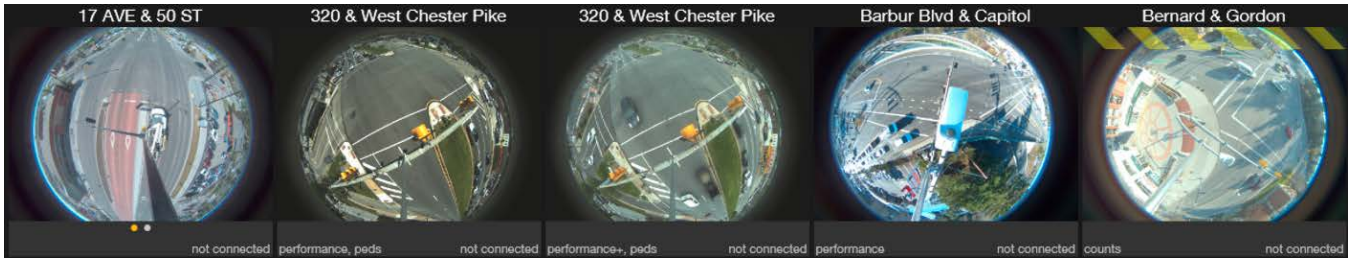
3.1 Site Cards and the Sites Homepage



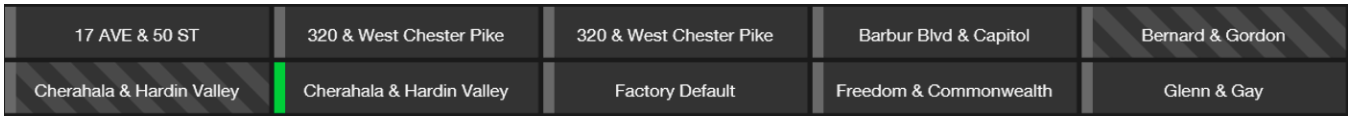
The Sites Homepage appears after you launch the Gridsmart App. A Site Card represents an individual intersection, and the Sites Homepage displays a Site Card for each of your known sites. Additional Site Cards appear on the Homepage after you connect or import new sites.

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

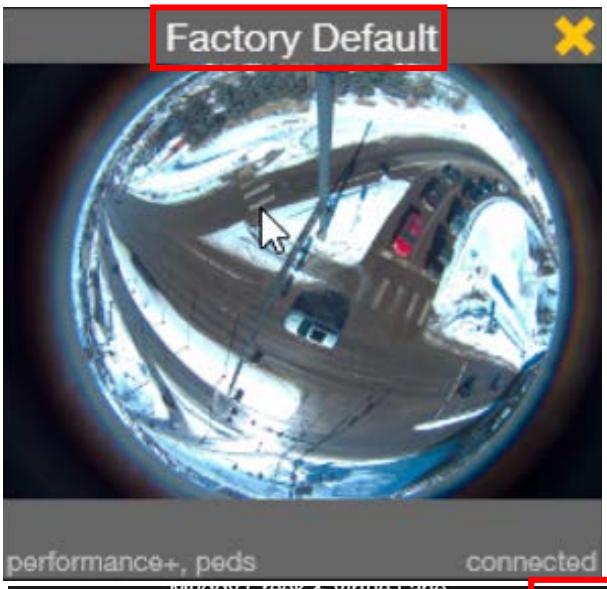


Detail View

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

Gridsmart App logs may be collected by clicking “Gridsmart” in the App. 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

3.2 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 App previously connected to the site and the IP address of the corresponding Gridsmart Processor has not changed.

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.

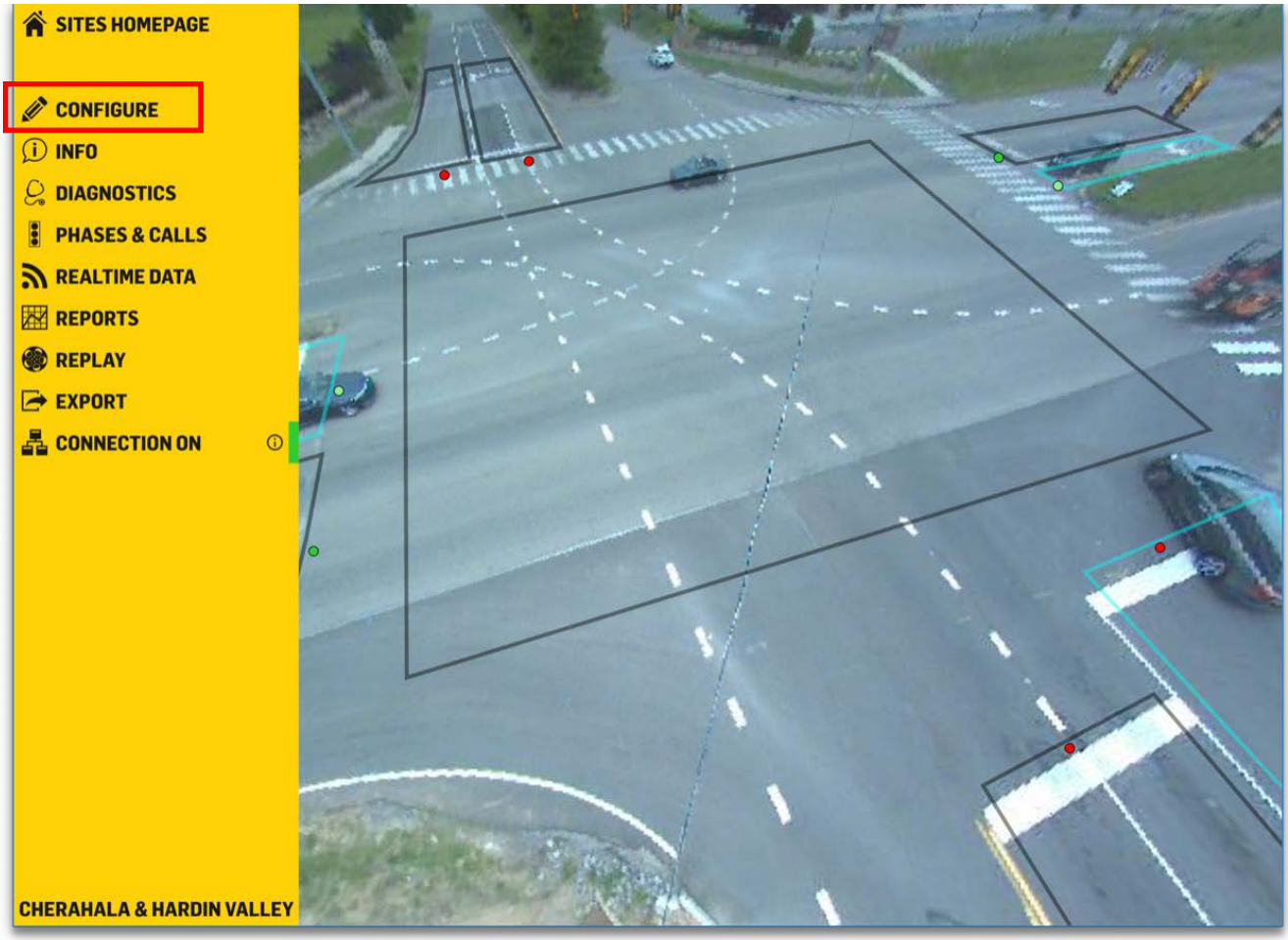
3.3 Site View Modes

Fisheye

Flattened

3.4 Configure a New Site from the Factory Default Setup

Launch the App 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.



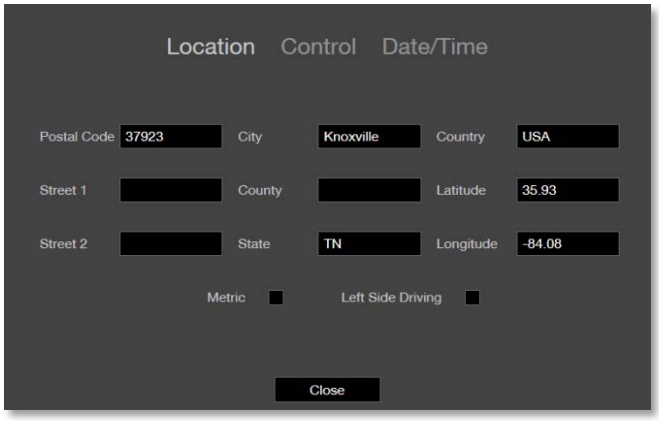
Click the Configure pencil on the Site Menu to start the setup wizard.

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 Gridsmart Processor via the Gridsmart Device Manager.

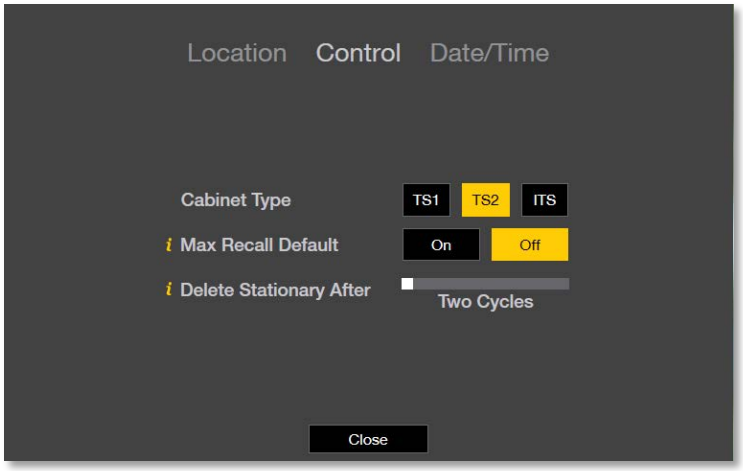
Location

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.



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.

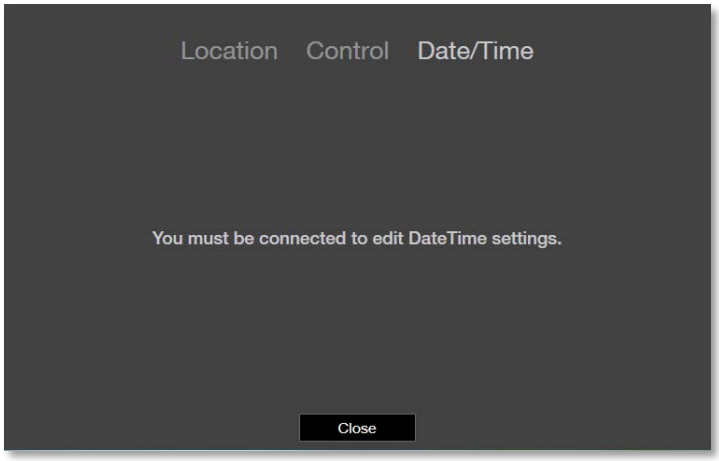


Date and Time

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.

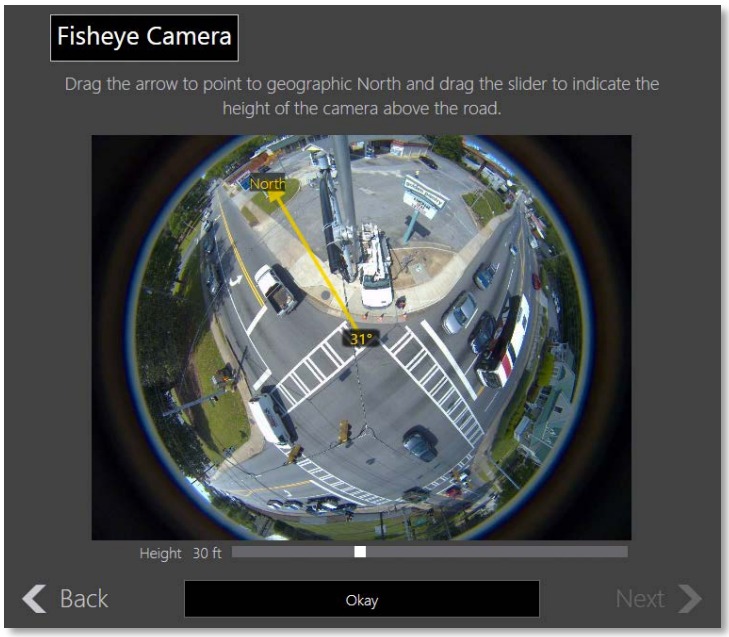


North Heading and Camera Height

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.

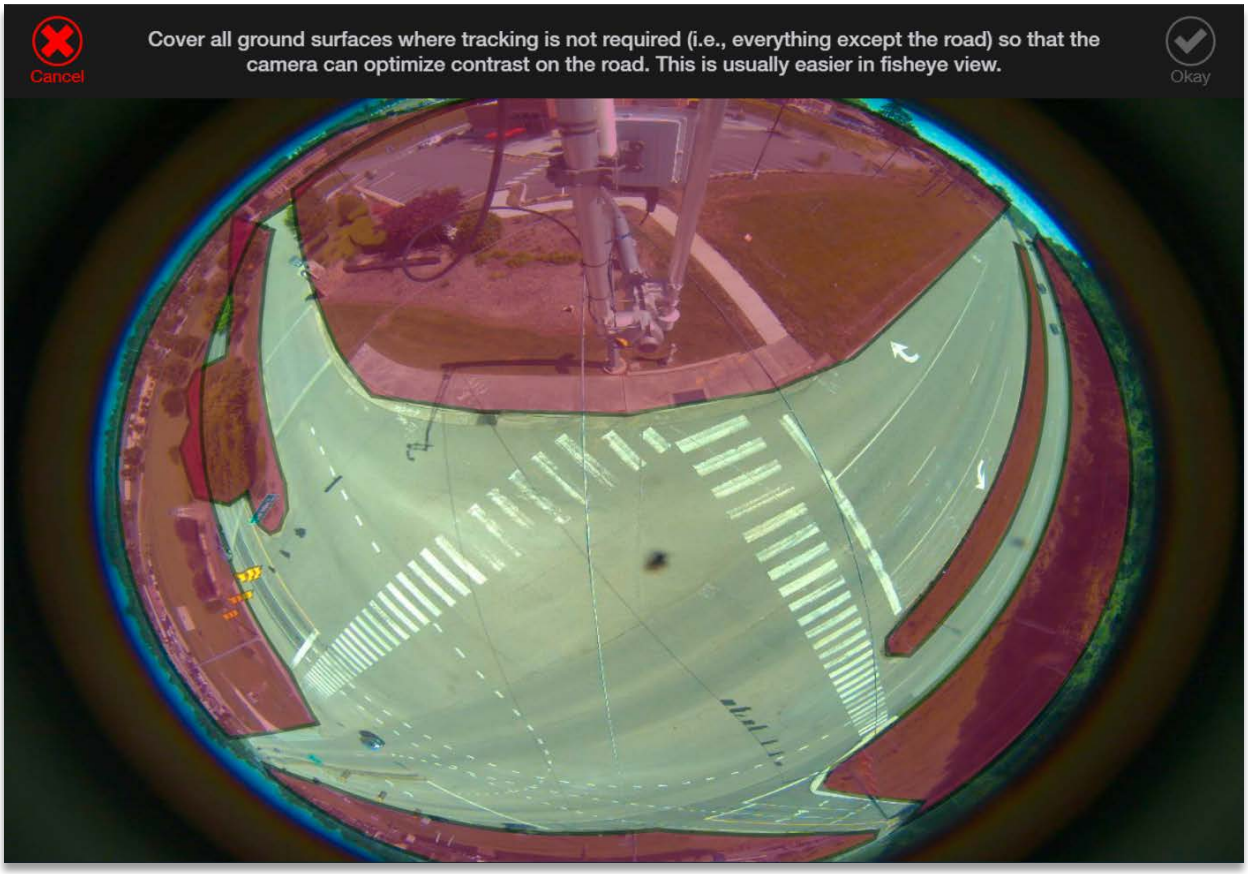


4.0 Site Configuration

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, crosswalks or pedestrian wait areas). 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. Hover the cursor over the green starting point until the cursor turns into a pencil, then click the pencil to close the mask area.

