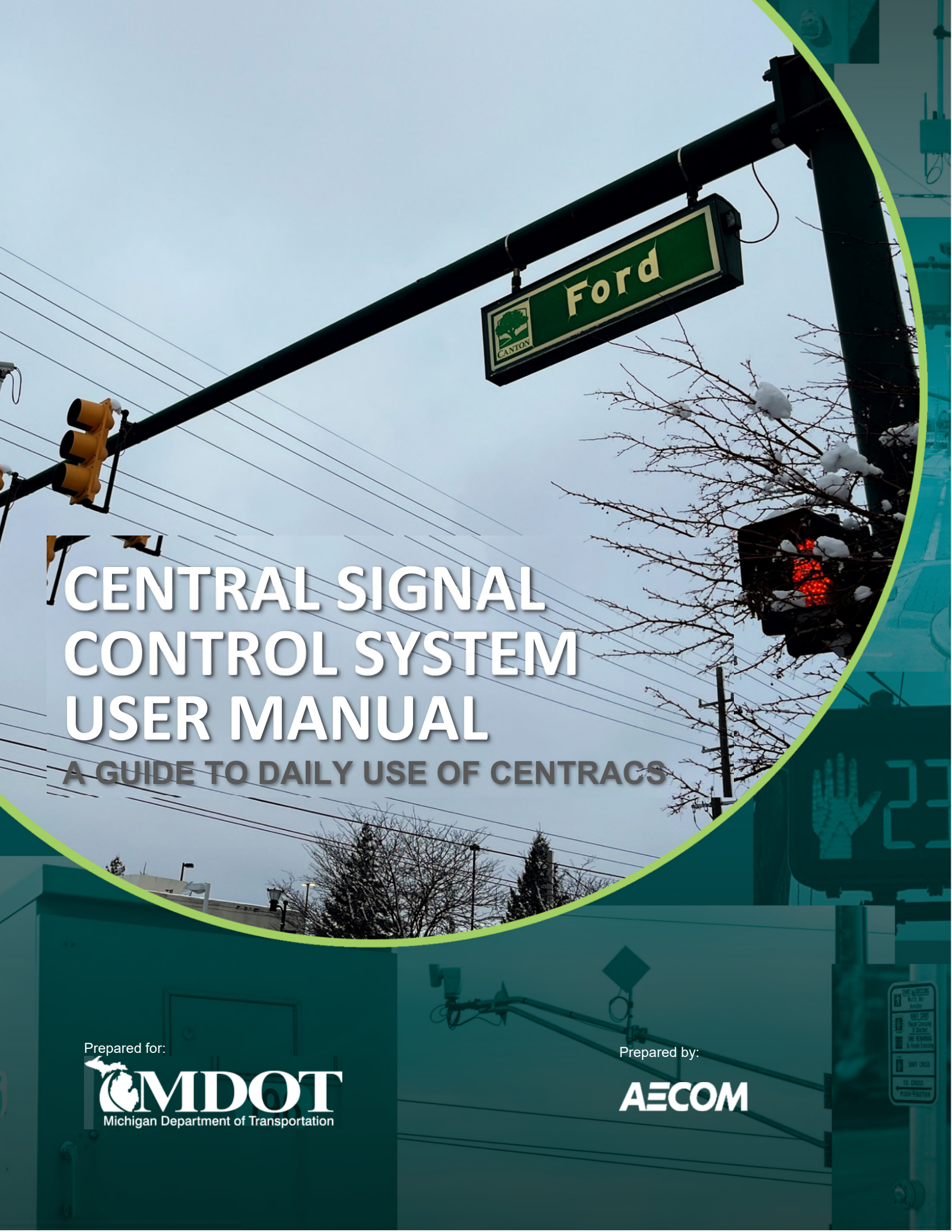

CENTRAL SIGNAL CONTROL SYSTEM USER MANUAL

A GUIDE TO DAILY USE OF CENTRACS

Prepared for:

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Introduction

Centracs is an Arterial Traffic Management System (ATMS) developed by Econolite Control Products, Inc., that offers a centralized platform for traffic signal system control. Centracs makes use of a client-server architecture and the MDOT statewide cellular network to display real-time status information through connections to traffic signal controllers on the street. Centracs uses a map-based approach to represent traffic signal operations and data both visually and numerically. Among its many uses and functions, Centracs provides methods to remotely manage and configure traffic signal timing parameters, monitor alerts and provide system notifications, and can be used to streamline the traffic signal troubleshooting process.

MDOT selected Centracs for the Central Signal Control System (CSCS) project in 2019. MDOT identified the need to implement a CSCS to provide the ability to remotely manage and monitor traffic signals and optimize operations and maintenance procedures.

This manual will provide an overview of the most common functions and uses of Centracs for typical daily use by MDOT users. Each chapter includes a description of intended audiences in the top right corner of the page. Audiences are based on user permissions levels for user accounts in Centracs and not all functions described in the manual may be available on your user account. Lastly, readers looking to learn more are encouraged to access the Econolite Centracs Manual for more detailed information when going beyond the scope of this manual.

Installing Centracs

To install Centracs on a MDOT laptop or workstation, first navigate to Centracs in Software Center and follow the Software Center prompts. **NOTE:** Manager or departmental approval may be required prior to installing Centracs.

Once the Centracs InstallShield has launched, follow these steps:

1. On the welcome screen, click **Next**.

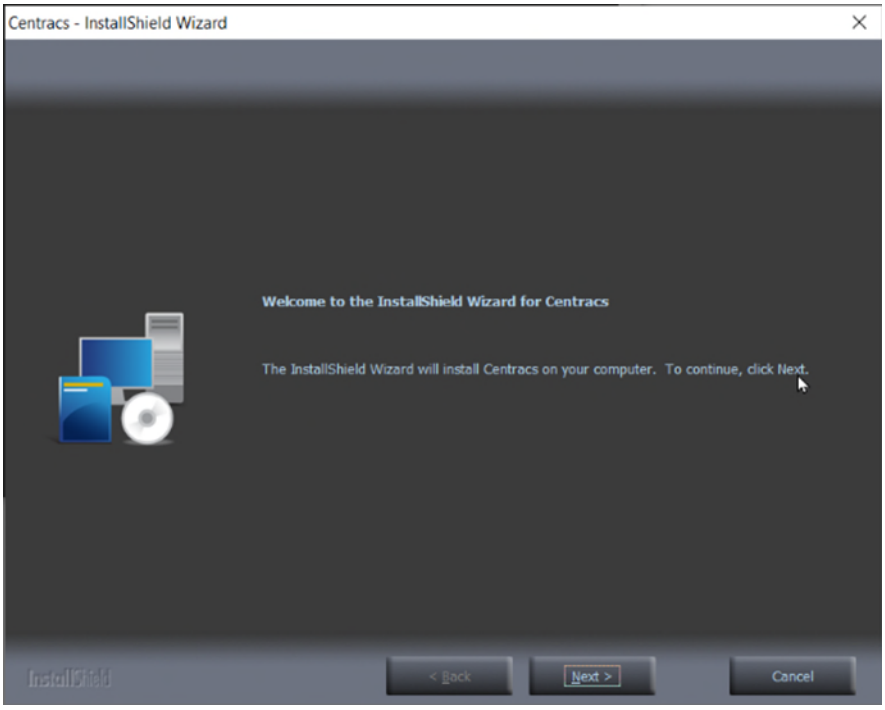

Figure 1: Welcome screen during the Centracs installation process

(Continued on the next page)

2. Read the license agreement. If accepted, click **Yes** to proceed.

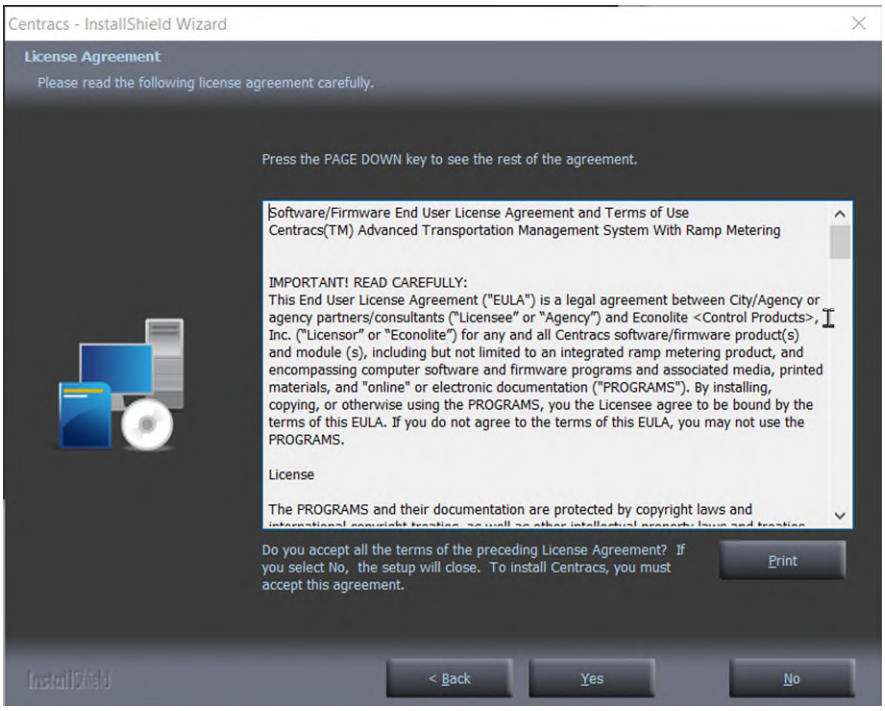

Figure 2: User agreement for the Centracs client

3. The installer will prompt the user for the appropriate location to install Centracs. The correct location is selected by default. Click **Next**.

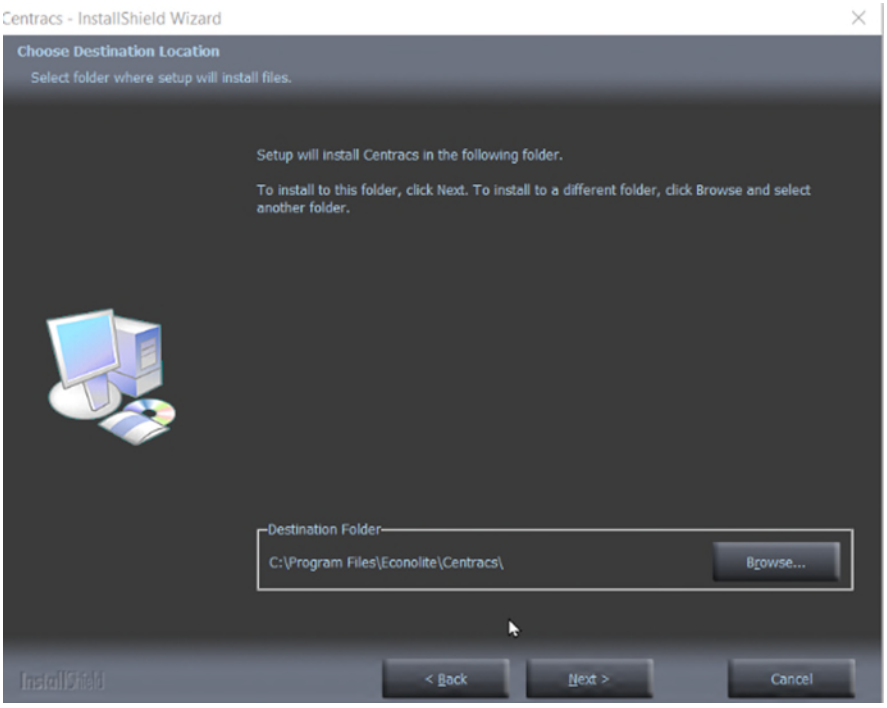

Figure 3: The installer prompts the user for a location to install Centracs. The correct location is listed by default.

4. The installer will prompt the user to select the content to install. Click the **+** symbol to expand the options within the Centracs Client Workstation.

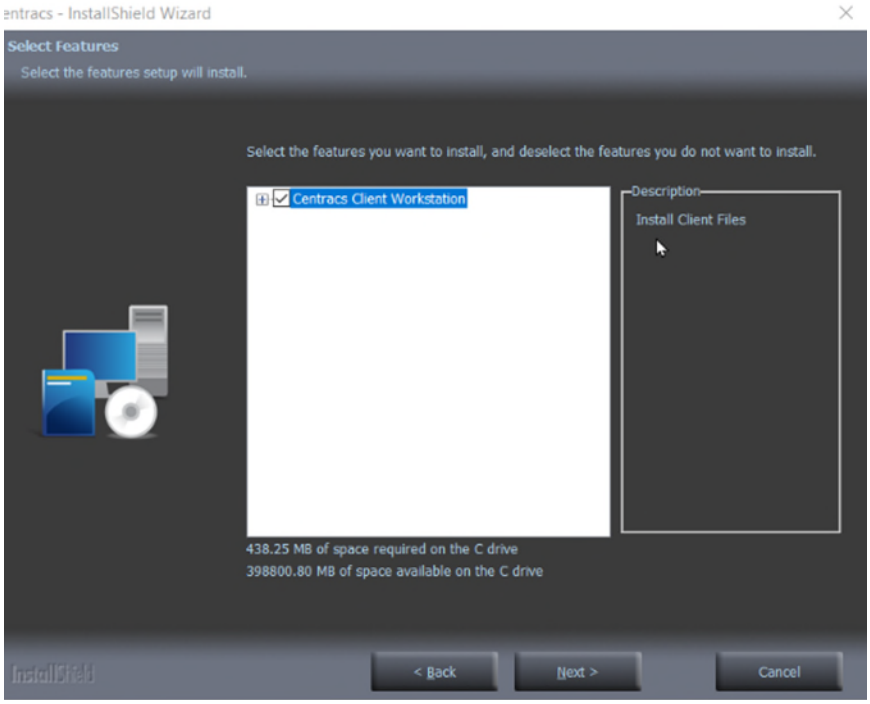

Figure 4: Identifying the components of Centracs to install.

5. Check the **EAGLE EPAC Editor** option. Check all other options under **Centracs Client Workstation**, if not already checked. Do not check **Rampmeter Editor.** Click **Next**.

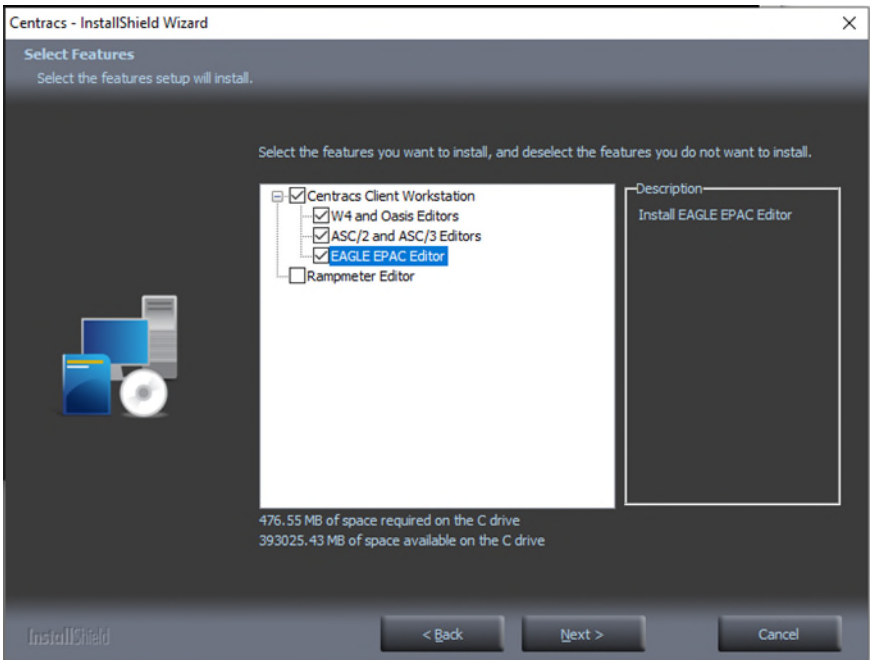

Figure 5: The expanded list of Centracs components to install.

6. Click **Install** to begin the installation.

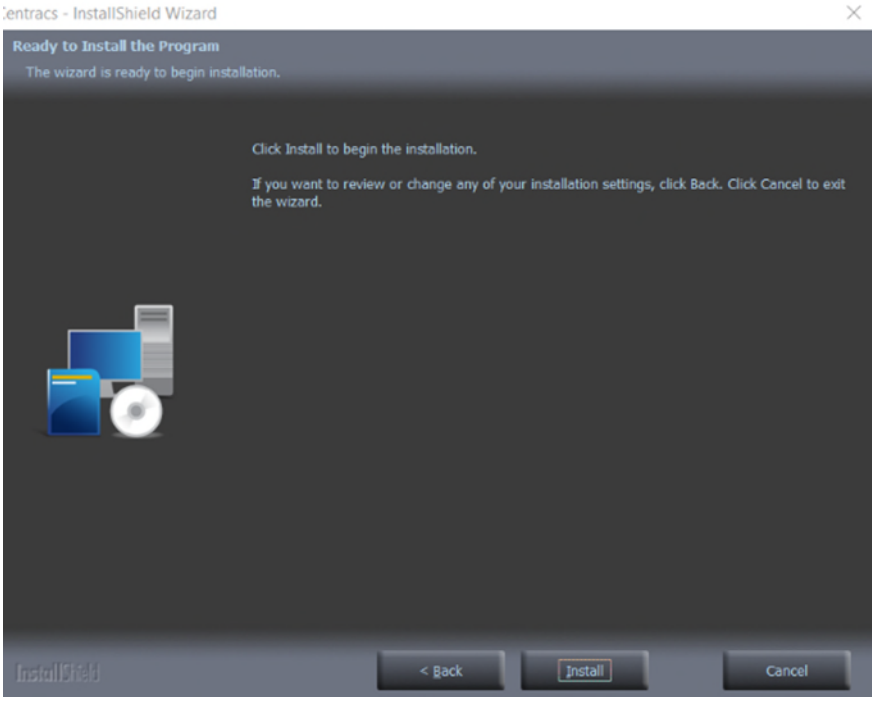

Figure 6: Centracs is ready to be installed.

Once the installation procedure is complete, Centracs will be available on your computer. If any issues occur during installation, contact your supervisor or the **MDOT Centracs System Administrator** for assistance.

Users that already have Centracs installed and need to update to the latest version must first uninstall Centracs. The installation process will automatically remove the existing client by clicking YES when it prompts the uninstall. Contact the MDOT Centracs System Administrator for assistance.

Logging into Centracs

To access Centracs on a MDOT computer, the Centracs client must first be installed. For instructions on installing Centracs, please refer to the Installing Centracs chapter of this manual. Verify Centracs ATMS has been installed on your machine. **NOTE:** Manager or departmental approval may be required prior to installing Centracs.

To log into Centracs:

1. If Centracs is installed on a computer, the Centracs logo, shown in Figure 7, should appear on the desktop. Double-click the Centracs logo to launch the application.

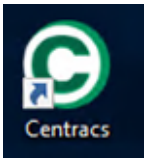

Figure 7: The Microsoft Windows shortcut for Centracs.

2. To log into MDOT's Centracs environment, you must have a Centracs username and password. If you do not know your username or your password, or you have not been assigned a Centracs username and password, contact the **MDOT Centracs System Administrator**. Enter your username and password into the appropriate fields in the Login Window that appears.

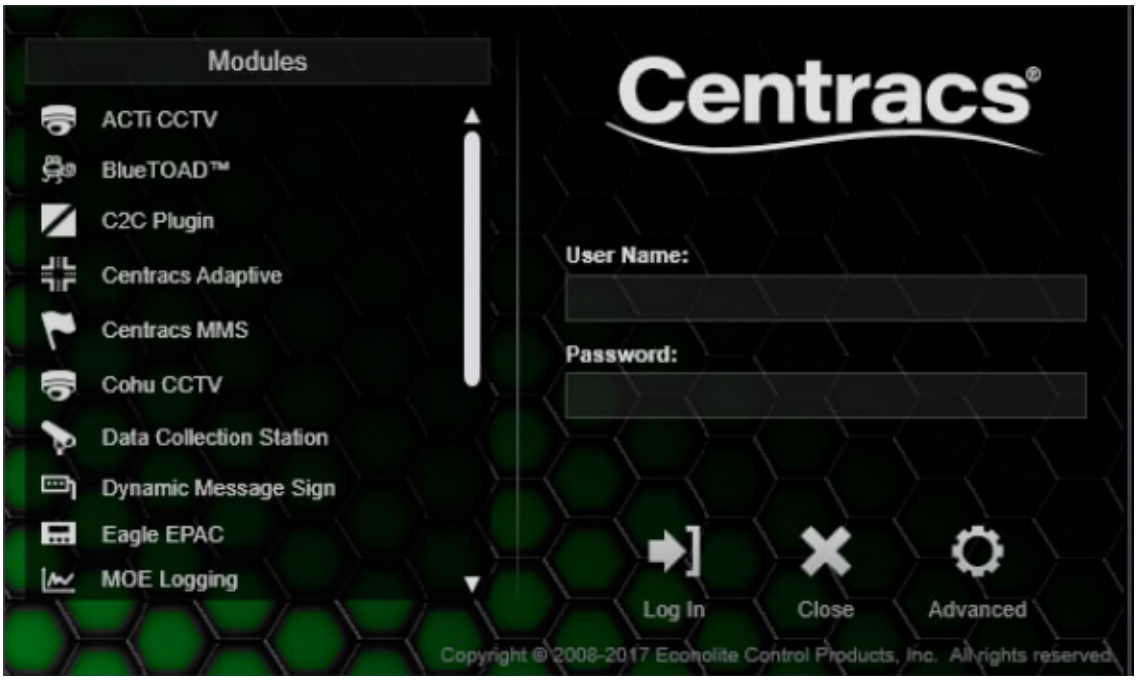

Figure 8: The Centracs Login Window.

3. **FIRST TIME ACCESS:** If you have not logged into Centracs before, you will need to setup the core settings. Click on the **ADVANCED** button. You will be prompted to input the Centracs server IP address into the **Core** field. Check with your manager or the **MDOT Centracs System Administrator** to obtain the Core IP information. Click the **RETURN** button when the core settings have been entered correctly.

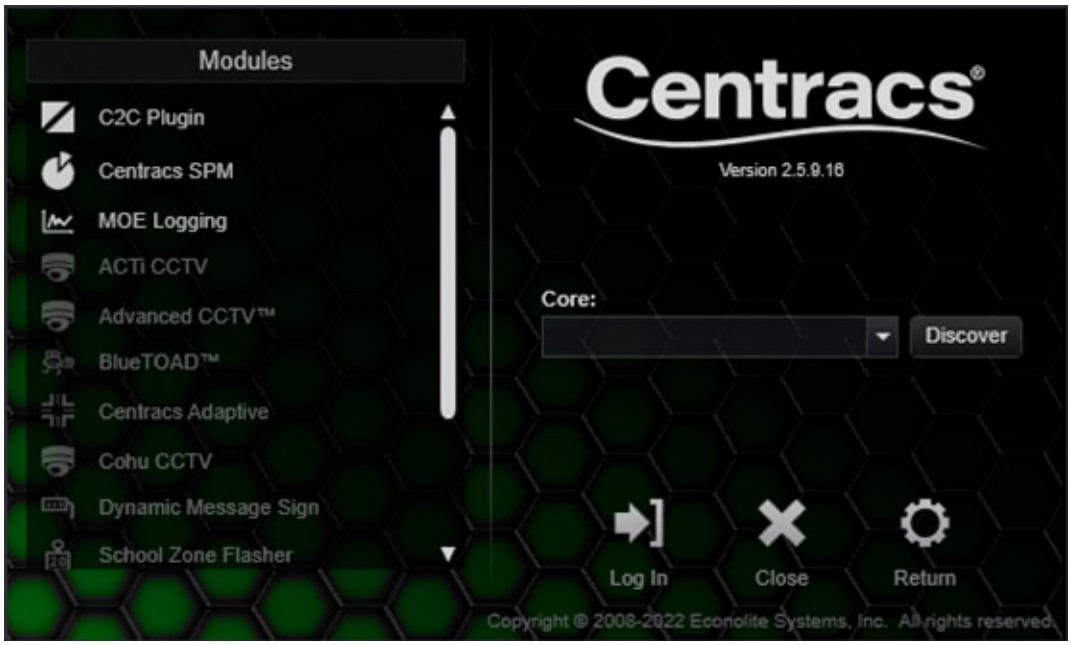

Figure 9: Centracs Login Window with ADVANCED Core settings shown.

4. If your username, password, and core settings are all correct, click the **Log In** button on the Login Window. A loading bar will appear.

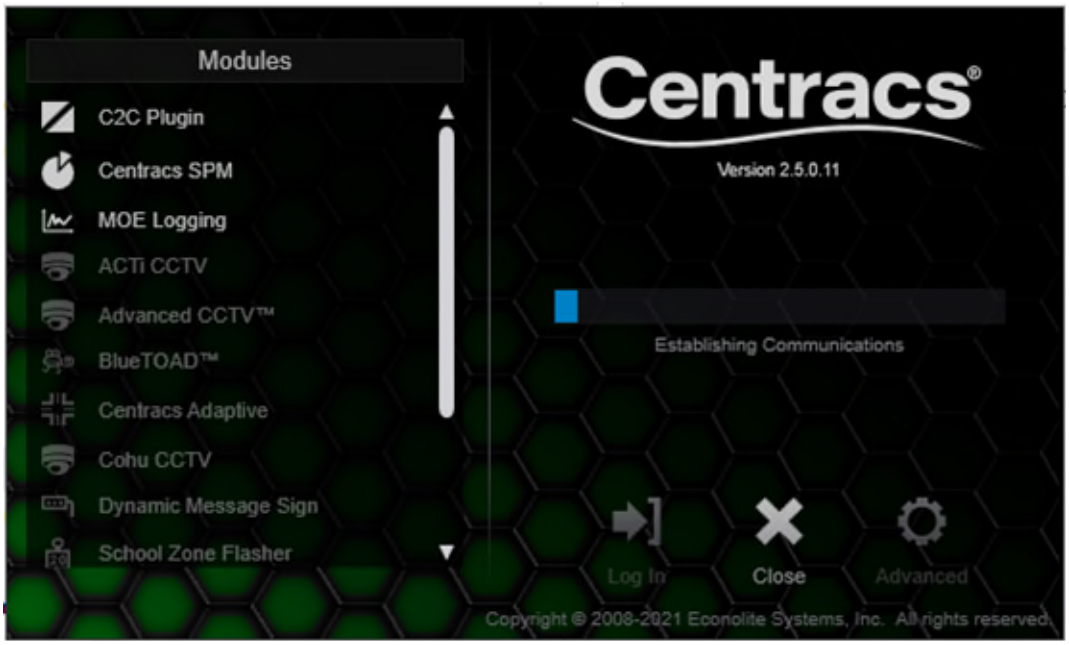

Figure 10: Centracs Login Window with loading bar.

5. If Centracs fails to load for any reason, write down the error message you are given and report it to your manager or the **MDOT Centracs System Administrator** for assistance.
6. Once login is successful the Centracs Login Window will disappear, and the Main Container Window will appear.

If you do not remember your password and cannot log into Centracs, contact the MDOT Centracs System Administrator for assistance.

Configuring the Main Container Window

The Main Container Window is the primary interface for using Centracs. All Centracs functionality is accessible from this window. Centracs makes use of a “container window” system that can be customized by each user. This allows different parts of the software to be anchored in the Main Container Window or moved to secondary screens. This also makes Centracs suitable for display on a video wall. MDOT has created a default configuration for the Main Container Window that users can access.

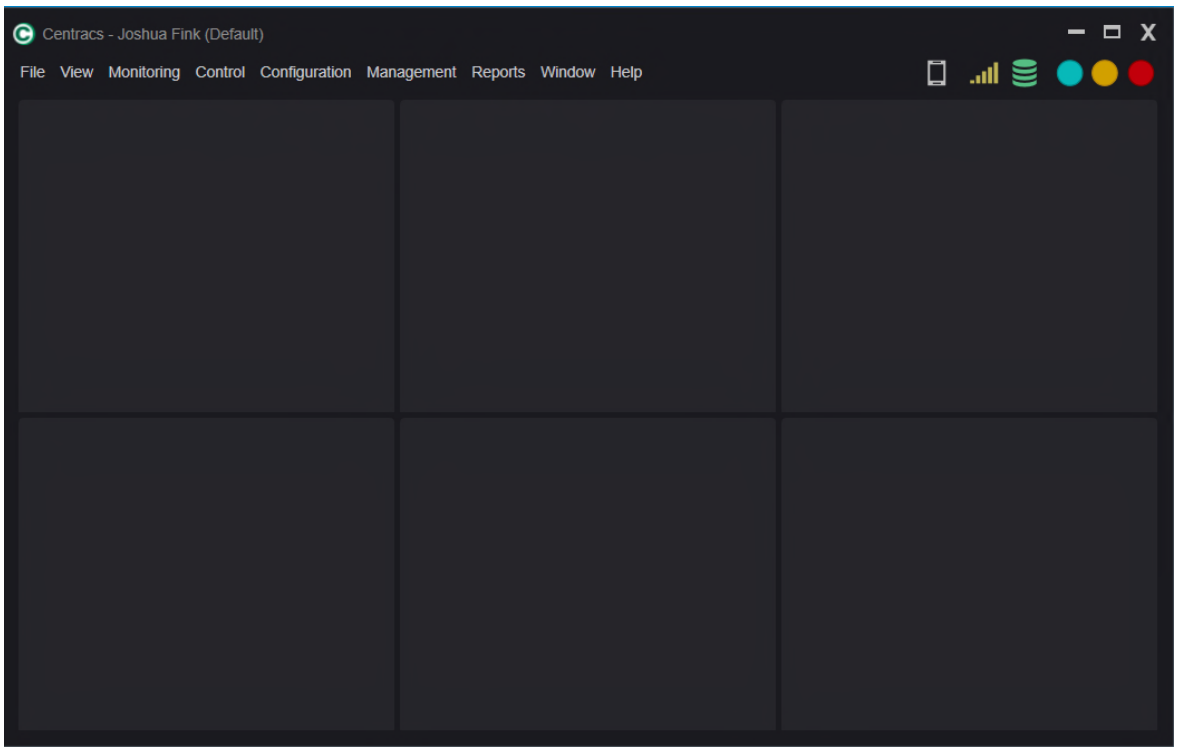

Figure 11: The Main Container Window (blank).

Accessing the MDOT Default Main Container Window and Using Existing Presets

Centracs can permanently store view configurations for the Centracs Main Window. View configurations can be easily retrieved so that users can quickly switch to different window configurations for convenience. MDOT has a default view for the convenience of Centracs users. To access the MDOT default configuration, follow the steps on the next page.

1. Navigate to the **View** menu and select **Preference Sets**.

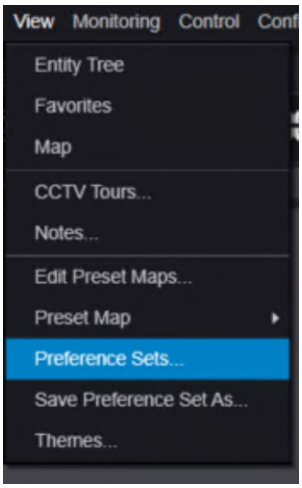

Figure 12: Selecting Preference Sets from the View menu.

2. Scroll down to find the default preset, named CSCS User Default.

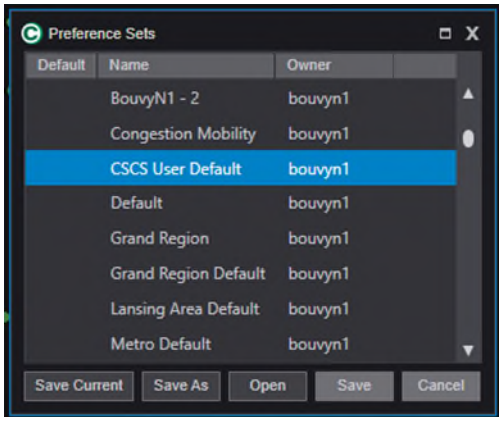

Figure 13: The Preference Sets window with the CSCS User Default option highlighted.

3. Select the pre-developed preset. Click **OPEN**.
4. A notification window will appear, identifying that the preset was successfully loaded. Click **OK**.

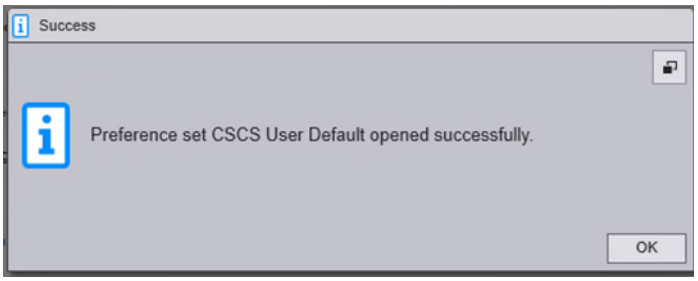

Figure 14: Successfully applying the CSCS User Default preference set.

This will load a default view that includes the Entity Tree, the Centracs Map, the Map Legend, and the Status Dashboard.

Customizing the Main Container Window

In addition to the preset window options, the Main Container Window can be customized according to each user's preferences. This section will guide the user to creating the MDOT CSCS User Default configuration from scratch to provide an example of how to use the Container Window system. To create the MDOT CSCS User Default for the Main Container Window:

1. Navigate to the **Window** menu and select **Main Container Window**. This provides a selection of Container Window configurations. The default MDOT Centracs user recommendation is to select the split window, circled in red in the screenshot below.

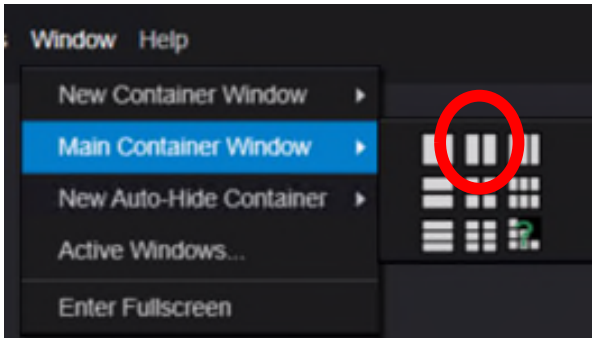

Figure 15: Selecting the Main Container Window configuration. The MDOT user default uses the "split screen" configuration circled in red.

2. Navigate to the **View** menu and select **Entity Tree**. This will bring up the Entity Tree window in Centracs.

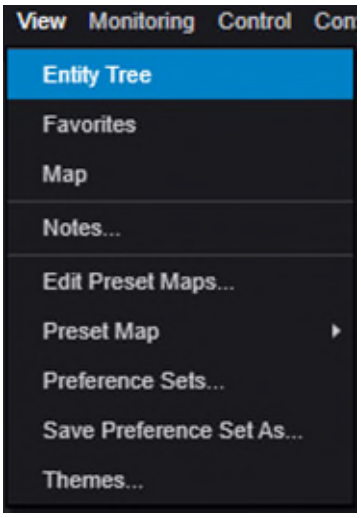

Figure 16: Bringing up the Entity Tree from the View menu.

3. Click in the title bar of the Entity Tree window and drag it over the left Container Window. A Container Window Docking Symbol will appear. Drop the Entity Tree window into the center of this symbol to dock the Entity Tree into the Main Container Window.

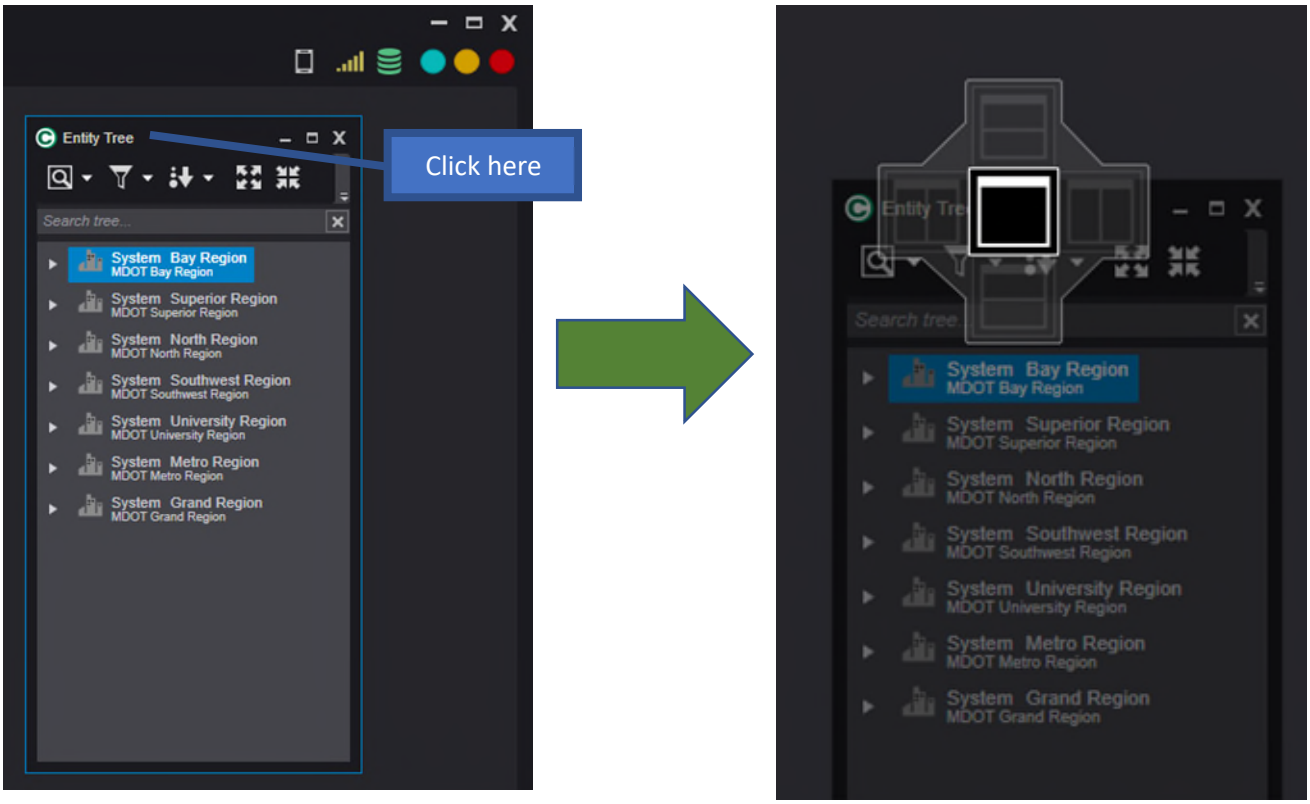

Figure 17: Dragging the Entity Tree by the title block to a Container Window will allow the user to dock the window.

4. Navigate to the **View** menu and select **Map.** Like the Entity Tree, this will bring up the Map window in Centracs.

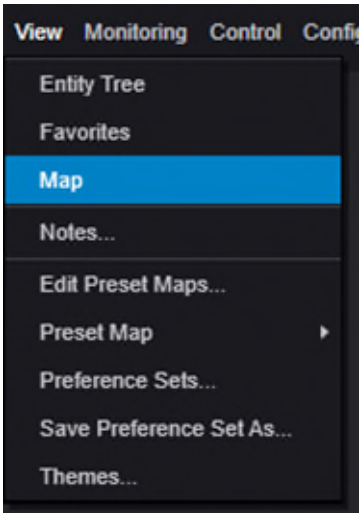

Figure 18: Bringing up the Map window from the View menu.

5. Click in the title bar of the Map window and drag it over to the right Container Window. The Container Window Docking Symbol will appear. Drop the Map window into the center of this symbol to **dock** the Map into the Main Container Window.

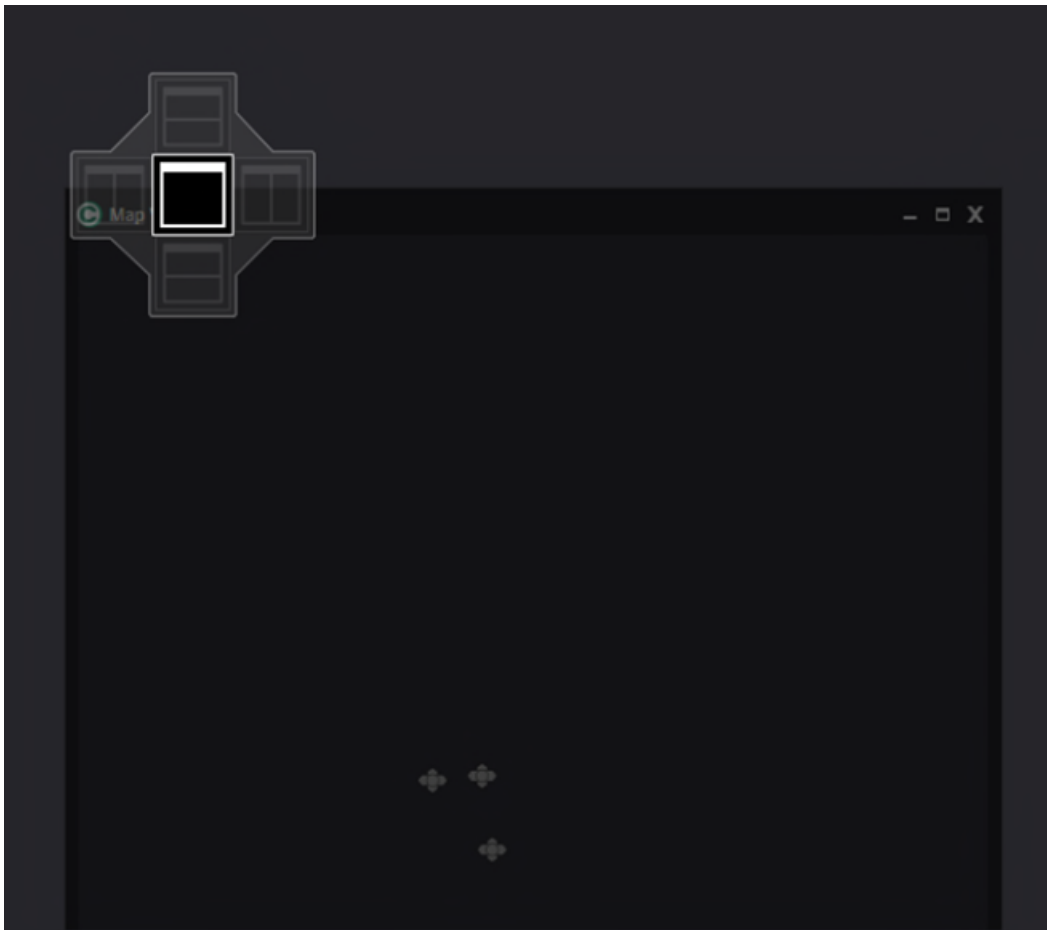

Figure 19: Dragging the Map by the title block to a Container Window will allow the user to dock the window.

6. Right click in the Map window to bring up the contextual menu and select **Show Legend**. This will show the intersection status legend on the Centracs Map.

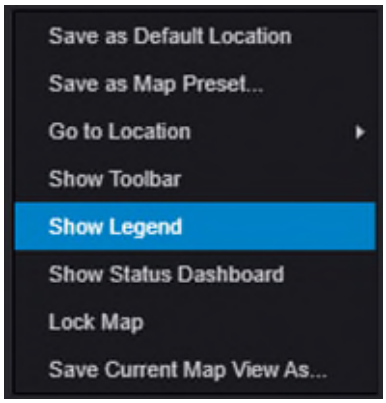

Figure 20: The right-click contextual menu in the Map window.

7. Right click in the Map window to bring up the contextual menu and select **Show Status Dashboard**. This will bring the Status Dashboard.

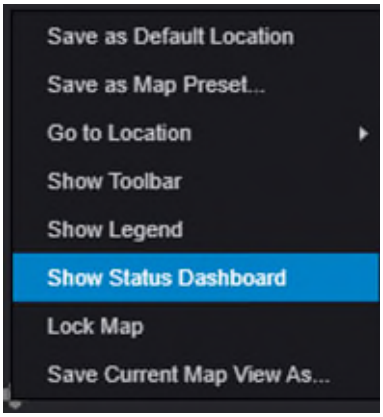

Figure 21: The right-click contextual menu in the Map window.

Using Hidden Containers

Sometimes it can be helpful to have windows easily accessible that do not clutter the primary workspace of Centracs. Using hidden containers can help hide and organize windows for users. To configure a hidden window:

1. Navigate to **Window | New Auto-Hide Container.** A secondary menu will appear that prompts the user to select the location of the new container. The left side, right side, or bottom of the Main Container Window are the three locations that a hidden container can be configured.

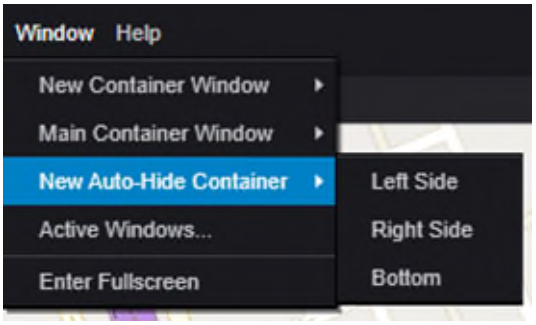

Figure 22: Adding a new auto-hide or hidden container to the Centracs interface.

2. Select the side of the Main Container Window for the hidden container. Figure 23 shows the result of selecting the left side of the Main Container Window for the new hidden container.

(Continued on the next page)

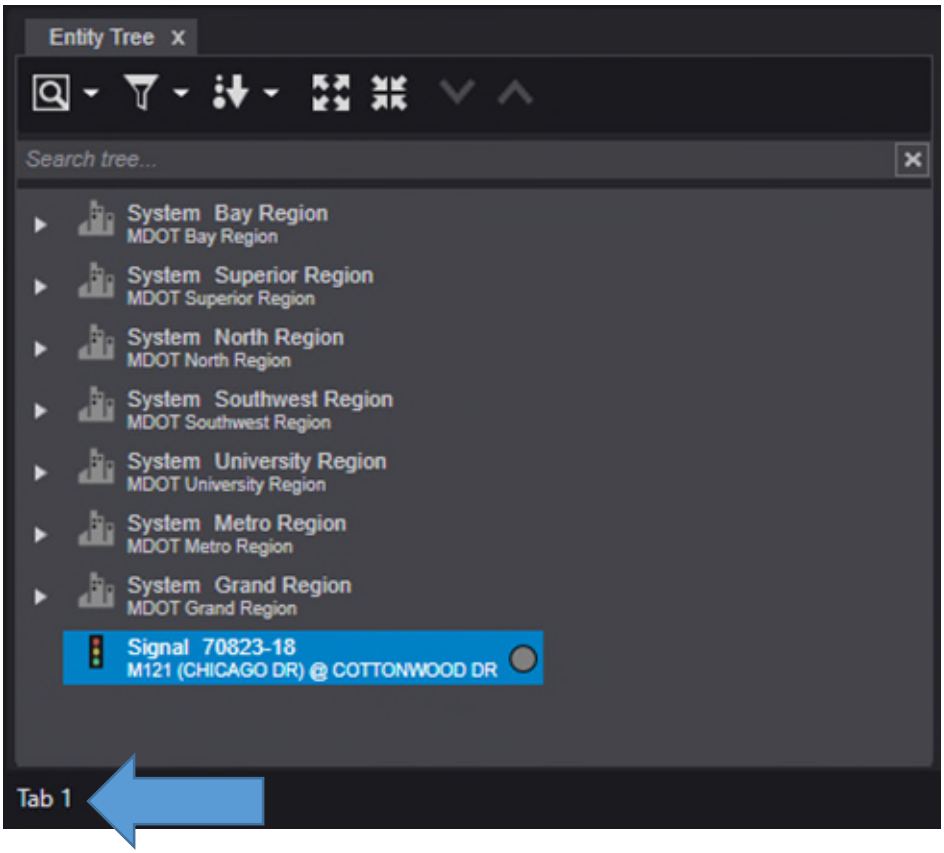

Figure 23: The Centracs interface showing the MDOT Entity Tree and a hidden container named Tab 1 at the bottom of the window.

3. To add windows to the hidden container, click and drag a window over to the name of the hidden tab. The hidden tab will “pop up” and a window can be added in a similar fashion as a standard container window.

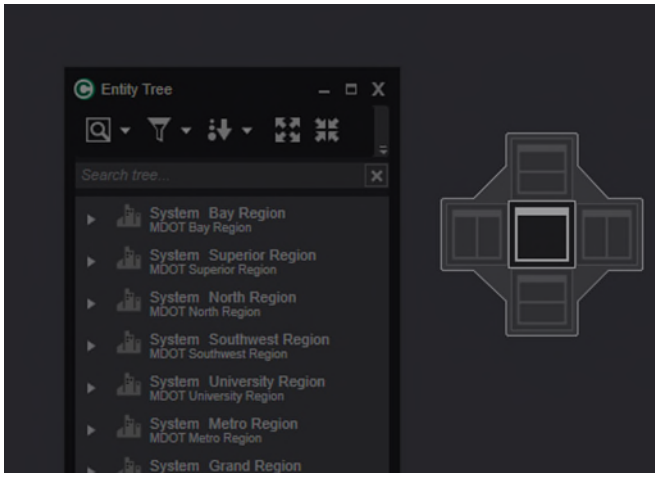

Figure 24: Dragging the Entity Tree window to the new hidden tab brings up the Container Window Docking Symbol.

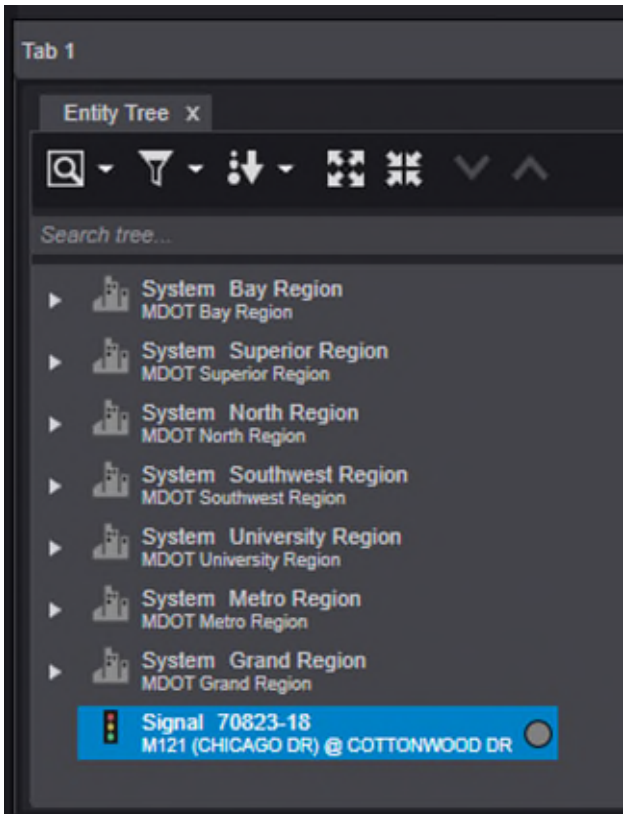

Figure 25: The Entity Tree has been docked into the hidden tab named Tab 1.

4. To use the hidden container window, click on the name of the hidden container window. In the example shown, the user clicks on “Tab 1” to bring up the hidden container window. To hide the window again, click in the Main Centracs Window and the hidden container window will minimize.
5. If the user wishes to rename the hidden container window, right click on the tab name and select **Rename**. A window will appear that prompts the user to enter the new name for the hidden container window.

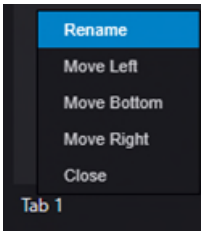

Figure 26: Right clicking on the hidden container window name to bring up the Rename option.

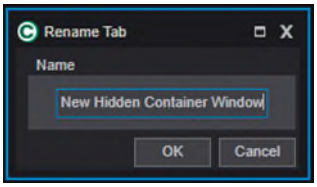

Figure 27: Using the Rename Tab window to rename the hidden container window.

The Centracs Map

The Centracs Map is a primary method of viewing the MDOT CSCS connected network of signals. Centracs is a map-based ATMS, meaning that symbols are placed at the corresponding latitude and longitude of the traffic signals they represent. Each user can pan and zoom on the map to view intersections or learn key information about a connected traffic signal.

Zooming in and out of the Centracs Map activates different Zoom Levels. It may be noticed that in a further zoomed out state, only a dot is rendered on the map to represent an intersection. The color of the dot corresponds to the real-time status of the signal. These statuses are reflected on the Map Legend and are explained in Figure 22.

Note that in different views and parts of the software, this color-coding scheme is consistent with reflecting intersection status.

Icon	Color	Meaning
	Green	In coordination
	Yellow	In transition
	Red	Error flash (i.e., unintentional flash)
	Orange	Programmed flash (i.e., intentional flash)
	White	Free
	Pink	Preempt active
	Gray	Offline
	Black	Standby
	Blue	Comm failure (or comms are not configured)

Figure 28: Explanation of intersection status colors (image source: Econolite Centracs User Manual, 2018).

Zooming in further will render a dot with arrows to represent an intersection. The dot will be colored with the same color scheme as described above, and the arrows will change between green and red to indicate directional main street/side street status.

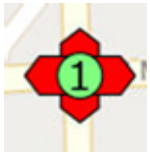

Figure 29: Sample zoomed-in map icon showing pattern number, green coordination indicator, and directional arrow status.

The following table is a sample of icons that may appear when the map is zoomed in.

(Continued on the next page)

Icon	Meaning
	The green circle in the center indicates that the signal is in coordination. In this example, pattern 1 is active.
	The yellow circle in the center indicates that the signal is in transition. In this example, pattern 2 is active.
	The center of the circle indicates that the signal is in error flash. (i.e., unintentional flash.) and the icon color alternates between clear and red.
	The center of the circle indicates that the signal is in programmed flash (i.e., intentional flash.)
	The center of the circle indicates that the signal is in Free mode.
	The pink circle in the center indicates that a preempt is active.
	The Mode for the signal is set to Offline (in the Entity Configuration screen).

Zooming in further will render aerial photography and individual map graphics. The graphics shown will be the same graphics that can be seen in the Intersection Status Window.

Refer to the Intersection Status Window chapter of this user manual for more information on the detailed intersection visuals at this zoom level.

Intersection Mouse-over Information

Hovering the mouse cursor over an intersection in Centracs will display basic information about that specific intersection, including the assigned jurisdiction, the firmware type, the current mode of control (e.g., a pattern number, free, or flash), current time drift of the local traffic signal controller clock, and active communications status.

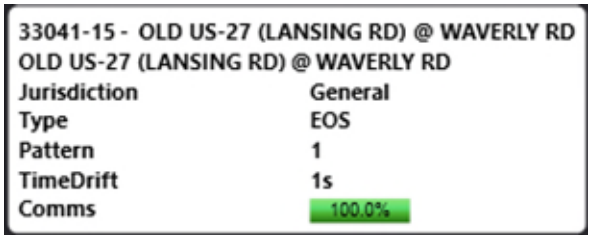

Figure 30: Hovering the mouse pointer over an intersection will bring up this information for a given intersection.

The Map Legend

Users can toggle a map legend on or off through the right-click contextual menu. To access the legend:

1. Right-click in the Map window to bring up the contextual menu.
2. Click **Show Legend**.

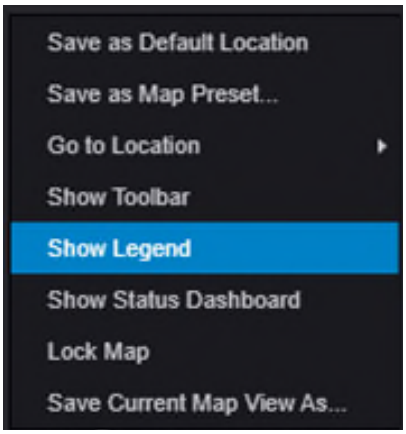

Figure 31: Selecting the Show Legend option in the right-click contextual menu on the map.

This will bring up the legend at the top of the Map window. The color scheme seen in the legend is used uniformly across Centracs for ease of user understanding and explained in more detail, above, in Figure 22. In addition to those colors, the three status colors on the right side of the legend (i.e., TA, Manual, and TSP) are “halos” that indicate a temporary status condition. The use of each condition is defined as follows:

- TA, or Traffic Algorithm, is used when the Traffic Responsive functionality in Centracs is active.
- Manual is used when a manual command is active at an intersection.
- TSP, or Transit Signal Priority, is used with transit-related applications.

Figure 32: The Centracs map legend. These colors are used throughout the software for uniformity and ease of use.

The Status Dashboard

Users can toggle the MDOT Status Dashboard through the right-click contextual menu. This dashboard provides an at-a-glance look at the active status of all intersections connected to the system. To access the dashboard:

1. Right-click in the Map window to bring up the contextual menu and click **Show Status Dashboard**.

(Continued on the next page)

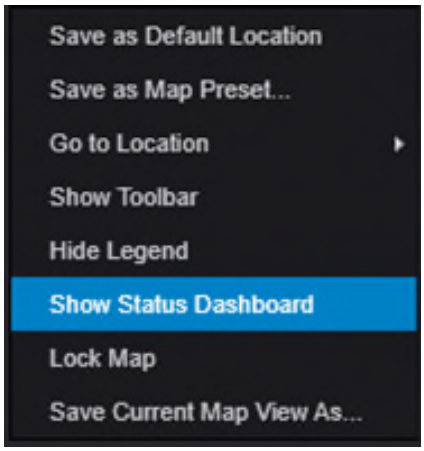

Figure 33: Selecting the Show Status Dashboard option in the right-click contextual menu on the map.

2. This will bring up the Status Dashboard at the top of the Map window.

Figure 34: The System Dashboard display on the MDOT Centracs system.

You can also have the Status Dashboard as a floating or dockable window. To do this, navigate to Monitoring | Status Dashboard.

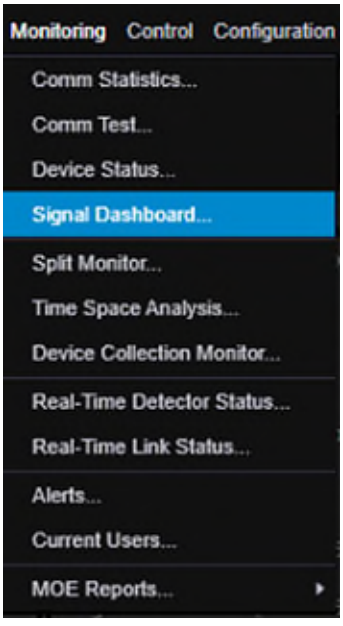

Figure 35: Selecting Signal Dashboard from the Monitoring menu.

3. The Status Dashboard is updated in real time and will always show the current status of all signals.

Figure 36: The filter icon.

The Dashboard also supports filters. To adjust what the dashboard displays, click on the **Filter** icon in the top right corner of the Dashboard window, seen in Figure 37. This brings up the Signal Dashboard Filter window.

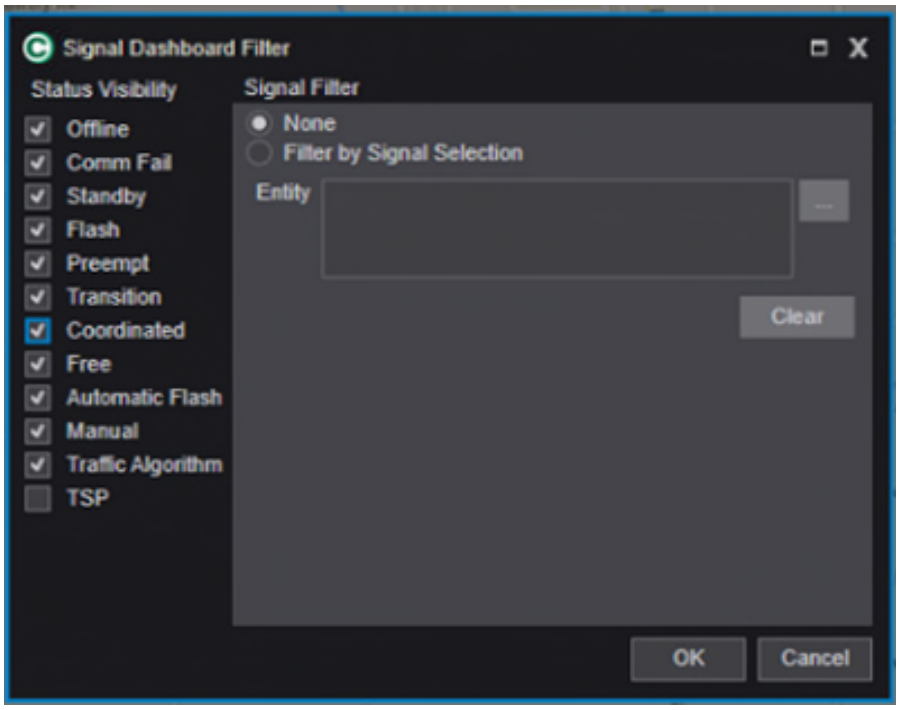

Figure 37: The Signal Dashboard filter window.

4. Using the check boxes under Status Visibility, users can enable or disable the visibility of intersection statuses, as desired. Further, the Dashboard can be filtered by a user-specified range. To do this:
   a) Click the **Filter by Signal Selection** option, as seen on the right side of Figure 37 under the Signal Filter section. This will enable the **…** button next to the Entity field.
   b) Click the **…** button next to the Entity field. This brings up the Entity selection window. From here, the user can select signals at the System (Region), Section (County), or Subsection (CS Number) to filter the Dashboard by.
   c) Click **OK** in the Entity Selection window. This returns to the Signal Dashboard Filter window with the chosen entities now listed. Click **OK** again and the Filter window will close. The dashboard should automatically refresh based on the selected criteria.

d) To clear any entity filters, click the **Clear** button.

Using ctrl-click can allow the user to select multiple individual intersections in the Entity Selection window!

The Intersection Status Window

The Intersection Status window in Centracs is the primary interface to access real-time, detailed information about a particular signal. The user can quickly assess the status of an intersection and to easily issue commands to a traffic signal controller.

To access the Intersection Status Window, double-click on a signal on the Map or the Entity Tree. This will highlight the signal and bring up a floating window with that signal's status screen, seen below.

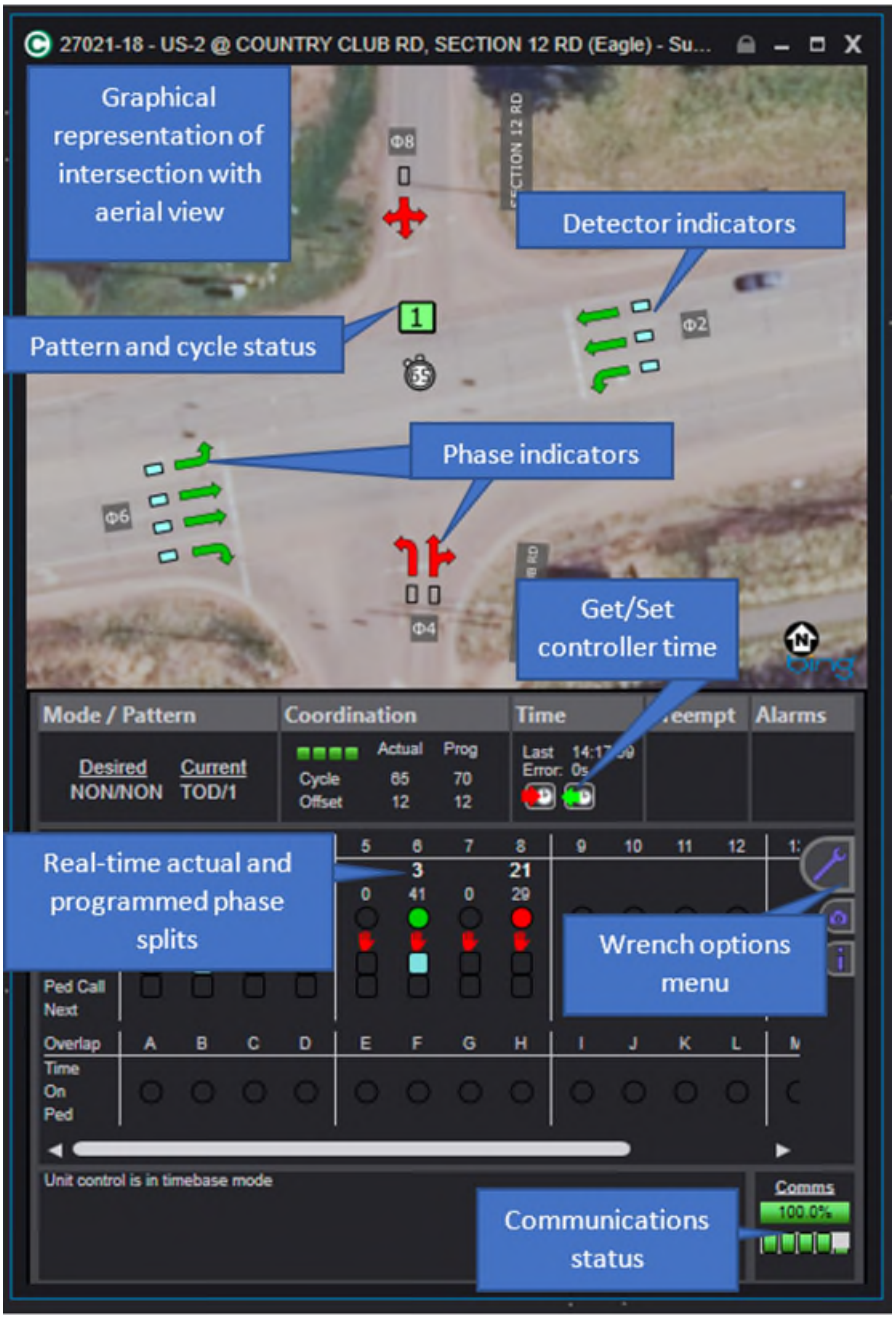

Figure 38: A sample Intersection Status window.

The Intersection Status Window provides valuable information for understanding what the traffic signal is doing in real time. The top half of the status screen is a visual representation of the signal overlayed on an aerial map. Arrows will change colors to indicate the real-time states of each phase. Teal boxes and circles will illuminate and darken to show real-time changes in vehicle and pedestrian detectors configured in the traffic signal controller. A full list of icons that have been configured for the typical MDOT Intersection Status Window is in the table below. For information on additional icons that can be added to the Intersection Status Window, please see the Econolite Centracs Manual.

Icon	Usage	Icon	Usage
	Through movement		Left turn movement
	Right turn movement		Through and left movements
	Through and right movements		Through, left, and right movements
	FYA traffic		Pedestrian phase
	Pedestrian detector call indicator. The circle turns blue when a call comes into the traffic signal controller for the assigned detector		Vehicle detector call indicator. The rectangle turns blue when a call comes into the traffic signal controller for the assigned detector
	Advance vehicle detection indicator		Preempt indicator
	Detector fault indicator. Appears only when there is an active detector fault for the intersection		Alarm input indicator. Appears only when the assigned alarm input is active
	Coordination state and pattern indicator. Changes colors based on colors shown in Figure 22		Cycle length counter. May count up or down depending on Econolite or Siemens traffic signal controller
	Manual command sent by Centracs to the controller is active		Manual command in use at the local traffic signal controller

Setting the Traffic Signal Controller Clock

Ensuring the traffic signal controller clock is accurate is vital to coordinated signal operations. The Time section of the Intersection Status Window provides a way to verify and, if desired, set the traffic signal controller clock.

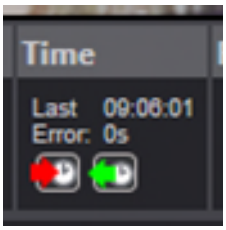

Figure 39: The Time section of the Intersection Status Window.

When troubleshooting an intersection, it is a good first step to ensure the traffic signal controller clock is accurate. The Intersection Status Window provides an easy way to do this.

This section of the Intersection Status Window provides the following:

- The last time the local traffic signal controller clock was checked by Centracs. In the screenshot in Figure 39, this shows the time at last check was 9:06:01 AM.
- The time drift error – this checks the local traffic signal controller clock against the central server clock. In Figure 39, the traffic signal controller was accurate to the server time with 0 seconds of drift.
- *Set Time* (the **red** arrow): The user can set the local traffic signal controller clock using the Centracs server time. If the traffic signal controller clock is showing an error (i.e., has time drift), this may cause a brief transition mode on the traffic signal controller as it adjusts to the new time. Note that the time being used to set the traffic signal controller clock is based on the MDOT Centracs server, which uses the standard Network Time Protocol (NTP).
- *Get Time* (the **green** arrow): The user can retrieve the current clock time on the traffic signal controller to refresh the clock display.

The MDOT Centracs system is configured to automatically set all traffic signal controller clocks statewide periodically throughout the day to reduce time drift and coordination errors.

The Wrench Toolbar Menu

Hovering the mouse cursor over the blue logo of a wrench on the Intersection Status Window brings up a toolbar with different viewing options for the selected intersection.

Figure 40: The wrench toolbar menu.

From left to right, these options are:

- Hide overlaps from being displayed that are not configured in the signal timing.
- Restore overlaps that have been hidden.
- Hide phases from being displayed that are not configured in the Intersection Status Window.
- Restore phases that have been hidden.
- Launch the EDI Conflict Monitor configuration software.
- Launch the controller front panel; for more information on this part of the software see the Controller Front Panel section of this chapter.
- Launch the files dialogue window.
- Launch the signal controller editor; for more information on this part of the software see the Signal Database Editor chapter of this user manual. Depending on the traffic controller type at the location, this option will launch either the EOS database editor or the SEPAC database editor.

Some of these options might not be available based on your user permissions level.

Controller Information

Mousing over the purple "i" icon below the wrench menu will bring up metadata information about the intersection, including the controller type, the IP address, and the current firmware version. This information can be valuable and is provided here for ease of access.

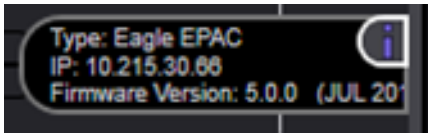

Figure 41: Type, IP, and firmware information in the Intersection Status window.

Asserting Manual Vehicle and Pedestrian Calls

The Intersection Status Window can be used to manually place a vehicle or pedestrian call on a phase. This can be a useful troubleshooting tool to assess if a traffic signal controller responds to a detector call appropriately. Mousing over a phase number will bring up the dialogue box seen below.

Figure 42: Phase mouse-over information with an option to manually assert a vehicle or pedestrian call on the selected phase.

In addition to information relating to the phase configuration and its most recent activity, the **Assert Vehicle Call** and **Assert Pedestrian Call** buttons can be clicked to manually place a call to that phase. The traffic controller will process this phase call as a typical detector input into the controller. The manual detector call is reflected in the interface by a red M over the detector column of the phase status.

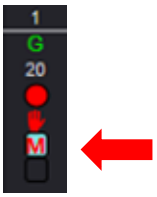

Figure 43: A vehicle asserted call is reflected with the red M in the detector status box under the phase number.

The asserted call will remain in place until the user removes it. If the user closes the Intersection Status window, an alert will appear reminding the user that the asserted call is in place.

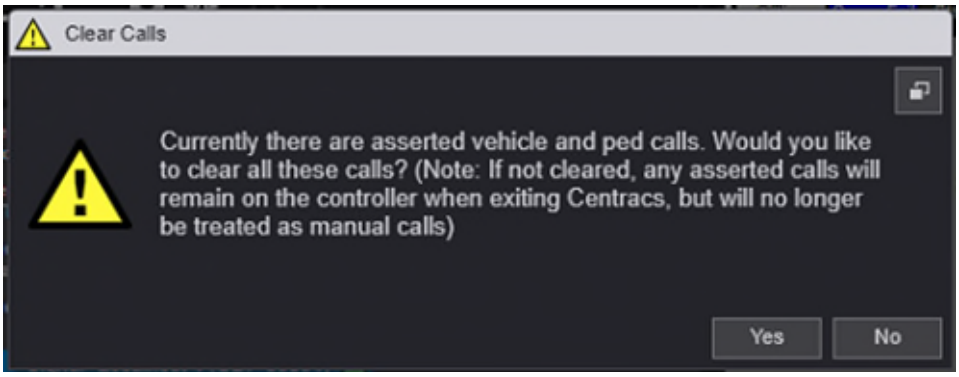

Figure 44: Centracs will remind the user that an asserted manual detector call is in place if the Intersection Status window is closed.

The Controller Front Panel

With the appropriate user permissions, the wrench toolbar menu will include access to the controller front panel. This is an interface that allows the user to directly see the actual front panel screen of the controller and manipulate the controller directly. A set of buttons that mirrors the Cobalt traffic signal controller functionality is included to allow the user to manipulate and navigate through different traffic signal controller screens.

Figure 45: Accessing the Controller Front Panel option from the wrench menu in the Intersection Status window.

The traffic signal controller front panel interface is only available for location using an Econolite Cobalt traffic signal controller running EOS. It is <u>not</u> available through Centracs for intersections operating with a Siemens M60 controller!

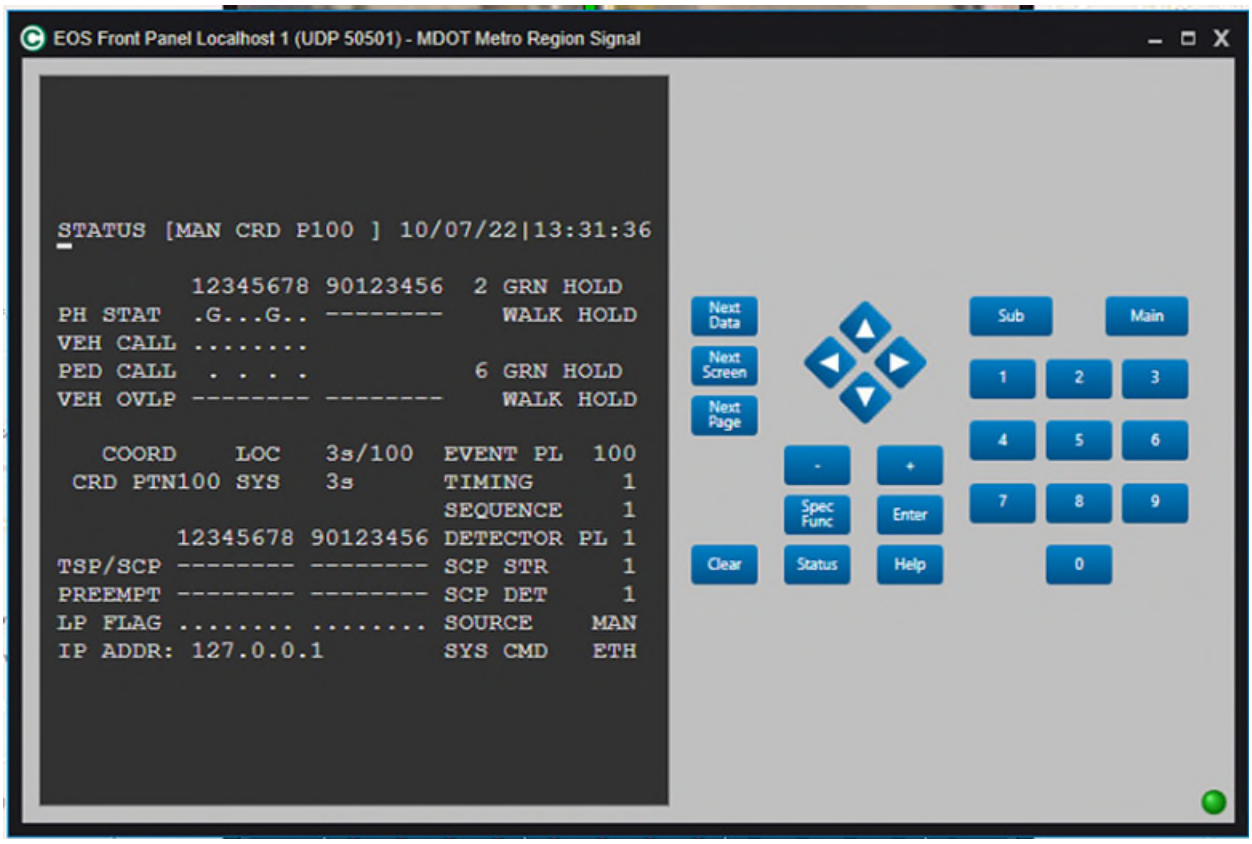

Figure 46: The controller front panel interface. Note that this is only available for the Econolite Cobalt controller running EOS. It is not available for locations running Siemens M60 controllers.

This function can be useful to jointly troubleshoot a location. If MDOT staff are in the field at the location, and an operator or engineer accesses that location's controller front panel in Centracs, both teams will be able to view the same screen in real time.

Note: Any changes made to parameters in the controller in this manner will **not** be reflected in the Centracs database editor. If changes are made through the controller front panel interface, it is recommended to upload the and store the configuration in the database editor to ensure consistency and accuracy in the MDOT CSCS environment.

The Centracs Entity Tree

The Centracs Entity Tree is a hierarchal view of all devices (or entities) connected to Centracs. This window is a core functionality of the Centracs system and users can rely on it for searching and for system organization within Centracs. It is recommended to keep the Entity Tree on the Main Container Window for ease of navigating the MDOT network of traffic signals. Figure 47 shows an example of the entity tree with descriptions of different parts of the window that will be explained in this chapter.