6. Click Okay to complete.
7. Continue masking out all other areas.

4.2 Vehicle Zones

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.**

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.

**With Gridsmart Protect you will be limited to 8 Vehicle stop-line zones per camera with a system maximum of 12.

** Advanced and Other Zones types are not available in Gridsmart Protect.

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.
Click the Vehicle Zone icon.

Draw the Vehicle Zone

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

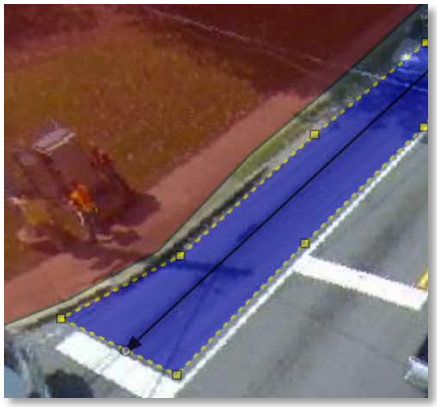
Click back on the first point to complete the zone.

Maintain 1-2 feet between each zone.

Set the Flow Direction

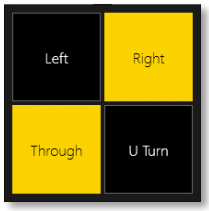
Left click the front of the directional flow arrow.

Drag the arrow to indicate the flow of traffic.



Turns

Select valid turns from the Vehicle Zone.

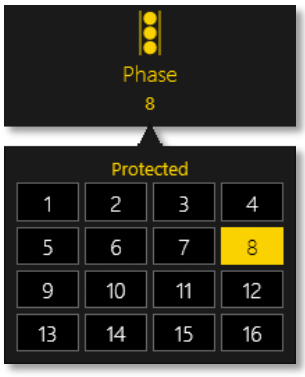


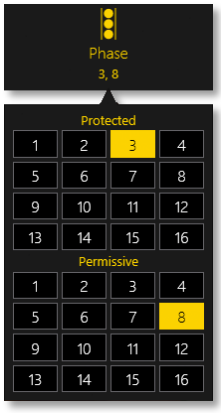
Phase

Select the phase(s) that will be active or associated with this Vehicle Zone.

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

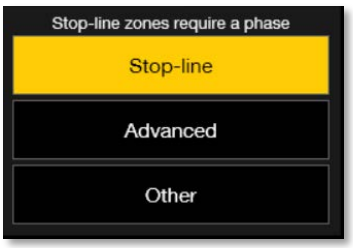
Only assign phases to zones that are located at the stop line and physically connected to the light state of that phase.





Type

Select the type of zone.
**Advanced & Other zone types are not available with Gridsmart Protect.

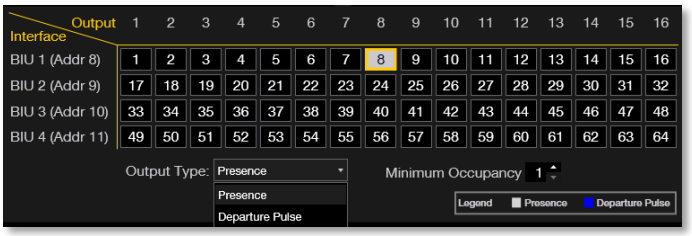


Output: TS1 / BIU / SIU

The output, or call, identifies the channel that the vehicle detector will send a signal to when activated. Gridsmart supports Presence Mode and Departure pulse.

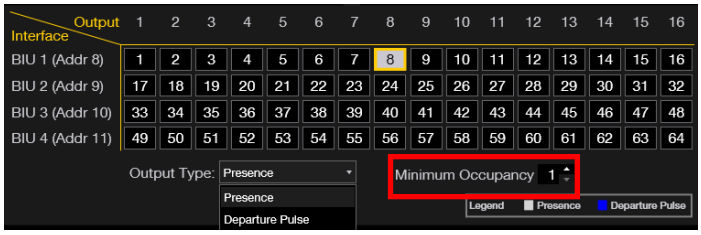
Multiple outputs may be assigned.

Occupancy based outputs can also be assigned.
**Occupancy based outputs are not available with Gridsmart Protect.



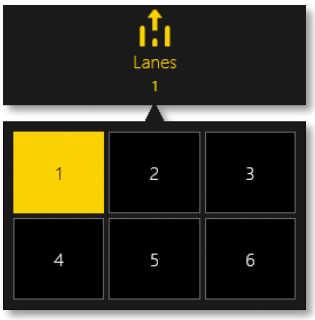
Occupancy-Based Outputs can be configured while creating zones.
To Start,
Select the number of cars desired (up to 6) for the new output.
You can now add up to 6 different outputs for each zone.

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



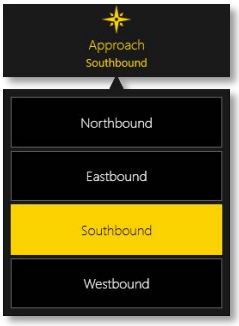
Lanes

Assign the number of lanes covered by the zone.



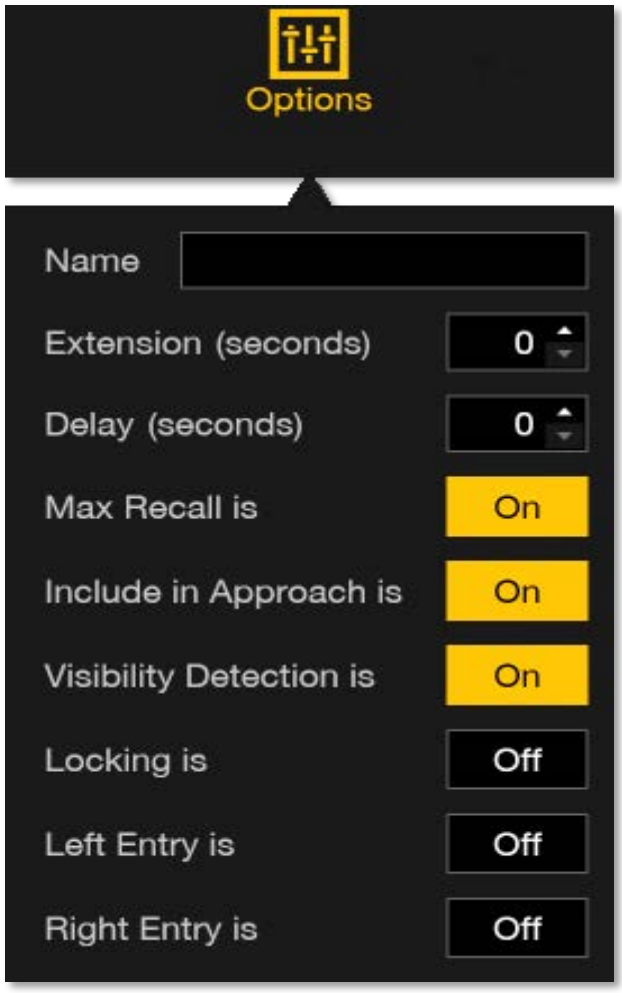
Approach

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



Options

These features can also be configured in your controller. Be careful when using these settings.



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 Gridsmart system will place a constant call during learning mode or a system failure event. When Off, the Gridsmart system will place a call until the phase is serviced by a green sequence.
Include in Approach logs vehicle Counts. Usually Off for any zone not at the stopbar.
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.

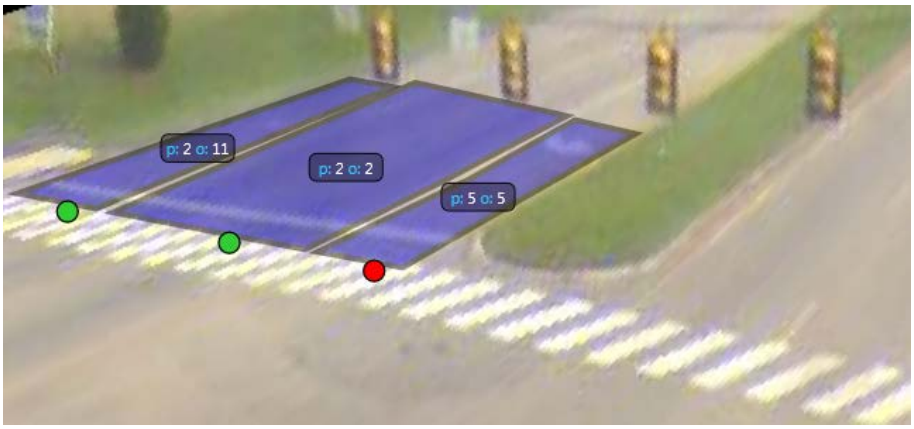
4.3 Object Masks

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

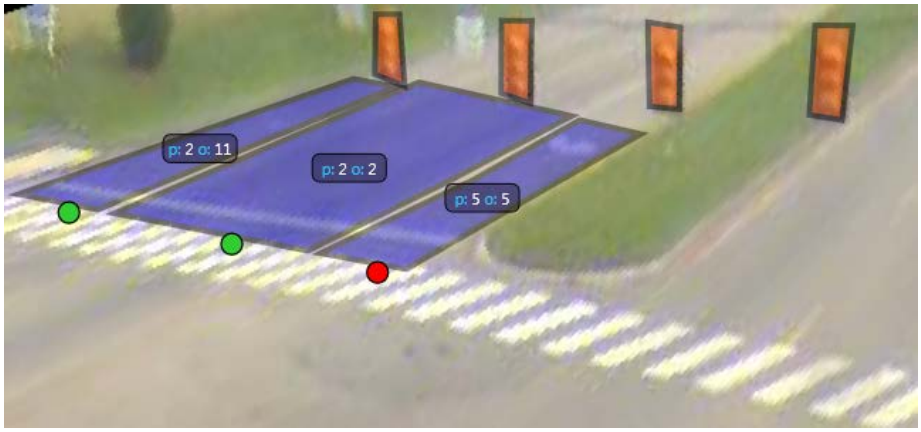
Object Masks are very important; moreover, they eliminate objects that may result in false calls (signal heads, mast arms); disrupt the image contrast because they are highly reflective (Luminaire heads, poles, mast arms); emit light at night (lighted signage).

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 Wrong Way Driving Zones

A Wrong Way Driving (WWD) zone is the vehicle detection region for detecting vehicles driving against the flow of traffic. When you assign an output to a WWD Zone, Gridsmart sends a signal to the controller when a vehicle is present within the zone.

WWD Detection Recommendations:

- Headlights should be visible to the camera as they are approaching, entering and exiting the WWD zone.
- The WWD zone should be between 10 feet and 40 feet long.
- For calls with extended duration, please use the call extension feature.
- WWD zones should not be closely grouped together.
- Avoid obstructed views from stationary objects – such as road signs, traffic lights, etc.

Zones also collect vehicle data for Reports and Alerts.

**Requires Gridsmart Performance or Performance Plus to set up Alerts.

Configuration of a Wrong Way Zone:

Click the WrongWay Zone icon.

Mark the region for Wrong Way detection.

Click the beginning point to complete the zone.

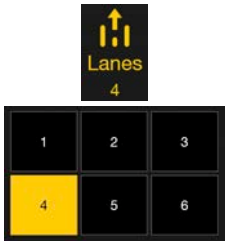
Click and drag the arrow point to face the opposite direction of the flow of traffic.

Configure the zone.

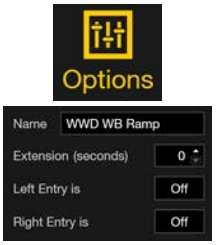
Alerts requires internet connectivity.

Left and Right Entry may be used if the vehicle trajectory is likely to enter from the side.

Click “Okay”



See Section 10.0

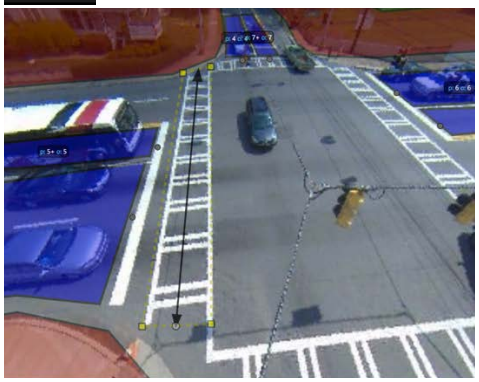


4.5 Crosswalk Zones

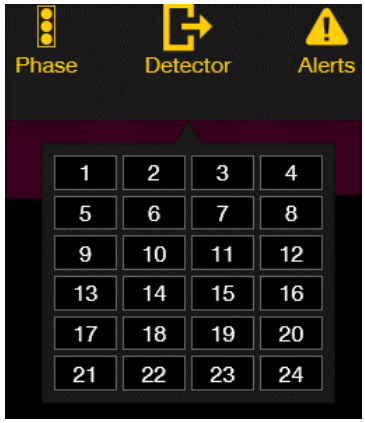
A Crosswalk Zone detects bi-directional pedestrian movement in crosswalks. The Crosswalk Zones require two cameras. This is to ensure that pedestrian detection and tracking is safe as possible.

Click Crosswalk Zone

Place the cursor at or near the corner of the crosswalk. Define the detection area by clicking around the crosswalk, then return to the starting point to close the zone.



Select the associated Phase and Output.

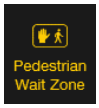


Set Alerts and Options as needed.

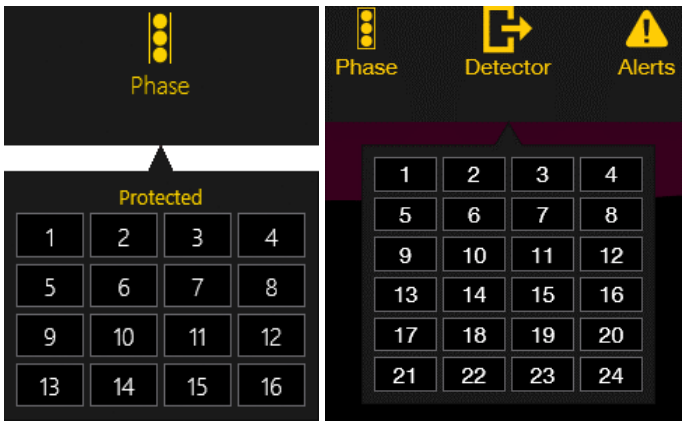
4.6 Pedestrian Wait Zones

A Pedestrian Wait Zone detects pedestrians in designated wait areas. The Crosswalk Zones require two cameras. This is to ensure that pedestrian detection and tracking is safe as possible. The call may be interpreted as a vehicle call so Logic in the controller may be needed to initiate pedestrian calls.