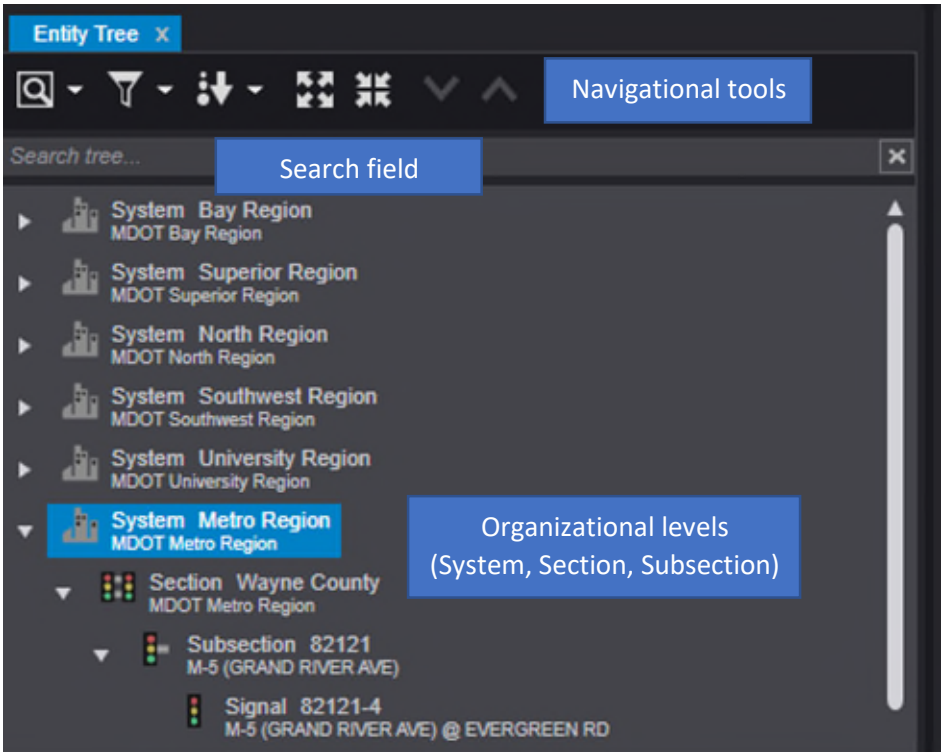

Figure 47: The Entity Tree.

The Entity Tree has multiple levels of organization in use by MDOT, including:

- MDOT Region (System Level),
- County Name (Section Level), and
- CS Number (Subsection Level).

MDOT's system identifies each individual traffic signal by its CS-Spot designation. A second line beneath the CS-Spot number is used to identify the crossroads of the intersection according to official MDOT descriptions.

(Continued on the next page)

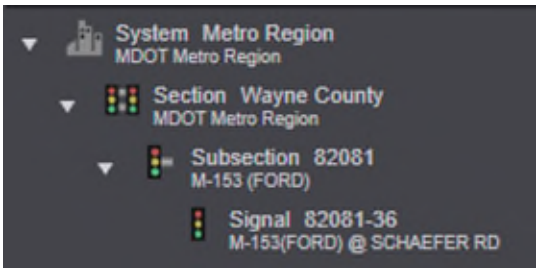

Figure 48: Different organizational levels of the entity tree used by MDOT.

Note! User permissions have been pre-configured for your Centracs account. If you believe there has been an error in configuring your account, please contact your manager or the MDOT Centracs System Administrator for more information.

Section and Subsection Status Windows

Similar to the Intersection Status Window, status windows for Sections and Subsections can be accessed from the Entity Tree. To access these status windows, double-click on the Section or Subsection name and the corresponding status window will appear. These status windows can be useful for reviewing active status and communication information for an entire corridor or county. Figures 49 and 50 show examples of these status windows.

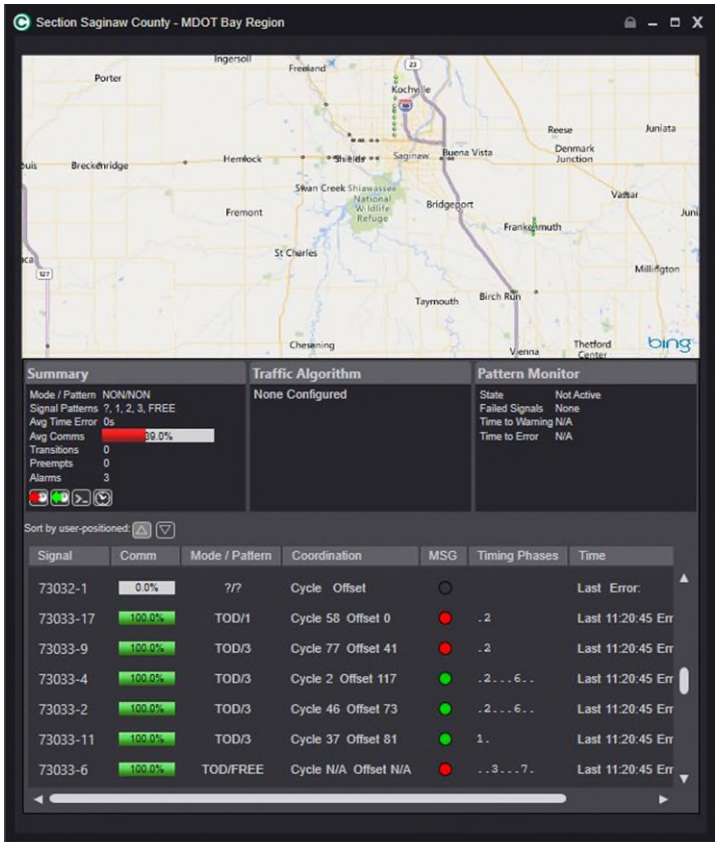

Figure 49: Section status window for Saginaw County in the Bay Region.

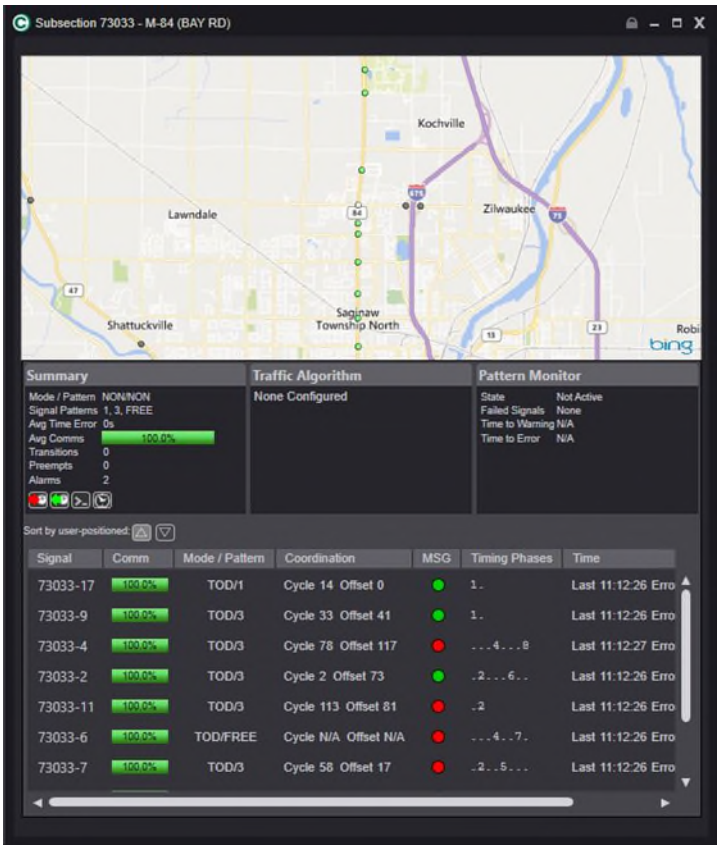

Figure 50: Subsection status window for the M-84 (Bay Rd) corridor in Saginaw County in the MDOT Bay Region.

Using the Entity Tree

Entities can be interacted with in the Entity Tree. Right-clicking on a System, Section, Subsection, or Signal will bring up a contextual menu with options relevant to the entity that has been selected. A right click on an entity can be a quick and easy way to access common commands and functions associated with that type of entity. It is also the easiest way to add a new entity.

(Continued on the next page)

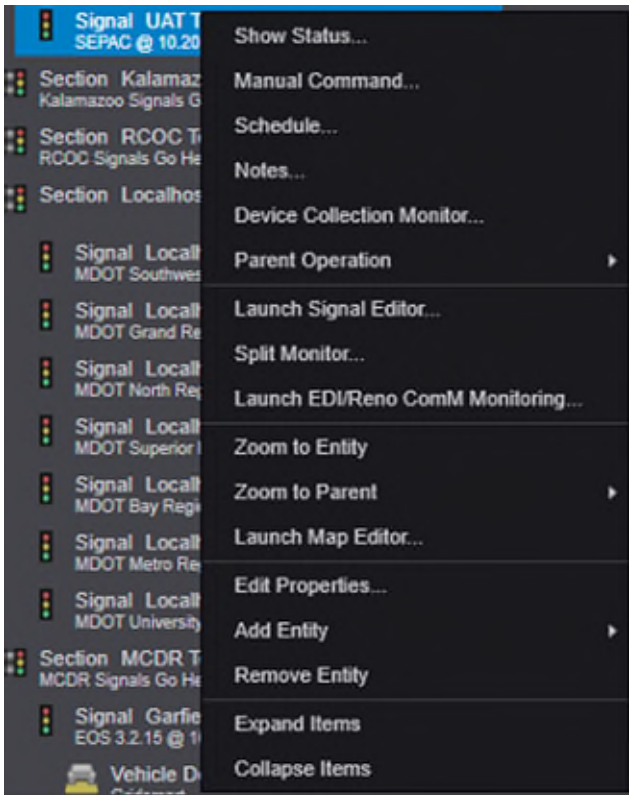

Figure 51: The right-click contextual menu for a signal in the Entity Tree.

In addition, there are inherent functions that assist in navigating the Entity Tree. The table below explains the navigational tools found at the top of the Entity Tree window.

Icon	Function	Description
	View Style	Change the appearance and information presented in the Entity Tree
	Filter	Filter entities in the Entity Tree by entity type
	Sorting/Ordering	Customize ordering in the tree
	Expand All Icons	Show all entities in all levels of the Entity Tree
	Collapse All Icons	Hide all child entities under their parent entities
	Move Up/Move Down	Reposition entities in the tree.

Changing the Look of the Entity Tree

The drop-down menu adjacent to the search icon at the top of the Entity Tree window provides some customization in the appearance of the Entity Tree for the user. The Entity Tree can be condensed and show less information or expanded to show additional information and the active status of the location. This allows the user to further customize their experience, but the "Large with Status" is the recommended option for users. This view option includes the active status bubble with a circle representing the same set of colors as found in the Map Legend, which can be seen in Figure 22 in the Centracs Map chapter.

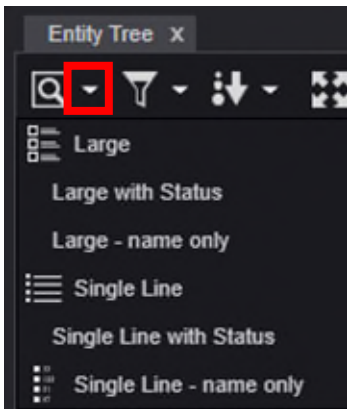

Figure 52: The appearance options for the Entity Tree. Note the drop-down arrow option next to the Search icon that brings up these options.

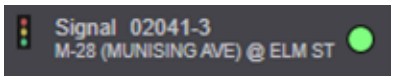

Figure 53: The appearance of the Entity Tree with the recommended "Large with Status" view option selected.

Searching the Entity Tree

Due to the number of intersections connected to Centracs, it is recommended to make use of the search function to quickly find an intersection of interest. To search the Entity Tree:

1. In the Entity Tree window, click the **SEARCH TREE** text field above the list of entities.

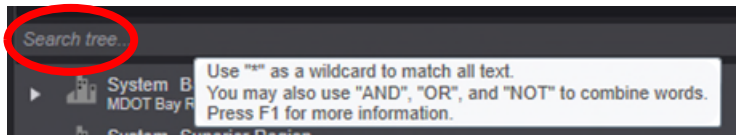

Figure 54: Searching the Entity Tree.

2. Enter the information pertinent to the sought-after signal(s). Some search examples include:
    a. The CS corresponding to a specific corridor
    b. The CS-Spot number for a specific intersection
    c. A street name

Some search examples are found on the next page.

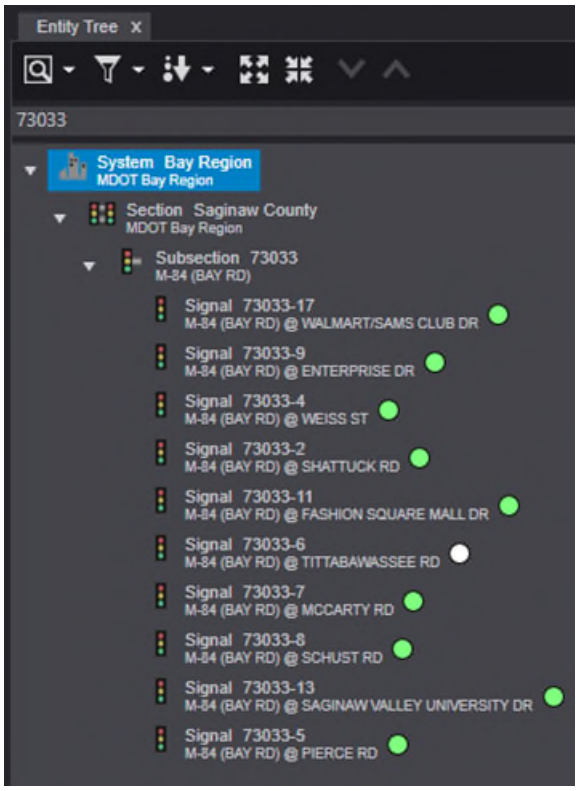

Figure 55: Searching the CS number 73033 brings up the M-84 corridor in the Bay Region.

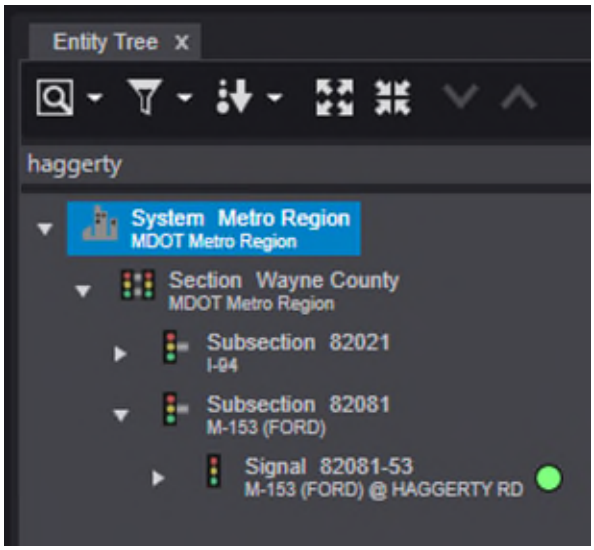

Figure 56: Searching "Haggerty" brings up M-153 (Ford) @ Haggerty Rd in the Metro Region.

Adding an Entity in Centracs

Entity is the term for an object in Centracs. Entities are used to differentiate between each MDOT region (Systems), each county within the state of Michigan (Sections), each CS number for a corridor (Subsections), and individual traffic signals (Signals). This is a hierarchy that Centracs uses to provide a method for organization of the traffic network. For more information on what is viewed within the Entity Tree, consult the Entity Tree chapter of this manual.

Adding a New Traffic Signal

Adding a new traffic signal location to Centracs means adding it as a new entity. To do so:

1. Navigate in the Entity Tree to the Subsection where the traffic signal will be located. Right click on the corresponding Subsection to bring up the contextual menu. A variety of options will be available for adding entities. Navigate to **Add Entity** and select **Signal**.

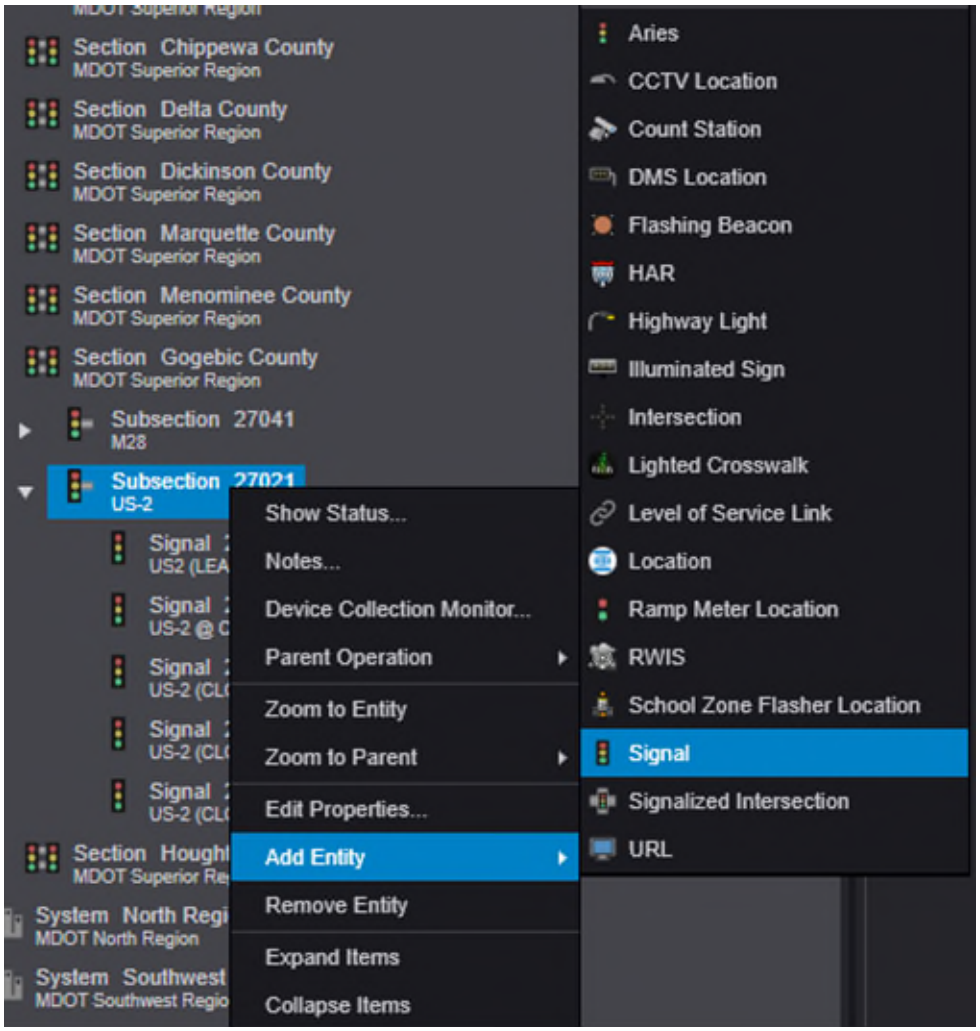

Figure 57: Adding a signal to a subsection in the Superior region.

2. Selecting Signal will bring up the Entity Configuration window. The fields needed to correctly configure a MDOT intersection are further described in this section as they are required to properly configure a new signal in Centracs. Other fields may be used as appropriate or needed. For additional information on fields in the Entity Configuration window, consult the Econolite Centracs Manual.

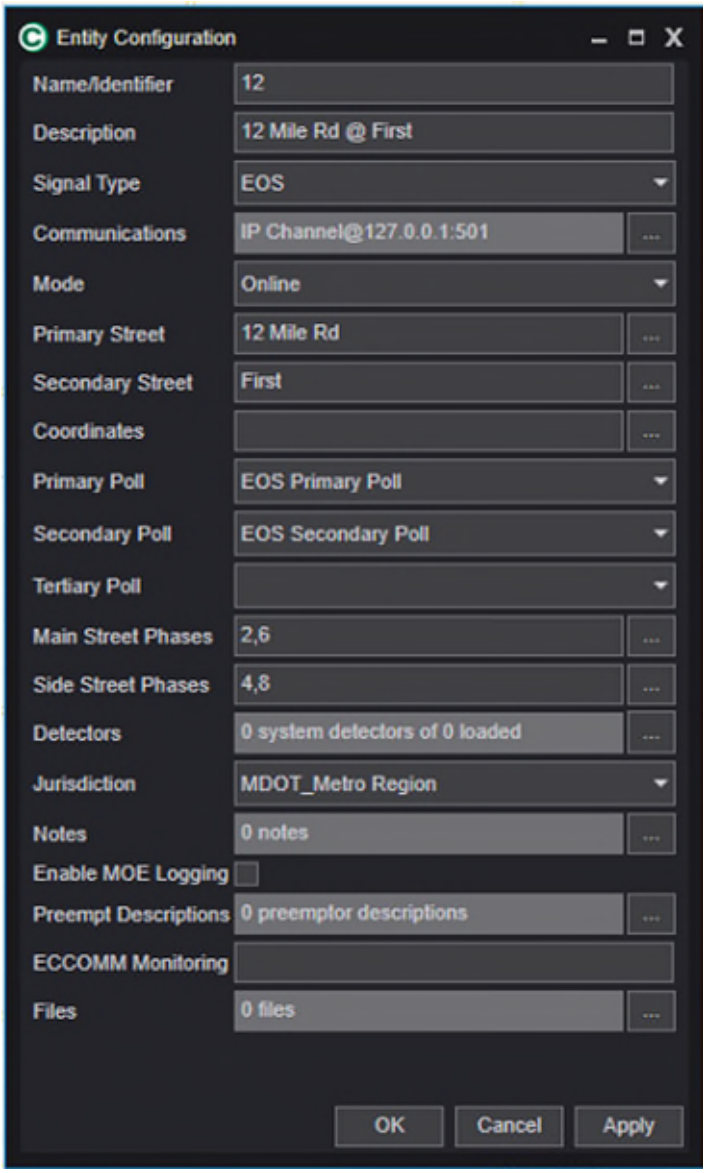

Figure 58: The Entity Configuration window.

3. There are several key pieces of information that are required to create and configure the new traffic signal before it can be monitored and interacted with in Centracs:
    a. **Name/Identifier:** This field must be filled out according to the MDOT naming convention. All signals are named according to the appropriate CS-Spot number; for example, 27021-1.
    b. **Description:** This field uses the official MDOT description of the signalized intersection; for example: US-2 (CLOVERLAND RD) @ Lake St.

c. **Signal Type:** This field defaults to ASC/3 and must be changed according to the traffic controller that is used at the intersection. For the MDOT system, either EOS or Eagle EPAC will be used.
d. **Communications:** The IP address and communications information must be filled out. To do so, click the **…** button next to the text field. This brings up the Device Communication Configuration window. Use the Destination IP field to fill out the appropriate IP address for this location. Click **OK** to return to the Entity Configuration window.

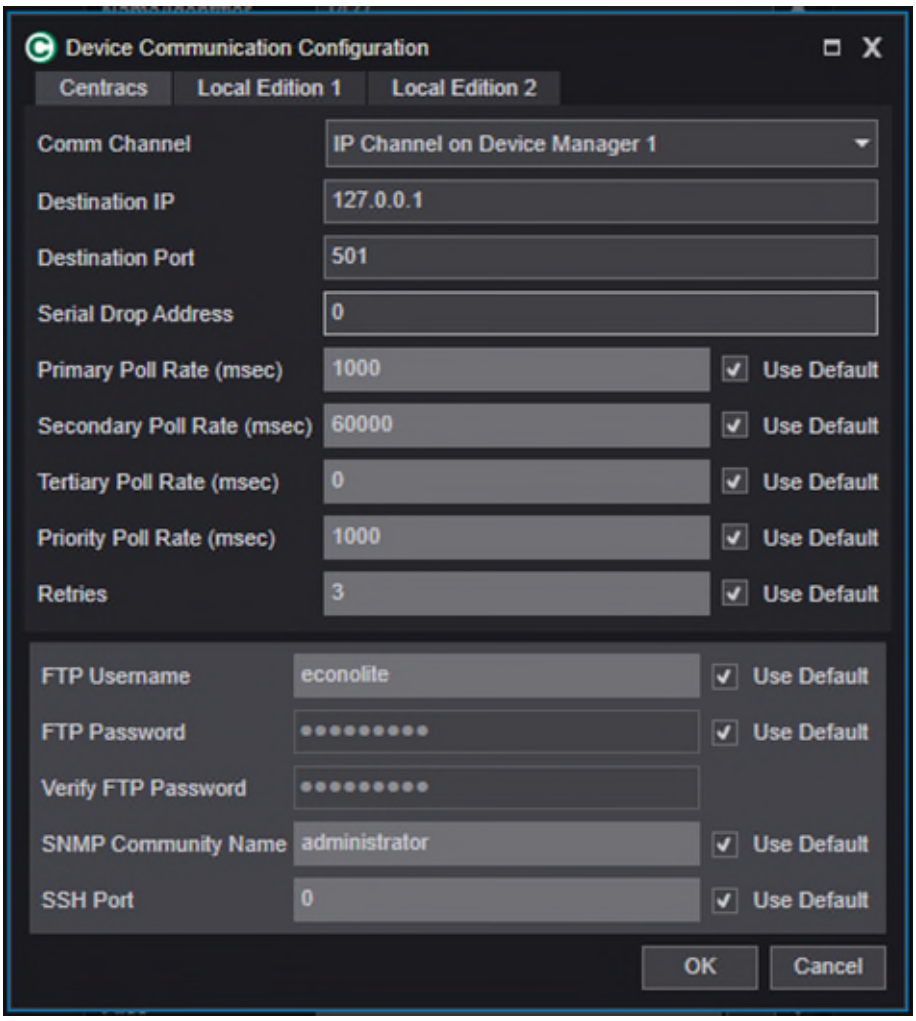

Figure 59: The Device Communication Configuration window. Use the Destination IP field to fill out the IP address for the location.

e. **Mode:** This option is used to dictate when Centracs should begin attempting a connection to the signal controller. Offline and Online are the two options that should be used to reflect the state of the signal controller. Switch this option to Online if the signal controller is in the field and connected to the MDOT network.

f. **Primary Street/Secondary Street:** These fields must be filled out according to the Street Names table. Select the **…** button next to the text field and use the table to navigate to the correct street names.

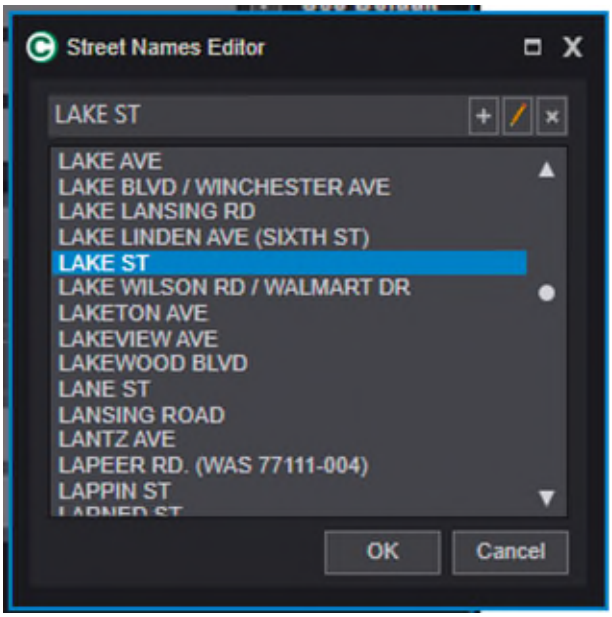

Figure 60: The street names editor window.

Note! If the street names do not exist, use the + icon to add the new name. Ensure any new names added to the Street Names table are done so according to the timing permit for the location.

g. **Primary Poll/Secondary Poll:** Use the dropdown menus to select the polls according to the traffic signal controller type.
h. **Main Street Phases/Side Street Phases:** Select the phases that correspond to the coordinated thru phases and the actuated side street through phases. These must be configured for the Centracs map graphics to display status correctly.
i. **Jurisdiction:** Use the drop-down menu to select the correct MDOT region that the signal is located in.

4. Once all fields have been correctly populated, click **Apply** and then **OK** to save and close the Entity Configuration window.

Note: The instructions included here do not identify all fields that can be populated in the Entity Configuration window. The fields identified here are required to properly configure a new signal in Centracs. Other fields may be used as appropriate or needed. For additional information on fields in the Entity Configuration window, consult the Econolite Centracs Manual.

The Entity Configuration window can be accessed at any time after the entity has been created. To access the window, right click on the signal in the Entity Tree and select **Edit Properties…**. This will bring up the Entity Configuration window and all options and fields can be managed and configured at any time.

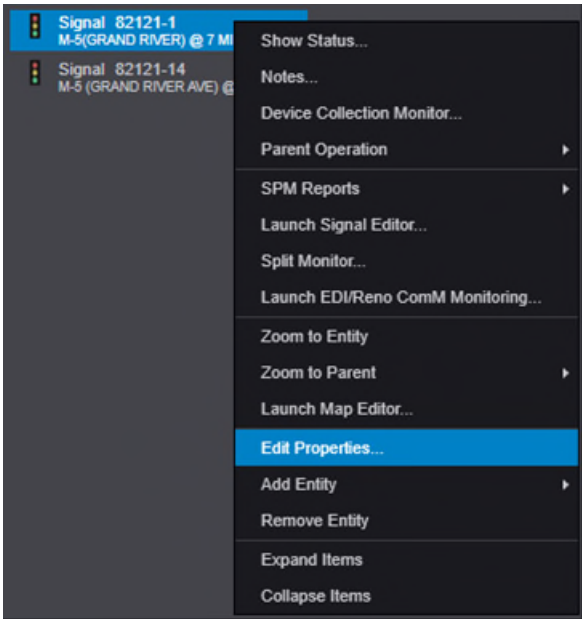

Figure 61: Navigating to Edit Properties from the right-click contextual menu for a signal.

Adding Other Entity Types

It is possible to add non-signal entities to Centracs. Consult the Configuring Entities section of the Econolite Centracs Manual for detailed descriptions and helpful information regarding all available entities.

Using the Map Editor

The Map Editor is available for users to adjust the visual representation of the real-time status of a selected traffic signal. Graphics for existing signals can be accessed by right clicking the entity and selecting **Launch Map Editor…** from the contextual menu.

(Continued on the next page)

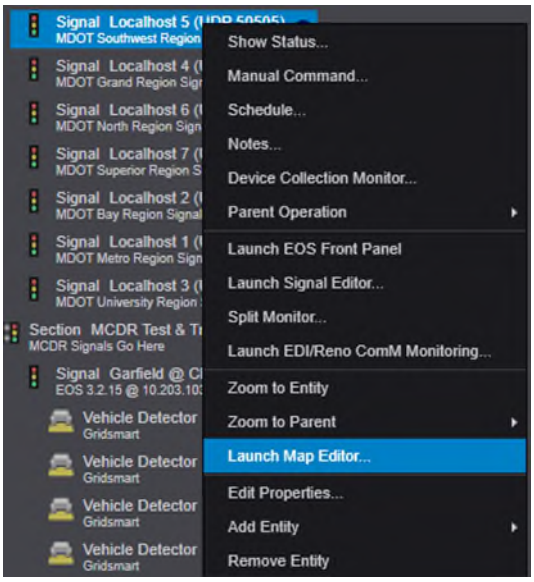

Figure 62: Navigating to the map editor from the right-click contextual menu for a signal in the entity tree.

Selecting this option will bring up the Map Editor window. From here, edits can be made to the intersection graphics at each of the different zoom levels of the map: **Point, Main Street Green (MSG) Status, MSG Pattern,** and **Intersection**, described below**.**

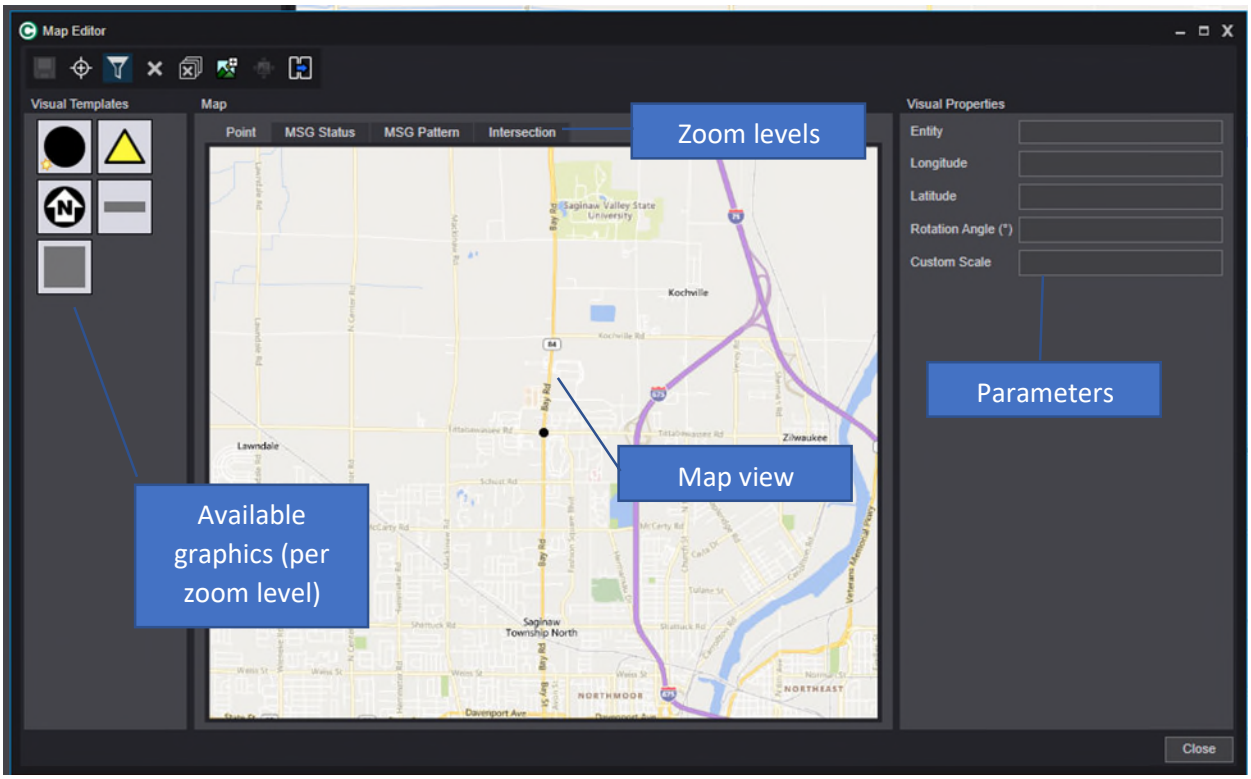

Figure 63: The map editor window interface.

Adding a New Intersection

If adding a new intersection to the map, first verify that the signal entity has been created. The Adding a New Traffic Signal portion of this chapter may be useful. Click and drag it from the Entity Tree to the correct location on the Centracs map in the Main Container Window. When this action is completed, the Map Editor window will automatically appear.

Point Level Graphics

A black dot corresponding to the location of the intersection on the map will be shown. No additional graphics need to be edited or added at this zoom level.

MSG Status Graphics

The black dot is replaced with a new symbol at this level that reflects the Main Street/Side Street Phases configured in the Entity Configuration window. Graphics can be added at this level that will be visible if zoomed in accordingly on the Centracs Map. To use the graphics, click and drag the icon from the Visual Templates section onto the map. Parameters can then be configured under the Visual Properties section of the window. It is strongly recommended to maintain consistency in graphical displays across all intersections in Centracs for ease of use. For a description of the icons MDOT has elected to use, consult the Intersection Status Window chapter of this manual, or consult the Maps section of the Econolite Centracs Manual for a complete list of icon descriptions.

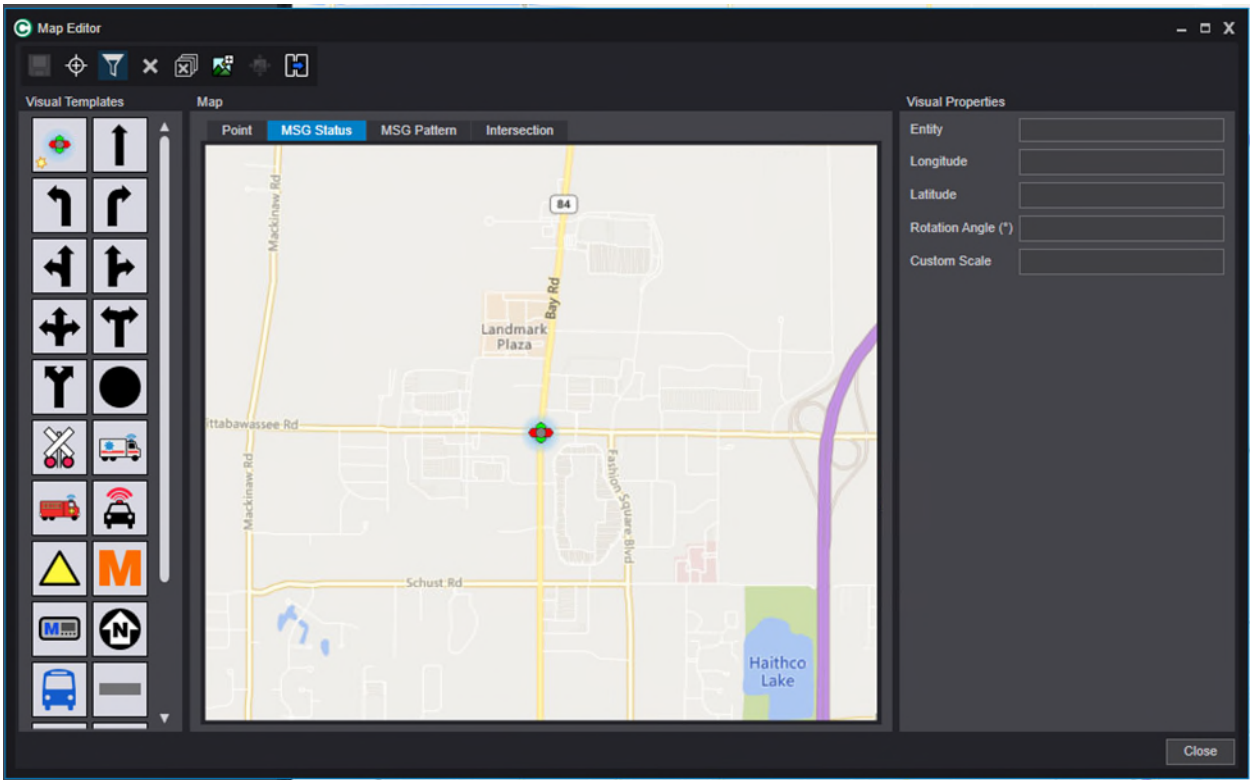

Figure 64: The Main Street Green (MSG) graphic editor interface.

MSG Pattern

The graphics at this level are similar as the MSG Status level. To use the graphics, click and drag the icon from the Visual Templates section onto the map. Graphics can be added at this level that will be visible if zoomed in accordingly on the Centracs Map. Parameters can then be configured under the Visual Properties section of the window. It is recommended to maintain consistency in graphical displays across all intersections in Centracs for ease of use. For a description of the icons MDOT has elected to use, consult the Intersection Status Window chapter of this manual, or consult the Maps section of the Econolite Centracs Manual for a complete list of icon descriptions.