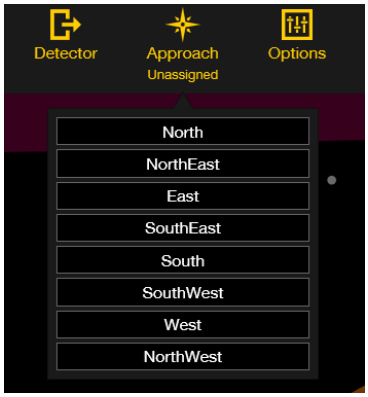
Click Pedestrian Wait Zone



Place the cursor near the wait zone. Cover the detection zone by clicking around the area, then return to the starting point to close the zone.
Select the Protected Pedestrian Phase and Output.



Assign the Approach and Options as needed.

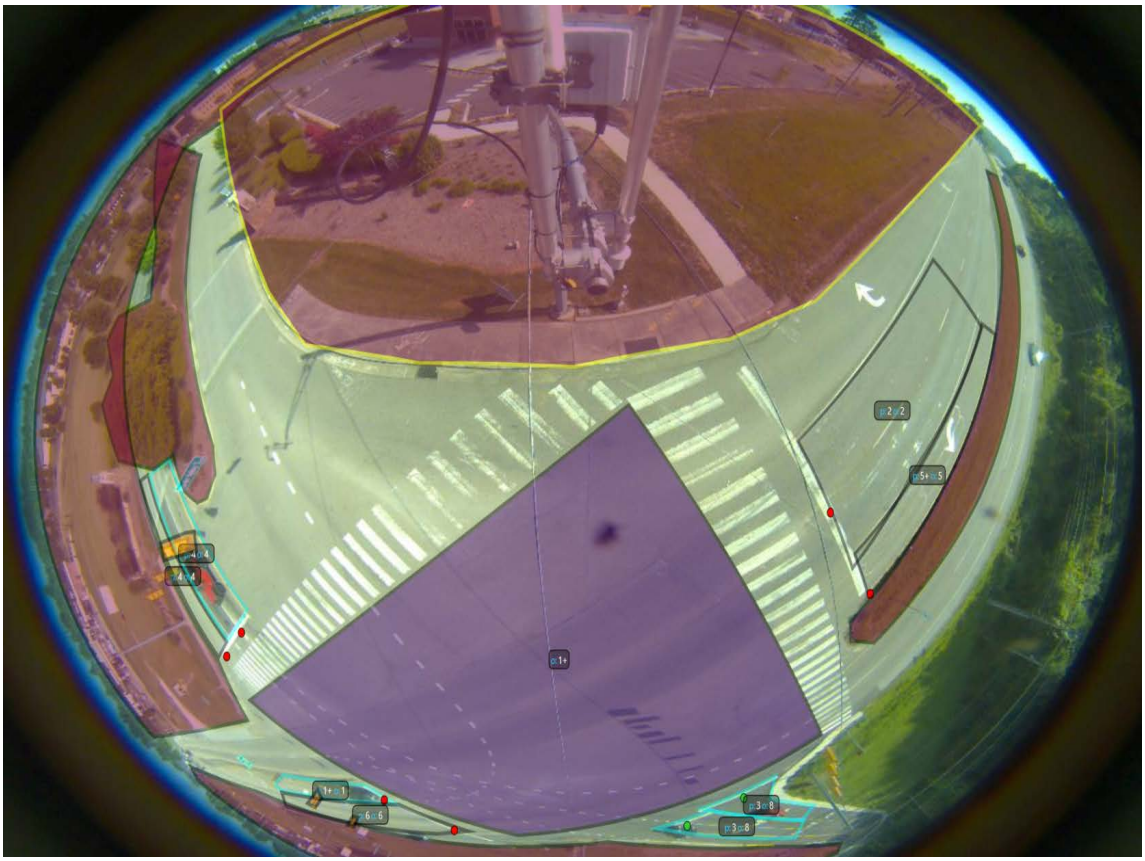


4.7 The Box

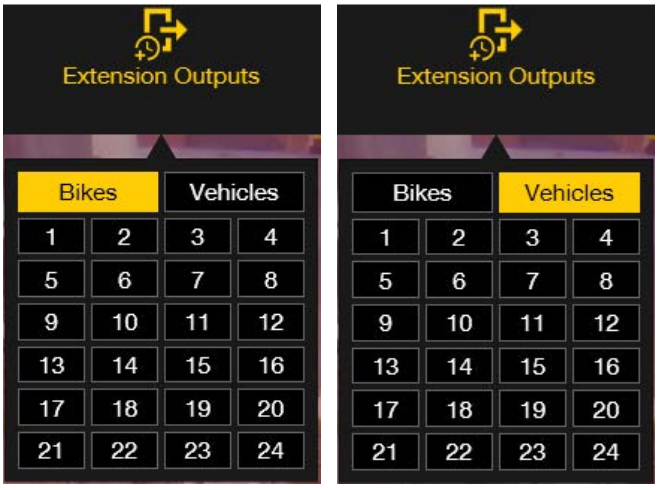
The Box was created to allow extensions for Vulnerable Road Users and/or vehicles entering the center of the intersection.

To add this zone type-

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.



4.8 Factory Default and Reset Configuration

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

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

1. Launch the Gridsmart App.
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 Configuration.
5. Authenticate with the Publish password, then click Reset Configuration to complete the process.

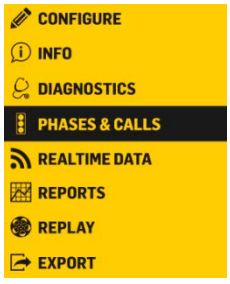
Reset Configuration does not remove the original Site Card from the Sites Homepage. If you no longer need the old Site Card, you can safely delete it by clicking the yellow X in the upper right-hand corner of the card.

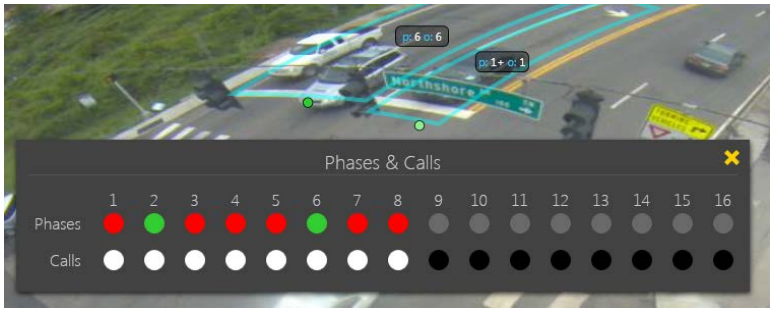
4.9 Quad View

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

4.10 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.





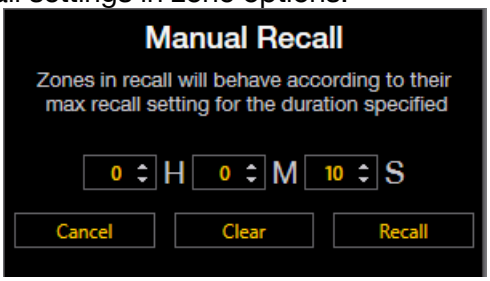
4.11 Make or Clear Calls on Operating Zones

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

4.11.1 Recall All Zones

To set a specific recall time for all programmed zones, find the Recall All Zones option in the pop out menu on the left. Set the desired recall timeframe, then click Recall. If you need to clear the calls, click Clear.

Remember to check recall settings in zone options.



4.11.2 Place Calls zone by Zone

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.

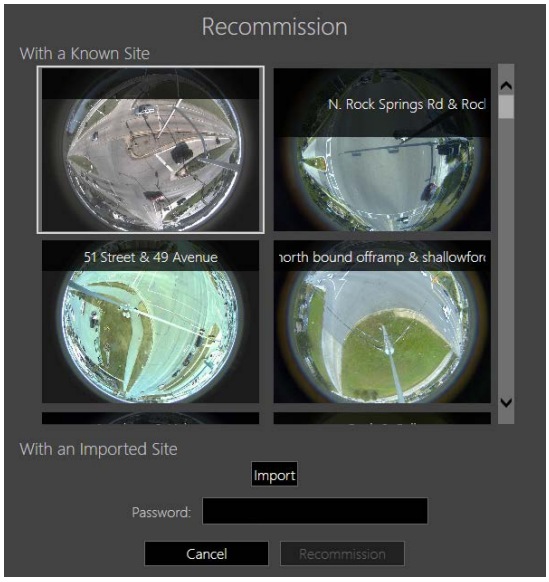
Click to see zone phase information:

4.12 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 App 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 Gridsmart 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 – Gridsmart Processor Networking & Security.

There are three levels of security permissions within the Gridsmart App: Admin, Publish and Read Only. These user account types can be managed locally, on the Gridsmart Processor, 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.

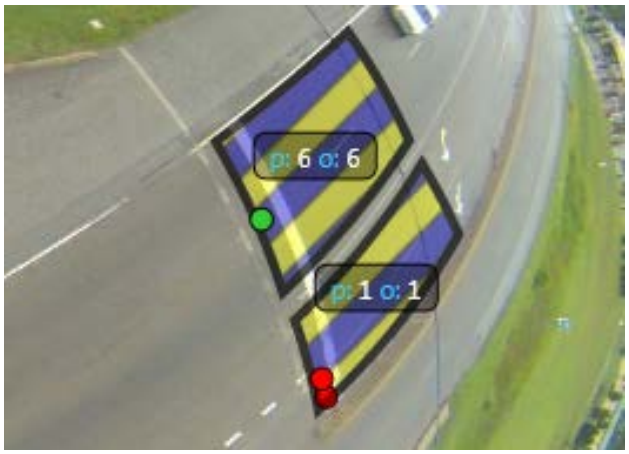
5.3 Make Changes to a Site Configuration

Changing a site configuration is similar to configuring a new site as described in the Factory Default section.

1. Launch the Gridsmart App.
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.

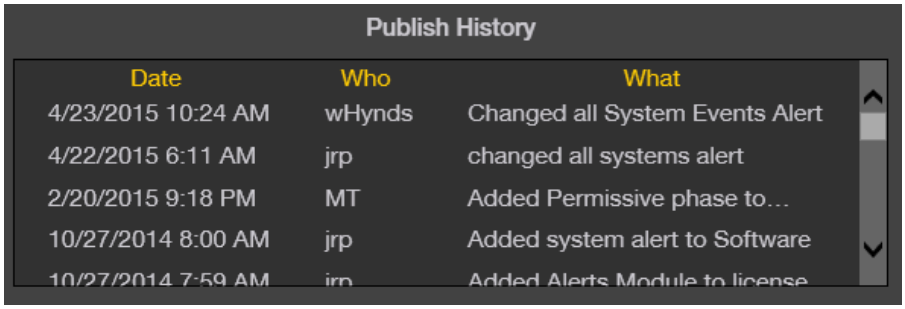
5.4 Unpublished Changes

Unpublished changes are site modifications, made in the App, 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



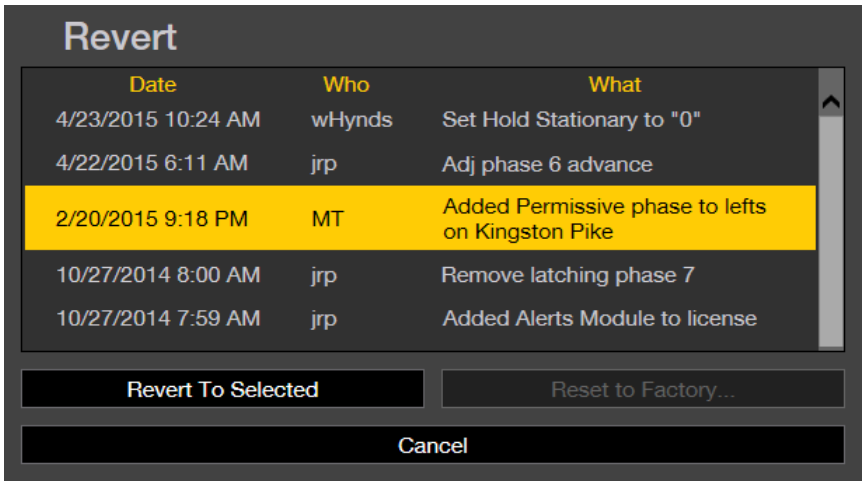
Publish History displays all previously published changes made to a site configuration. Click the Info icon on the Site Menu to see the date, time, username and description of the changes.

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.



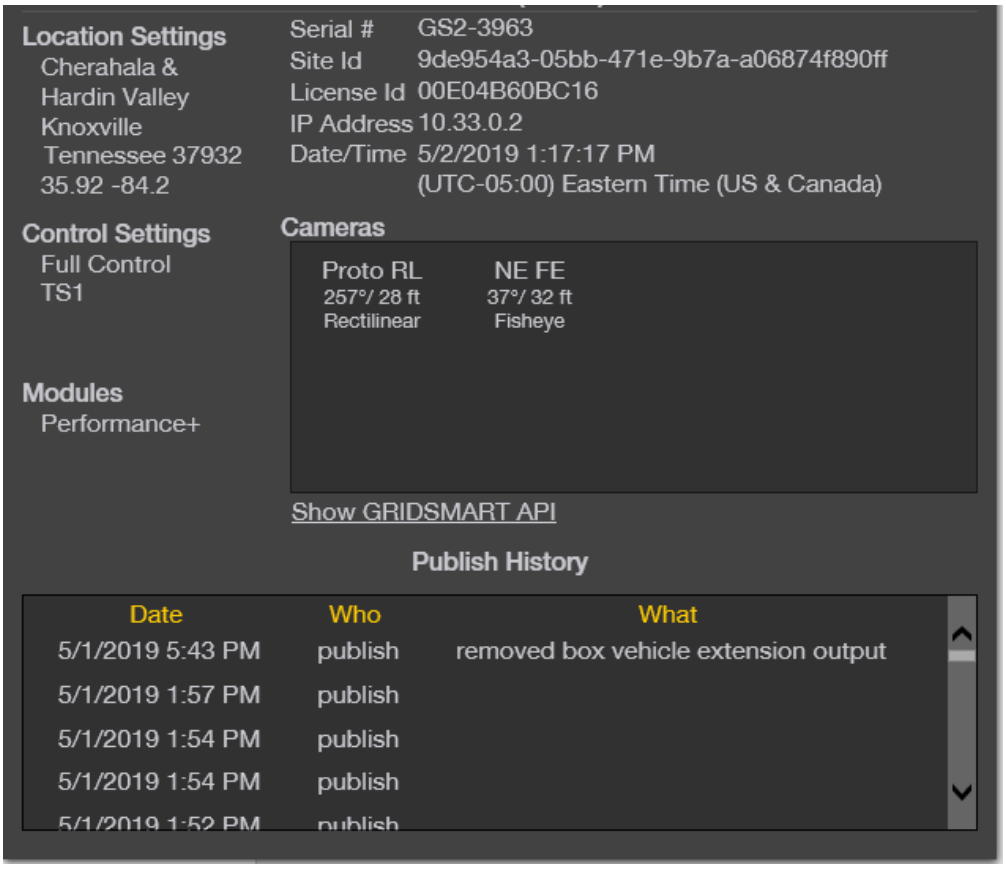
2. Select a previously published configuration, then click the Revert to Selected button.

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.



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 and Features

FEATURES	GRIDSMART PROTECT	GRIDSMART SYSTEM	STREAMS MODULE	VRU DATA MODULE	VRU DATA PLUS MODULE	PERFORMANCE MODULE	PERFORMANCE PLUS MODULE
Available with Protect	--		X	X	X		
Available with GRIDSMART System		--	X	X	X	X	X
BASE FUNCTIONALITY							
# of Vehicle Detection Zones (Per Bell)	8(12)[3]	64	--	64	64	64	64
# of Pedestrian Wait Zones (Per Bell)	64	64	--	64	64	64	64
# of Pedestrian Crosswalk Zones (Per Bell)	64	64	--	64	64	64	64
Max # of Bell Cameras per Intersection	2	2	--	2	2	2	2
Max # of Stop Bar/Advance Cameras per Intersection	0	4[4]	--	4[4]	4[4]	4[4]	4[4]
Optional Cellular Connectivity							X
VEHICLE REPORTS							
Volume						X	X
Turning Movement Counts (TMC)						X	X
Vehicle Classification						X	X
Incident						X	X
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
Synchro UTDF Turning Movement Counts						X	X
Raw Export						X	X
VRU REPORTS							
Pedestrian Counts				X	X	X	X
Bicycle Volume				X	X	X	X
Bicycle TMC				X	X	X	X
AUTO REPORTS							
All Reports				X[3]	X	X[3]	X
SIGNAL PERFORMANCE METRICS							
Departure Pulses							X
STREAMS							
H.264 Live Stream			X		X		X
Stream Recording			X[1]		X[1]		X[1]
ALERTS							
All System Events[2]	X	X	X	X	X	X	X
Loss of Visibility				X[3]	X	X[3]	X
Volume Exceeded						X[3]	X
Loss of Green (Flash)				X[3]	X	X[3]	X
Zone Activated				X[3]	X	X[3]	X

KEY
[1] The Stream recording is only supported on GRIDSMART High Capacity model, which includes the Streams module with purchase.
[2] All System Events alert is supported on intersections without the need for a license.
[3] Requires use of Customer/Agency network. Use of internal cell modem requires Performance+ or VRU Data+.

GRIDSMART SYSTEM LICENSES
The GRIDSMART Solution use software licenses to enable expanded functionality of the product. The licenses can be purchased with the initial GRIDSMART purchased and applied in the factory, or post order and applied in the field. Each licensable module has its own start date and expiration date.

USING TEMPORARY LICENSES
Because each licensed module has its own start and expiration date, each module can optionally be created for a trial period. This allows you to sample the expanded functionality before committing to purchasing it for one, many or all of your intersections.
Standard trial duration is 30, 60, or 90 days. When a Processor sends a heartbeat to GRIDSMART Cloud for the first time after installation, a 45 day Performance+ trial is automatically enabled for the Processor. If the intersection already has Performance+, no change is made. If licenses other than Performance+ are enabled, the temporary license will take precedence for 45 days.

8.2 Description of Alerts

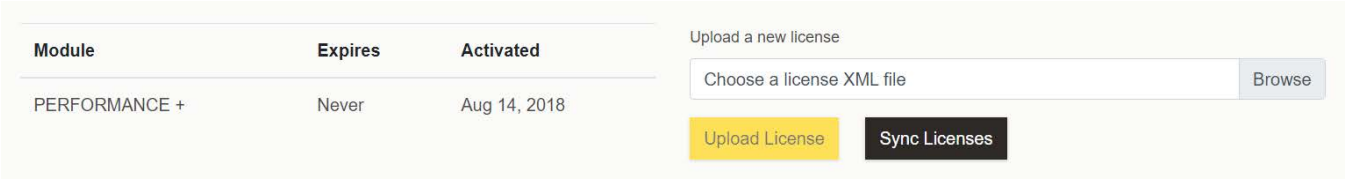
All System Events	On system events such as Publish, startup, IP address change, Camera offline/online.
Loss of Visibility	When the camera visibility is lost for any zone. Includes snapshot.
Volume Exceeded	When the site volume exceeds a set amount.
Flash (Loss of Greens)	When the intersection is suspected 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

Your Data modules will be added automatically once your Processor begins communicating to Cloud. If you are unable to connect your Processor to Cloud you can import it through the device manager.

1. Connect to the Processor via the Gridsmart device manager.
2. Click Settings
3. Click Modules.
4. Browse for your license file, then click Upload License.



9.0 Reports

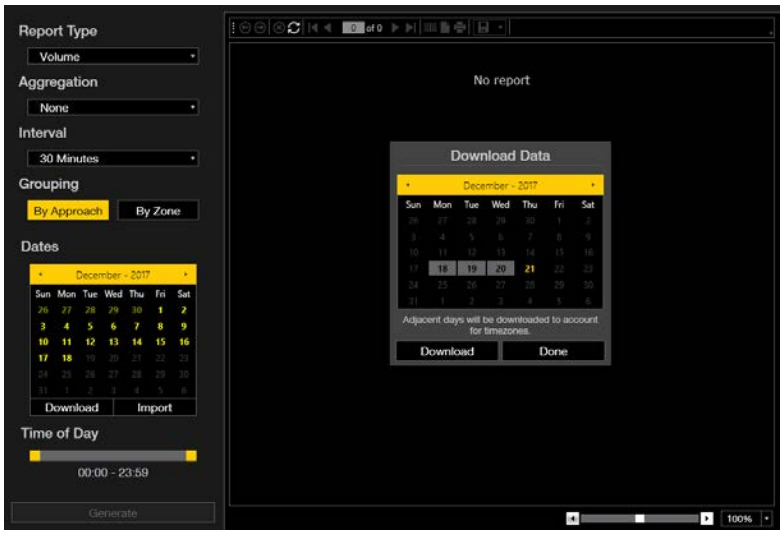
REPORTS

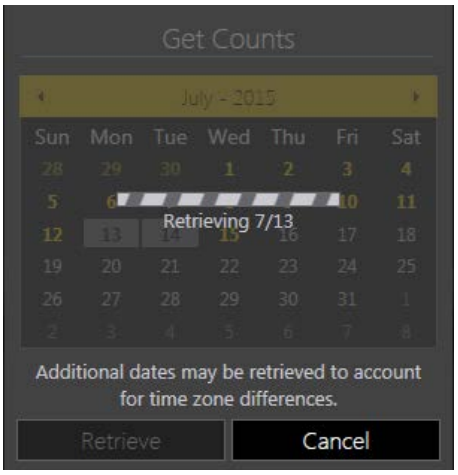
With the PERFORMANCE and PERFORMANCE PLUS Modules, Gridsmart automatically logs vehicle counts for at least one year. Counts are stored on a first in, first out basis.

9.1 Downloading PERFORMANCE DATA with the App

When connected to a site either locally or remotely, use the Gridsmart App 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

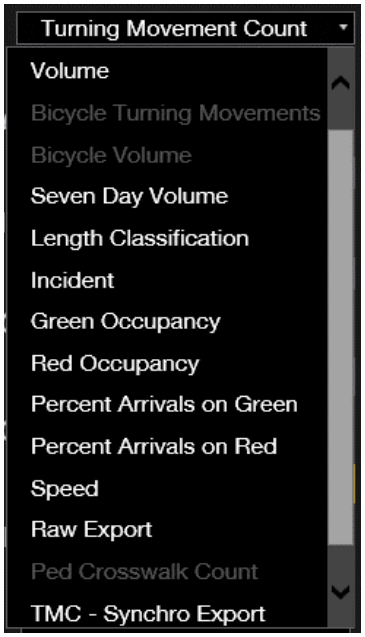
Note: This will only work if the USB sync is enabled in the Device Manager.

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 App for reporting.
7. Launch the App, 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 App and available for use in the Reports Screen as indicated by highlighted dates in the calendar.

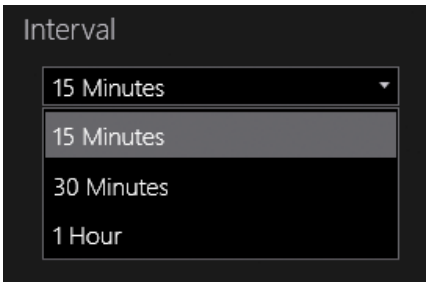
9.3 Generating Reports

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

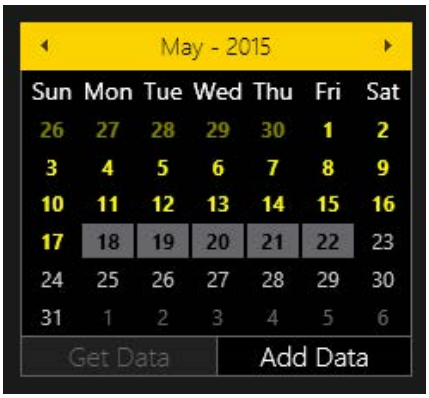
Select the Report Type.



Select the Interval.



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



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

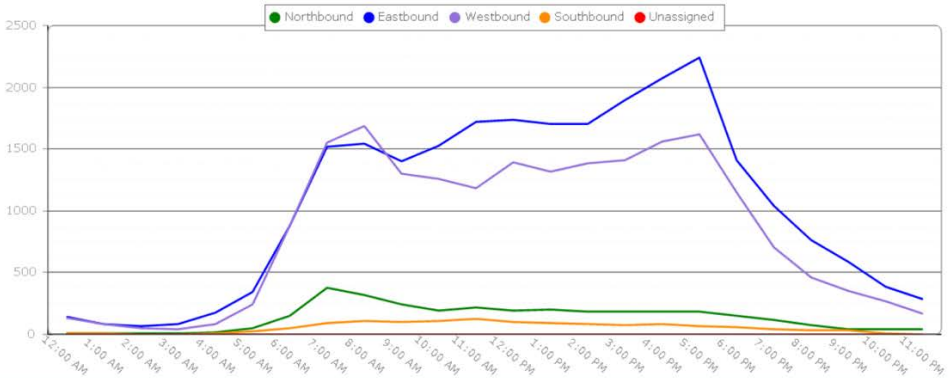
9.3.1 Report – Turning Movement Counts

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**

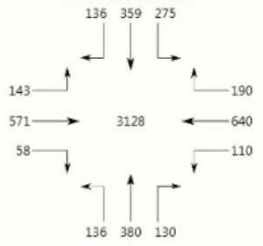


GRIDSMART

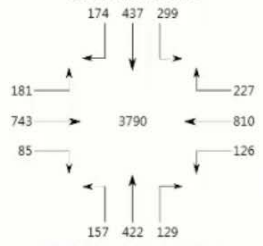
Turning Movement Counts

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

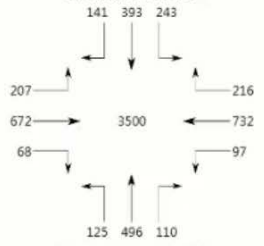
AM PEAK HOUR VOLUME (0:00-10:45)
FROM 09:45 TO 10:45



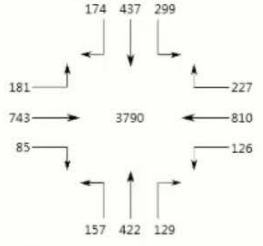
MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 11:30 TO 12:30



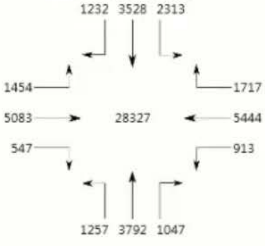
PM PEAK HOUR VOLUME (14:15-23:45)
FROM 14:30 TO 15:30



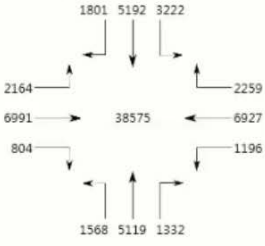
OVERALL PEAK HOUR VOLUME
FROM 11:30 TO 12:30



DAYTIME TOTAL VOLUME
FROM 07:00 TO 18:00



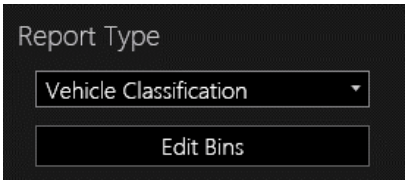
SELECTED TIME VOLUME
FROM 00:00 TO 23:59



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.