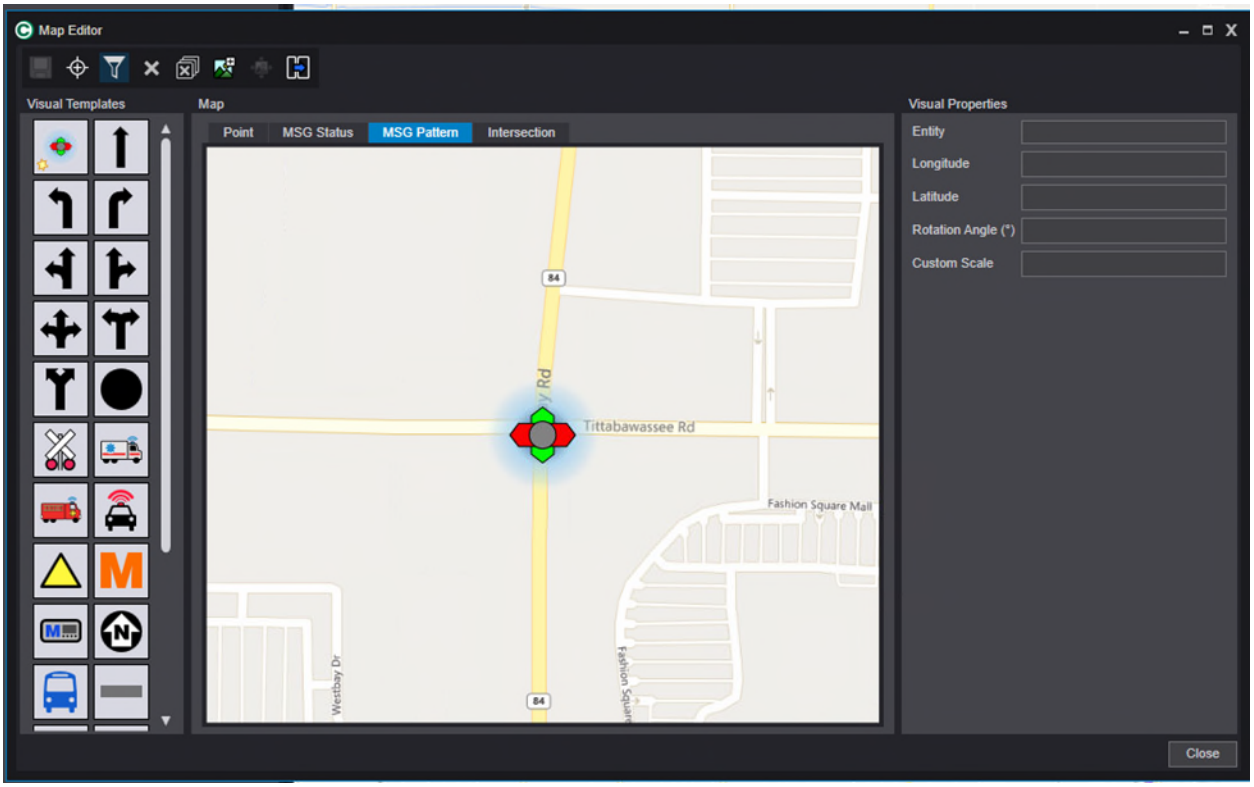

Figure 65: The Main Street Green (MSG) with pattern indicator editing interface in the map editor.

Intersection

The graphics at this level are displayed in the Intersection Status Window. To use the graphics, click and drag the icon from the Visual Templates section onto the map. Parameters can then be configured under the Visual Properties section of the window. It is strongly recommended to maintain consistency in graphical displays across all intersections in Centracs for ease of use. For a description of the icons MDOT has elected to use, consult the Intersection Status Window chapter of this manual, or consult the Maps section of the Econolite Centracs Manual for a complete list of icon descriptions.

Figure 66: The intersection graphics editor portion of the map editor interface.

The EOS Signal Database Editor

The signal database editor in Centracs is used to configure, edit, and manage signal timing configurations and parameters on traffic signal controllers.

Note that the database editor and functionality will change based on the type of traffic signal controller used at the intersection.

MDOT currently makes use of EOS on Econolite Cobalt controllers and SEPAC 5 on Siemens M60 controllers. Both traffic signal controller types are supported with Centracs database editors, but the interface will be different. Please refer to the corresponding chapter of this manual for information on the correct database editor. This chapter will introduce the EOS editor. Please use the SEPAC Signal Database Editor chapter for the SEPAC editor.

Understanding the Role of the Database Editor

It is important for the user to understand the role of the database editor in the signal timing editing process. The signal editor provides a method for the user to upload information from an existing traffic controller in the field. The uploaded data is displayed in the signal controller database editor interface. Data can also be downloaded to the traffic signal controller in real time, which will overwrite existing data in the field.

The database editor also provides the ability to store – or save – the data in the Centracs database. It is important for the traffic signal controller timing database and the Centracs database to store the same information so that the system is accurately reflecting current in-field conditions. Figure 67 illustrates the relationship between the database editor, the Centracs database, and the traffic signal controller, as well as the corresponding terminology used in Centracs.

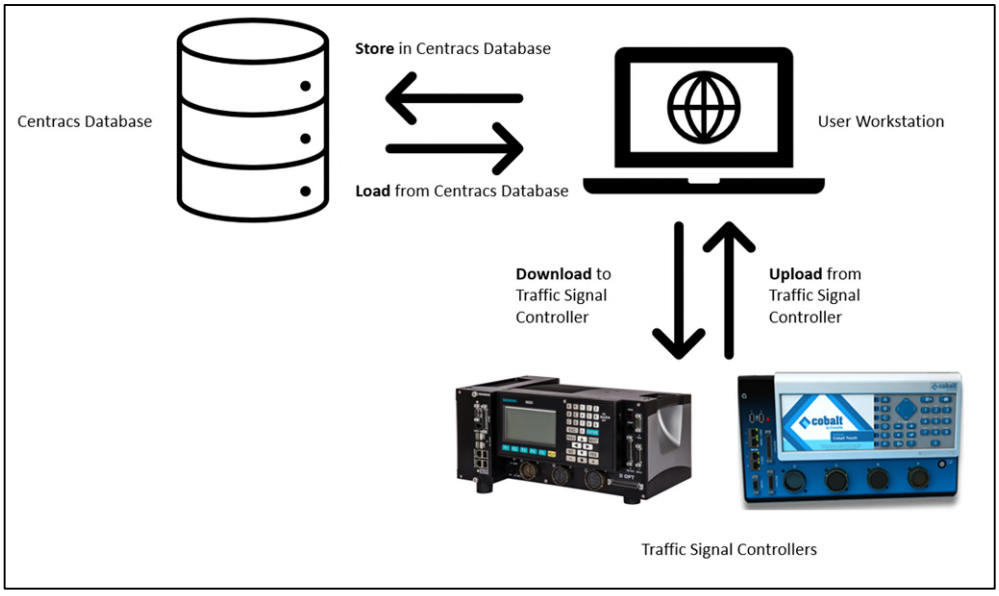

Figure 67: The relationship between the database editor on the user workstation, the Centracs database, and the traffic signal controller.

Accessing the Signal Database Editor

Centracs has multiple ways to access the signal database editor depending on user preference. Seen below, users can right click on an intersection on the map or in the entity tree to bring up the right-click contextual menu. From there, navigate to the **Launch Signal Editor…** option.

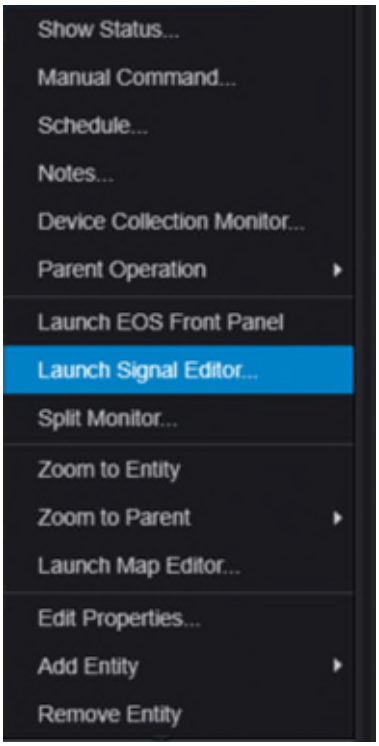

Figure 68: Navigating to the signal editor via the right-click contextual menu for a signal in the entity tree.

(Continued on the next page)

Alternatively, from the intersection status window, users can launch the signal database editor by using the mouse-over wrench menu in the interface.

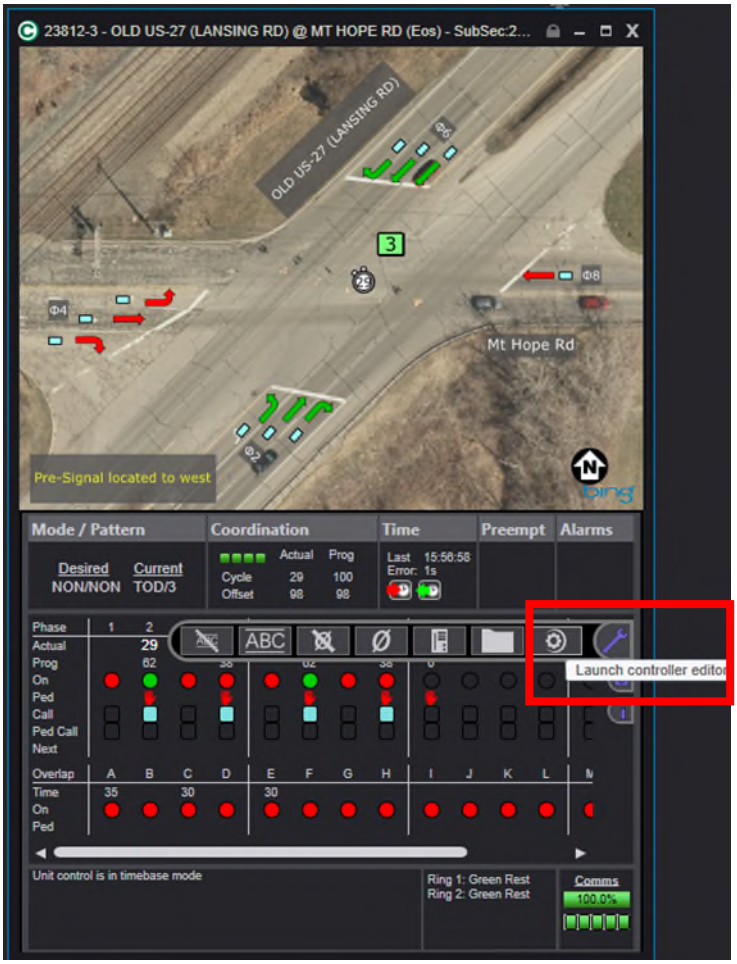

Figure 69: Navigating to the database editor (also known as the controller editor) from the wrench menu in the intersection status screen.

Regardless of the type of traffic signal controller, both described methods will bring up the correct signal database editor for that intersection automatically.

(Continued on the next page)

The EOS Database Editor Window

The EOS database editor allows the user to make and track signal configuration and timing changes for MDOT intersections. The figure below shows the signal database editor.

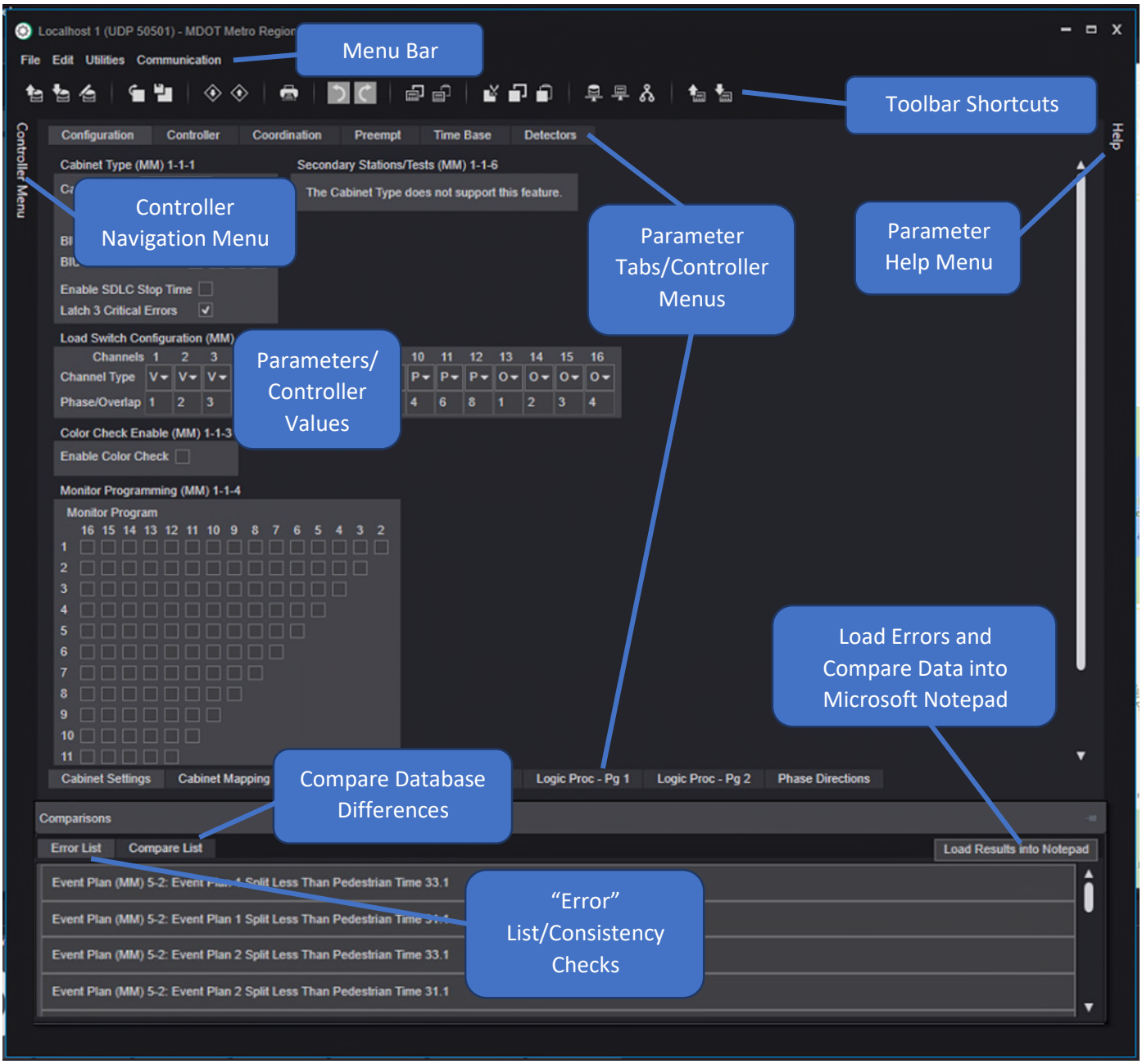

Figure 70: The signal database editor window for MDOT locations running EOS firmware.

This window provides access to all features of the EOS signal database editor. The rest of this chapter of the MDOT user manual describes sections of the database window in detail.

Signal Name: At the top of the window, the full name of the signal the user is currently editing will be displayed. Use this to ensure the correct signal is being edited.

Menu Bar: Use this to navigate to many of the same commands that are found in the Toolbar shortcuts. Additional commands are available from the menus that are not in the Toolbar. An explanation of the available menu commands follows.

Toolbar Shortcuts: The signal database editor provides quick and easy access to most common commands. The symbols found here mirror those found in the database editor menus.

Icon	Option	Description
	Load Controller	Used to load previously saved configurations of the traffic signal controller database into the database editor.
N/A (File menu)	Load Template	Used to load an existing template into the database editor. Templates can be used as shortcuts when configuring multiple intersections that have similar configurations.
	Store Controller	Used to save controller parameters from the database editor to the Centracs database.
N/A (File menu)	Store Template	Stores current controller parameters in the database editor as a template.
	Manage Database Versions	Allows the user to view and manage all existing previously stored controller database versions.
N/A (File menu)	Manage Templates	Allows the user to view and manage existing previously stored controller database templates.
	Import	Imports controller settings from an exported controller file. For EOS, this file is a .CFG file. Note that this command **cannot** be used for SEPAC databases.
	Export	Saves the controller settings to a .CFG file. Note that this command **cannot** be used for SEPAC databases.
	Export Synchro Files	Saves the controller database parameters to a .CSV file in UTDF format, which can be opened in Synchro. The CSV file can also be accessed through Microsoft Excel. Consult the Econolite Centracs Manual for more information.
	Import Synchro Files	Use this to import a Synchro UTDF CSV file into the signal database editor. Consult the Econolite Centracs Manual for more information.
	Print	Prints the controller settings. Print settings and options are available.
	Undo	Undo the previous action or entry.
	Redo	Redo the previous action or entry.
	Copy Controller	Copies all parameter values to the clipboard. This can be useful to duplicate controller settings for another location.
	Paste Controller	The user can specify controller parameters to be pasted into a different controller database.
	Cut	Copies and removes selected data. The data is available via the Windows clipboard.
	Copy	Copies selected data to the Windows clipboard.
	Paste	Pastes data from the clipboard.
	Compare Database	Toggles a compare mode that allows the user to compare the controller settings saved in the Centracs database with the settings currently loaded in the database editor. A controller upload must be conducted first.
	Quick Compare	Compares the controller parameters saved in the Centracs database with the settings saved on the controller. Individual differences are not shown with this method.
	Merge DBs	The user can merge data from one controller database to another.
	Upload from Controller	The user can upload controller parameters from the traffic signal controller to the database editor and view the data.
	Download to Controller	The user can download data in the database editor to the traffic signal controller. **This action overwrites prior stored controller values.**

Parameter Tabs/Controller Menus: Use these to navigate to different parameter tables found in the signal firmware.

Parameters/Controller Values: This area shows individual traffic signal controller configuration parameters that can be edited. Any changes will be marked with an asterisk and will need to be stored in the database or downloaded to the traffic signal controller in order to be used. Each table of parameters is identified using the same language as found in the traffic signal controller firmware, and a “breadcrumbs” navigation reference is included as well that indicates how the user would find the same parameters in the traffic signal controller firmware.

Controller Navigation Menu: The user can click here to expand a full list of menus found in EOS, and navigation to different parameters can be done through this window rather than using the parameter tabs above and below the parameter window.

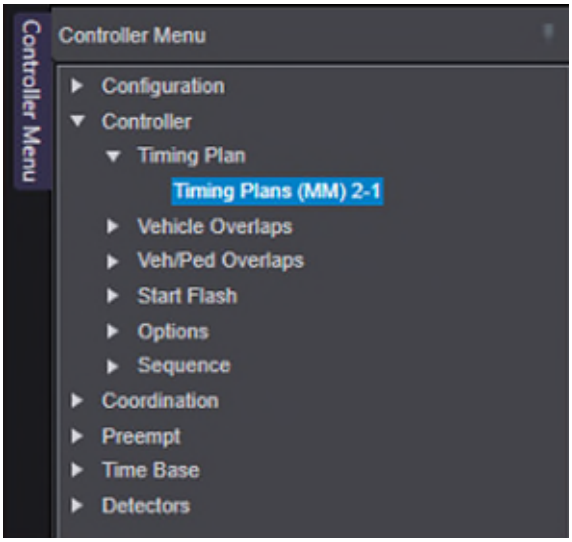

Figure 71: Expanding the Controller Navigation Menu to navigate through the signal database.

Parameter Help Menu: The user can click here to expand an area where help on the individual controller parameter can be found. This information mirrors the same as the HELP function in the EOS firmware on the Cobalt traffic signal controller.

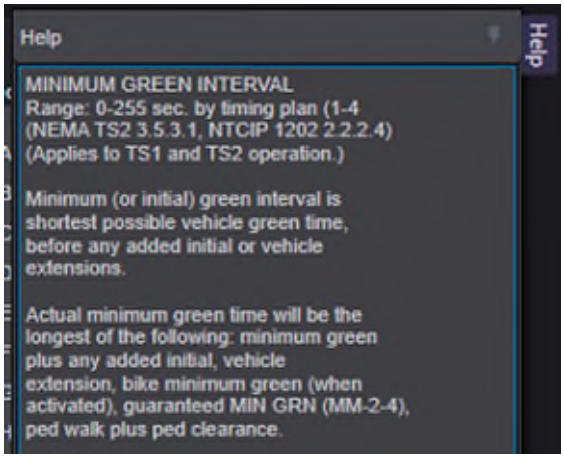

Figure 72: Expanding the Parameter Help Menu.

Error List: If any potential errors or misconfigurations have been found in the traffic signal controller parameters, the details will be shown in this tab. In the database editor screenshot (Figure 70), it is shown that vehicle split times are less than pedestrian times. This is similar to the consistency checks conducted by EOS on the Econolite Cobalt controller.

The error list may show information that is not a "true" error and must be evaluated through the engineering judgement of MDOT personnel. For example, a pedestrian time that is longer than a vehicle time is a valid signal timing strategy and may not warrant a change. For questions, discuss with your supervisor or the MDOT Centracs System Administrator.

Compare List: When the **Compare Database** function is in use, this tab will show the differences between the Centracs database and what is currently running on the traffic signal controller. Clicking on an individual line in the list will take the user to the screen with the difference.

Loading and Storing Traffic Signal Controller Data

To load traffic signal controller data from the Centracs database:

1. Click **Load Controller** in the toolbar shortcuts. The Load Controller window appears with all stored configurations for this database. The Comment field can be used to identify each version of the database that has been stored previously.

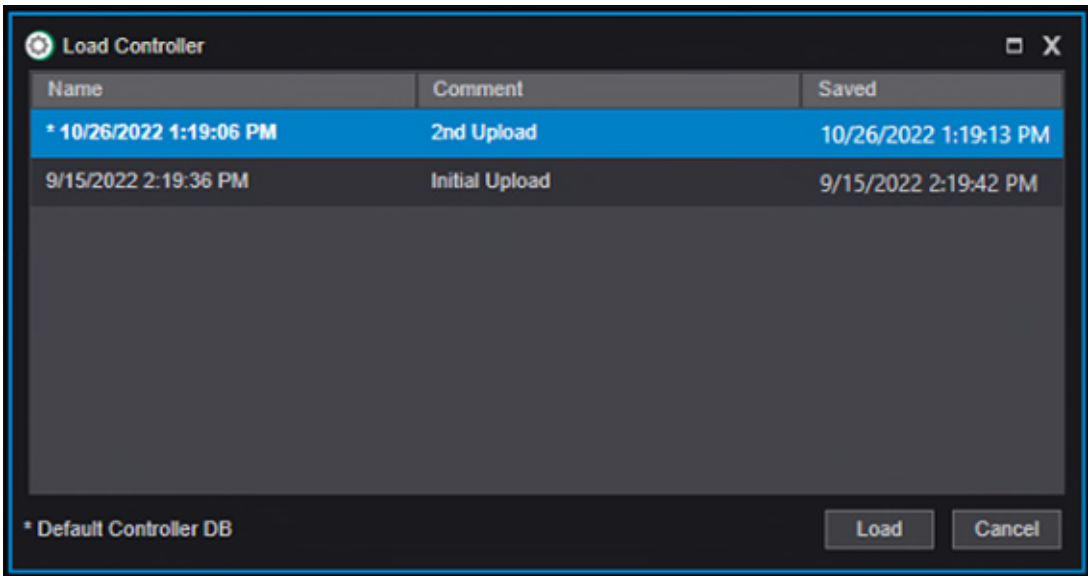

Figure 73: The Load Controller window.

2. Select the version to load, then click **Load**. Previous versions may not be available if no previous stores have occurred.

To store traffic signal controller data in the Centracs database:

1. Click **Store Controller** on the database editor toolbar. The Store Controller window appears.

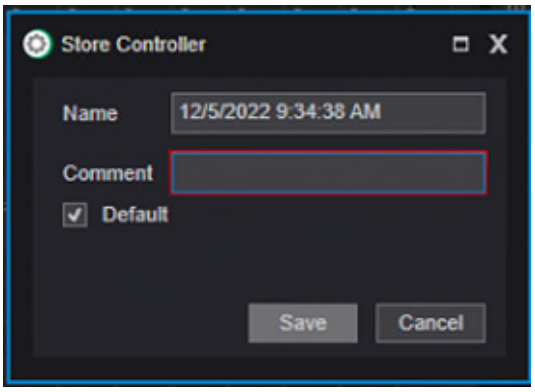

Figure 74: The Store Controller window will prompt the user for a comment explaining the edited data.

2. The Store Controller window prompts the user to add a comment. This comment is used to explain why this version of the traffic signal controller database has been created. Consult your manager or the **MDOT Centracs System Administrator** for MDOT policies on using the comments field.
3. Click **Save**. Once the progress bar disappears, the database has been stored.

Using Templates

Templates allow the user to reuse a pre-configured set of traffic signal controller settings that can be applied when bringing a new MDOT intersection online, applying changes to multiple signals, or resetting a traffic signal controller back to the default settings. This makes it easier to apply multiple settings at once.

To store a template:

1. Configure any desired settings and parameters to be used in the template.
2. Select **File | Store Template.**
3. Enter a name for this template and add a comment explaining its use.
4. Click **Save.**

To load a template:

1. Select **File | Load Template.**
2. Select the template to load from the list, then click **Load.** This will load the settings saved in the chosen template into the parameters of the signal database editor. The user can then manipulate settings or execute any other command in the database editor.

Importing and Exporting Database Settings

To import settings from a .CFG file:

1. Select **File | Import.**
2. Browse to the location of the .CFG file to be imported into signal database editor.
3. Click **Open.** When opening the .CFG file, note that any parameters currently in the signal database editor will be overwritten with the parameters of the .CFG file being imported.
4. The user can now manipulate the imported parameters and choose the option to **Store** or **Download to Controller.**

To export settings to a .CFG file:

1. Select **File | Export**
2. Specify the location and name for the exported file. Click **Save**.

NOTE: The traffic signal controllers must be the same type!

Copying and Pasting Traffic Signal Controller Settings

Multiple copy and paste functions exist within the EOS database editor. Two options exist to copy and paste values within the signal controller database. A third option exists to copy and paste values between signal controller databases.

First, a value within a parameter table cell can be highlighted, copied, and pasted into another cell. The user can right-click to select copy or paste commands, or use the standard Windows ctrl-C and ctrl-V keyboard functionality.

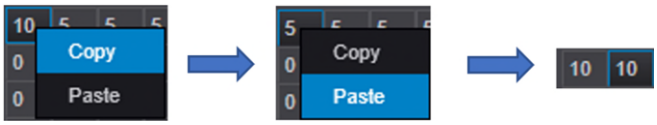

Figure 75: A parameter value of 10 is copied and pasted into an adjacent cell within a parameter table.

Second, when editing parameter values in a table, the user may notice a small gray box in the bottom right corner of a cell. Clicking on this gray box and dragging to adjacent cells in the same row or column will copy the value to all cells highlighted.

Figure 76: A small gray box appears in the bottom right corner of a parameter in a cell.

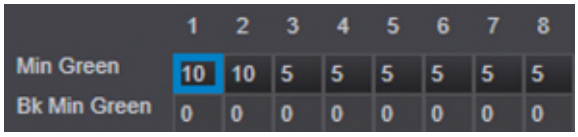

Figure 77: Clicking and dragging on the gray box across the Min Green row will copy the value of the original cell to all highlighted cells.

Figure 78: The value of 10 has been copied to all 8 phases in this example.

Lastly, the user can copy settings from one traffic signal controller and paste them in another controller. To do so, follow the steps on the next page.

1. Make sure to have the signal database editor open for the database that is intended to be *copied from* (referred to as Controller A in this example) as well as the database intended to be *pasted to* (referred to as Controller B in this example).
2. For Controller A, make sure the settings to copy are current in the signal database editor. It may be necessary to upload from the controller or load a stored version to accomplish this.
3. In the signal database editor toolbar of Controller A, click **Copy Controller.**
4. In the signal database editor of Controller B, click **Paste Controller.** The Controller Copy window will appear.
5. Select the parameters to paste from Controller A. See Figure 79 for an example. A ⊘ symbol is used to show partial settings are selected in a category.

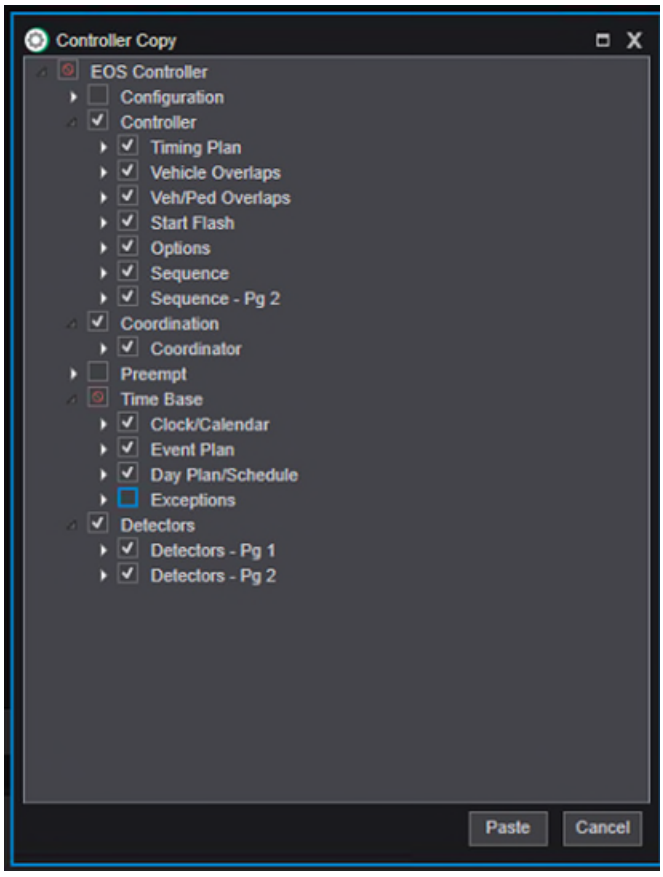

Figure 79: The Controller Copy window where different sections of the database can be selected to be copied.

6. From here, the user may choose to store the settings in the Centracs database, or conduct an upload, compare, or download with Controller B.

The procedure above copies all settings from a controller and lets you paste selected settings to another controller.

The Controller Menu may also be used to select a segment and paste it to another traffic signal controller. For example, the Timing Plan segment for a traffic signal controller may be selected by right-clicking and selecting the **Copy** option. The copied Timing Plan segment can then be applied in the other Controller Menu by right-clicking and selecting the **Paste** option:

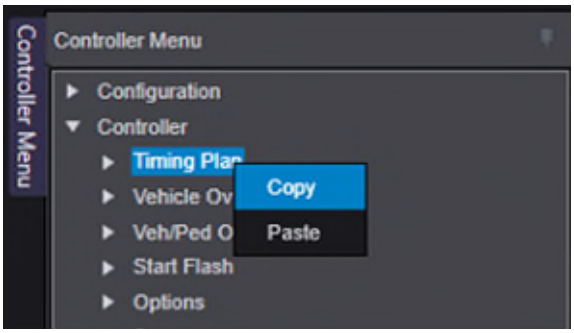

Figure 80: Using the Controller Navigation Menu to conduct copy and paste commands.

Uploading and Downloading Traffic Signal Controller Settings

Uploading and downloading data is an essential function to using Centracs for remote signal operations and timing changes. Data from the traffic signal controller are uploaded into the database editor, which enables the user to compare the controller data with the data stored in the Centracs database. Similarly, if changes are made to the data stored in the Centracs database, these changes can be downloaded to the traffic signal controller in the field. Consult your manager if you are uncertain about what signal operations impacts might occur based on the data you wish to download to the live traffic signal controller.

Remember that you are uploading from the traffic signal controller and downloading to the traffic signal controller.

To upload data from a traffic signal controller:

1. From the database editor toolbar, select **Upload from Controller.** The Upload window will appear.

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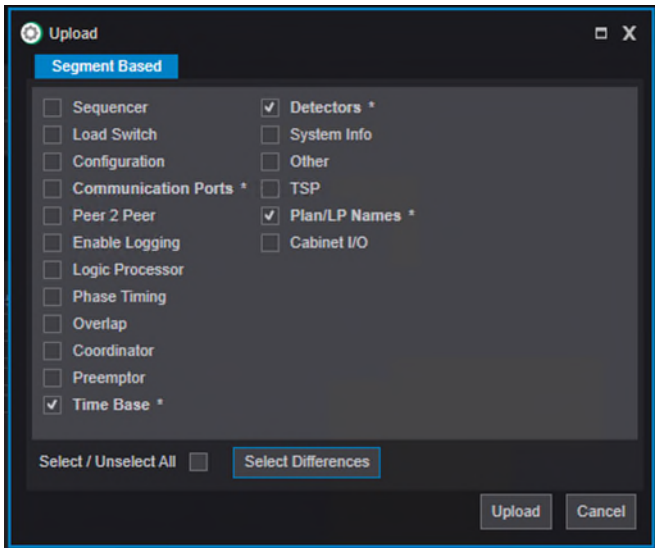

Figure 81: The Upload window showing different segments of the signal database that can be uploaded from the signal controller.

2. The Upload window allows the user to specify the segments to upload from the traffic signal controller. Any segments that differ from the data stored in Centracs will be marked with an asterisk (*). The user can use the checkmark boxes to select individual segments or use the options to select/unselect all segments, or select only segments where differences are found. These segments correlate to menu structure found in the traffic signal controller firmware.
3. Click **Upload.** A status bar will appear to indicate the upload progress.

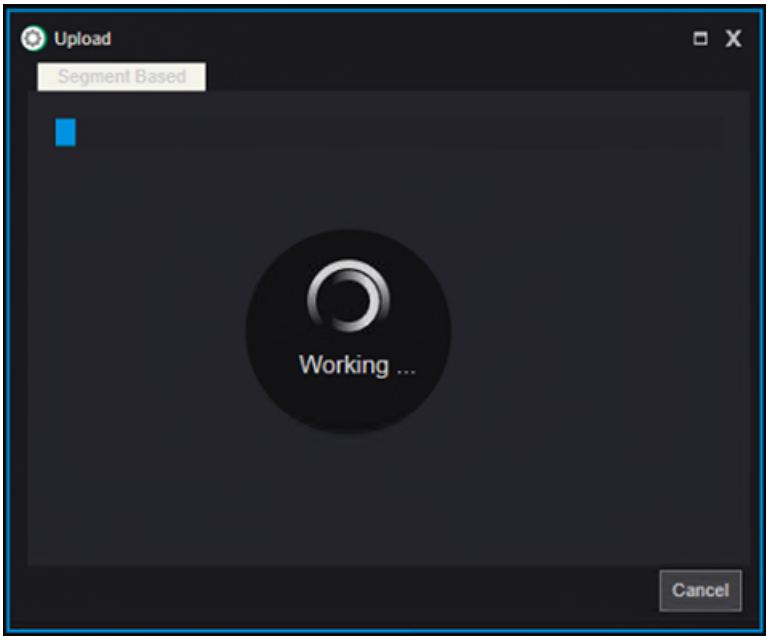

Figure 82: The status bar shows the progress of the upload action.

4. Once the upload has completed, the user can enable the Compare mode, Store the data in the Centracs database, or make any edits and changes as desired.

To download to a traffic signal controller:

1. From the database editor toolbar, select **Download to Controller**. If there is any un-stored data in the editor currently, the user will be prompted to store the data. Once the data is stored, the **Download** window will appear.

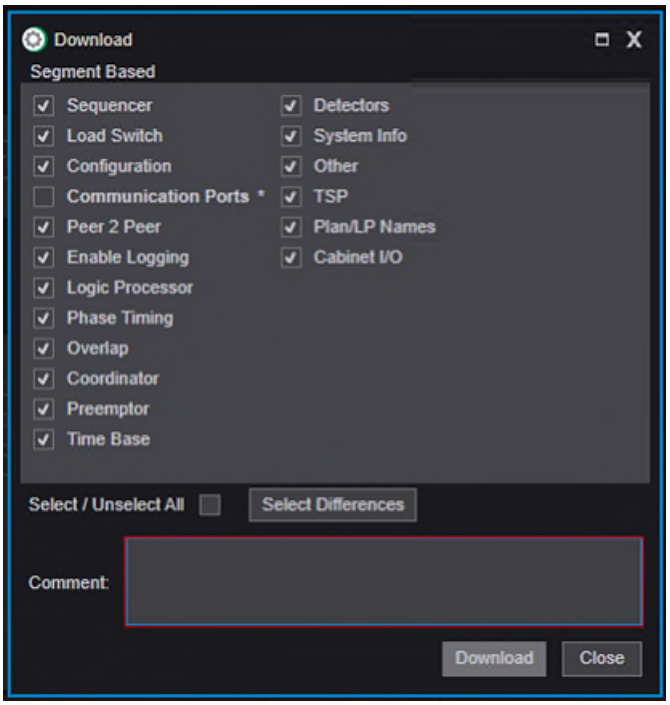

Figure 83: The Download window showing different segments of the signal database that can be downloaded to the signal controller.

2. This window allows the user to specify the segments to download to the traffic signal controller. Any segments that differ from the data stored in Centracs will be marked with an asterisk (*). The user can use the checkmark boxes to select individual segments or use the options to select/unselect all segments, or select only segments where differences are found. These segments correlate to menu structure found in the traffic signal controller firmware.
3. The window also prompts the user for a comment. Use this field to briefly describe why this download is occurring, including the changes to be made and any important context for the download (e.g., changing signal timing for a construction project).
4. When the user is ready, click **Download.** This will bring up a download status bar.

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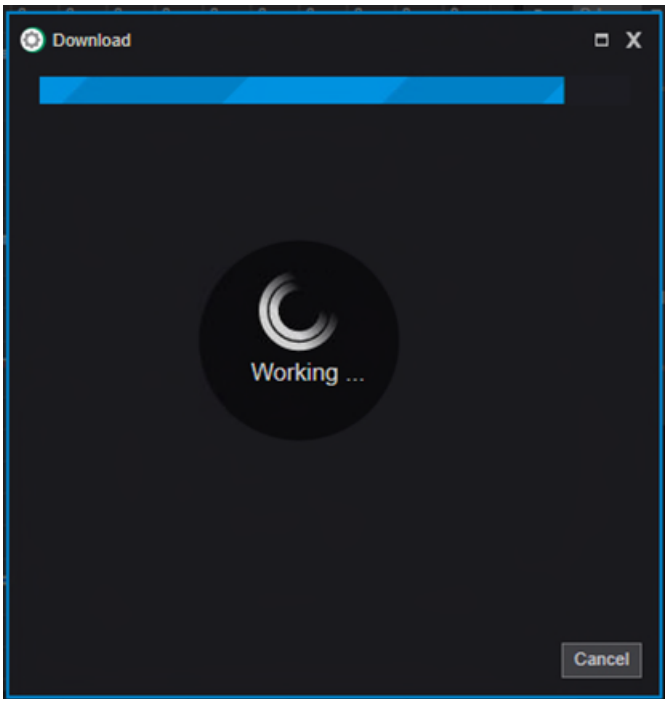


Figure 84: The status bar shows the progress of the download action.

Upon successful completion of downloading the data, the progress bar will disappear. The download process is complete at this point.

Comparing Databases

The user can compare traffic signal controller settings in the Centracs database with the settings currently on the traffic signal controller.

To compare the settings saved in the Centracs database with the settings saved on the traffic signal controller:

1. From the toolbar, select **Upload from Controller**. The Upload window will appear.
2. Specify the segments to upload. For the purposes of a database comparison, it is recommended to click the **Select Differences** button to upload only the segments that are different. This is also the quickest upload option.
3. Click **Upload.** A progress bar will display while the controller data is uploaded. This may take several minutes.
4. From the toolbar, select **Compare Databases.** The signal database editor will now be in a comparison mode. Any differences between the traffic signal controller upload and what is saved in the Centracs database will be highlighted in yellow. An asterisk also appears on any tabs or sub-tabs containing differences between the traffic signal controller data and the saved data. See Figure 85 on the next page for an example.

Figure 85: Parameters that have differences between the stored values and the traffic signal controller field values. In this example, the traffic signal controller database has Max Recall options selected that have not been stored in the Centracs database.

5. The **Compare List** tab at the bottom of the signal database editor window will show details about any differences found. The Current column shows the controller value, the Database column shows what the parameter is stored as in Centracs.
6. Clicking on an item in the Compare List will display the appropriate page for that parameter.

NOTE: The results of the Error List and Compare List tabs can be loaded into Notepad for further analysis or use outside of Centracs. Click **Load Results into Notepad** to the right of the tab names to complete this action.

Printing Traffic Signal Controller Settings

Traffic signal controller timing and configuration parameters can be printed directly from the database editor. This can be a valuable and convenient way to provide printouts and all-data reports for different uses.

1. From the database editor, select **File | Print.** The Print Page Selection window will appear.

(Continued on the next page)

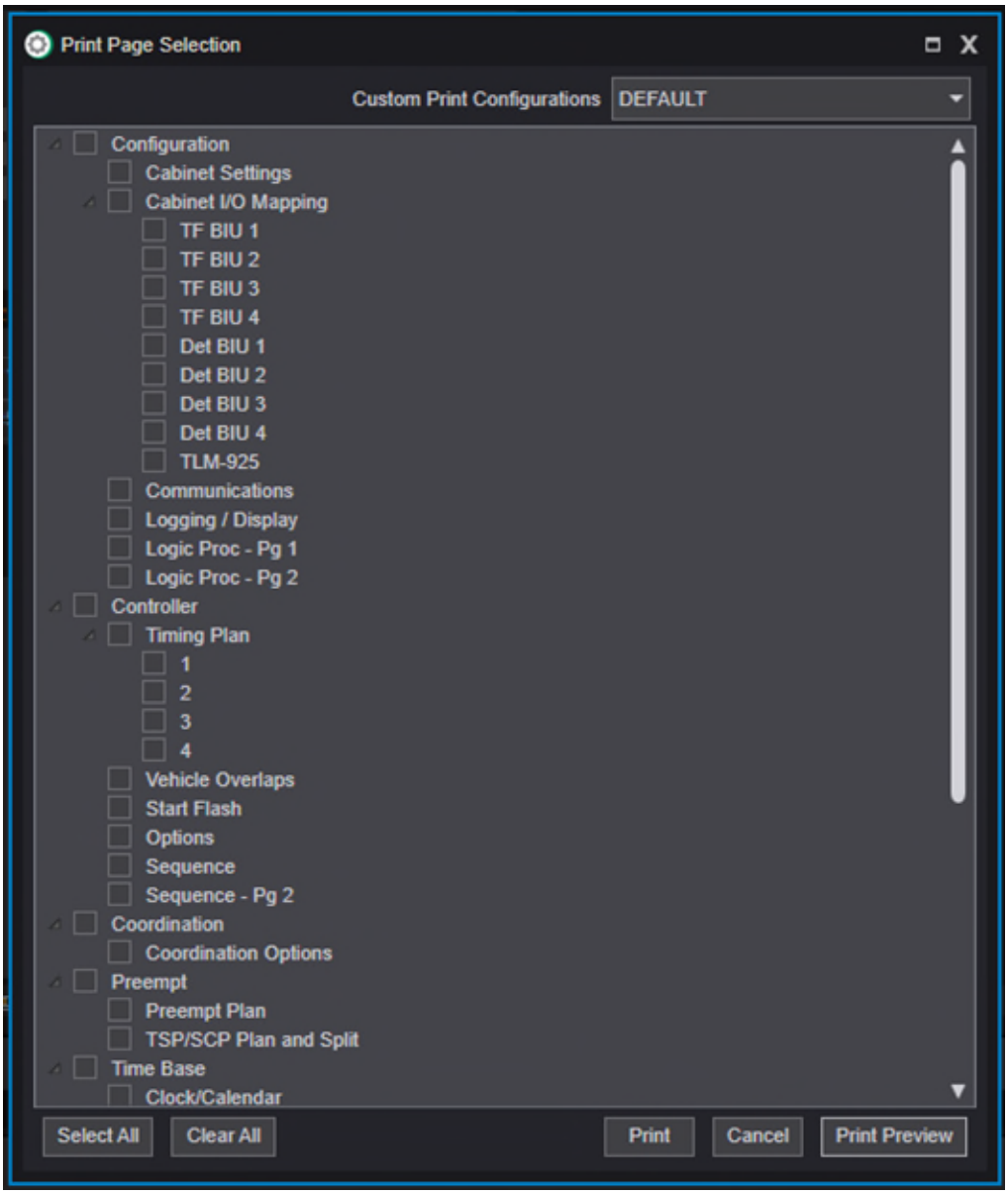


Figure 86: The Print Page Selection window. Different segments of the signal timing database can be selected to be printed.

2. Select the sections of the database to be printed.
3. Use **Print Preview** to review the output if desired. Otherwise, click **Print.**

The SEPAC Signal Database Editor

The signal database editor in Centracs is used to configure, edit, and manage signal timing configurations and parameters on traffic signal controllers.

The display and functionality of the database editor will change based on the type of traffic signal controller configured at the intersection.

MDOT currently makes use of EOS on Econolite Cobalt controllers and SEPAC 5 on Siemens M60 controllers. Both traffic signal controllers are supported with Centracs database editors, but the interface will be different. Please refer to the corresponding section (EOS Editor or SEPAC Editor) of this manual for information on the appropriate database editor.

Accessing the Signal Database Editor

Centracs has multiple ways to access the signal database editor depending on user preference. Seen below, users can right click on an intersection on the map or in the entity tree to bring up the right-click contextual menu. From there, navigate to the **Launch Signal Editor…** option.

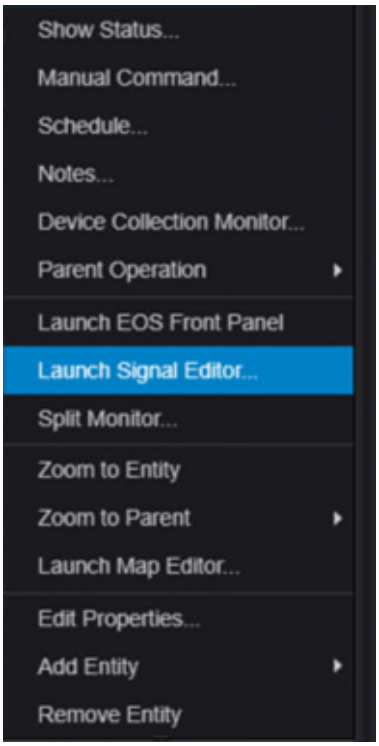


Figure 87: Navigating to the signal editor via the right-click contextual menu for a signal in the entity tree.

Alternatively, from the intersection status window, users can launch the signal database editor by using the mouse-over wrench menu in the interface. Figure 88 shows how to access the signal database editor by this method.

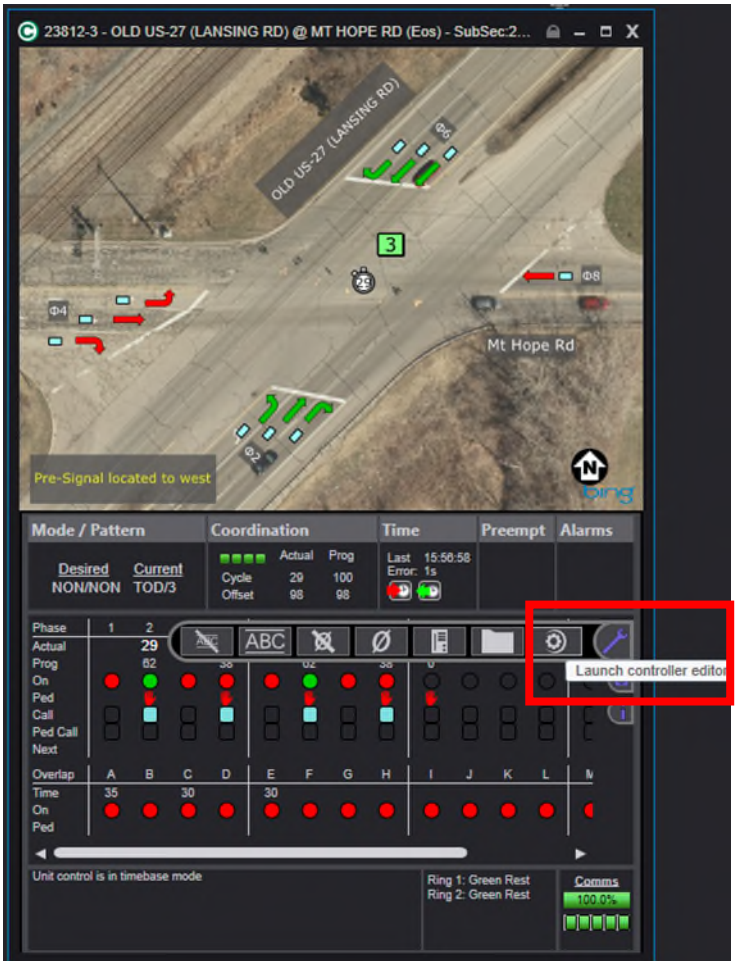


Figure 88: Navigating to the database editor (also known as the controller editor) from the wrench menu in the intersection status screen.

Regardless of the type of traffic signal controller, both described methods will bring up the relevant signal database editor automatically and the user does not need to do anything to access specifically the EOS or SEPAC editor. Centracs handles this automatically.

The SEPAC Database Editor Window

The SEPAC database editor provides an interface within Centracs to make and track signal configuration and timing changes for MDOT intersections using the Siemens M60 controller.

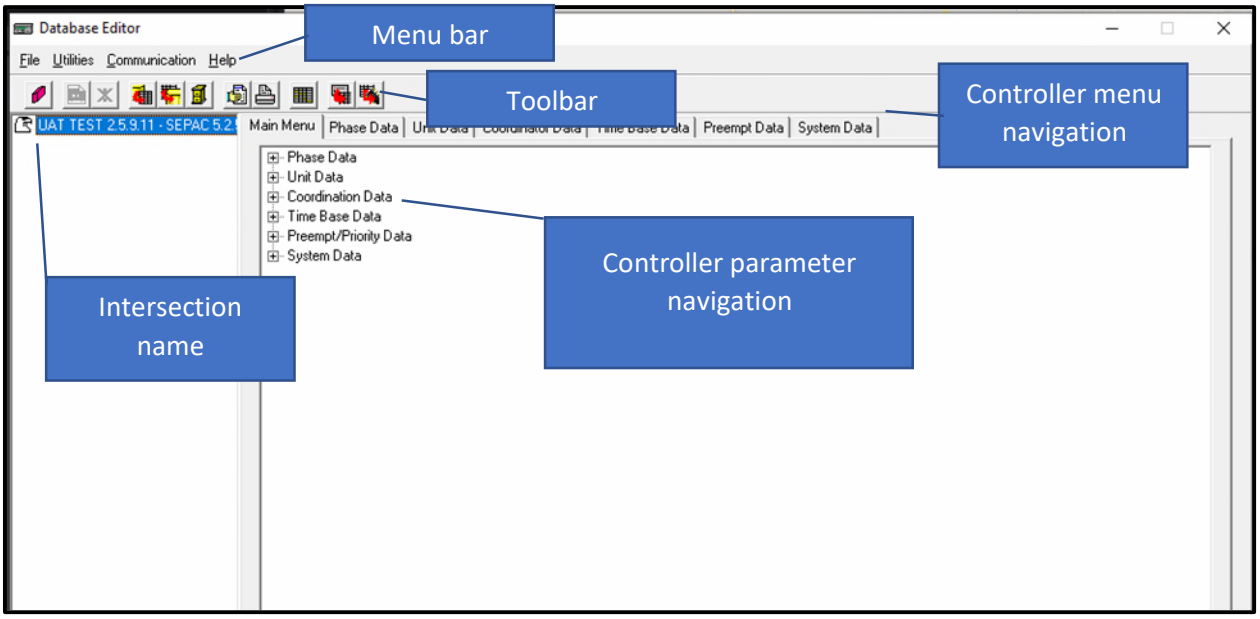


Figure 89: The signal database editor window for MDOT locations running SEPAC firmware.

This window provides access to all features of the SEPAC signal database editor. The rest of this chapter describes the database window in detail.

Intersection Name: On the left side of the window, the full name of the signal currently being edited will be displayed. Use this to ensure the correct signal is being edited.

Menu Bar: Use this to navigate to many of the same commands that are found in the Toolbar.

Toolbar: Easy access to common commands used in the database editor. An explanation of the toolbar options are as follows.

Icon	Option	Description
	Restore	Restore controller's database data (similar to an undo function)
	New	Create a new controller timing
	Delete	Delete the selected controller
	Load	Load controller data from database
	Store	Store controller data in database (similar to save function)
	Close	Close the selected controller (this keeps the editor window open)
	Preview	Print preview with options to select what to print preview
	Print	Print selected database segments
	Compare	Toggle compare mode on and off (note: upload first)
	Upload	Upload data from selected controller
	Download	Download data to controller

Controller menu navigation: Use these tabs to quickly switch to different menus found within the SEPAC controller firmware. The tabs accurately reflect the menu structure found in the traffic signal controller firmware.

Controller parameter navigation: When first opening the signal database editor, the expandable lists can be used to navigate to different parts of the traffic signal controller database. This works similar to the controller menu navigation tabs at the top of the window. Using the + symbol next to each item in the list will expand the selection. Clicking on one of the items in the selection list will bring up the traffic signal controller parameters associated with that topic.

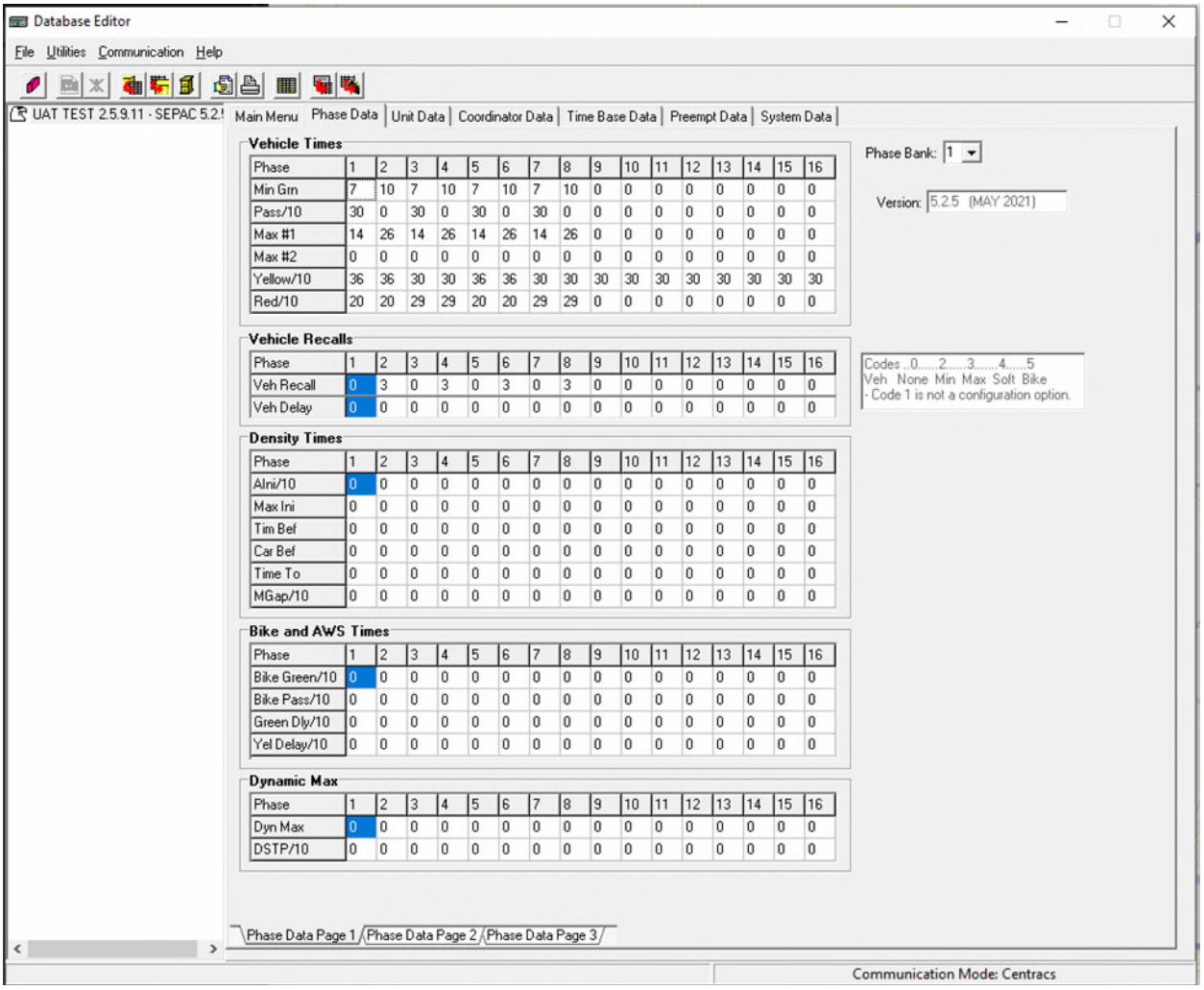


Figure 90: The database editor window after selecting the Phase Data navigation tab or Phase Data in the expandable list.

Loading and Storing Traffic Signal Controller Settings

The database editor can be used to load traffic signal controller settings from the Centracs database.

1. Navigate to **Utilities | Load Previously Saved Data**. The Load Controller window appears with all previously stored configurations for this database. If no previously

stored data exist, the window will be blank. The date and time of each stored data will appear.

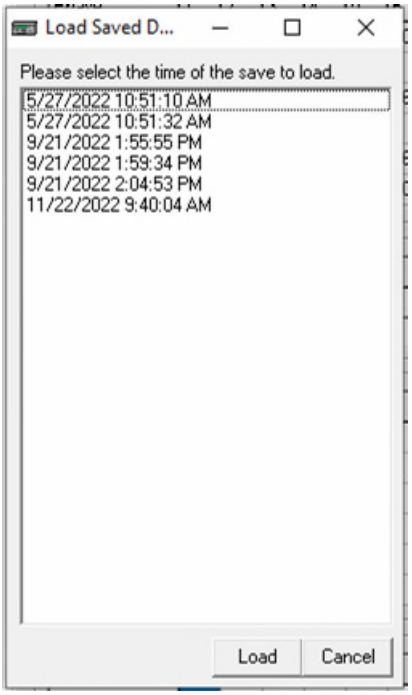


Figure 91: The Load Previously Saved Data window showing timestamps of previously saved database versions.

2. Select the version to load, then click **Load**. If no database versions are shown, this traffic signal controller database has never been saved to the Centracs database.

To store traffic signal controller settings in the Centracs database:

1. Click **Store** on the toolbar. The user will be prompted to confirm the store. If the correct intersection name appears, click **Yes.**

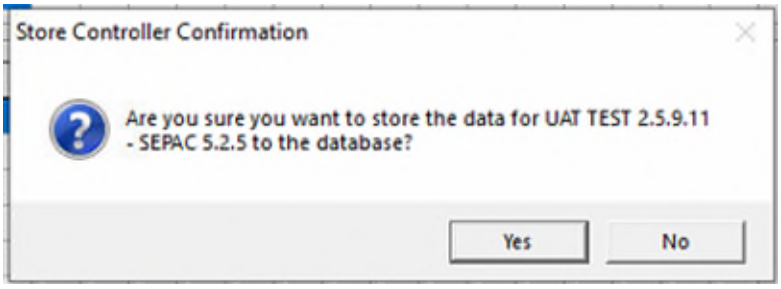


Figure 92: A user prompt to confirm storing (or saving) controller data.

2. A progress bar will appear showing the status of the store. Once the progress bar disappears, the database has been stored successfully.

Remember that you are uploading from the traffic signal controller and downloading to the traffic signal controller.

Uploading and Downloading Traffic Signal Controller Settings

Uploading and downloading data are essential functions to using Centracs for remote signal operations and timing changes. Data from the traffic signal controller are uploaded into the database editor, which enables the user to compare the traffic signal controller data with the data stored in the Centracs database. Similarly, if changes are made to the data stored in the Centracs database, the changes can be downloaded to the traffic signal controller in the field. Consult your manager if you are uncertain about what signal operations impacts might occur based on the data you wish to download to the live traffic signal controller.

To upload data **from** a traffic signal controller:

1. From the toolbar, select **Upload.** The Select Controller window will appear.

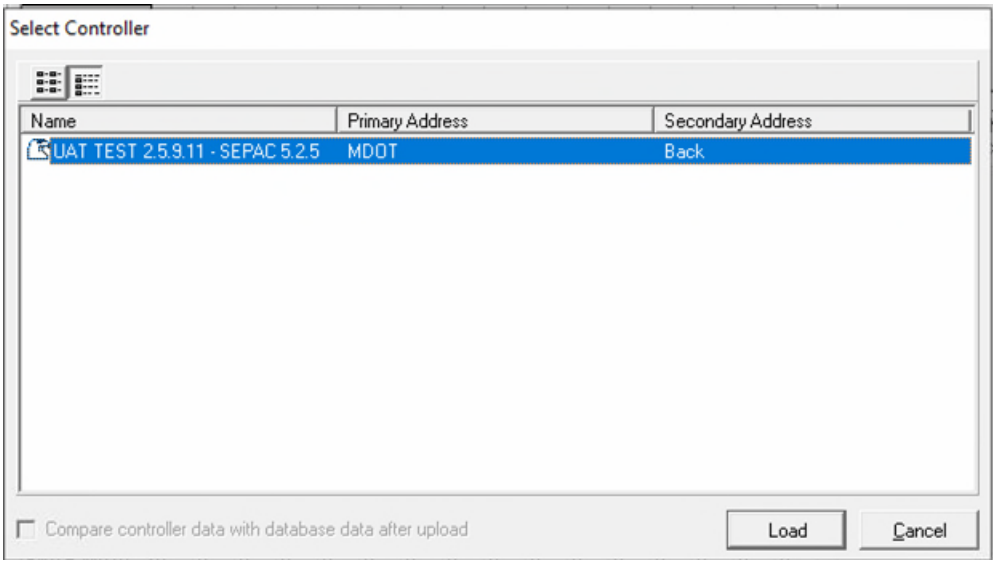


Figure 93: Select the controller to conduct the upload.

2. Select the controller and click **Load.**
3. The Upload/Download window will appear. Select the segments to be uploaded or use the **Select All** button to select all the segments automatically. These segments correlate to menu structure found in the traffic signal controller firmware.

(Continued on the next page)

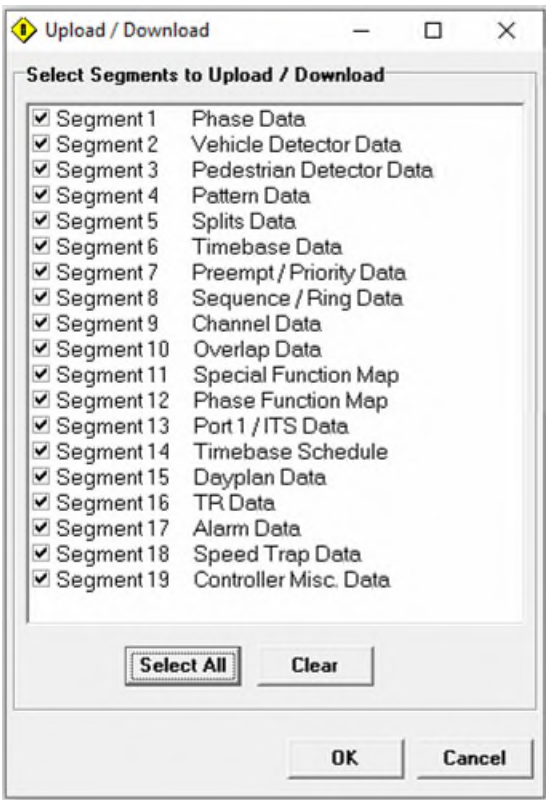


Figure 94: The Upload/Download window where different segments of the signal database can be chosen for upload and download commands.

4. Click **OK**. A status bar will appear to indicate the upload progress.

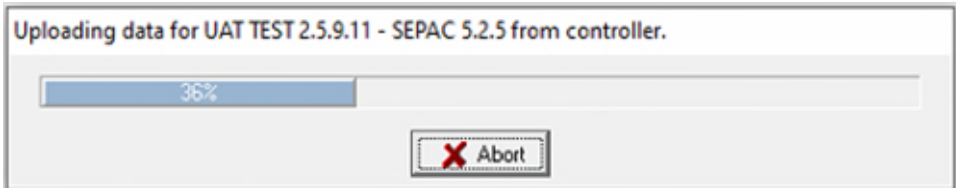


Figure 95: The status bar of the upload action will update in real time.

5. Once the upload has completed, the user can enable the **Compare** mode, **Store** the data in the Centracs database, or make any edits and changes as desired.

To download **to** a traffic signal controller:

1. From the toolbar, select **Download**. If there is any unsaved data in the editor currently, the user will be prompted to store the data.

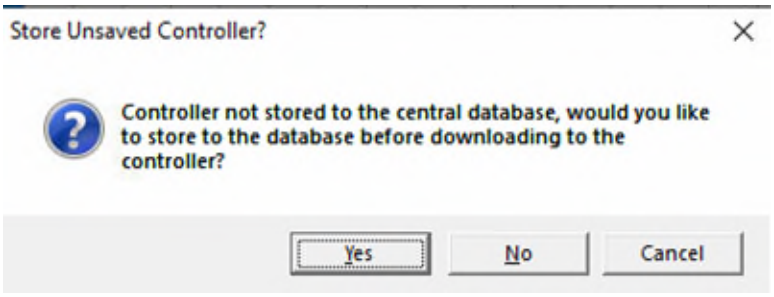


Figure 96: Prompt to store any unsaved signal controller data.

2. Once the data is stored, the user will be prompted to confirm a download window will appear. If the correct intersection is listed, click **Yes**.

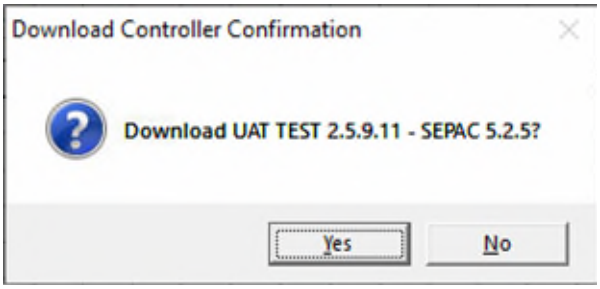


Figure 97: Confirmation to conduct the download.

1. The Upload/Download window will appear, seen in Figure 94. Select the segments to be download or use the **Select All** button to select all the segments automatically. These segments correlate to menu structure found in the traffic signal controller firmware.
3. When the user is ready, click **OK.** This will bring up a download status bar. Upon successful completion of downloading the data, the progress bar will disappear. The download process is complete at this point.

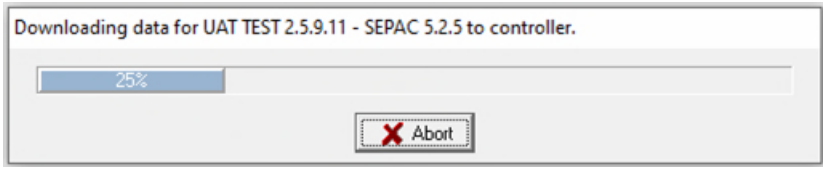


Figure 98: The status bar of the download action will update in real time.

Comparing Databases

Controller settings in the Centracs database can be compared with settings currently on the traffic signal controller.

To compare the settings saved in the Centracs database with the settings saved on the traffic signal controller:

1. From the toolbar, select **Upload**. The Upload window will appear.
2. Specify the segments to upload. It may be beneficial to use the **Select All** button to make all traffic signal controller database segments available for the comparison.
3. Click **Upload.** A progress bar will display while the controller data is uploaded. This may take several minutes.

4. From the toolbar, select **Compare.** The signal database editor will now be in a comparison mode. Any differences between the traffic signal controller upload and what is saved in the Centracs database will flash in a yellow highlighted color.

Figure 99: When the Compare mode is active, parameters that are different in the Centracs database will flash yellow to indicate to the user where the difference is. Both the controller and the stored values will be shown.

Printing Traffic Signal Controller Settings

Traffic signal controller timing and configuration parameters can be printed directly from the database editor. This can be a valuable and convenient way to provide printouts and all-data reports for different uses.

1. From the database editor, select **File | Print.** The Print window will appear.

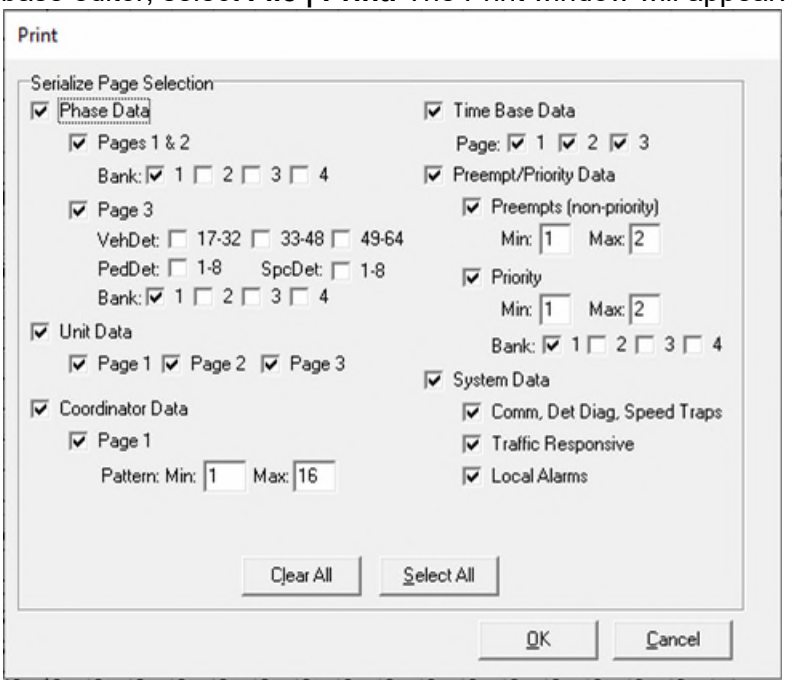


Figure 100: The Print window. Different segments of the signal timing database can be selected to be printed.

2. Select the sections of the database to be printed.
3. Click **OK.**

The user can also navigate to **File | Print Preview** to generate an HTML preview of the selected sections of traffic signal controller data to print.

Alerts in Centracs

Centracs generates alerts that are based on events from field devices and other elements of the system. Users can choose the method, style, and conditions of these alerts. For example, an alert can be generated if a signal goes into flash. Alerts can also be configured to be sent to one or more users that a particular event has occurred and may require attention. Centracs can be used to show the alert in multiple ways:

- An on-screen notification called a toast pop-up
- An email to a recipient
- A SMS text message to a recipient

Note: Users must be logged in to Centracs to receive the on-screen notification. Email and SMS text message alerts require additional user configuration, described in the Defining Recipients section of this chapter. Please confirm with your supervisor or the **MDOT Centracs System Administrator** if you expect to receive email or SMS text message alerts from Centracs.

Alerts work using *triggers* and are developed like a simple if-then programming statement: *if* a signal in the Metro region goes into conflict flash, *then* display a pop-up window in Centracs to all Metro region users.

Alert Severities

Alerts are classified, logged, and displayed according to their severity. These include:

- **Critical** alerts, which are shown in red and represent high-priority items that require immediate action.
- **Warning** alerts, which are shown in yellow and represent medium-priority items that should be reviewed in a timely manner.
- **Informational** alerts, which are shown in blue and represent low-priority items.

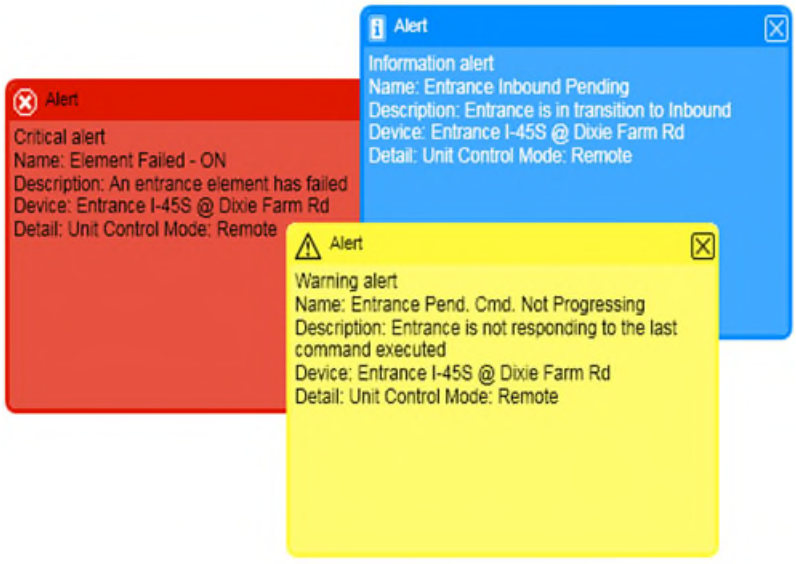


Figure 101: Examples of critical, warning, and informational on-screen alerts (image source: Econolite Centracs Manual, 2018).

The three levels of severity should be used to better communicate the immediacy of the alert. A signal going into flash requires immediate attention and is considered a critical alert, for example.

Alert States

Alerts also have different active states determined by user interaction. This allows MDOT to build in a workflow associated with handling information provided by alerts, and track the status of the situation or event that the alert is reporting on:

- **New** alerts have been generated by the system but have not been acknowledged or closed. New alerts cause the Alert Status Bar corresponding bubble to flash if the alert is a Warning or Critical type of alert.
- **Acknowledged** alerts have been viewed by a user and have been acknowledged in the Alert Status Window. The Status Bar bubble will no longer flash if all new alerts have been acknowledged. This state represents that workflow to resolve a problem or address a situation has been initiated, but perhaps not completed.
- **Closed** alerts are removed from the Alert Status Window and are no longer counted in the Alert Status Bar bubbles. This state represents that workflow associated with this alert has been completed.

Alert Status Bar

The number and type of each active alert is shown in the top right corner of the Centracs interface. The number and severity are indicated by the 3 blue, yellow, and red dots, as shown in Figure 87. Each classification of alert is updated in real time as alerts are generated by the system. Numbers represent both new and acknowledged alerts. **Note:** Warning and Critical alerts will cause a corresponding bubble/pop-up to flash for attention when new alerts come in. An audible alert may also be configured, if sound is available on the computer.

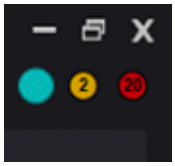


Figure 102: The Alert Status Bar, shown in the top right corner of the Main Container Window.

Alert Lists

Clicking on each of the alert bubbles will bring up their corresponding alert list for informational, warning, or critical alerts. The Alert List windows will show all new or acknowledged alerts. When an alert is closed, it will disappear from the Alert List window. Closed alerts can still be accessed via the Alerts Log report in the Reports menu.

In addition, the Alerts List window provides the user with the options to acknowledge and close reports. These features can help track workflow and response to alerts as they are generated by Centracs.

Creating Alerts

To create a new alert:

1. Navigate to **Configuration | Alerts and Events…**

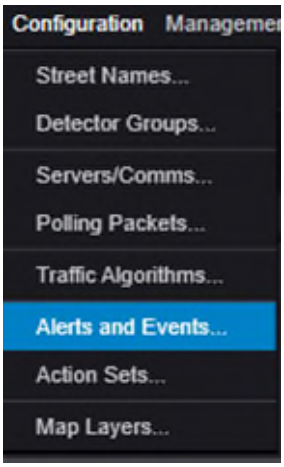


Figure 103: Navigating to the Alerts and Events command in the Configuration menu.

2. This option brings up the Alerts and Events window. From here, users can add new alerts, edit or delete existing alerts, and define alert escalations. A list of all configured alerts in the system are shown within this window.

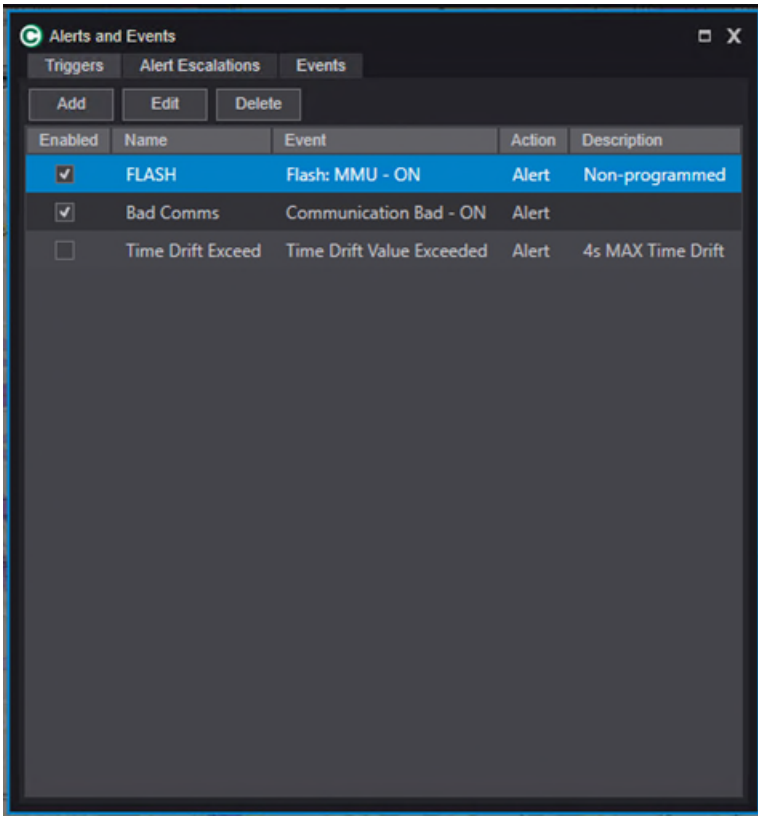


Figure 104: The Alerts and Events window.