GRIDSMART

Vehicle Classification Counts

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

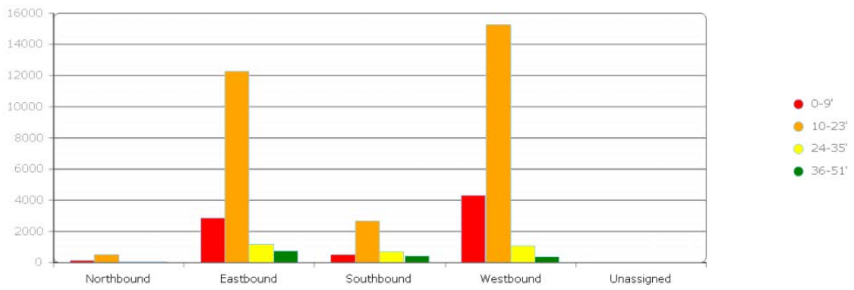
	Northbound				Southbound				
	0-9'	10-23'	24-35'	36-51'	0-9'	10-23'	24-35'	36-51'	0-9'
11:30 AM	4	20	2	2	6	54	11	6	26
11:45 AM	2	15	4	1	11	46	16	6	22
12:00 PM	6	26	1	0	12	63	13	8	28
12:15 PM	3	17	4	4	8	59	9	11	27
12:30 PM	4	16	3	1	7	36	5	5	29
12:45 PM	3	14	0	1	6	36	5	4	26
1:00 PM	1	16	3	1	5	43	7	5	20
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

Incident Report

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

	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 | 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											

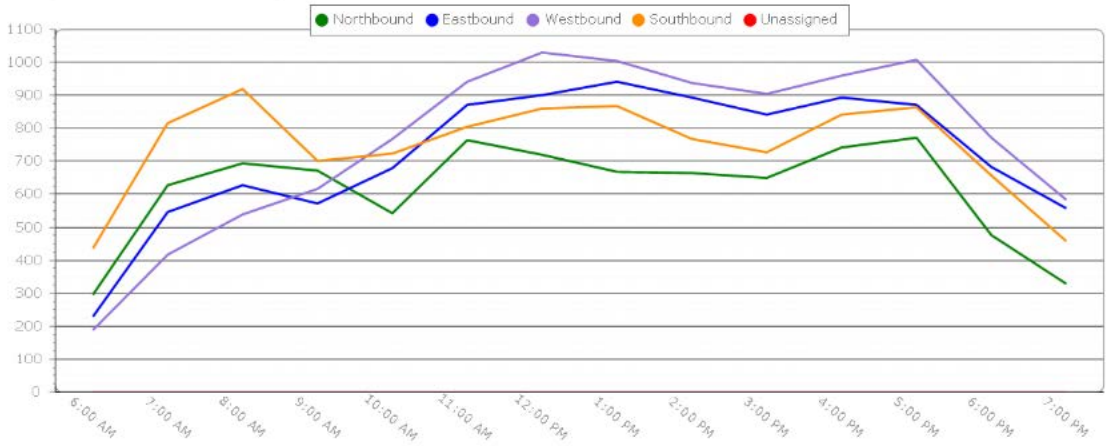
9.3.5 Report – Volume

GRIDSMART

Volume Report

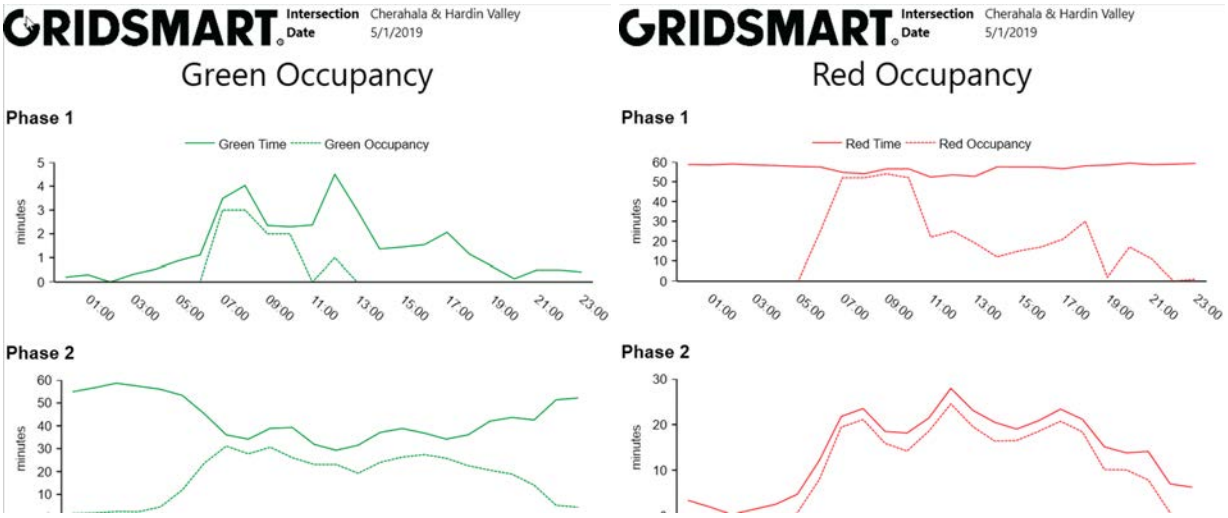
Intersection Kingston Pk & Northshore
Date Monday, July 13, 2015

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

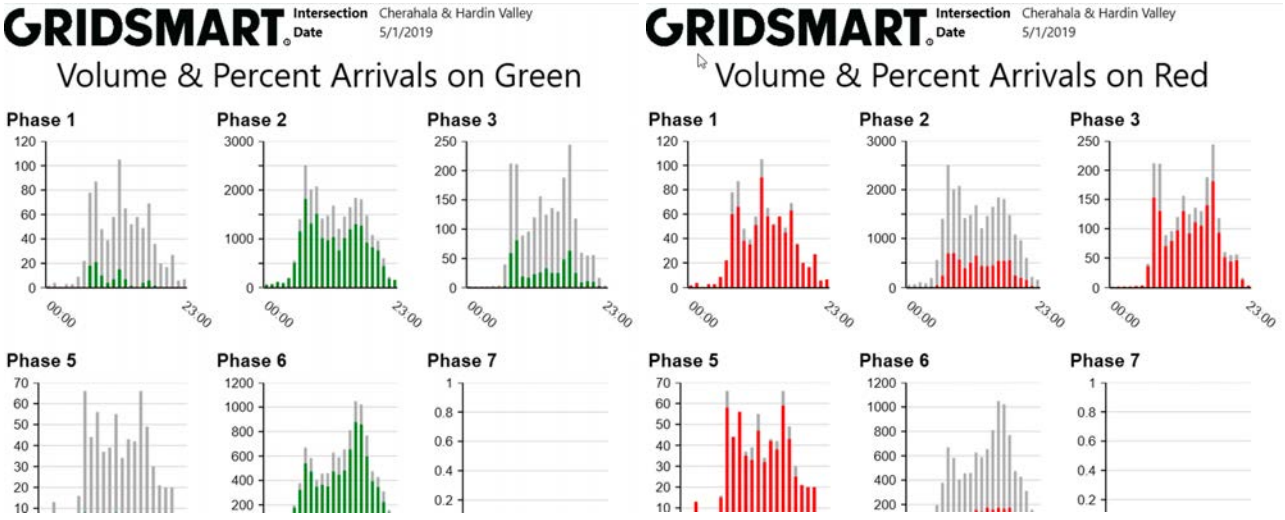


	Northbound	Southbound	Eastbound	Westbound	Total
6:00 AM	294	435	228	187	1144
7:00 AM	626	814	548	417	2405
8:00 AM	693	919	629	540	2781
9:00 AM	672	703	572	618	2565
10:00 AM	542	723	681	768	2714
11:00 AM	763	803	870	940	3376
12:00 PM	719	859	900	1029	3507
1:00 PM	667	866	942	1003	3478
2:00 PM	663	766	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**

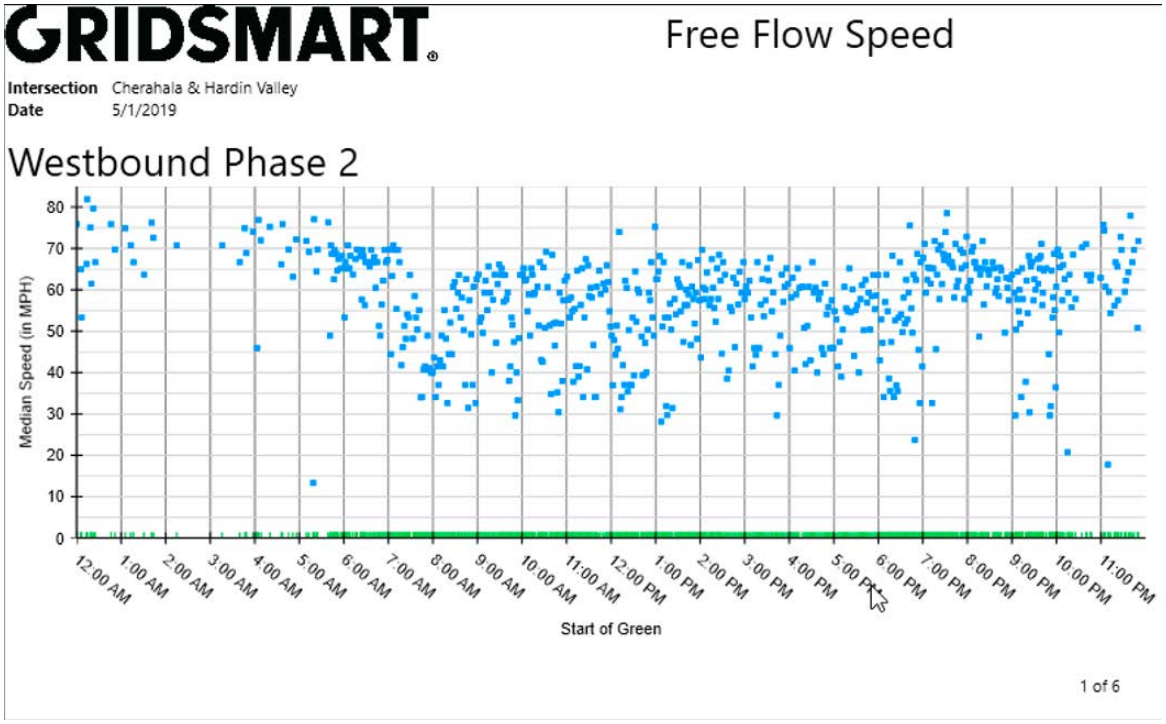
9.3.6 Report – Green/Red Occupancy



9.3.7 Report – Percent Arrivals On Green/Red



9.3.8 Report – Speed



9.3.9 Report – Raw Data Export

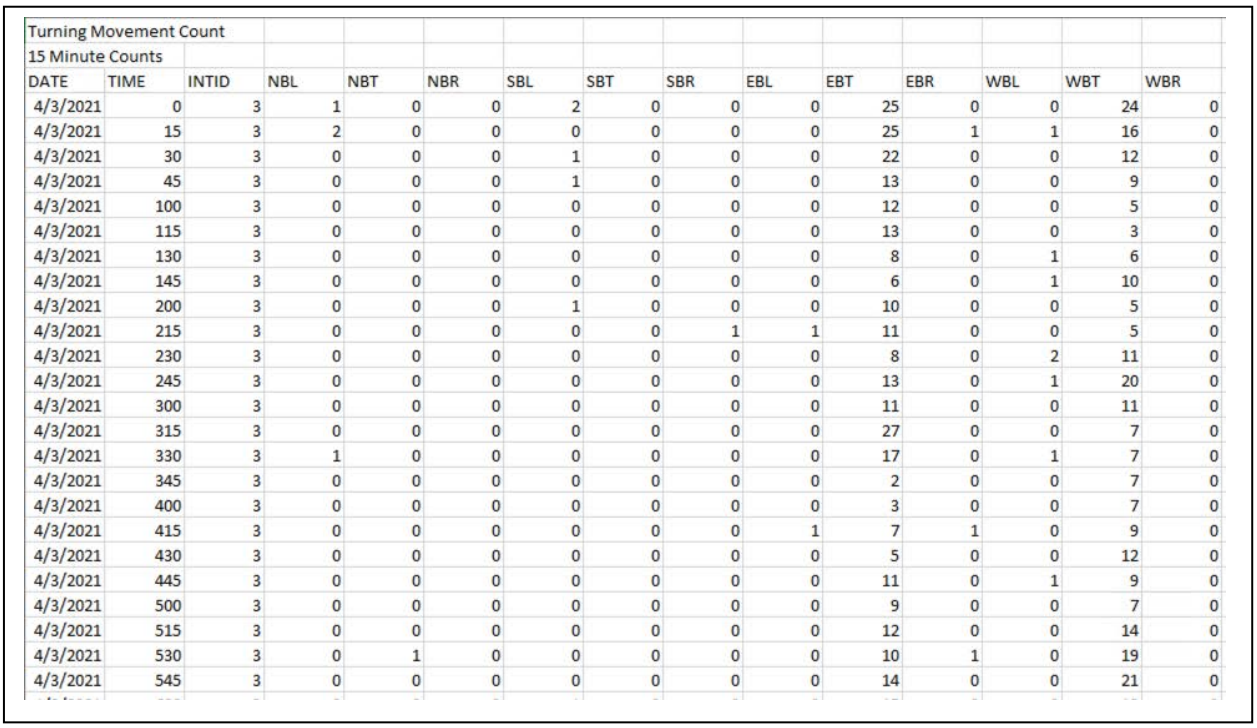
Creates a CSV file with raw count data.

A1 | Date-UTC

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Date-UTC	ApproachType	Name	SecondsSinceLastExit	SecondsInZone	SecondsSinceLastGreen	TurnType	SpeedOnExit	DayMode	CarLength	LightState	QueueLength	AllowableTurnType
2	2015-07-14T11:30:01.0625000-04:00	Eastbound		84.48439789	3.799999952	0	Straight	4	D	10	Green	4	Right, Straight
3	2015-07-14T11:30:02.5625000-04:00	Eastbound		1.5	5.300000191	0	Straight	5	D	11	Green	4	Right, Straight
4	2015-07-14T11:30:03.8750000-04:00	Eastbound		1.3125	6.699999809	0	Straight	14	D	14	Green	4	Right, Straight
5	2015-07-14T11:30:05.5625000-04:00	Eastbound		1.6875	1.100000024	0	Straight	15	D	5	Green	4	Right, Straight
6	2015-07-14T11:30:05.9687500-04:00	Eastbound		0.40625	3.900000095	0	Straight	17	D	17	Green	3	Right, Straight
7	2015-07-14T11:30:06.7656250-04:00	Westbound		5.5	3.900000095	0	Straight	11	D	22	Green	5	Right, Straight
8	2015-07-14T11:30:06.7656250-04:00	Westbound		19.2031002	0.100000001	15.3593998	Left	0	D	11	None	3	Left
9	2015-07-14T11:30:06.9687500-04:00	Westbound		0.203125	4	0	Straight	11	D	10	Green	3	Right, Straight
10	2015-07-14T11:30:07.7656250-04:00	Eastbound		1.796880007	10.5	0	Straight	13	D	5	Green	2	Right, Straight
11	2015-07-14T11:30:08.5625000-04:00	Eastbound		0.796875	5.099999905	0	Straight	18	D	4	Green	1	Right, Straight
12	2015-07-14T11:30:10.0625000-04:00	Westbound		0.796875	7.099985891	0	Straight	18	D	21	Green	4	Right, Straight
13	2015-07-14T11:30:10.5625000-04:00	Eastbound		2	3.5	0	Straight	14	D	10	Green	2	Right, Straight
14	2015-07-14T11:30:10.9687500-04:00	Westbound		0.6875	0.5	0	Right	26	D	14	Green	3	Right, Straight
15	2015-07-14T11:30:11.5625000-04:00	Eastbound		0.203125	2.799999952	0	Straight	26	D	5	Green	2	Right, Straight
16	2015-07-14T11:30:13.1718750-04:00	Westbound		0.703125	5	0	Straight	26	D	30	Green	3	Right, Straight
17	2015-07-14T11:30:13.6718750-04:00	Eastbound		2.109380007	2.5	0	Straight	16	D	4	Green	3	Right, Straight
18	2015-07-14T11:30:14.8750000-04:00	Westbound		1.203130007	4.099999905	0	Straight	21	D	12	Green	2	Right, Straight
19	2015-07-14T11:30:15.4687500-04:00	Eastbound		1.796880007	3.200000048	0	Straight	26	D	5	Green	4	Right, Straight
20	2015-07-14T11:30:15.6718750-04:00	Eastbound		0.203125	4.099999905	0	Straight	16	D	6	Green	3	Right, Straight
21	2015-07-14T11:30:16.5625000-04:00	Westbound		2.890630007	3.400019884	0	Straight	24	D	20	Green	6	Right, Straight
22	2015-07-14T11:30:16.7656250-04:00	Westbound		0.203125	3.100029945	0	Straight	28	D	26	Green	4	Right, Straight
23	2015-07-14T11:30:17.2656250-04:00	Eastbound		0.203125	2.400029898	0	Straight	28	D	11	Green	6	Right, Straight
24	2015-07-14T11:30:18.5625000-04:00	Westbound		0.203125	0.400000006	0	Straight	23	D	18	Green	2	Right, Straight
25	2015-07-14T11:30:18.8750000-04:00	Eastbound		1.609380007	3.800019979	0	Right	12	D	13	Green	2	Right, Straight

9.3.10 Report - UTDF Turning Movement export

Creates a UTDF file for import into Trafficware Synchro Studio. Requires the Performance Module.



Turning Movement Count
15 Minute Counts

DATE	TIME	INTID	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
4/3/2021	0	3	1	0	0	2	0	0	0	25	0	0	24	0
4/3/2021	15	3	2	0	0	0	0	0	0	25	1	1	16	0
4/3/2021	30	3	0	0	0	1	0	0	0	22	0	0	12	0
4/3/2021	45	3	0	0	0	1	0	0	0	13	0	0	9	0
4/3/2021	100	3	0	0	0	0	0	0	0	12	0	0	5	0
4/3/2021	115	3	0	0	0	0	0	0	0	13	0	0	3	0
4/3/2021	130	3	0	0	0	0	0	0	0	8	0	1	6	0
4/3/2021	145	3	0	0	0	0	0	0	0	6	0	1	10	0
4/3/2021	200	3	0	0	0	1	0	0	0	10	0	0	5	0
4/3/2021	215	3	0	0	0	0	0	1	1	11	0	0	5	0
4/3/2021	230	3	0	0	0	0	0	0	0	8	0	2	11	0
4/3/2021	245	3	0	0	0	0	0	0	0	13	0	1	20	0
4/3/2021	300	3	0	0	0	0	0	0	0	11	0	0	11	0
4/3/2021	315	3	0	0	0	0	0	0	0	27	0	0	7	0
4/3/2021	330	3	1	0	0	0	0	0	0	17	0	1	7	0
4/3/2021	345	3	0	0	0	0	0	0	0	2	0	0	7	0
4/3/2021	400	3	0	0	0	0	0	0	0	3	0	0	7	0
4/3/2021	415	3	0	0	0	0	0	0	1	7	1	0	9	0
4/3/2021	430	3	0	0	0	0	0	0	0	5	0	0	12	0
4/3/2021	445	3	0	0	0	0	0	0	0	11	0	1	9	0
4/3/2021	500	3	0	0	0	0	0	0	0	9	0	0	7	0
4/3/2021	515	3	0	0	0	0	0	0	0	12	0	0	14	0
4/3/2021	530	3	0	1	0	0	0	0	0	10	1	0	19	0
4/3/2021	545	3	0	0	0	0	0	0	0	14	0	0	21	0

9.3.11 Report – Pedestrian Crosswalk Counts

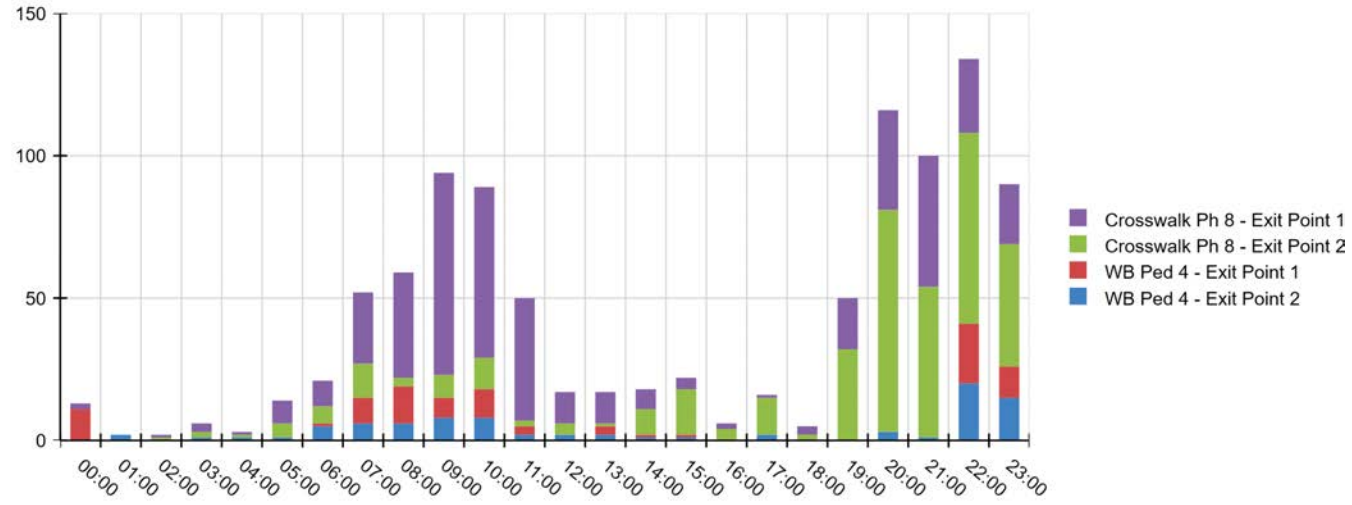
The Pedestrian Crosswalk Counts report displays directional Ped volumes from your Crosswalk zones.

GRIDSMART

Pedestrian Crosswalk Counts

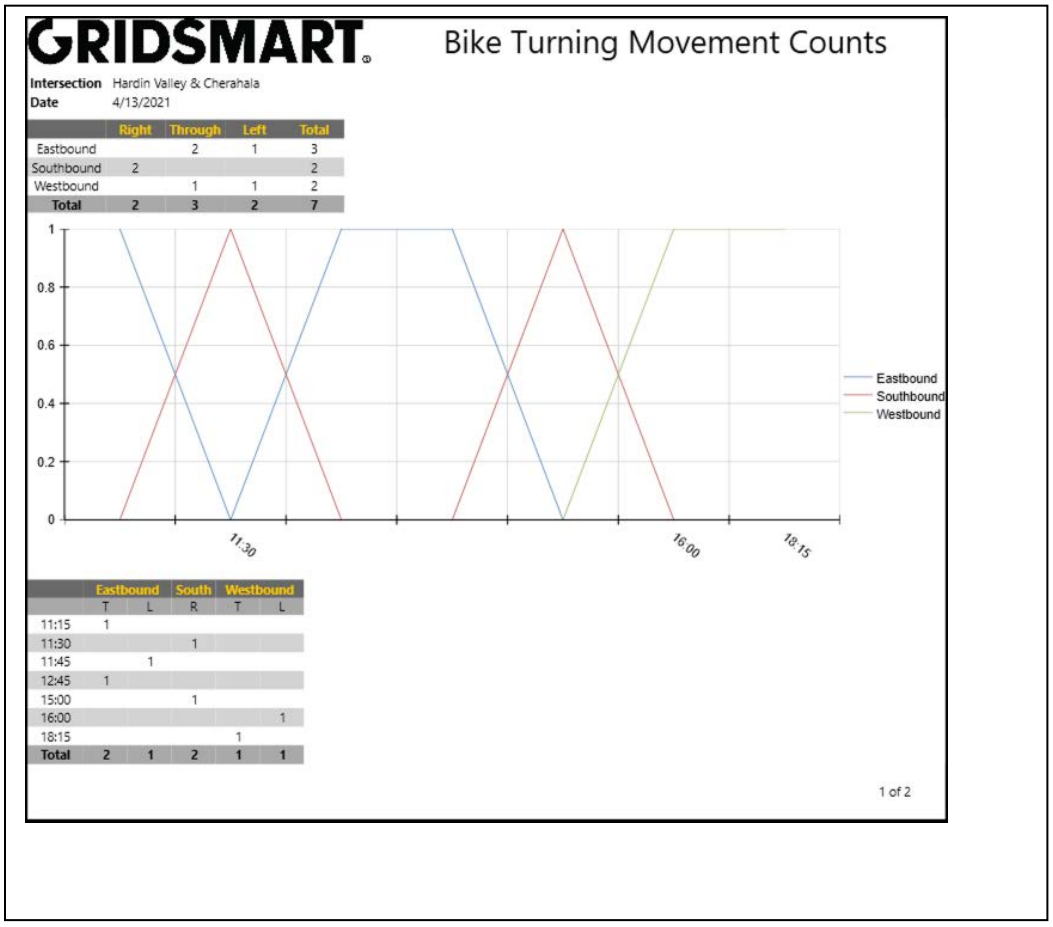
Intersection Penrose ave & Pattison ave
Date 3/29/21

	Exit Point 1	Exit Point 2	Total
Crosswalk Ph 8	445	373	818
WB Ped 4	91	87	178
Total	**536**	**460**	**996**



9.3.12 Bicycle Turning Movement

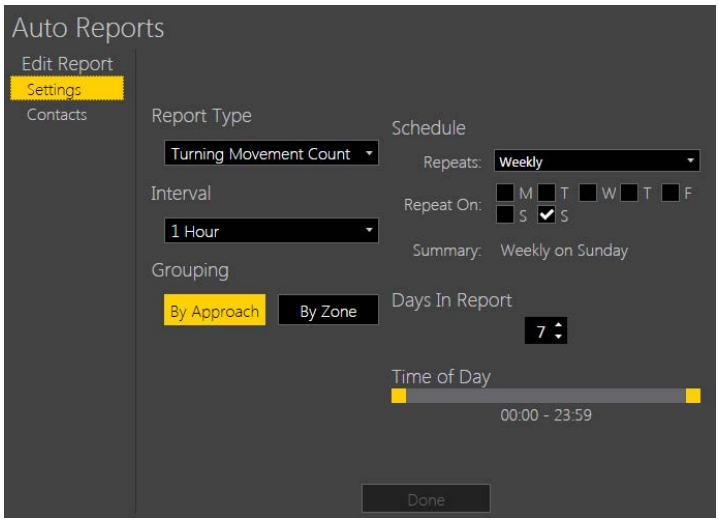
This report will detail the turning movements for Bicycles in the intersection.



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 App 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. Apply your changes.



10.0 Alerts

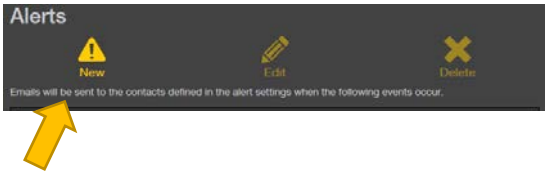
An Alert will email a user-defined set of contacts when the Gridsmart Processor detects certain events.

Site Alerts include All System Events, Loss of Visibility, Volume Exceeded and Flash (Loss of Greens). All System Events are included with your Gridsmart system and do not require a Data Module. All other Alerts require Performance Plus.
Zone Alerts include Volume Exceeded and Zone Activated, where Zone Activated alerts can be used to detect wrong way travel or breakdown lane occupancy.

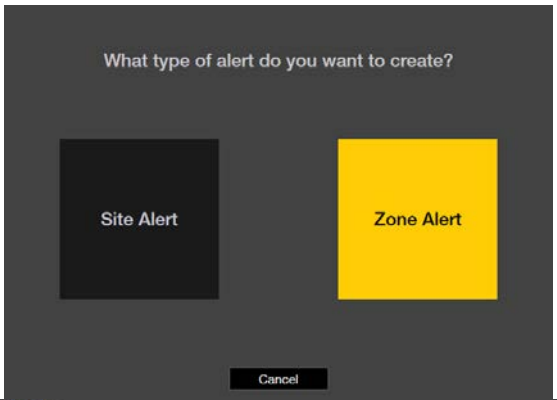
Note: New zones must be published before Zone Alerts can be configured

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

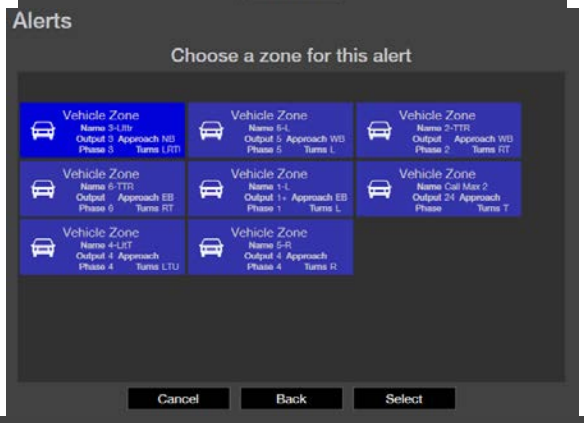
Click New.



Click Site Alert or Zone Alert.

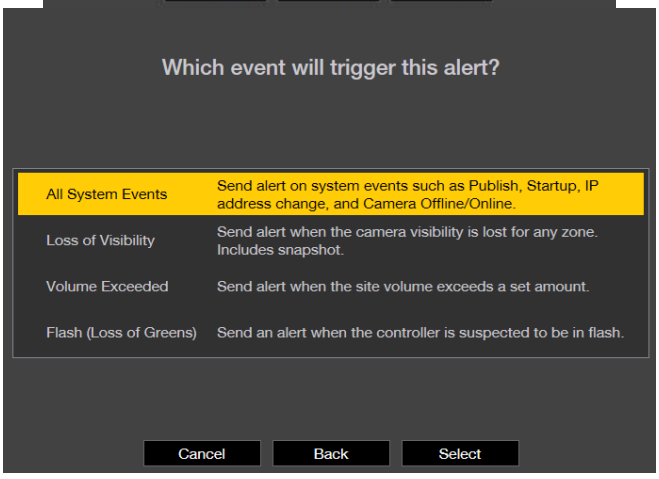


If you are creating a Zone Alert, choose a vehicle zone, then click Select.



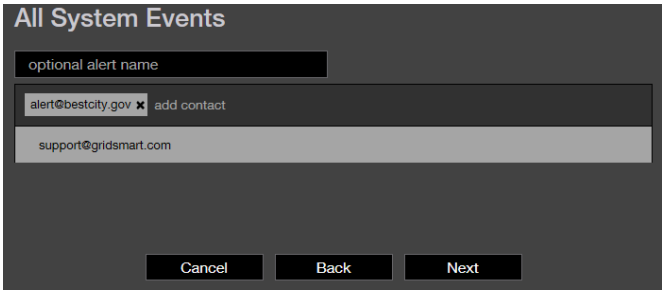
Choose an event to trigger the alert, then click Select.

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.

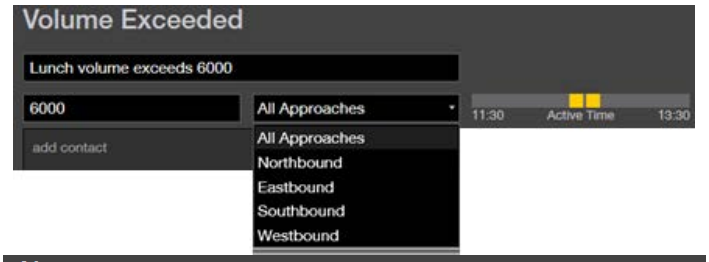
Optionally add an alert name. The name defaults to the event type.