3. To create a new alert, click **Add**. This brings up the Trigger Editor window. Existing alerts may also be edited from this window.

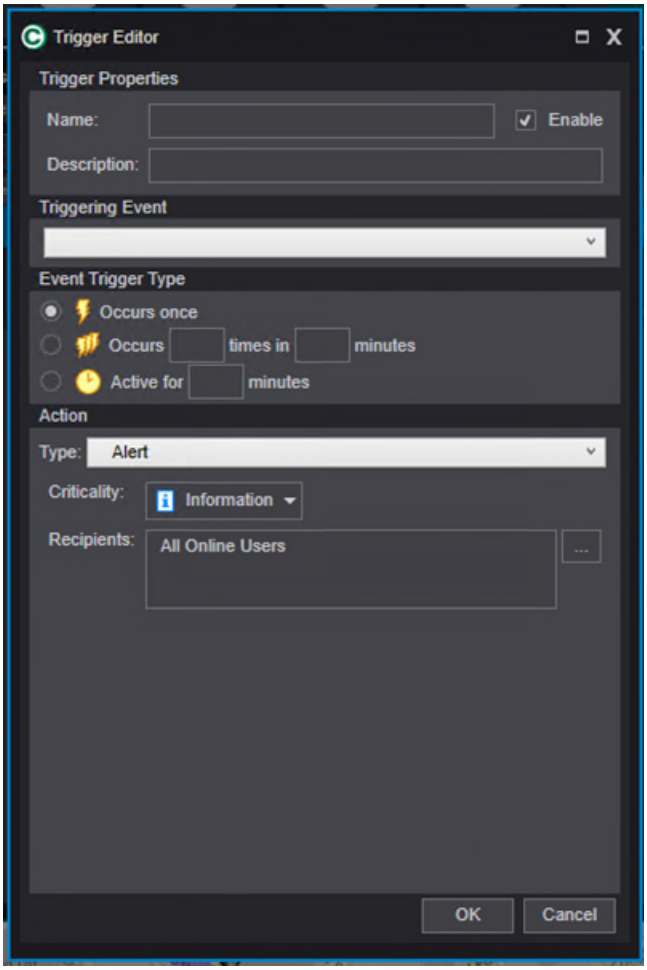


Figure 105: The Trigger Editor window, used to edit or create new alerts.

4. Enter a name and description for the alert. This information is used to identify the alert to other users and for easy reference in reporting. Some examples might include “Signal in flash – Metro Region” or “NB Vehicle Detector Constant Call – Bay Region.”

5. Use the drop-down menu to define the Triggering Event. This is the ***if*** part of the alert as described at the beginning of this chapter. In the example below, a signal flash condition has been highlighted and the Flash: ALL OFF option has been selected as the trigger. The list of available triggers is found in the dropdown menu, under Triggering Event. Please see the Event Types table in the Econolite Centracs Manual for descriptions of the available events that can be configured.

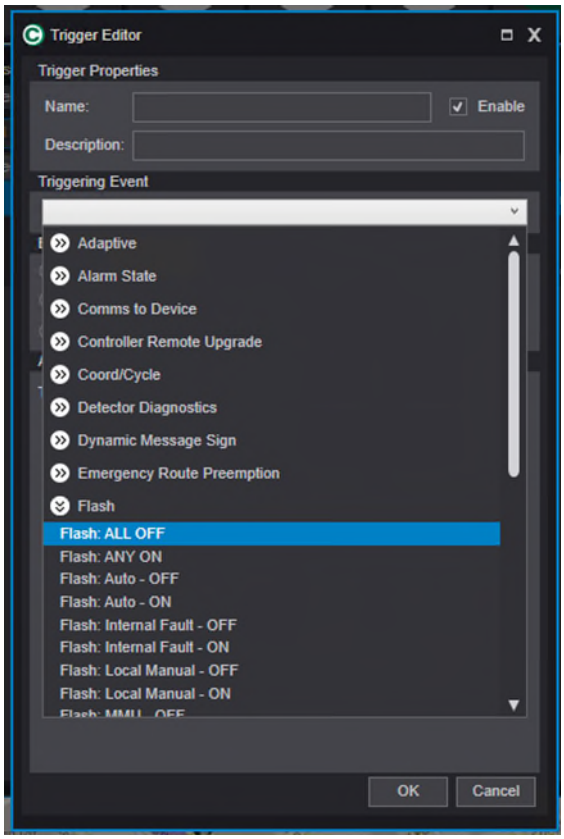


Figure 106: In this example, the FLASH: ALL OFF is selected as the trigger. The list of available triggers is found in the dropdown menu under Triggering Event.

6. Next, the Event Trigger Type is specified to determine how the alert is generated. The options include:
    a. **Occurs once**, which will generate the alert if the Triggering Event is true at any time. A signal-in-flash event is a good example of how to use this setting.
    b. **Occurs X times in Y minutes**, which will only generate the alert if X and Y conditions are satisfied. This can be useful to catch an erratic vehicle or pedestrian detector, as one example.
    c. **Active for X minutes**, which creates a condition where the alert is not generated until the Triggering Event condition has been true for X minutes. This can be useful to create a delay to ensure that a condition is consistent before engaging in troubleshooting. An example of using this trigger type might be waiting for signal communications to be inactive for at least 15 minutes prior to generating an alert.
7. Specify the action to be taken. This is the ***then*** portion of the if-then structure described at the start of this chapter. In addition to notifications via on-screen, email, and/or text message, other actions can be configured using the drop-down, such as Set Pattern or Set Time. Many different actions can be defined from the drop-down menu; however, the most common action to take is to generate an alert. The example shown on the next page uses the Set Time action instead of an alert.

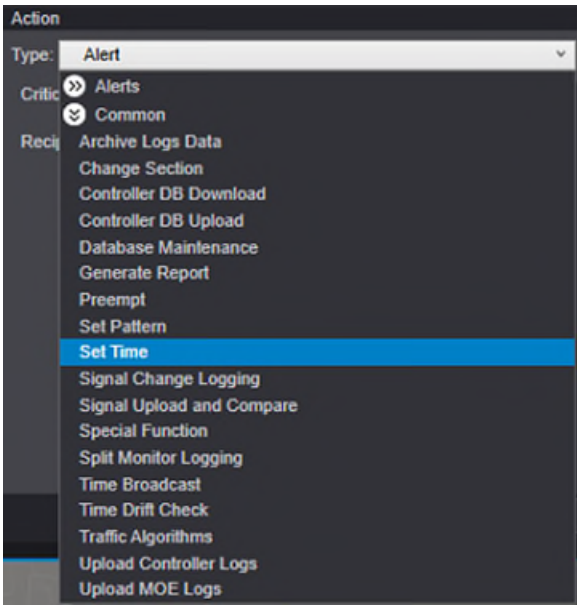


Figure 107: Alert action drop-down menu.

8. As part of specifying the action to be taken, identify the criticality of this alert: information, warning, or critical.
9. Finally, if sending notifications, use the Recipients options to specify who should receive a notification about this alert.

Defining Recipients

Users who need to receive alert notifications via email or text message must be configured as a Recipient. The user must have an email address and/or a SMS address to receive emails or text messages. To access the Recipients window, navigate to **Management | Recipients.**

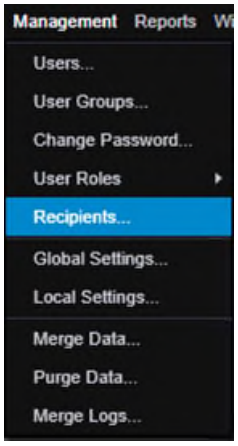


Figure 108: Navigating to the Recipients option in the Management menu.

To edit an existing Recipient, click the name on the left side of the Recipient window.

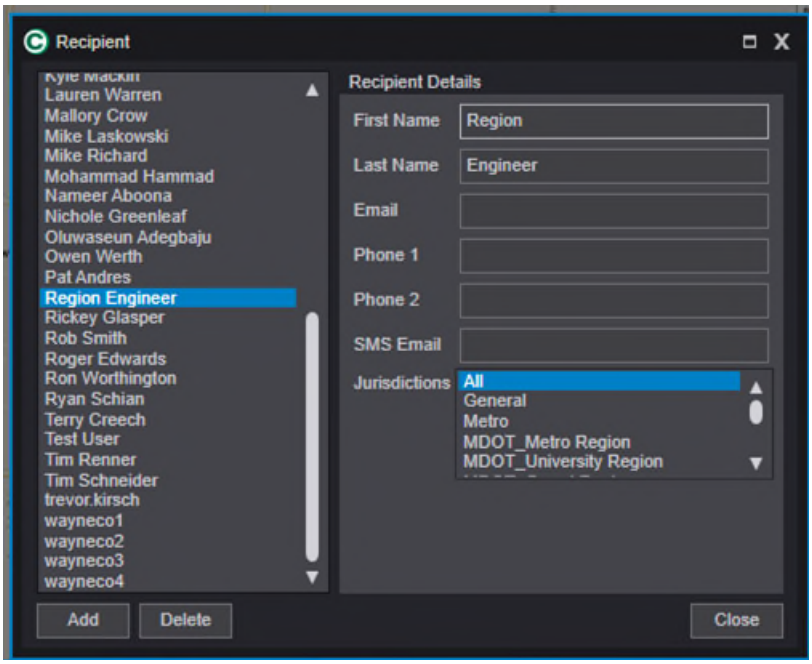


Figure 109: The Recipient window. This is used to add and edit recipients who may receive alert notifications.

To add a new Recipient, click **Add** to add a blank record and fill in the details on the right side of the window, including:

- An email address if the recipient anticipates to receive email alerts.
- The **Phone** fields must use a text message SMS address according to the phone carrier. This can change by phone carrier. Consult your manager or the **MDOT Centracs System Administrator** for more information.
- Use the **Jurisdiction** field to specify the MDOT region the Recipient will receive alerts from. Using **Ctrl-Click** or **Shift-Click,** multiple MDOT regions can be selected if appropriate.

Using Manual Commands in Centracs

Centracs can be used to run temporary operations or changes to traffic signals using manual commands. Manual commands are one-time commands sent to a traffic signal controller and can be configured to run immediately or scheduled in the future. In some cases, a duration for a manual command can be specified depending on the command that is being used. **Note:** Manual commands are available for all MDOT traffic signal controllers regardless of the type of controller at the location (Econolite Cobalt or Siemens M60).

When a manual command is executed, it is processed on the specified traffic signal controller(s). If a command is used to set a pattern or otherwise override existing signal timing, the manual command will take precedence over the programmed schedule in the traffic signal controller. At the conclusion of the manual command, normal operations are resumed based on the programmed configuration on the controller(s).

Viewing Existing Manual Commands

To view the current manual commands created on the system, both active and scheduled, navigate to **Control | Manual Commands | List**. Accessing the list of manual commands will show all active or currently scheduled manual commands in the system. **Note:** this will not be specific to an assigned MDOT region.

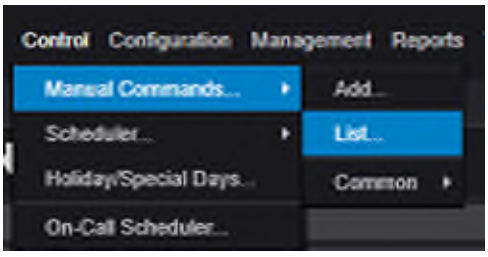


Figure 110: The List… option, available from the Control and Manual Command selections.

Following the above-mentioned steps and selecting the **List…** option brings up the Manual Commands window:

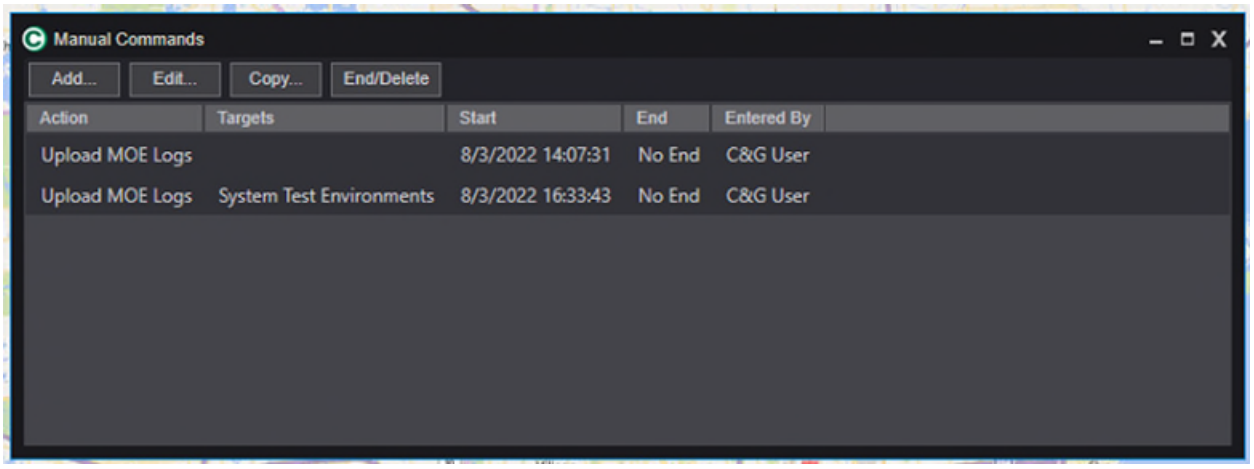


Figure 111: List of existing manual commands created on the system.

From the Manual Commands window, users may add a manual command, edit or copy an existing command, or end and delete an existing command.

Adding a Manual Command

To create a new manual command, use the **Add…** button in the manual command window shown in Figure 111 on the previous page, or navigate to **Control | Manual Commands | Add.** This will bring up the Manual Command window:

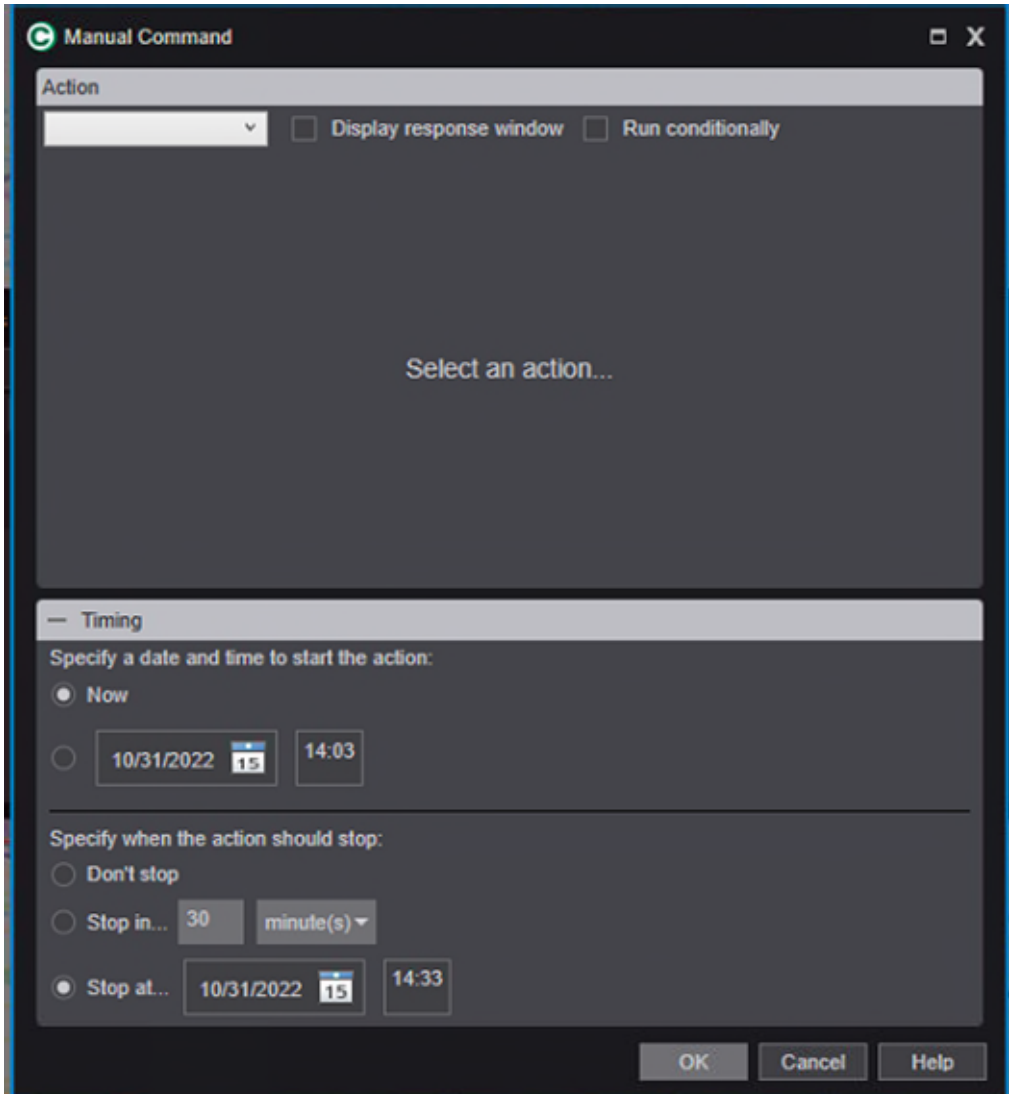


Figure 112: Creating a manual command in the Manual Command window.

First, the action needs to be specified for what the manual command will do. Use the drop-down menu and click on **Common** to bring up the list of available actions that can be completed with a manual command.

For descriptions of the types of actions found in the Action drop-down menu, please see the Econolite Centracs Manual.

As an example, in Figure 113, **Set Pattern** is highlighted as an action that can be taken. This is a common action and can be used for temporary signal timing operations in a planned event scenario such as a concert or a football game, or an unplanned event scenario using a flush plan as an incident response. Select the action that is intended to be used.

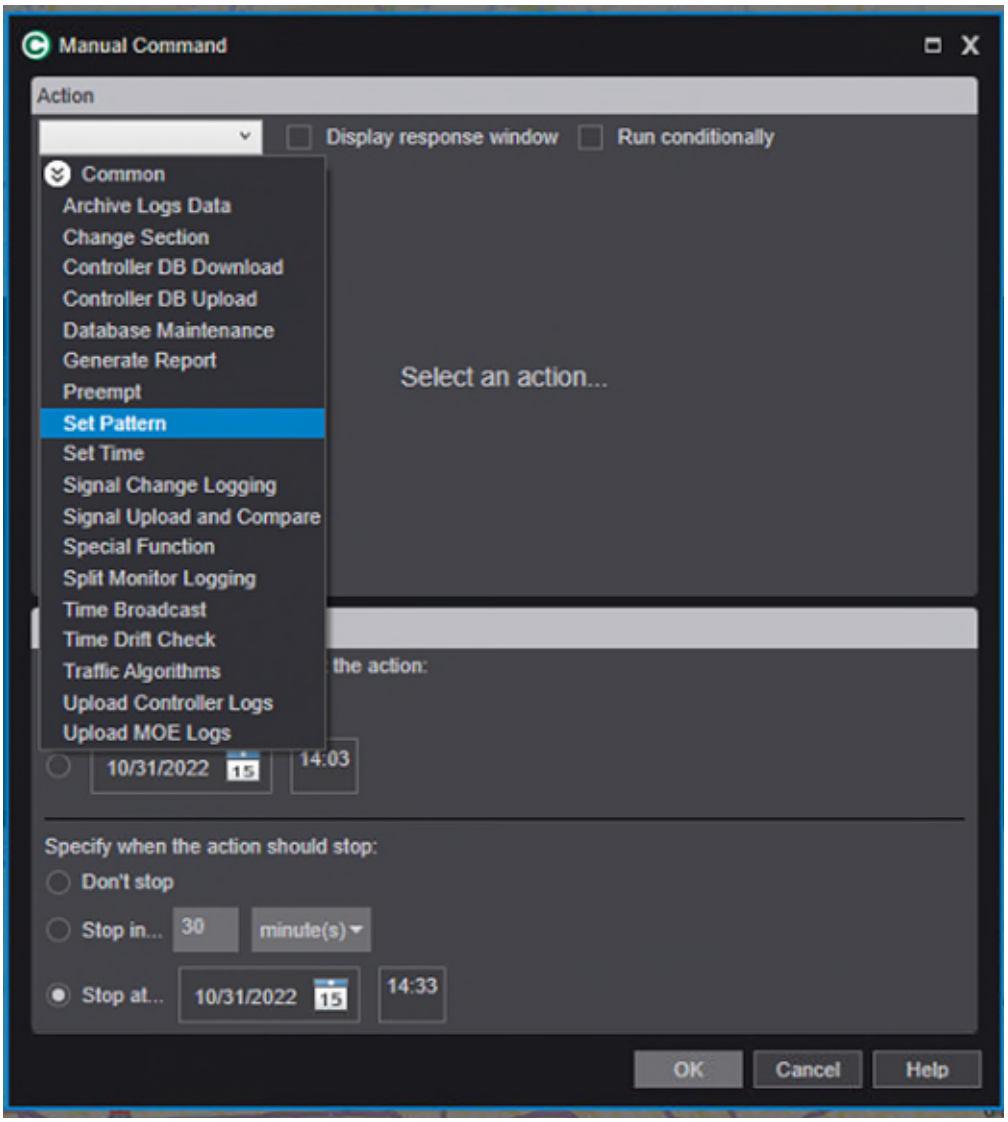


Figure 113: A list of common actions that are available within the Manual Command window.

Once the action is selected, the window will change to provide configurable options relevant to the chosen action. In the example in Figure 114 on the next page, a manual command has been configured to set the signal Localhost 5 to run Pattern 1. Note other options for the Set Pattern command include running Free and Flash.

After the action is configured, the timing for the manual command must be programmed. Manual commands can either run immediately or scheduled to occur in the future and can be set to run for a duration in minutes or end at a specific time. In the example in Figure 114 on the next page, the Set Pattern 1 command for Localhost 5 will run immediately and end in 60 minutes.

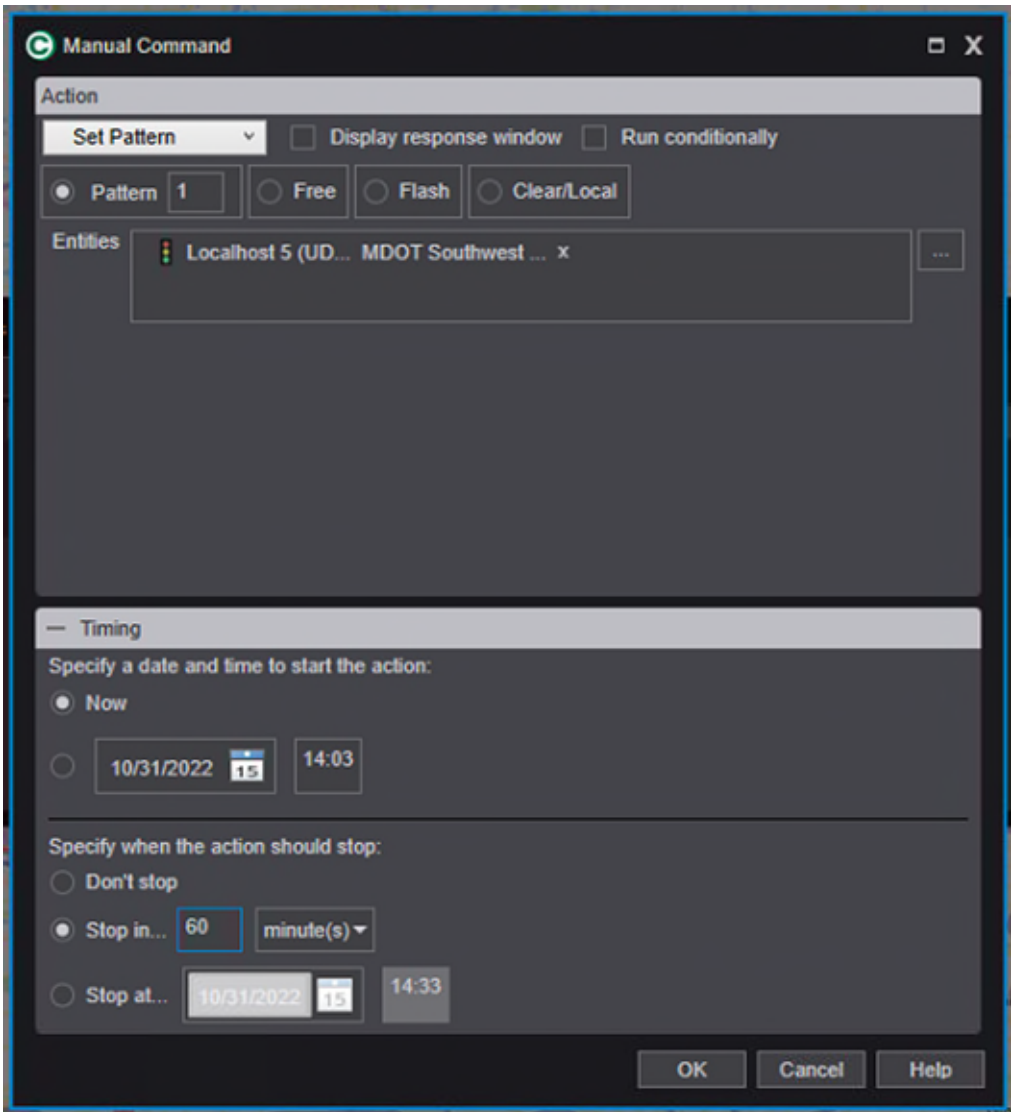


Figure 114: An example of setting a manual command for entity Localhost 5.

When the manual command has been configured, click OK. The manual command will be added to the List window until such a time as the command has been completed. To ensure that a manual command has been successfully applied, the user can check the **Display response window** option. Upon completion of the manual command, the Manual Command Response window will appear and provide status information on all entities selected for the manual command and whether the action was started successfully. In Figure 115 on the next page, the status window shows that the manual command for the intersection Localhost 5 was successfully applied.

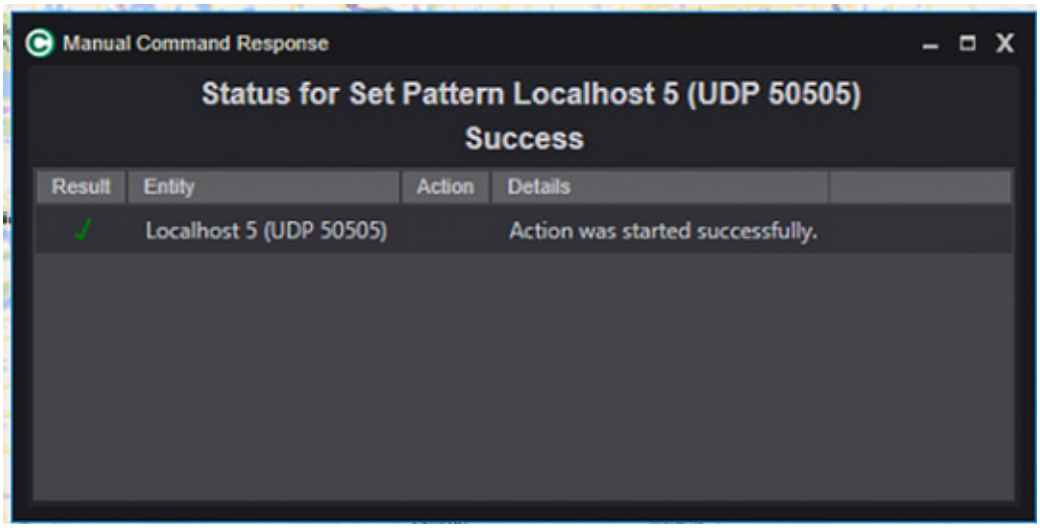


Figure 115: Manual command status window.

Note that manual commands can be applied to individual or groups of signals, subsections, sections, systems, or groups. Any organizational level in the Entity Tree is able to accept a manual command. This can be useful when creating temporary special event timing that must be utilized across a corridor or multiple signals across several different corridors.

Using the Scheduler in Centracs

The Scheduler can be used to configure operations that need to be repeated on a fixed schedule. This can include setting the clock, running special traffic patterns, or generating reports. The Manual Commands interface requires repeated configuration and is best used for a single instance of an operation, while the Scheduler is best used for repeat operations so that repeated configuration of the operation is not needed.

The scheduler can be used for simple scheduling conditions, such as assigning an operation to occur the 1st of each month at 9:00 AM; or, more complex scheduling conditions can be applied, such as scheduling the operation to occur at the start of the hour on the 17th of February between 9:00 AM until 9:00 PM for 15-minute intervals. After the command has been saved and enabled, the scheduled event will automatically run the command as scheduled and configured without the need for user input.

For additional information on manual commands, the user should consult the Manual Command section of this manual prior to using the Scheduler.

To add a new schedule entry:

1. Navigate to **Control | Scheduler | Add**. This brings up the New Schedule Entry window, which is the interface for all Scheduler commands.

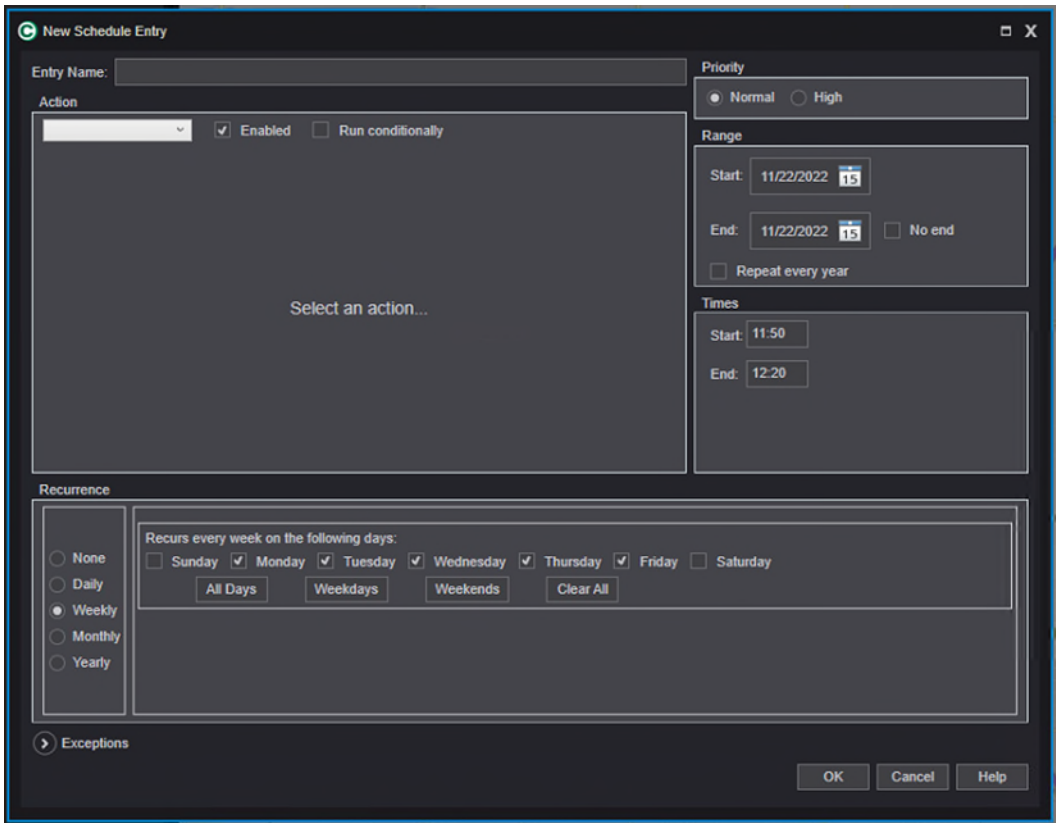


Figure 116: The New Schedule Entry window. This is the interface for all Scheduler commands.

2. Fill in a unique name for this entry. Name the command in such a manner that other MDOT CSCS users can identify and understand the reason for the command.
3. Use the Action drop-down menu to identify the command to be scheduled. For a description of each of these actions, please see the Econolite Centracs Manual.
4. Depending on the Action that is selected, the **Select an action…** area of the New Schedule Entry window will populate with programmable parameters. The figure below shows an example of a Comm Statistics report that has been scheduled to run on the first Monday of every month beginning in November of 2022.

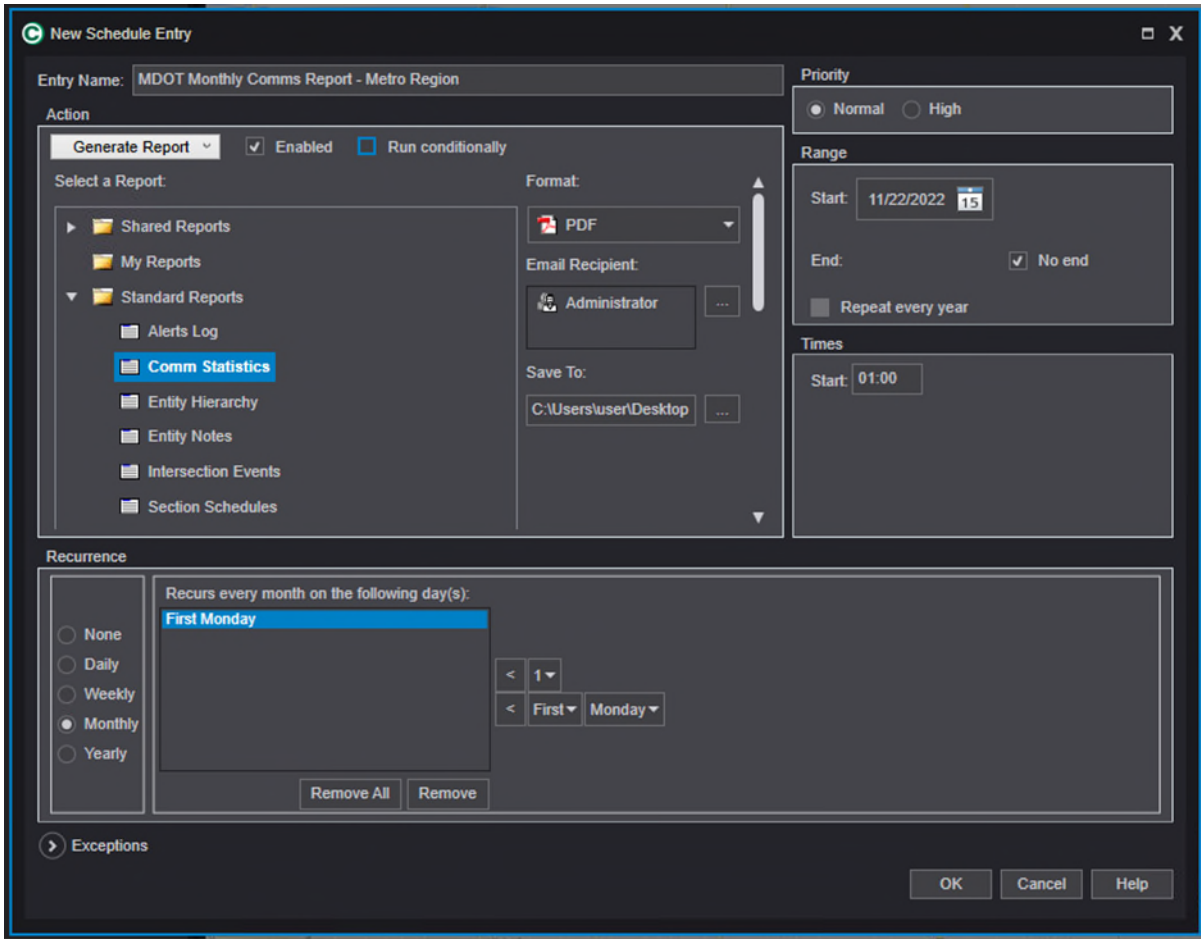


Figure 117: A sample configuration using the Scheduler.

5. In the **Range** section of the window, specify the first and last days on which this scheduled command will run. Use the **No End** option to run the command indefinitely. This feature is useful for setting up a recurring status report to be generated, for example.
6. In the **Times** section of the window, specify the time of day for the scheduled event to take place. If the action specified is an action with a duration (e.g., Set Pattern), specify the end time for the command.
7. In the **Recurrence** section of the window, specify the frequency for the event. The options will change depending on the radial button option selected (None, Daily, Weekly, Monthly, or Yearly).
8. Use the **Exceptions** drop-down to specify any days where the report should not run.

Split Monitor

The Split Monitor feature in Centracs can be a useful troubleshooting and analysis tool. MDOT staff can use this feature to analyze phase and usage characteristics of a signal based on a selected time frame. The Split Monitor will also show pedestrian statistics, transition statistics, controller alarms, the number of cycles, and other data for the selected time frame. To bring up the Split Monitor:

1. Navigate to **Monitoring | Split Monitor**. The Split Monitor Window will appear.

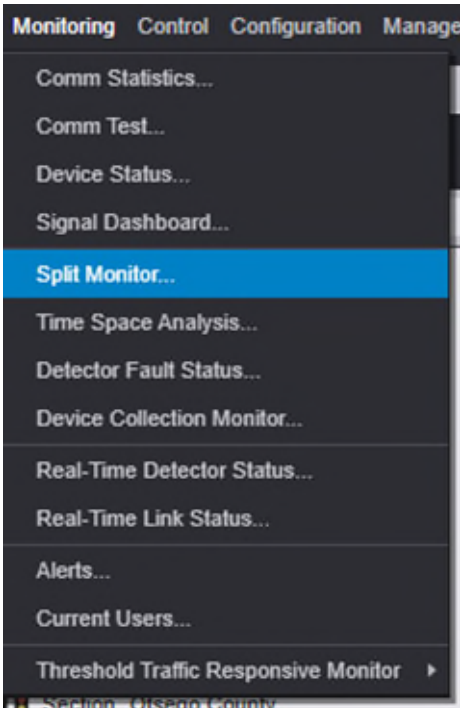


Figure 118: Accessing the Split Monitor tool through the Monitoring menu.