Enter the maximum volume for Volume Exceeded alerts.

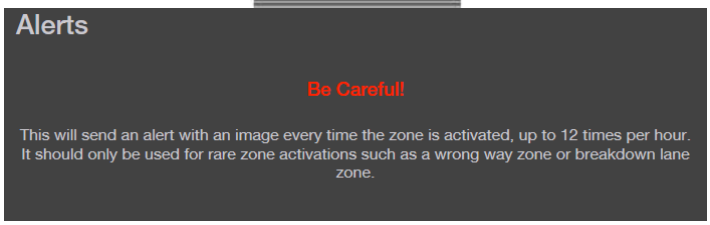
Select an approach for Site Alerts.

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.



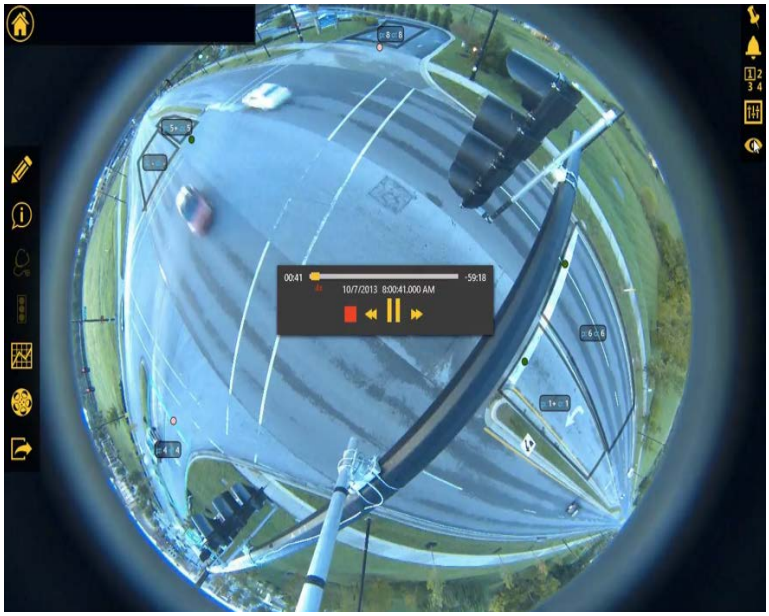
Apply your changes.

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 App computer, then launch the App.
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

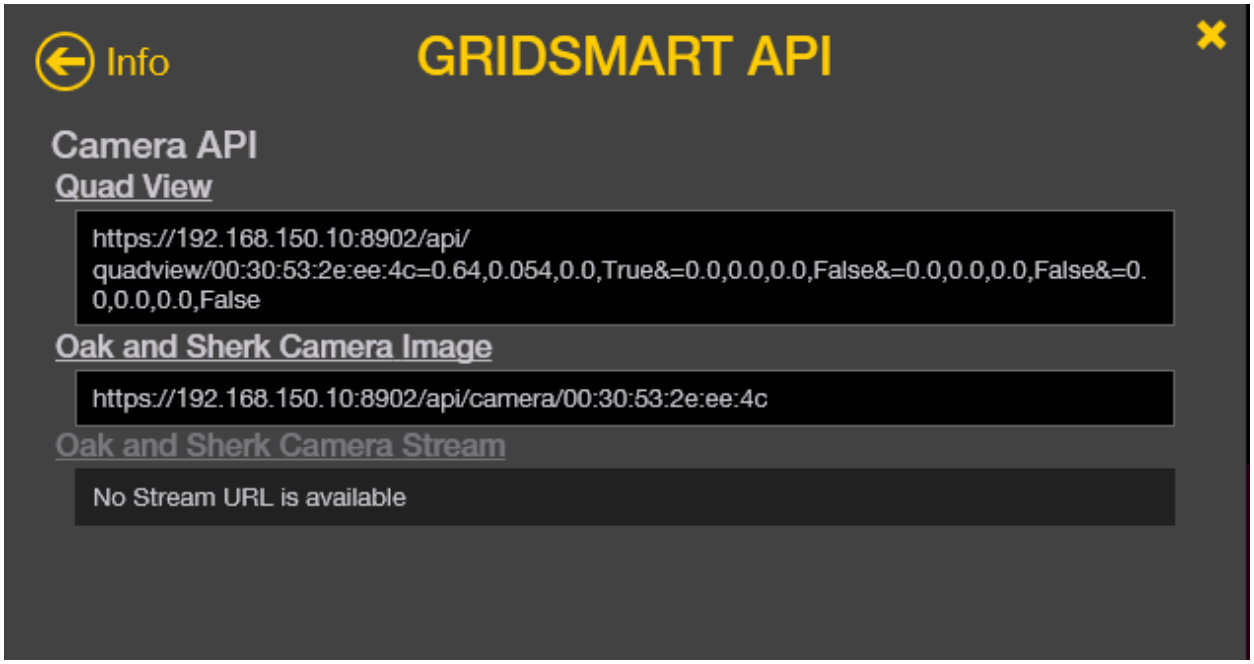
second until the drive is full. On small capacity devices, images are stored at approximately one image per second for three minutes only.

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 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…



See the API documentation on the Gridsmart Support Portal for more details.

13.0 Streaming H.264 streams via RTSP

Gridsmart supports RTSP streams from the Gridsmart cameras using the STREAMS module included in the Performance+ module and with a high-speed connection to the Gridsmart Processor. The Stream is compatible with most 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 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 – 9009 MUST be open on your network.

Any other method used to stream video from the cameras other than using the Gridsmart App 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.

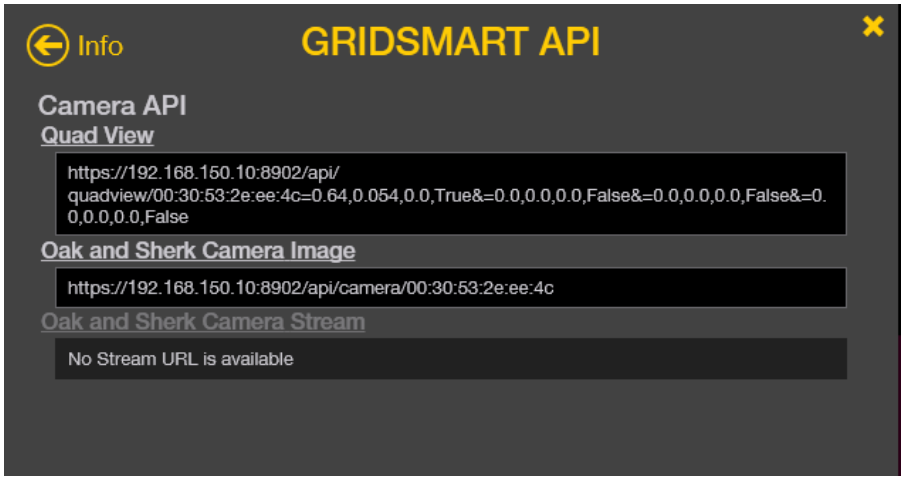
13.1 Gridsmart STREAMS Requirements

To setup STREAMS you must setup a static IP on the Gridsmart Processor. As a Best Practice, it is recommend to setup a static IP on the processor with a DHCP reservation. See section 2.4.1 on how to configure a static IP address. Additionally, video management App connecting to the video stream must be able to reach the Gridsmart Processor on ports 9000-9009.

13.1.1 RTSP URLS in Gridsmart App

From the site's homepage menu in the Gridsmart App, 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.

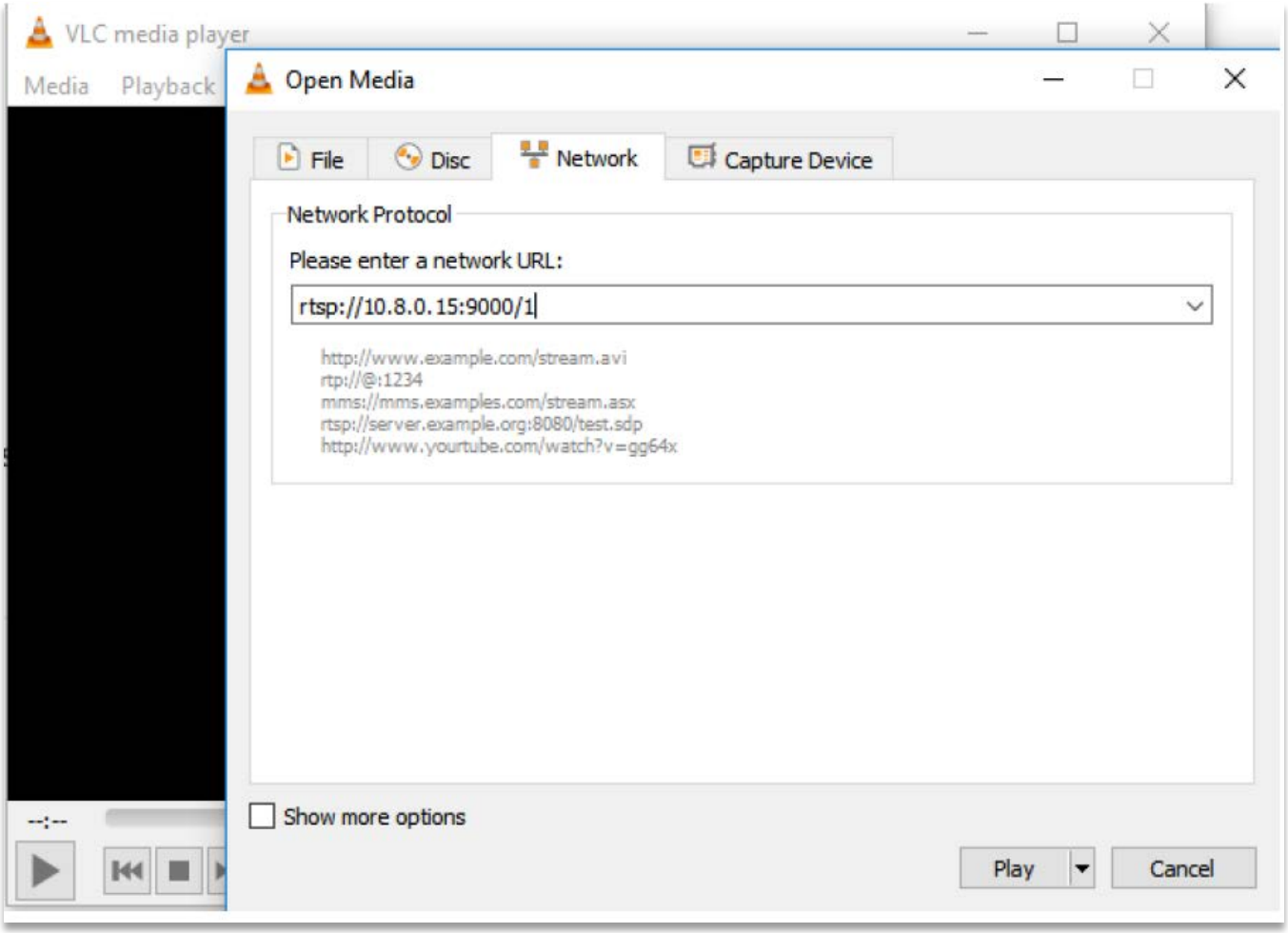


13.1.2 RTSP URLS in Device Manager

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

13.1.3 Testing STREAMS Using VLC

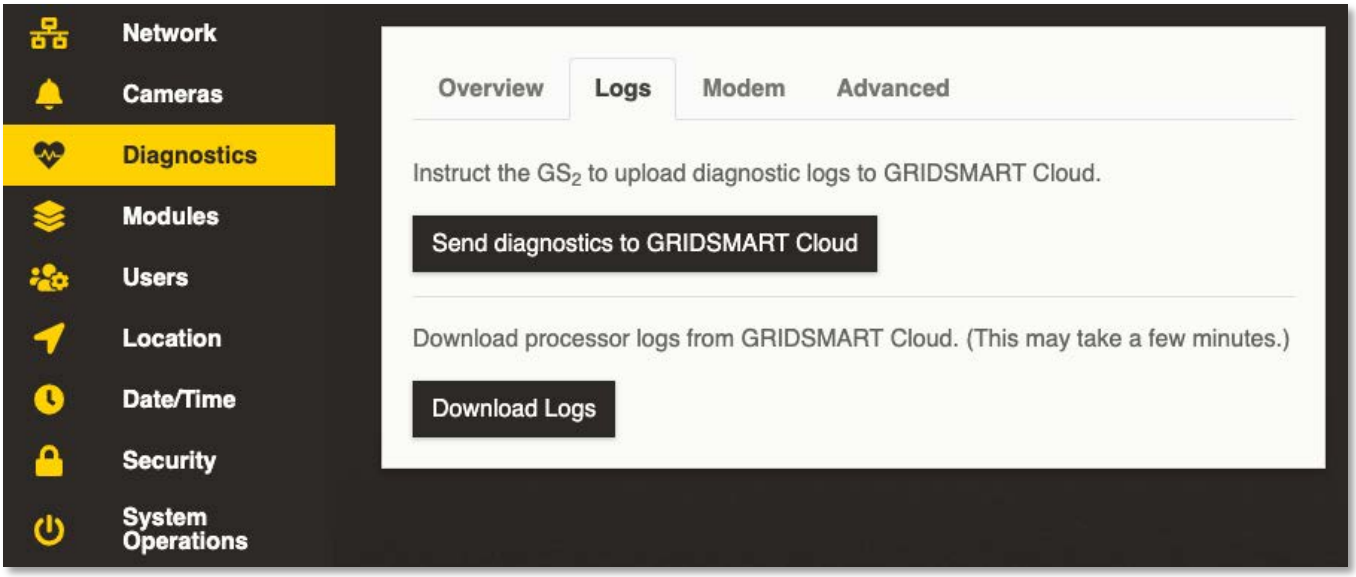
VLC is a free open-source media player that supports RTSP. Install VLC on an App machine. Open VLC, then select menu Media→Open Network Stream and copy/paste the full Camera Stream URL as the network URL (ex. rtsp://10.8.0.15:9000/1).



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 App 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 App and email it to Gridsmart Support as follows.

1. Launch the App 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 App. 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 App 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 App 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.

Gridsmart Processor
The front panel of the Gridsmart 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.

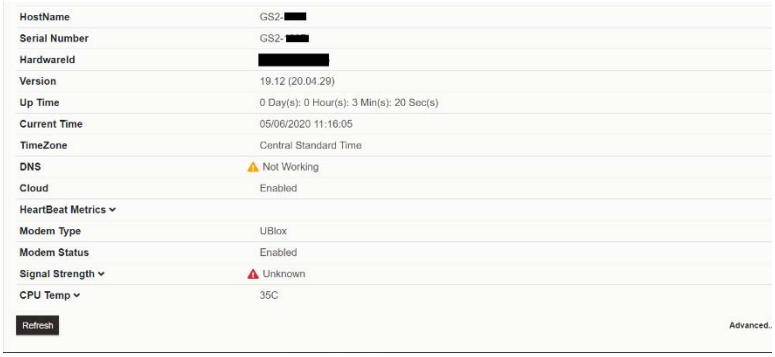
Once the update is complete, the Gridsmart Processor will reboot. After several minutes, your site will return to normal operations.