(Continued on the next page)

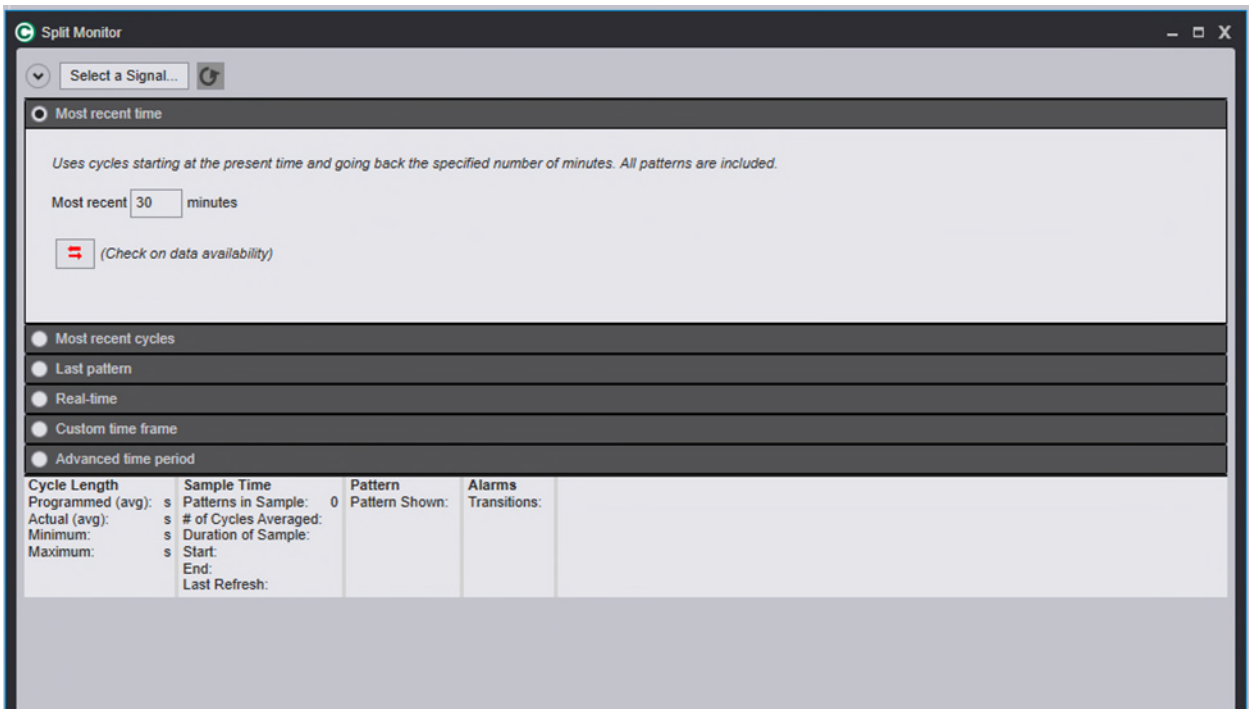


Figure 119: The Split Monitor interface.

2. Click on **Select a Signal…** at the top of the interface. This brings up the Entity Selection window. Search for or navigate to the signal to be analyzed. Figure 120, below, shows an example search for CS24011, where the intersection of 24011-1 has been selected for a Split Monitor analysis. The name of the intersection can also be used here.

Note that the Split Monitor feature can only analyze one signal at a time.

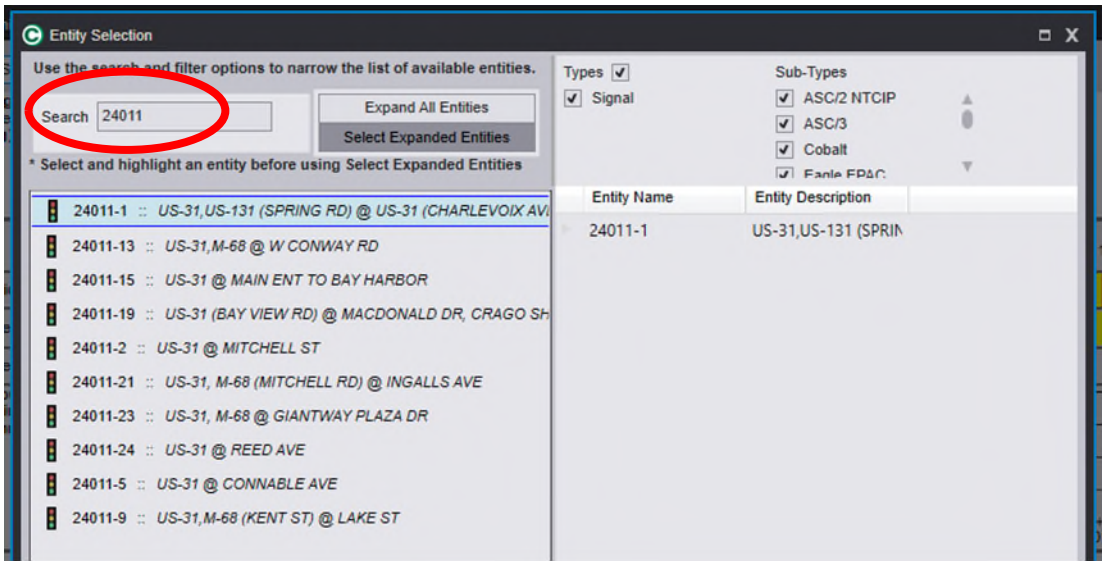


Figure 120: Selection of intersection 24011-1 through a search of CS24011.

3. Next, select the desired time frame. In the example shown in Figure 121, 6 AM to 6 PM on October 10, 2022 has been selected to conduct the analysis. To use a different time frame, simply update the configurable options.

> **At this time, the real-time option is not available.**

4. The *(Check on data availability)* option can be used to ensure data is available for the selected analysis period and intersection. If data for the requested period is available, a confirmation will be provided, as shown in the example below.

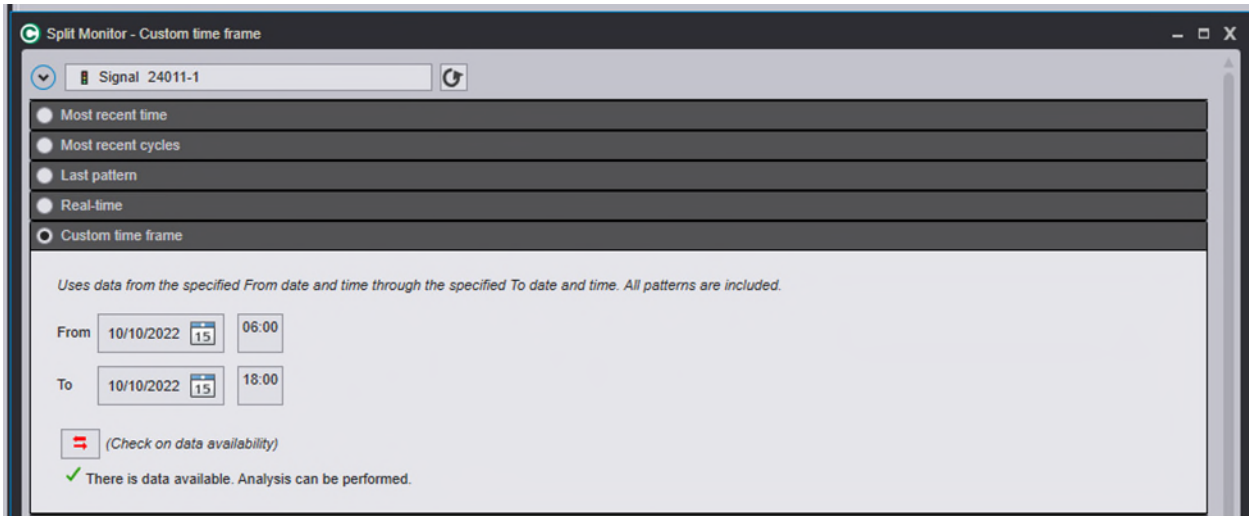


Figure 121: Confirmation of data availability for Split Monitor analysis of Signal 24011-1 with a time frame of 6 AM to 6 PM on October 10th, 2022.

5. Click the ↻ icon to run the analysis. Figure 122 on the next page shows an example. The top part of the Split Monitor results window shows key information about the selected time range or cycle range.

(Continued on the next page)

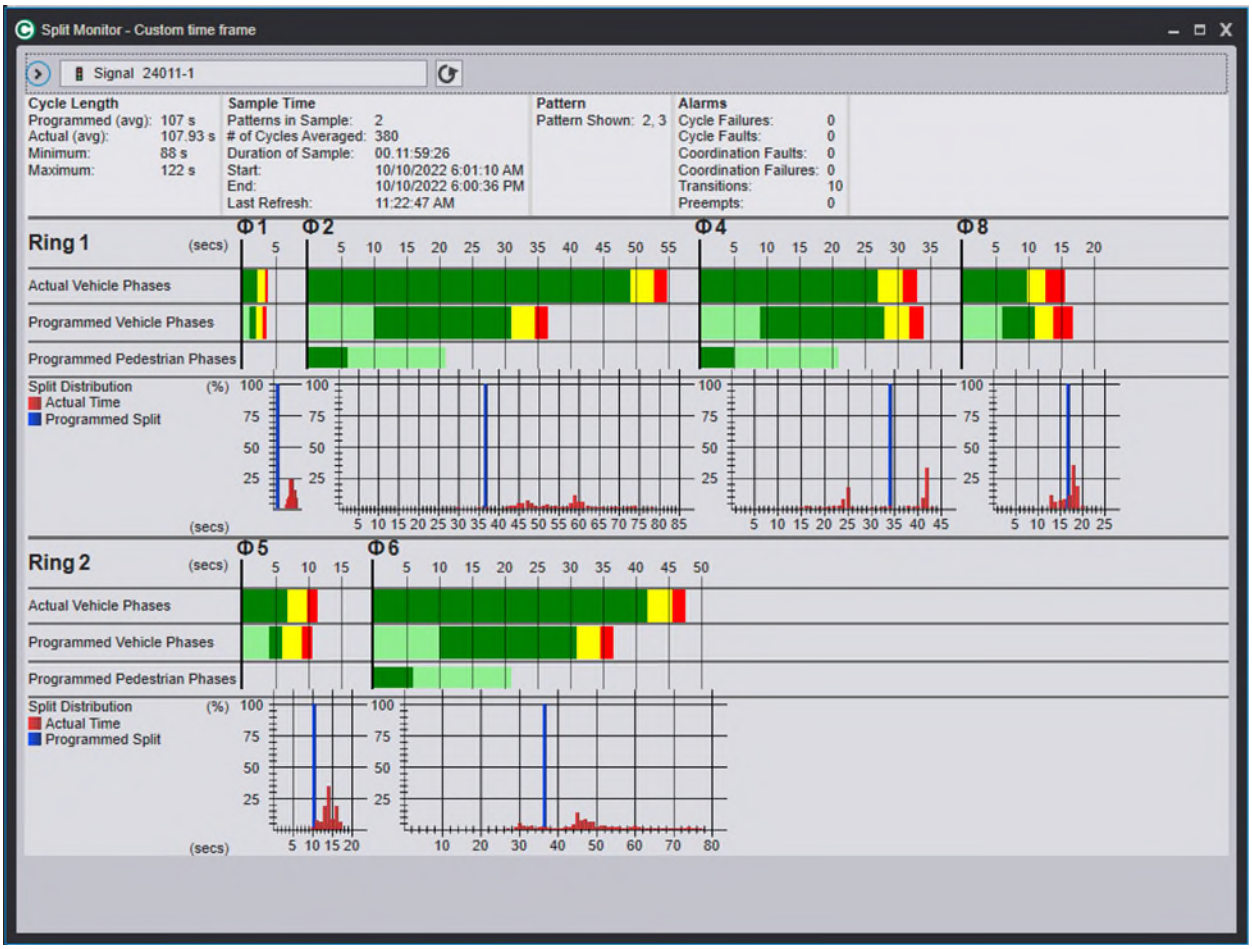


Figure 122: Sample results of the Split Monitor analysis.

Interpreting Split Monitor Results

The Split Monitor analysis results provide detailed information that can be useful in traffic and operations studies. This section will briefly describe some of the results seen in Figure 122. For a complete explanation, please refer to the Econolite Centracs Manual.

Cycle Length

- **Programmed:** This value shows the configured cycle length in the analysis period. This will be averaged if multiple patterns are included in the analysis period
- **Actual:** This value shows the average of the actual cycle lengths during the analysis period
- **Minimum:** The minimum cycle length that occurred during the analysis period
- **Maximum:** The maximum cycle length that occurred during the analysis period

Sample Time

- **Patterns in Sample:** The number of patterns that were active on the traffic signal controller during the analysis period
- **# of Cycles Averaged:** The total number of cycles during the analysis period

- **Duration of Sample:** The length of time used for the analysis based on the selected time frame or period of analysis.
- **Start/End:** The beginning and end points of the analysis. Depending on the time frame method selected, this may be different from the selected time frame as the analysis must coincide with the nearest cycle end time so that the analysis includes only complete cycles.

Alarms

- **Transitions:** The total number of cycles that were in transition during the analysis period.
- **Preempts:** The total number of preempts during the analysis period.

Graphical Interface

- **Actual/Programmed Vehicle Phases:** The graphs will indicate, for both rings, a comparison of the programmed phase times against the actual recorded phase times across all cycles in the analysis period
- **Programmed Pedestrian Phases:** The graphs will indicate, for both rings, the programmed pedestrian times for phases with pedestrian programming
- **Split Distribution:** A statistical distribution of the splits that are used to display the Actual Vehicle Phases graphs. This graph can indicate details on *how* the phase is used from cycle to cycle.

Time Space Analysis Diagram

The Time Space Analysis Diagram can be used to visually display current coordination conditions between multiple consecutive intersections. This tool can be used to analyze pattern parameters, historical data logged and stored in Centracs, or even display a continuous real-time diagram that can be monitored. This may provide value during routine traffic signal or corridor studies. At least two signals are required to create the diagram.

To run a Time Space Analysis:

1. Select **Monitoring | Time Space Analysis**. This will bring up the Time Space Analysis Window.

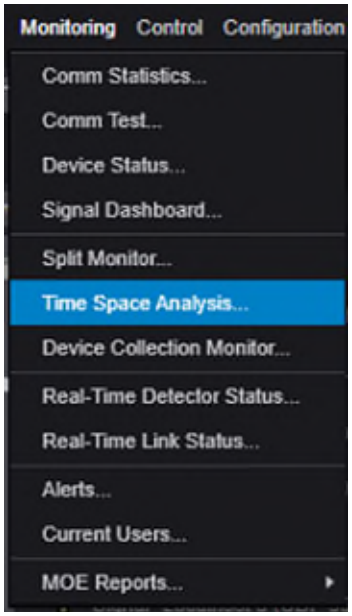


Figure 123: Navigating to the Time Space Analysis in the Monitoring menu.

(Continued on the next page)

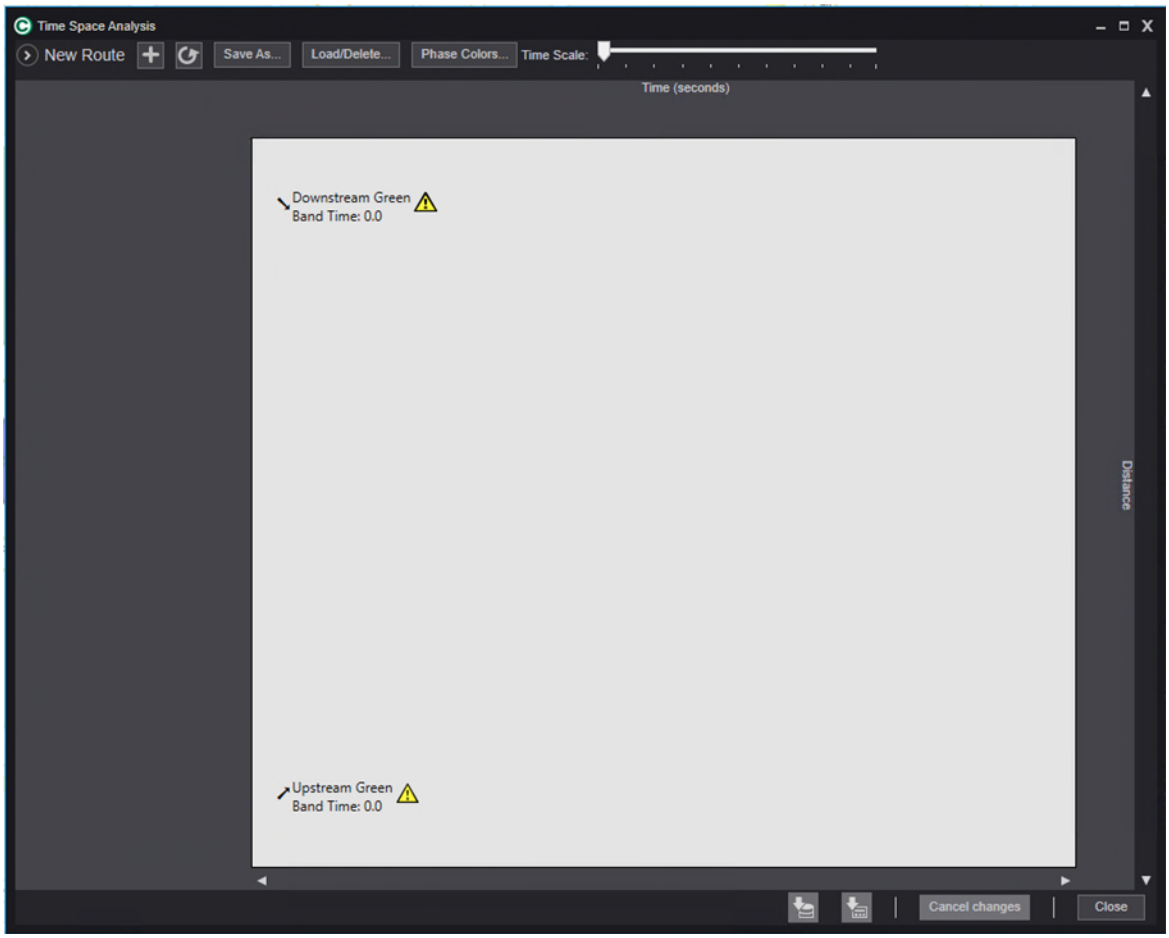


Figure 124: The Time Space Analysis window (blank).

2. Click the › icon to expand the analysis options.

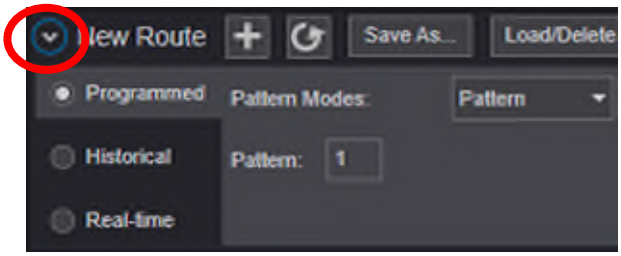


Figure 125: Expanding the analysis options.

3. Select a calculation type:
    a. **Programmed:** This option creates a diagram based on programmed phases at selected intersections. This version of the time space diagram is a static representation of the configured parameters. This mode can use a specific pattern, or a time of day can be used.
    b. **Historical:** This option creates a diagram based on logged data in Centracs for how each of the selected intersections were configured. Up to 24 hours of data can be used.

c. **Real-time:** A diagram is drawn in real-time based on real-time status of the selected intersections.

4. Click the + symbol next to New Route to open the Entity Selection window. Select the intersections upon which to conduct the analysis. Note that entire corridors, individual intersections, or groups of intersections can be selected. It is important that intersections used are adjacent and consecutive to one another for the most accurate analysis. Figure 126 shows a sample corridor of 3 selected intersections loaded into the Time Space Analysis window.

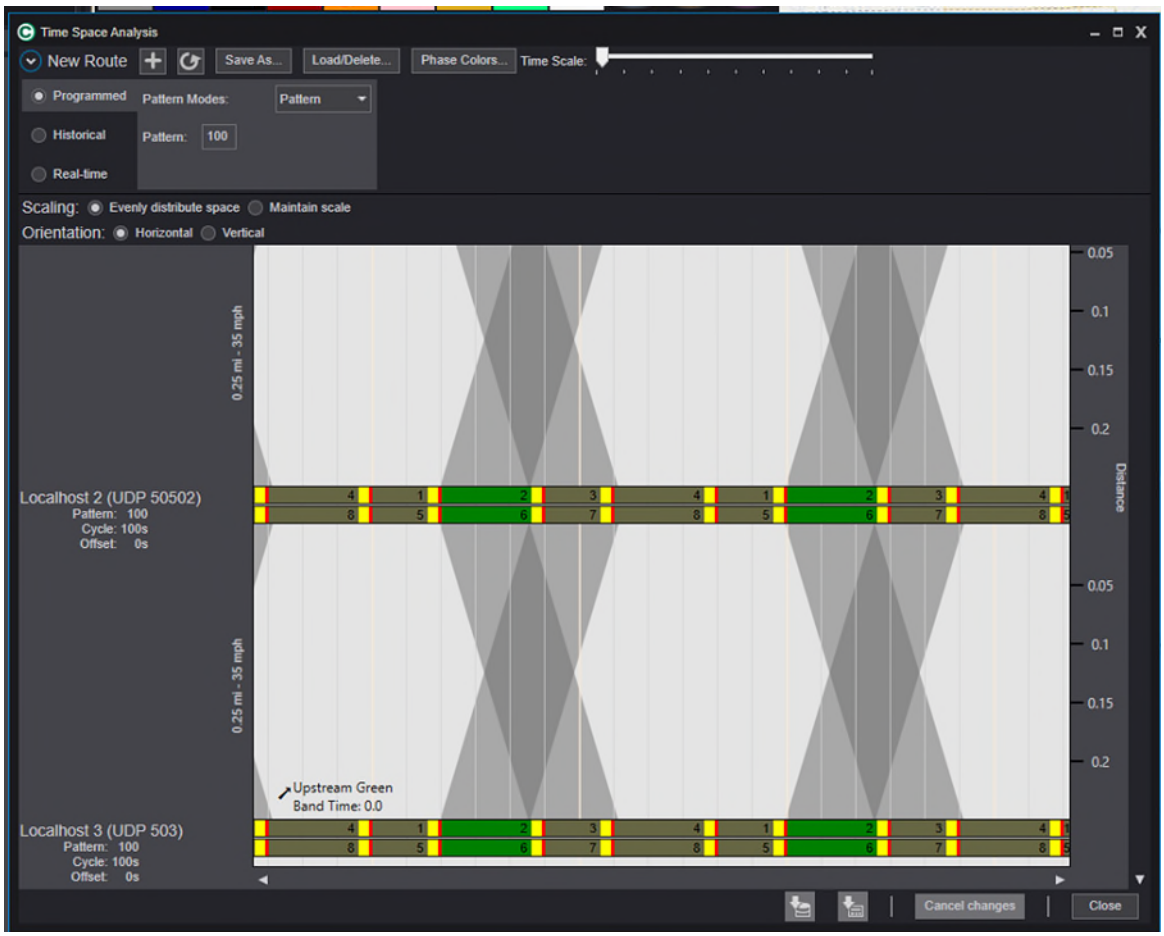


Figure 126: Time space analysis results with diagram.

5. Hover the mouse cursor on the arrow bars between intersections to edit the distance between the signals as well as enter the appropriate speed limit. Entering these parameters ensures the time space analysis is more accurate to field conditions.

Figure 127: Entering distance and speed data into the expanded link between signals.

6. If the order of the intersections is not accurate or an intersection needs to be removed, use the X and the ⌄ and ⌃ buttons to remove or adjust the position of the intersection in the corridor.

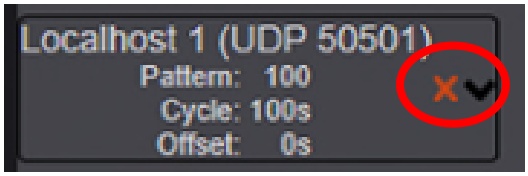


Figure 128: Indication of the red X and black arrow allowing users to remove or adjust the position of the intersection in the corridor.

7. If necessary, click on the name of the intersection to bring up the Signal Location Properties window. This can be used to verify settings for the individual controller based on the selected pattern, and also verify how each of the rings should be displayed. The coordinated phase will also be highlighted and can be adjusted if necessary for the analysis.

(Continued on the next page)

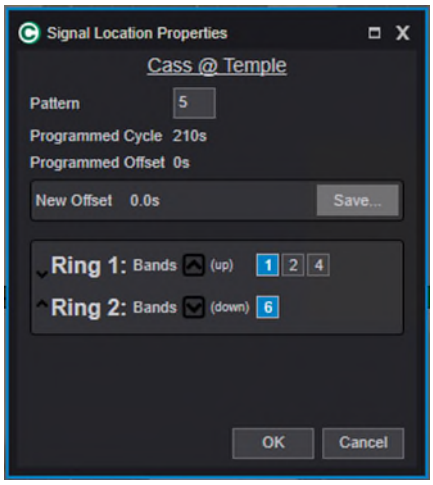


Figure 129: The Signal Location Properties Window.

8. Click the ↻ button to perform the analysis.
9. Note that corridors can be saved using the **Save As…** button in the Time Space Analysis window. This may be useful for frequent analysis of specific corridors.

Corridors that have been previously saved can also be reloaded for analysis. To do so:

1. Select the Load/Delete button in the Time Space Analysis window toolbar

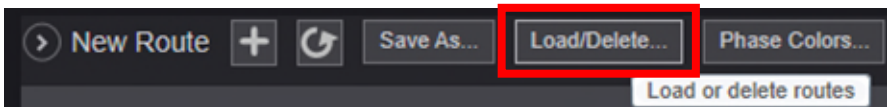


Figure 130: The Load/Delete button in the Time Space Analysis window.

2. Select the saved corridor from the Load / Delete Route window that appears. Click **Load**.

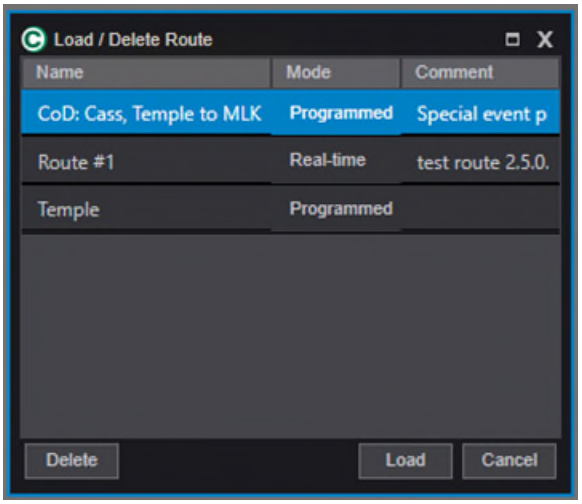


Figure 131: Selecting a previously saved corridor to load into the Time Space Analysis window.

3. The corridor will load into the Time Space Analysis window with all previously entered and saved data, including distance between intersections and speed limit. All options for analysis are now available. This can be a useful tool to use to revisit corridors or segments of corridors for repeated analysis, or as part of a project or study.

Generating Reports

Users are able to generate a variety of reports on signal and system activity that is recorded in the Centracs database. Report generation is accomplished by using the **Reports** menu at the top of the Main Container Window.

To generate a report:

1. Navigate to the **Reports** menu and select a desired report from one of the submenus. This manual will use a Comm Statistics report as an example.

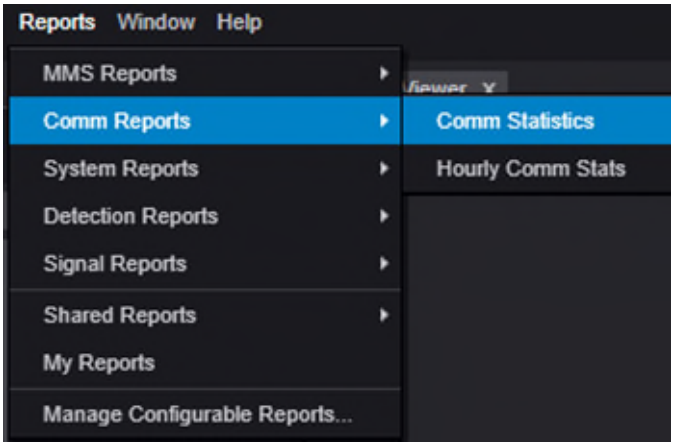


Figure 132: Selecting the Comm Statistics report from the Reports menu.

2. Each report will have a configurable set of parameters specific to that report. These parameters are always at the top of the report window that appears when the report has been selected from the Reports menu. For details and explanations of each report's parameters, consult the Reports section of the Econolite Centracs Manual. A list of commonly used reports for daily operations is described at the end of this chapter.

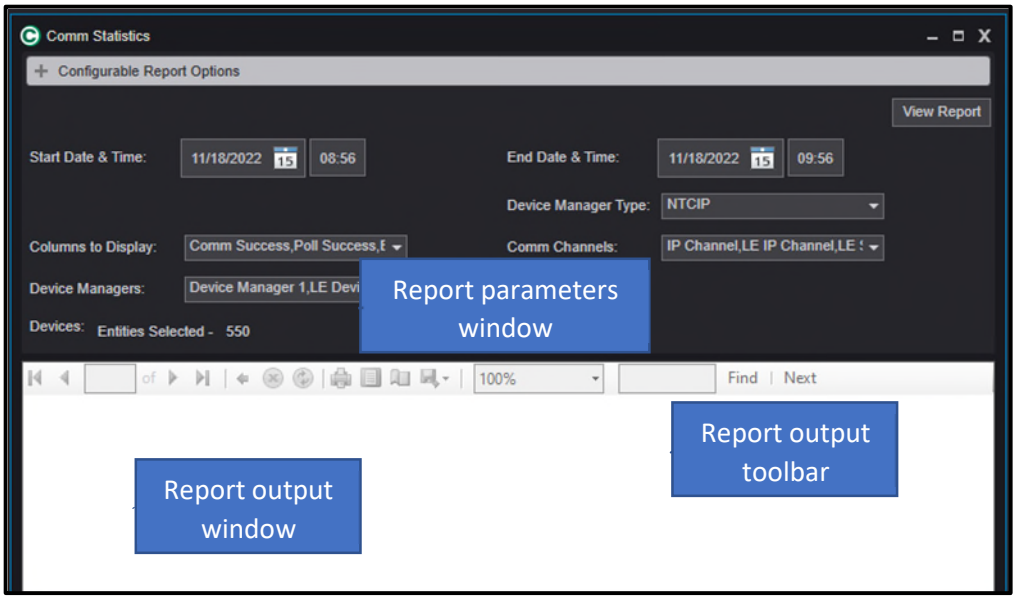


Figure 133: The report interface to configure and generate a report.

3. In this example, a Comm Statistics report has been configured for the BUS-75 corridor in the Superior Region for Monday, November 14th, 2022, to Friday, November 18th, 2022.

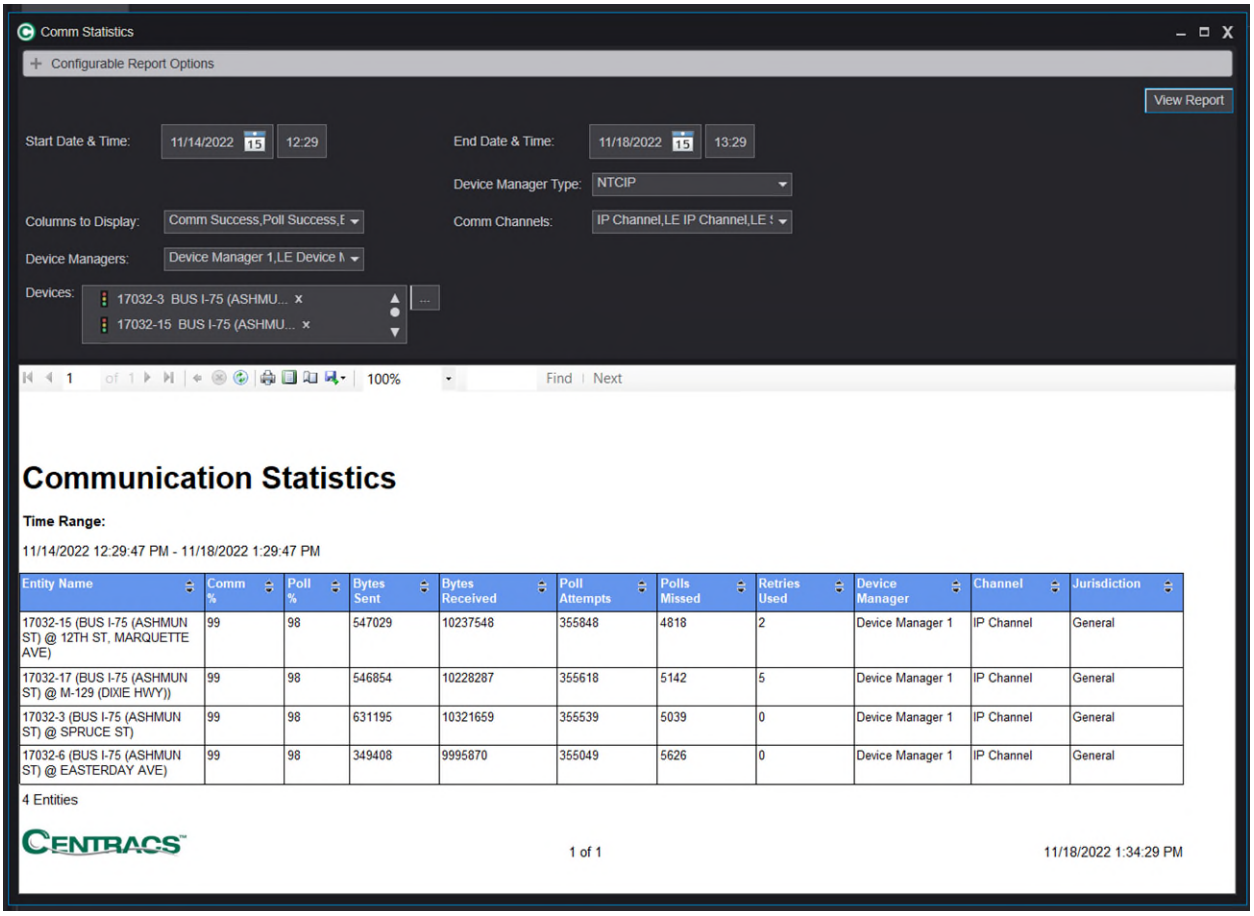


Figure 134: Example output of a Communication Statistics report.

(Continued on the next page)

4. The report output includes a toolbar with different functions. See the table below for a detailed explanation of each of these options.

Icon	Function
	First Page – jumps to the first page
	Previous Page – jumps to the previous page
	Next Page – jumps to the next page
	Last Page – jumps to the last page
	Back to Parent Report – For some reports, such as Users and Recipients or Hourly Comm Statistics, this can be used to generate the User Login report and the Comm Statistics report. See the Econolite Centracs Manual for more information
	Stop Rendering – cancels the report generation
	Refresh – refreshes the report
	Print – launches the Windows Print window
	Print Layout – shows a print preview of the report
	Page Setup – brings up Windows page setup dialogue box for print settings
	Export – saves the report to a specified file type. This can be useful for supplemental analysis or data inclusion into MDOT reports

In addition to generating reports via the Reports menu in Centracs, reports can also be automatically generated using the Scheduler function in Centracs. These automatically generated reports can be saved in a specific output format and saved to a specific location, or the file can automatically be emailed to a recipient. Refer to the Manual Commands and Scheduler chapters of this manual for more details on general uses for the Scheduler.

To configure a report to run on a schedule or to automatically email the report:

1. From the main menu, select **Control | Scheduler.** The Scheduler Entries window will appear.
2. Click **Add.** The New Scheduler Entry window appears.
3. Enter a name for the scheduled entry. Due to the statewide, cross-regional nature of the MDOT Centracs system, it is important to name the scheduled entry in a clear and easily identifiable manner for other users to understand the purpose of the scheduled event.
4. In the Action drop-down list, expand the Common list of actions and select **Generate Report.**
5. Select the report to be generated. Make sure the Enabled checkbox is checked.
6. Select the output to be generated in the Format drop-down.
7. Select the type of output. If the report is to be emailed, click **Browse** to the right of the Email Recipient box. **Note:** Recipients must have an accurate email address assigned in

Centracs. If the recipient in question does not have an email address, contact the **MDOT Centracs System Administrator** for assistance.

8. If the report should be saved to a local folder or network location, click **Browse** next to the Save To field. Navigate to the folder where the report will be generated.
9. On the New Schedule Entry window, specify the date range for when the report should be generated. No End can be an option for recurring reports.
10. In the Recurrence field, specify how frequently the report will be generated.
11. Click **OK.** The scheduled report will now display in the Scheduler Entries window. For more information on the Scheduler, see the Manual Commands and Scheduler chapter of this manual.

Configurable Reports

In some cases, it may be desirable to frequently run the same report. Settings for reports can be saved as a configurable report in Centracs and this can be a convenient option for users. For example, a configurable Comm Statistics report could be configured to show the communications status for a specific set of locations for the previous week. This might be useful to keep a continuous review of communications statuses for a corridor or region as part of an ongoing study or operations review. This option also works well with the Scheduler feature that can generate customized reports on a recurring basis.

To create a configurable report:

1. Navigate to the Reports menu and select one of the available reports. This chapter will walk through creating a Comm Statistics customized report.

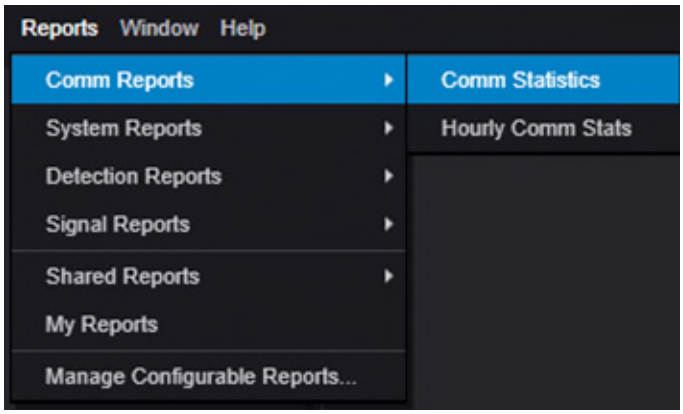


Figure 135: Selecting the Comm Statistics report to create a configurable report.

2. On the report window, click **Expand** to display the options under Configurable Report.

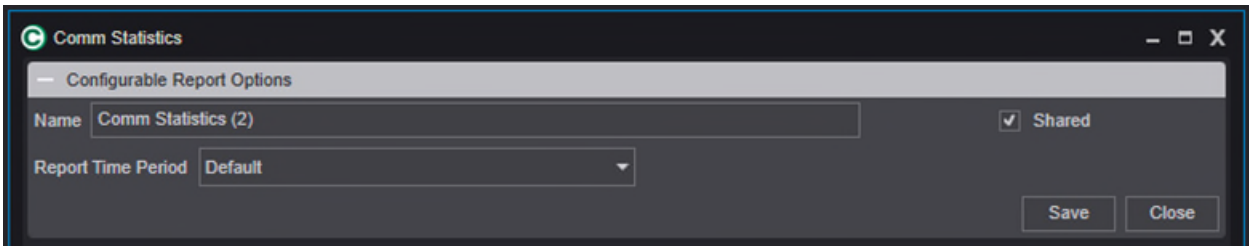


Figure 136: Configurable report options for a Comm Statistics report.