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

14.6 Diagnostics

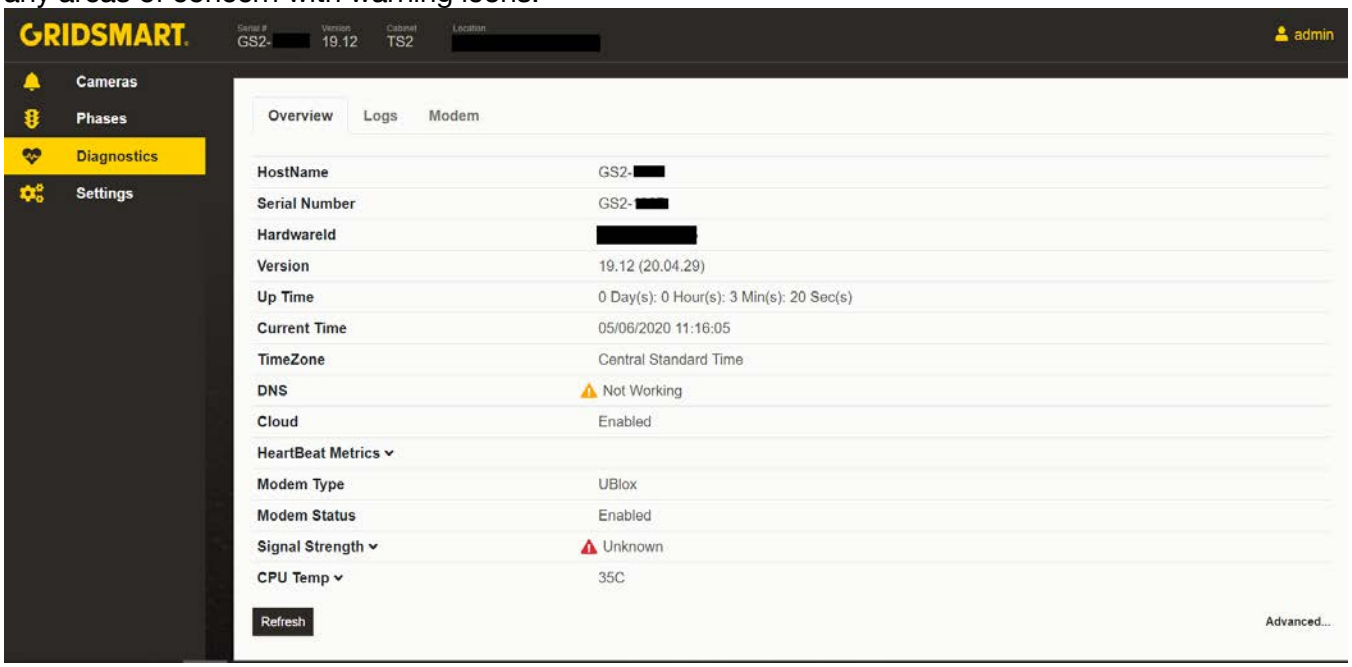
14.6.1 Diagnostics through the Gridsmart App

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



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.



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 App, 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 App

1. Open Programs and Features by clicking the Start button, clicking Control Panel, and then clicking Programs and Features.

2. Select the Gridsmart App, then click Uninstall.

3. To repair the App, click Repair. To remove the App, 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/CubicTS

Facebook: https://www.facebook.com/cubiccorporation

Vimeo: https://vimeo.com/Gridsmart

YouTube: https://www.youtube.com/channel/UC6Cyj0ORFNOAl3rno2u6_xQ

LinkedIn: https://www.linkedin.com/company/cubictransportationsystems/

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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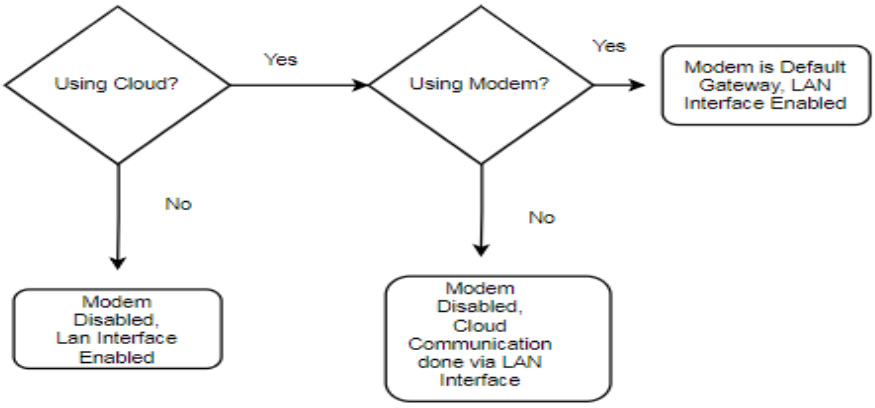
Appendix A -Gridsmart Processor Networking and Security

Introduction

The Gridsmart 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 Gridsmart Processor 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 Gridsmart 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 100Mbs 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 Gridsmart Processor on a private LAN that is optimized specifically for transmission of video to the Gridsmart 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 Processor with software release 19.3 or higher contains a feature rich set of security features including:

- The Gridsmart Processor Device Manager is a new application for easy configuration of network and security settings, user management and advance diagnostics.
- HTTPS connectivity for App 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 Gridsmart Processor 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 Gridsmart Processor undergoes intense penetration testing during each software cycle to ensure vulnerabilities are minimized as much as possible.

2.0 Other Considerations

2.1 Monitoring the Gridsmart Processor

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

Beginning with version 20.10, SNMPv3 may be used to monitor devices and can provide information such as device name and uptime data.

2.2 Firewall Ports

The following ports should be reachable within the network for each Gridsmart Processor:

Inbound Ports
3389 TCP/UDP – Remote Desktop (Can be disabled)
8900 (default) – Gridsmart Processor 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

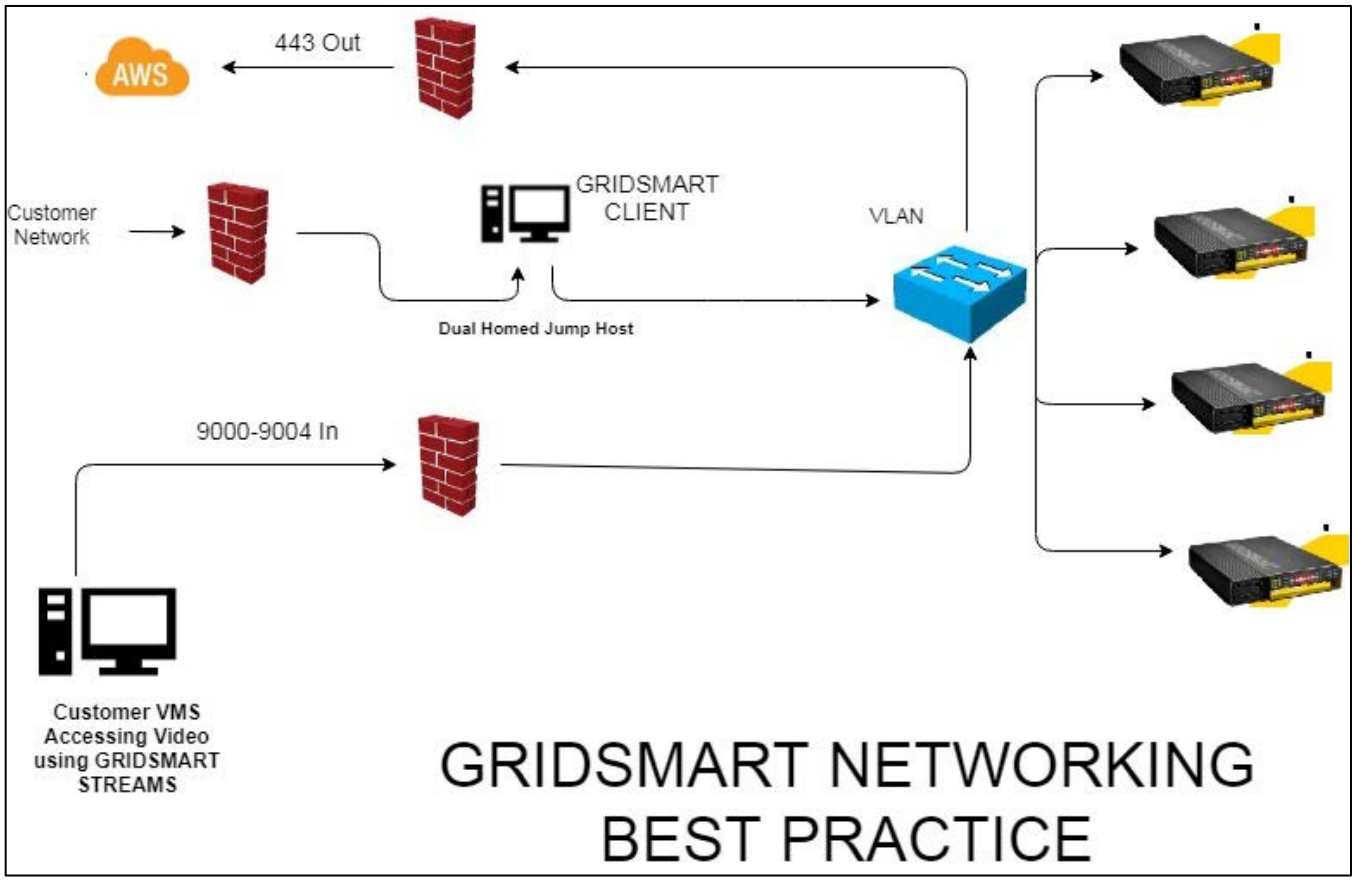
2.3 Private LAN connection (Laptop Port)

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.

3.0 Network Configurations - Best Practices

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

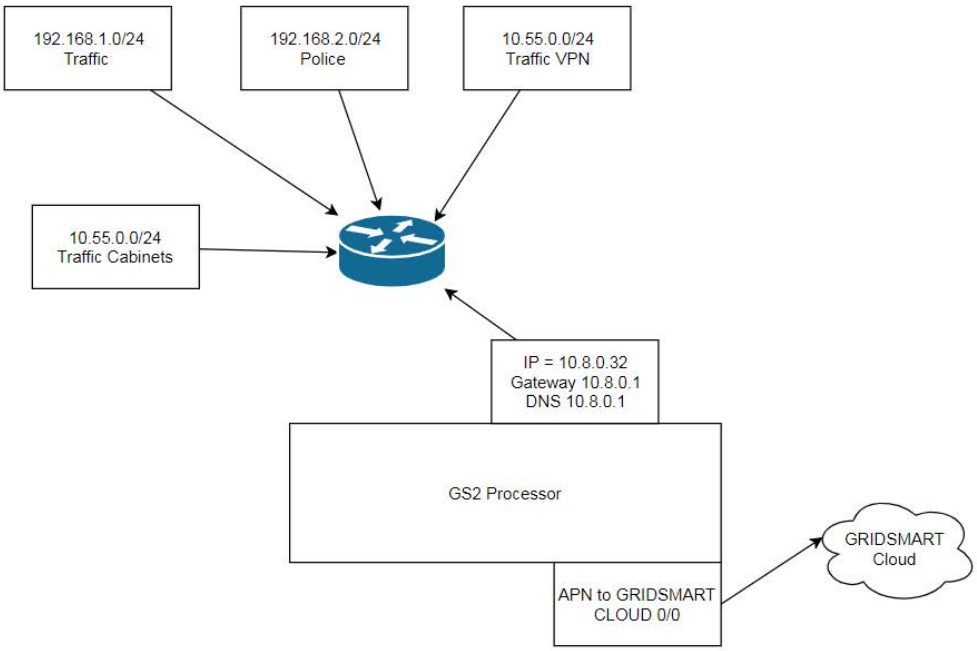
DO NOT CONNECT a Gridsmart Processor directly to the Internet on a public facing IP address.



4.0 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: 10.8.0.0/24 (Router Address 10.8.0.1)

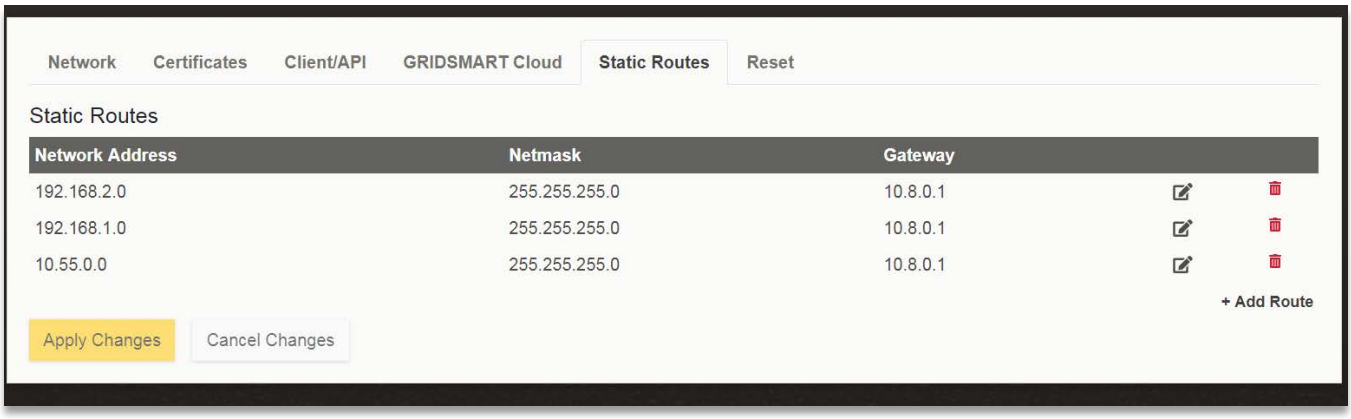


The connection to the traffic cabinet is done via 900 MHz radios running at 10Mbps.
The police department wishes to stream video to their operations center. The traffic department would like to upload configuration changes and send alerts using the Gridsmart cloud. They have decided the modem can be used for cloud communications to save bandwidth instead of using the limited bandwidth of the radio. Additionally, the traffic department wants to access the Gridsmart Processor to run reports and to make configuration changes from the local area network using the Gridsmart App software.

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

The Cloud configuration would be set as follows:

The static Routes would be setup as follows:



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

FAQs

Q: Can antivirus/firewall software be installed on the Gridsmart 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 Gridsmart Processor is an embedded appliance. We cannot guarantee the 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 Gridsmart Processors?
A: Yes. The Gridsmart Processor 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 Gridsmart 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 Gridsmart Processor. **Note, the Gridsmart Processor 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 Gridsmart 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 you 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: Yes. SNMP V3 support was added in version 20.10.

Q: Can I access the Gridsmart 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.