3. Use the Name field to describe the report.
4. Use the Report Time Period drop-down menu to select one of the following options
    a. **Default:** This option uses the default time frame that is selected for the report. For a Comm Statistics report, this is the most recent 60 minutes by default
    b. **Configured Time:** This will use a specified date and time-period. To specify the time for the configured report, use the Start Date & Time and End Date & Time fields.
    c. **Hour:** This will use data from one or more prior full hours. Selecting this option will prompt the user to specify the number of hours to use. As an example, if the report is set to run at 10:05 AM, the report will use 9:00 AM to 10:00 AM.

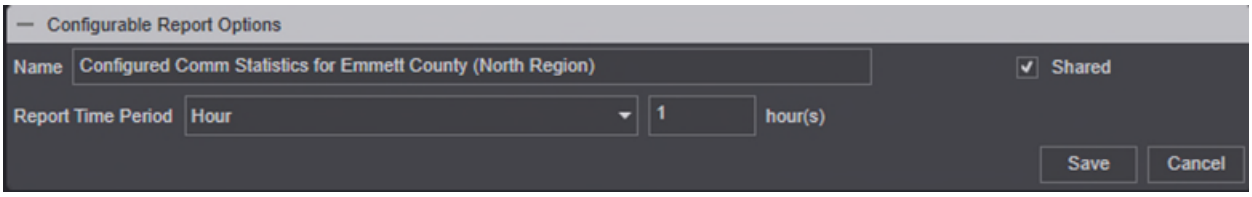


Figure 137: A configured report with the Hour time-period selected. 1 hour is entered as the number of hours to use for the report.

    d. **Day:** This option works similar to the Hour option. As an example, if the report is set to run at 3:00 PM on a Wednesday, the report will use data for Tuesday 00:00 to Wednesday 00:00.
    e. **Week:** This option works similar to the Hour option. Data used will start on the most recent Monday. As an example, if the report is set to run on a Tuesday and uses one week of data, the report will use the previous week's data from Monday to Sunday.
    f. **Month:** This option works similar to the other time frame options.
    g. **Year:** This option works similar to the other time frame options.
    h. **Beginning to End of Day:** This option includes data from one or more prior full day.
5. The other report parameters should be entered as appropriate for the type of report.
6. Use the **Shared** checkbox to indicate if the report can be shared with other users on the system. Note that **all** MDOT users will have access to this report if it is shared.
7. Click **View Report** once all parameters have been configured appropriately.
8. Click **Save.**

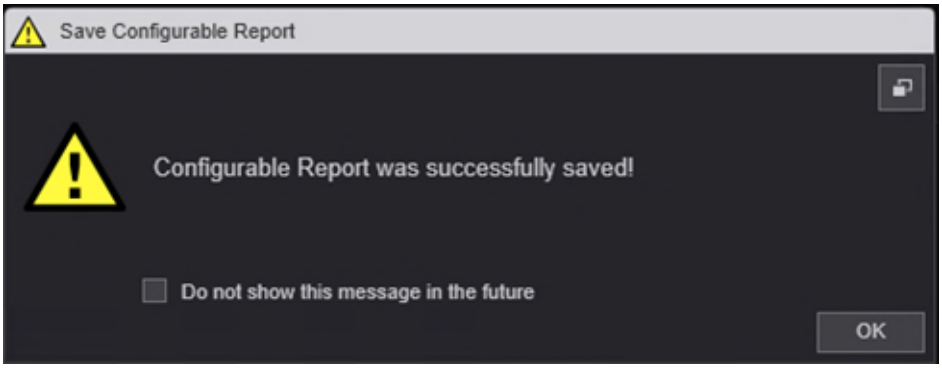


Figure 138: Saving the configured report.

9. The new configured report will now appear in the Reports menu. If the report was shared, it will appear under the **Shared Reports** submenu, otherwise it will appear under the **My Reports** submenu.

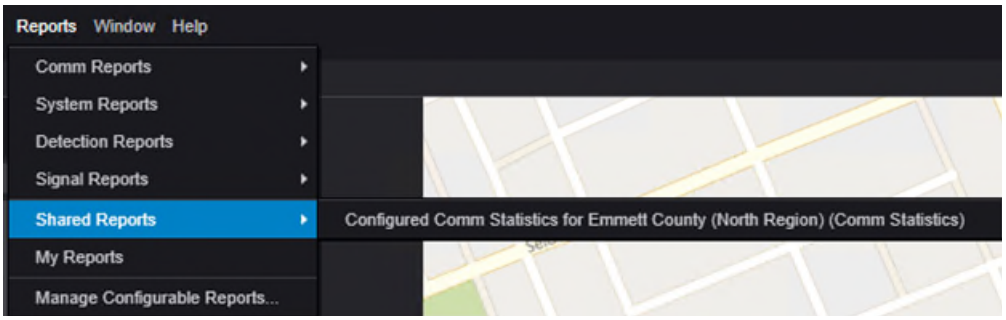


Figure 139: Accessing the new Shared Report from the Reports menu.

Note! Only the DTMB Administrator role can delete existing configured reports.

Commonly Used Reports

Centracs offers 30 reports for users to generate. Each of these reports are explained and described in detail in the Econolite Centracs Manual. The following are some of the most commonly used reports and a description of how they are used.

- **Comm Statistics:** A report to monitor communications levels at signals. Monitoring signals in poor service areas may be valuable to determine if infrastructure upgrades are necessary.
- **Alerts Log:** Once Alerts are removed from the Alert List window, this report can be used to generate a complete list of alerts for different intersections. Using this report can help track alert trends or spot recurring issues that might otherwise be difficult to diagnose.
- **System Events:** This report shows all events that Centracs has logged. The report can be filtered based on events that are available for the report.
- **Signal Changes:** This report can generate a list of events occurring at the traffic signal in question and can provide a good timeline of how the signal controller has operated during the specified timeframe. This can be a useful troubleshooting tool to understand at what point an issue occurred.
- **Signal Upload and Compare:** This report generates the results of the scheduled Signal Upload and Compare action that is configured in the MDOT environment. The results show differences noted between traffic signal controllers and stored data in the database editor. Note that this is only available for locations using an Econolite Cobalt controller.
- **Split Monitor:** The Split Monitor report provides similar information as found in the Split Monitor feature within Centracs. A split table option is selectable for this report, which will generate a cycle-by-cycle table showing the split times for each phase of the ring. Note that only one signal can be selected at a time for this report.
- **Time Drift:** This report provides information on the most recent results of the Time Drift Check scheduled command in the system and shows users the drift check result for each queried intersection. This report can be useful to check how much clock drift is occurring at intersections of concern.

Examples Using Centracs

This section will provide a few basic examples of how to use Centracs to supplement daily workflows and operations. These examples are simplified but will reflect real-world challenges in which Centracs could be a useful tool to approach a situation. These examples may be useful to MDOT TOC staff, region engineers and technicians, or electricians.

Example 1: Reviewing Intersection Operations

A request is made to review intersection operations as part of a traffic study. The region wants to collect additional information about existing conditions in addition to reviewing the existing timing permit. The MDOT engineer decides to make use of the Intersection Status Window to take observe current operations.

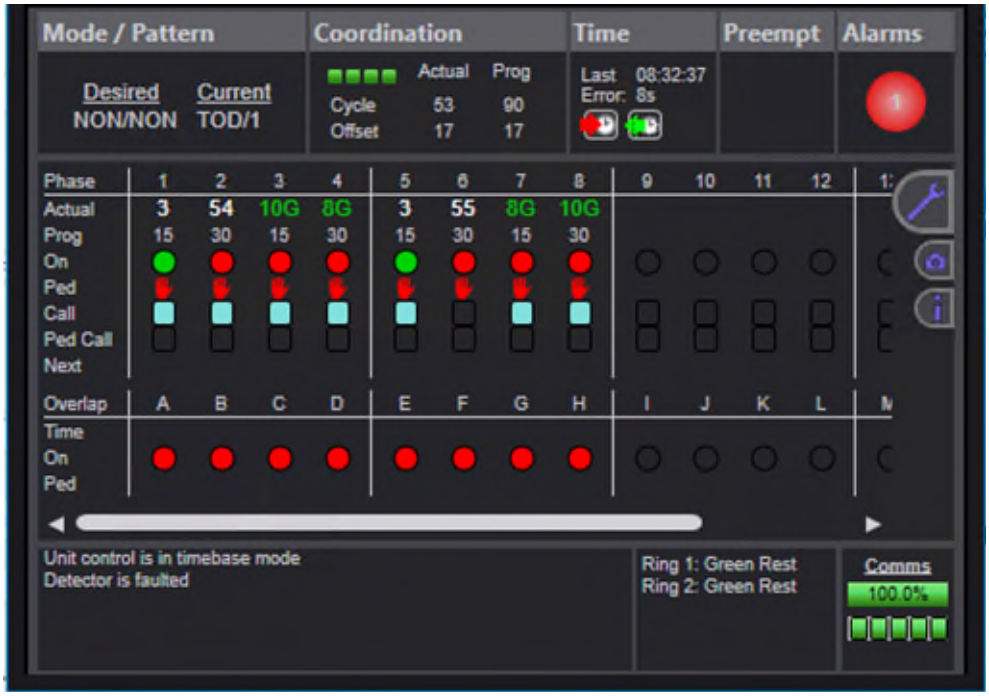


Figure 140: Reviewing the Intersection Status Window details during the observation of current operations.

The engineer notes that the time differential indicates the clock is incorrect. The engineer notes the difference of 8s off the system clock, and uses the Set Clock feature of the Intersection Status Window to set the traffic signal controller clock. The engineer makes a note of this to share with the region staff that are managing the traffic study.

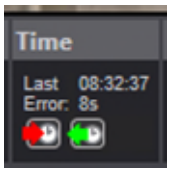


Figure 141: The engineer notes the time discrepancy on the traffic signal controller.

Next, the engineer uses the current timing permit to identify that vehicle detection is present at the intersection and is expected to actuate side street and left turn phases; however, the

Intersection Status Window indicates the Detector Fault controller alarm is active. After reviewing operations for several cycles, the engineer notes that the vehicle detector call box for phase 1 has not dropped its call and that the left turn phase forced off on every cycle that was observed. The engineer makes a note that a site field visit to review detection for phase 1 may uncover malfunctioning equipment that needs maintenance.

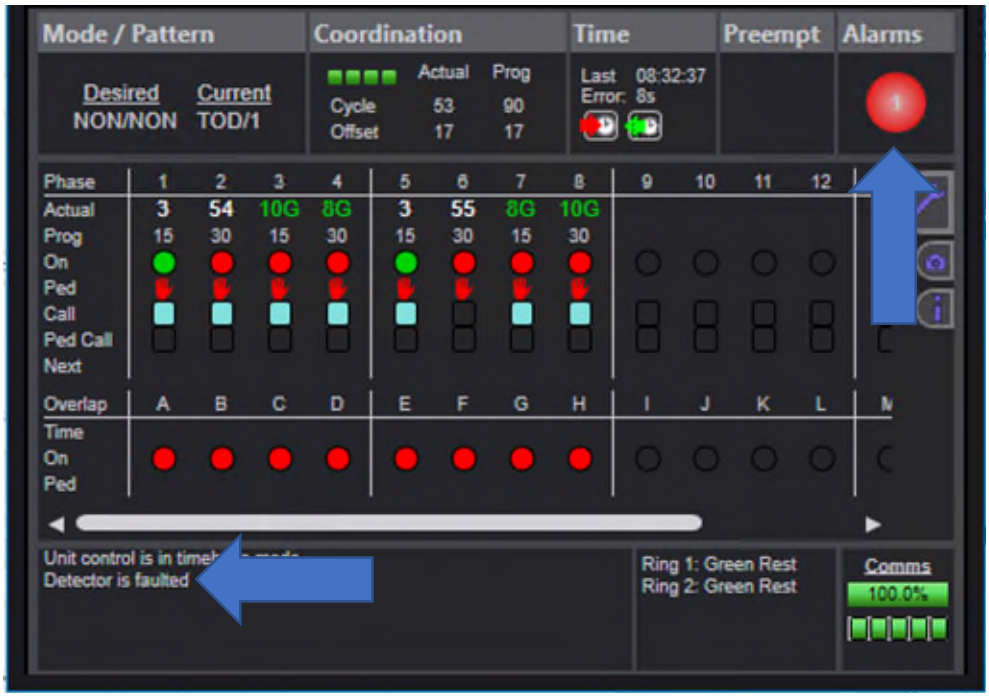


Figure 142: The engineer notes that a controller alarm is active and that a detector is faulted.

Last, the engineer notes that the timing permit indicates pedestrian detection is present on side street phases 4 and 8. However, during the review, the engineer has not observed any pedestrian calls or activation of Walk 4 or Walk 8. The engineer opts to assert a manual call on the pedestrian detectors through the Intersection Status Window to verify that side street pedestrian phases are operating as intended. The results show that the traffic signal controller runs Walk 4 and Walk 8 in response to the asserted manual call, and ultimately confirms for the engineer that pedestrian actuation configured in the controller is operational. The engineer makes a note to verify that the in-field pedestrian actuation facilities are operational.

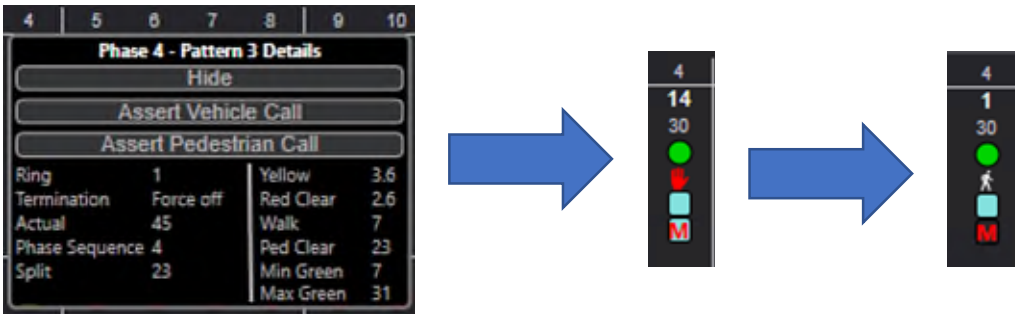


Figure 143: The engineer hovers the mouse over Phase 4 in the Intersection Status Window and asserts a manual pedestrian call to watch pedestrian operations.

Example 2: Comparing the Timing Permit Traffic Patterns to In-field Conditions

Next, as part of collecting data for the traffic study, the engineer needs to verify that the cycles, splits, and offsets stated on the timing permit match the parameters that are operating on the traffic signal controller in the field. The engineer chooses to use the Centracs signal database editor to accomplish this task. First, the engineer navigates to the intersection in question by searching the CS-Spot number in the search field of the entity tree.

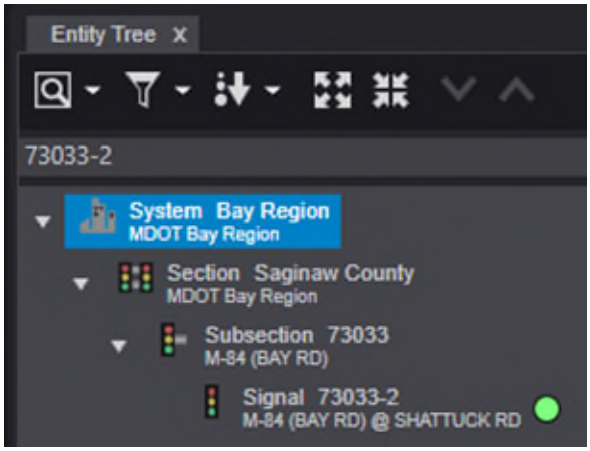


Figure 144: The engineer searches for the intersection in question using the entity tree.

Next, the engineer uses the right-click contextual menu from the entity tree to access the signal database editor. The EOS database editor appears, so the engineer confirms that an Econolite Cobalt controller is currently used at this location.

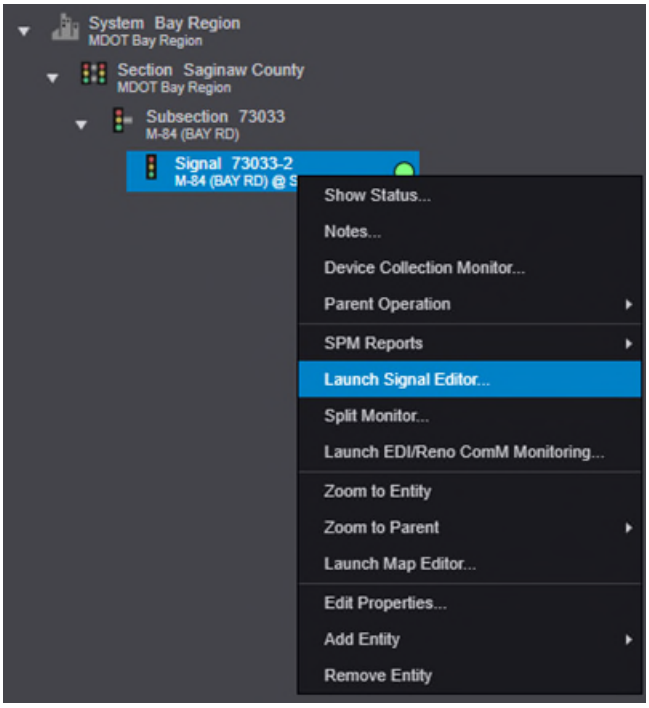


Figure 145: The engineer uses the right-click contextual menu to launch the signal database editor.

The engineer navigates to the event plans in the database editor and compares the split, cycle, and offset times in the database to the official MDOT timing permit and finds there are differences in the values. The engineer wishes to ensure the Centracs database is accurate to field operations, and uses the Upload command to compare databases. The results of the compare finds there are differences between the Centracs database and the traffic signal controller.

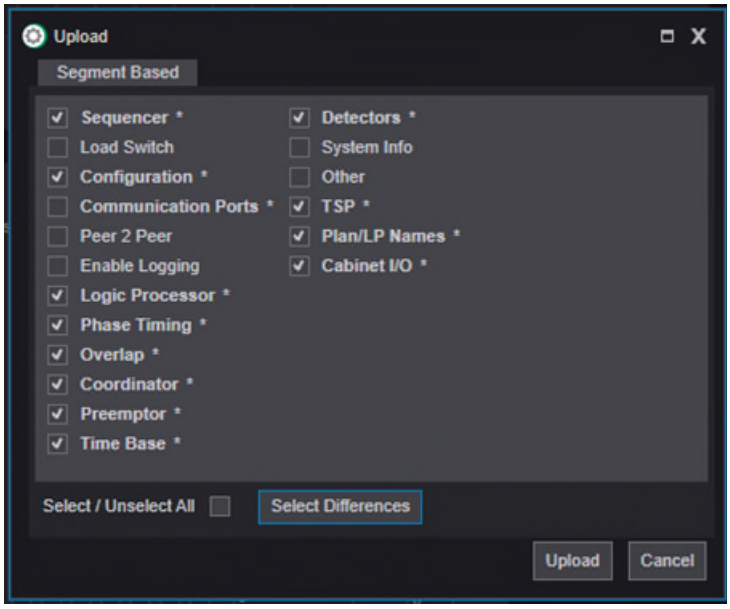


Figure 146: The engineer uploads the segments of the controller database that have differences compared to what is saved in the Centracs database.

The engineer stores the data in the Centracs database and adds a comment. Comparing the timing permit to the data uploaded from the traffic signal controller finds that the timing permit matches what is running in the field.

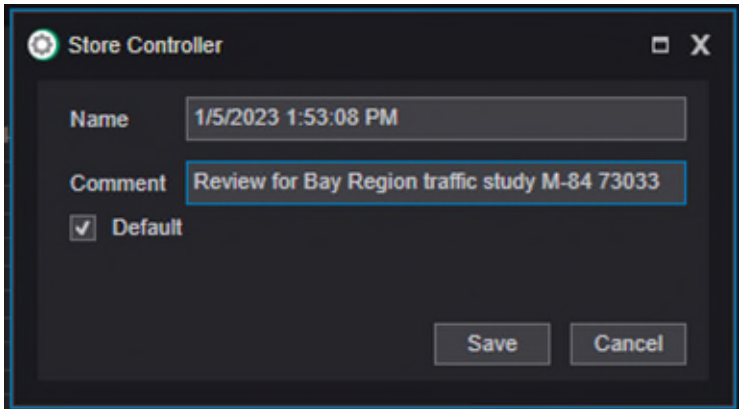


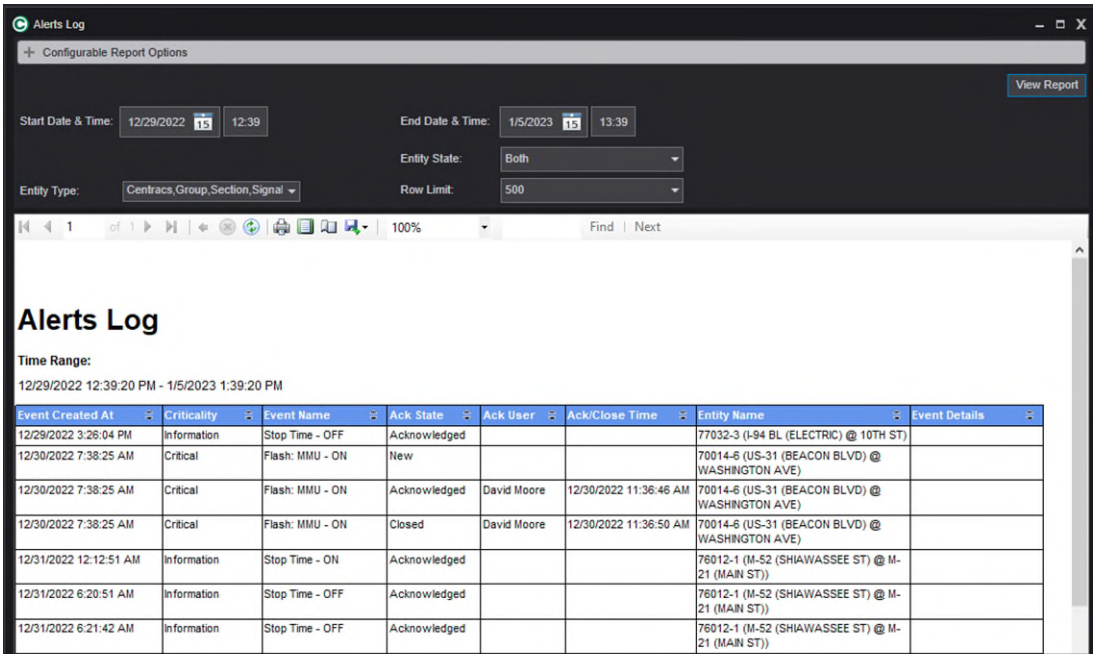
Figure 147: The engineer stores the uploaded data into the Centracs database and uses the comment field to explain the purpose of the upload.

Example 3: Signal In Flash

SEMTOC traffic signal specialists have noticed that a specific signal in the MDOT Metro Region has gone into flash numerous times over the past week. The TSMO engineer wishes to review

frequency and timing of the flash events and requests a report is generated for this intersection showing each of the flash events and the time stamps associated with the flash event. The signal specialist chooses to generate a report in Centracs and uses the Alerts Log report with start and end times covering the week of observed incidents. The report is exported to a Microsoft Excel file, where the specialist can filter the data in the following ways:

- Critical alerts only
- Flash MMU – ON events
- Events are filtered to the specific intersection under review



Event Created At	Criticality	Event Name	Ack State	Ack User	Ack/Close Time	Entity Name	Event Details
12/29/2022 3:26:04 PM	Information	Stop Time - OFF	Acknowledged			77032-3 (I-94 BL (ELECTRIC) @ 10TH ST)	
12/30/2022 7:38:25 AM	Critical	Flash: MMU - ON	New			70014-6 (US-31 (BEACON BLVD) @ WASHINGTON AVE)	
12/30/2022 7:38:25 AM	Critical	Flash: MMU - ON	Acknowledged	David Moore	12/30/2022 11:36:46 AM	70014-6 (US-31 (BEACON BLVD) @ WASHINGTON AVE)	
12/30/2022 7:38:25 AM	Critical	Flash: MMU - ON	Closed	David Moore	12/30/2022 11:36:50 AM	70014-6 (US-31 (BEACON BLVD) @ WASHINGTON AVE)	
12/31/2022 12:12:51 AM	Information	Stop Time - ON	Acknowledged			76012-1 (M-52 (SHIAWASSEE ST) @ M-21 (MAIN ST))	
12/31/2022 6:20:51 AM	Information	Stop Time - OFF	Acknowledged			76012-1 (M-52 (SHIAWASSEE ST) @ M-21 (MAIN ST))	
12/31/2022 6:21:42 AM	Information	Stop Time - OFF	Acknowledged			76012-1 (M-52 (SHIAWASSEE ST) @ M-21 (MAIN ST))	

Figure 148: The signal specialist uses the Alerts Log to capture all of the signal in flash events at the intersection in question.

The Metro Region team now has a list of timestamps associated with MMU conflict flashes for the specific intersection and can discuss further with region electricians if there are any trends or potential causes that can be identified as to why the signal has gone into flash.

Example 4: Signal Upload and Compare

An engineer in the Bay Region receives a motorist concern about operations along M-84 (Bay Road) and wishes to use Centracs as a preliminary method to evaluate operations. In addition to reviewing the Intersection Status Window to check individual intersection operations, along with the established MDOT workflow for signal operations reviews, the engineer chooses to make use of the Signal Upload and Compare report. This report will help the engineer quickly identify if any of the traffic signal controllers at intersections along this corridor are not running the same data that is stored in Centracs. This will help the engineer identify specific intersections to conduct a data upload and check operations against the timing permit, as discussed in Example 2.

The engineer chooses the report settings seen in Figure 149 on the next page. Note that the engineer has selected to only return results that indicate there is a difference found in the past

day. This will show the engineer the most recent results of the Signal Upload and Compare action configured in the MDOT CSCS environment.

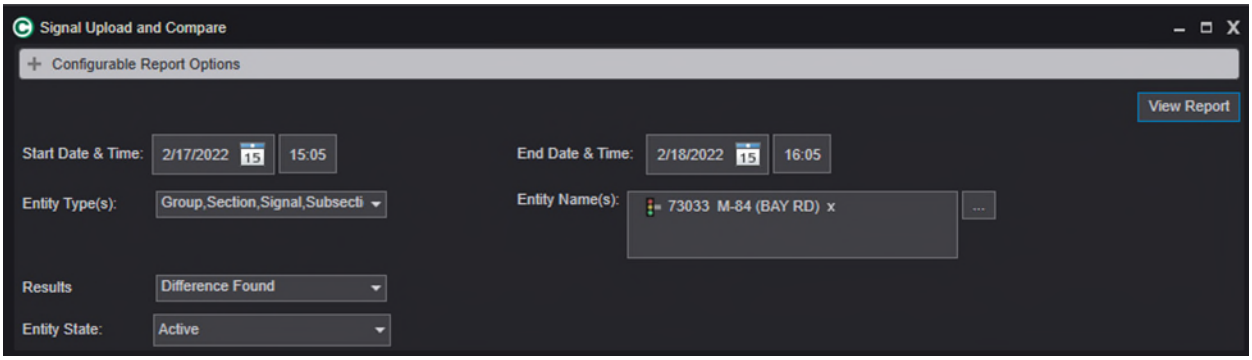
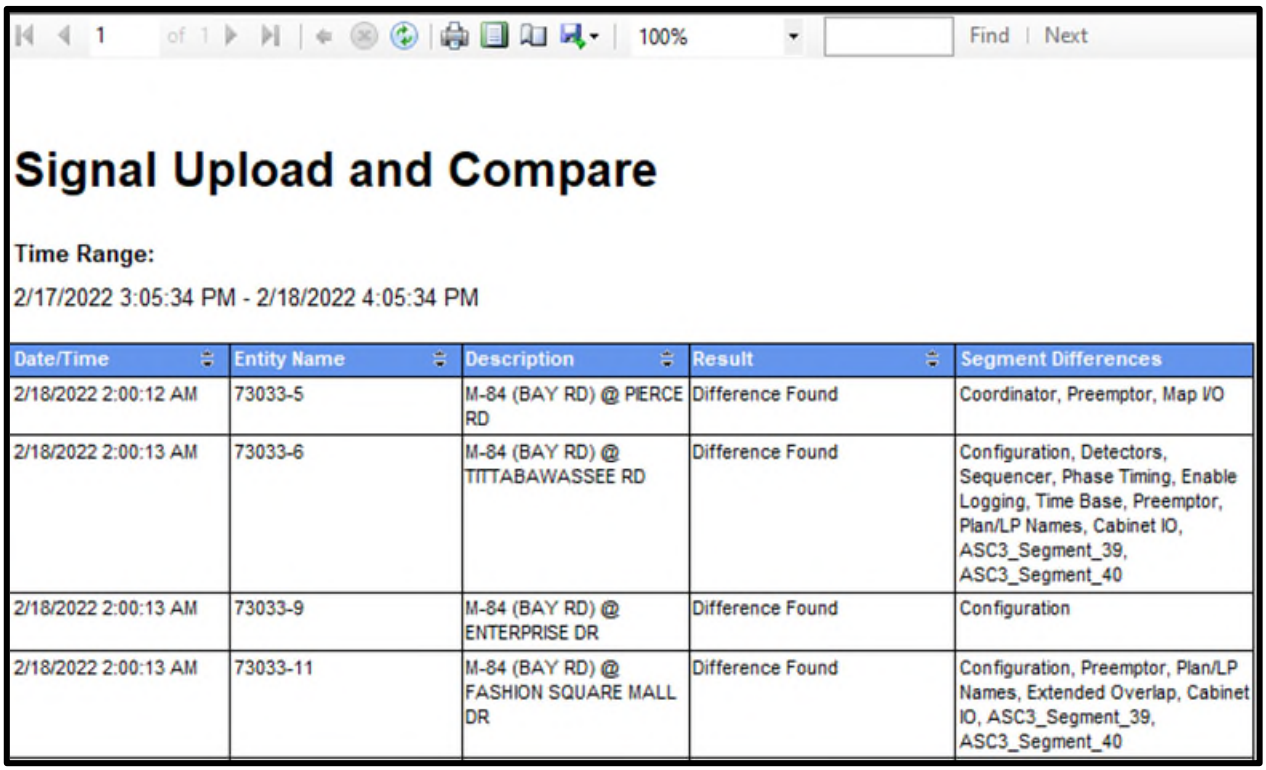


Figure 149: The settings used for the Signal Upload and Compare report.

The engineer notes that differences are found on some of the intersections in the corridor. The results of the report are shown in Figure 150.



Signal Upload and Compare

Time Range:

2/17/2022 3:05:34 PM - 2/18/2022 4:05:34 PM

Date/Time	Entity Name	Description	Result	Segment Differences
2/18/2022 2:00:12 AM	73033-5	M-84 (BAY RD) @ PIERCE RD	Difference Found	Coordinator, Preemptor, Map I/O
2/18/2022 2:00:13 AM	73033-6	M-84 (BAY RD) @ TITTABAWASSEE RD	Difference Found	Configuration, Detectors, Sequencer, Phase Timing, Enable Logging, Time Base, Preemptor, Plan/LP Names, Cabinet IO, ASC3_Segment_39, ASC3_Segment_40
2/18/2022 2:00:13 AM	73033-9	M-84 (BAY RD) @ ENTERPRISE DR	Difference Found	Configuration
2/18/2022 2:00:13 AM	73033-11	M-84 (BAY RD) @ FASHION SQUARE MALL DR	Difference Found	Configuration, Preemptor, Plan/LP Names, Extended Overlap, Cabinet IO, ASC3_Segment_39, ASC3_Segment_40

Figure 150: Signal Upload and Compare results on M-84.

These four intersections can now be the focus of reviewing operations against the MDOT timing permit to verify accurate settings using the Compare function in the database editor. If it is found that the traffic signal controller is accurate to the timing permit, the engineer can upload and store the data.

Example 5: Using Split Monitor Data

MDOT personnel are reviewing operations along M-153 (Ford Road) in the Metro region. An engineer has been tasked with analyzing the effects of the detection equipment installed at the Canton IKEA driveway on M-153. The engineer chooses to use the Split Monitor to begin the analysis.

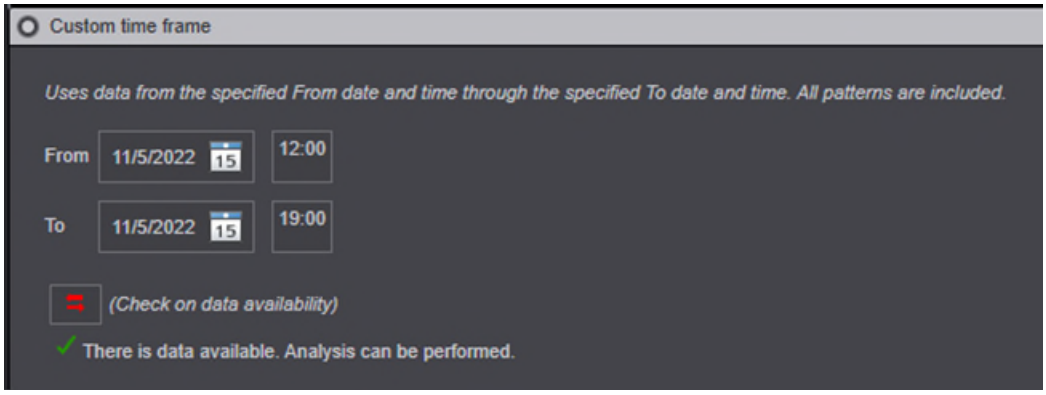


Figure 151: The Split Monitor configuration settings to run the analysis.

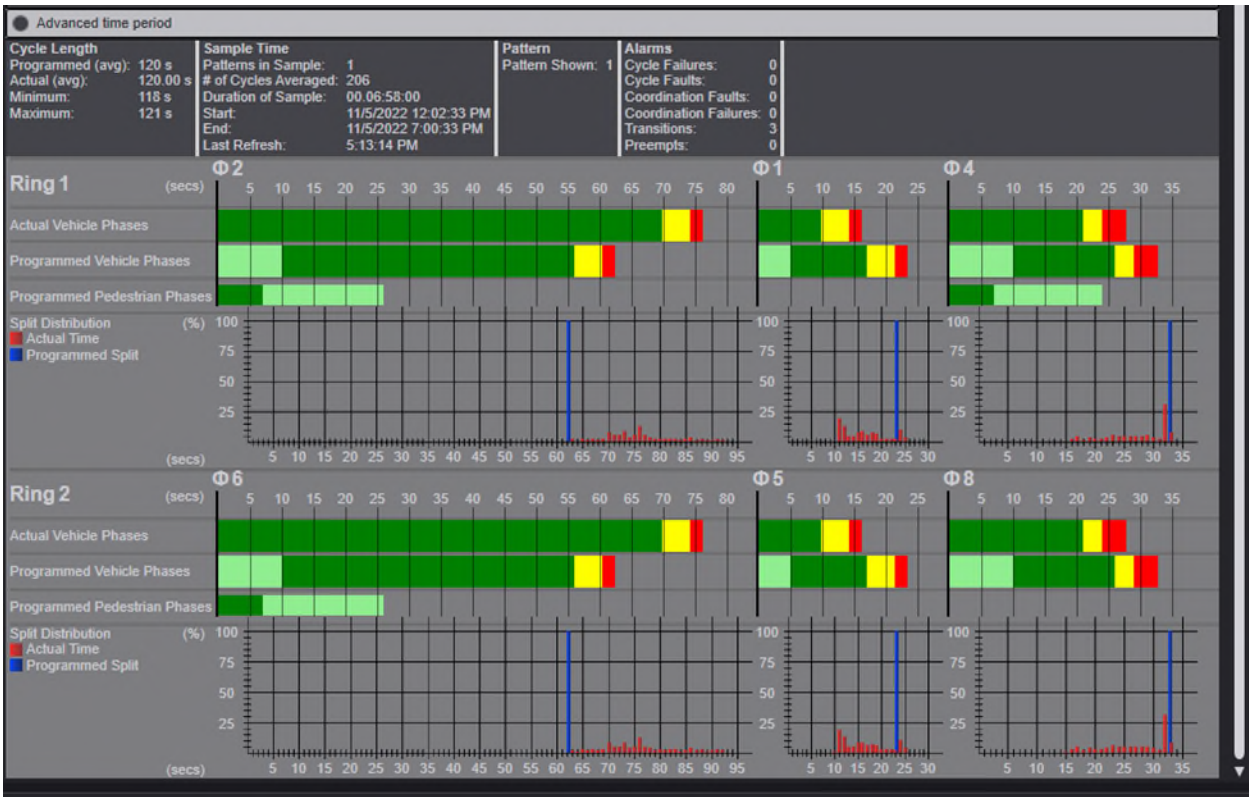


Figure 152: The Split Monitor analysis results.

Reviewing the results, the engineer can confirm that the detection system that was installed to actuate the left turn phases and driveway phases at this intersection is operating as intended. The engineer compares the Actual Vehicle Phases to the Programmed Vehicle Phases for the left turn and side street phases and notes that the Actual average time is less than the

Programmed average time. The engineer knows that this indicates the left turn and side street phases are gapping out before the programmed split is used in its entirety. The engineer also notes that the extra time is reallocated to the coordinated phases 2 and 6, as indicated by the Actual bar graph extending beyond the Programmed bar graph for those phases.

To gather further detail on the detection system, the engineer runs the Split Monitor Report to view the results and the split table of values. The split table breaks down the time (in seconds) that each phase ran for every cycle in the analysis period. The table also provides information on cycle length, transition activity, and a time stamp that each cycle occurred. The engineer can review the exact split length of the actuated phases to help the team understand how often the actuated phases are gapping out, as well as how much time is being used on average. This is valuable information that could help develop action items in adjusting the split times at this location. Figure 153 shows a sample of this data. Additional data can be viewed in the report output.

Actual/Programmed Split Values

Date/Time	1	2	3	4	5	6	7	8
11/5/2022 12:00:34 PM	11/24	84/63		22/33	11/24	84/63		22/33
11/5/2022 12:02:33 PM	16/24	78/63		26/33	16/24	78/63		26/33
11/5/2022 12:04:33 PM	11/24	87/63		21/33	11/24	87/63		21/33
11/5/2022 12:06:33 PM	19/24	77/63		24/33	19/24	77/63		24/33
11/5/2022 12:08:33 PM	21/24	69/63		30/33	21/24	69/63		30/33
11/5/2022 12:10:33 PM	11/24	83/63		25/33	11/24	83/63		25/33
11/5/2022 12:12:33 PM	17/24	82/63		21/33	17/24	82/63		21/33

Figure 153: Partial results of the Split Monitor report focusing on the Split Table.