



NetAcquire® MissionView™ Users Manual

**NetAcquire
MissionView™
Users Manual**

NA-MAN-062-2_0_0-A

NetAcquire Corporation

Information furnished by NetAcquire Corporation is believed to be accurate and reliable. However, no responsibility is assumed by NetAcquire Corporation for its use, nor for any infringements of patents or other rights of NetAcquire Corporation. NetAcquire Corporation reserves the right to change specifications at any time without notice.

Copyright © 2016-2026 by NetAcquire Corporation

All rights reserved. Printed in the U.S.A.

NetAcquire Corporation
12000 115th Avenue N.E.
Kirkland, WA 98034-6900

Tel. (425) 821-3100

Fax. (425) 952-0468

<https://netacquire.com>



Trademarks:

NetAcquire is a registered trademark of NetAcquire Corporation. Microsoft and Windows are registered trademarks of Microsoft Corporation. Linux® is the registered trademark of Linus Torvalds in the U.S. and other countries. Mac and macOS are trademarks of Apple Inc., registered in the U.S. and other countries. Java and all Java-based marks are trademarks or registered trademarks of Oracle Corporation. Temurin is a trademark of the Eclipse Foundation. Amazon Corretto is a trademark of Amazon.com, Incorporated. GLG Toolkit, GLG Widgets are trademarks of Generic Logic, Inc. Quasonix and RDMS are trademarks of Quasonix, Inc. Other products and company names are registered trademarks or trademarks of their respective holders. Additional attribution: "[Antares on its Way](#)" by [NASA Goddard Space Flight Center](#), used under [CC BY](#) / Cropped from original.

Table of Contents

1. Introduction	1
1.1 Features	1
1.2 System Requirements	2
1.3 Organization of NetAcquire Manuals	2
2. Quick Start	3
2.1 Installation	3
2.2 Getting Started	3
3. Software Installation	7
3.1 Installation	7
3.2 Java Runtime Environment (JRE)	9
3.3 Updating or Reinstalling	12
3.4 Removing the Installation	12
3.5 Automatic Update Check	13
3.6 Manual Update Check	13
3.7 MissionView Display Data Files	14
4. MissionView Display	15
4.1 Overview	15
4.2 Data Sources	37
4.3 Subscription Table	37
4.4 Subscription Real-Time Chart	43
4.5 Subscription Logger/Replayer	45
4.6 Alarms	57
4.7 Drawings	67
4.8 Charts and Graphs	76
4.9 Global Settings	87
4.10 Support Bundles	107
4.11 Application Persistence	109
4.12 Help	110
5. Drawings	113
5.1 Drawing Actions	113
5.2 Drawing Constants	119
5.3 Drawing Dynamics	122
6. Security	127
6.1 Client Certificates	127
6.2 Server Certificates	127

6.3 Application Security Configuration	128
6.4 TLS v1.0 and v1.1 deprecation	135
7. Diagnostics	137
7.1 Client System Requirements	137
7.2 Installation	137
7.3 MissionView Display	139
8. Other Topics	147
8.1 Port Use	147
8.2 Menu Customization	147
8.3 Performance Optimization	149
8.4 Restrictions	152
9. Limited Warranty	155

1. Introduction

MissionView™ software provides easy point-and-click configuration, real-time data display, and control for NetAcquire systems.

MissionView Display connects to NetAcquire servers to display real-time measurement and telemetry data as well as configuration, control, and status.

MissionView Display supports configuration and management functions of a NetAcquire server, including advanced decommutation, real-time processing and derived measurands, engineering unit conversion, and recording/playback.

MissionView Designer supports creation of highly configurable and sophisticated graphic displays that leverage a large library of real-time charts, meters, gauges, and more.

1.1 Features

1.1.1 *Displays*

- Powerful data visualization with full control over color, sizing, spacing, and alignment
- Supports a wide range of rich graphical elements, including both standard and industry specific components

1.1.2 *User Interface and Management*

- Manage multiple pages and multiple NetAcquire servers
- Deploy on any PC-based system including workstations, laptops, embedded smart displays, and rack-mount PCs
- Fully integrated with NetAcquire server access control security and encryption
- Support for Windows, Linux, and macOS operating systems

1.1.3 *NetAcquire Publish/Subscribe (NAPS) Processing*

a) **Tabular Display**

- Scrolling numeric display of a selectable list of subscriptions

b) **Logging/Playback**

- High-speed logging of selectable subscription data in convenient comma-delimited ASCII format (CSV)
- Replay logged data

c) Alarms

- Configurable comparisons with multiple thresholds and ranges

1.2 System Requirements

Your computer should meet the minimum system requirements before you install and use MissionView Display.

- Operating System
 - Windows 10
 - Linux 64-bit (glibc 2.29 or greater) with X Windows
 - RHEL minimum version 8.9
 - macOS (Monterey 12 or later)
- Disk free space: 200 MB
- NetAcquire system(s) running software version 7.4.0 or later
- See section 7.1 for client system requirements and limitations

1.3 Organization of NetAcquire Manuals

NetAcquire MissionView Display includes the following manuals.

- *NetAcquire MissionView Users Manual*, NA-MAN-062 (this manual), describes the operation of MissionView Display
- *NetAcquire Command Line Guide*, NA-MAN-065, describes command line access to NetAcquire server functions

In addition, the following manuals may also be useful:

- *NetAcquire Server Users Manual*, NA-MAN-001, describes features and procedures that are common to all NetAcquire systems
- *NetAcquire MissionView Designer Manual*, NA-MAN-071, describes the operation of MissionView Designer
- *NetAcquire Server Data Flow Manual*, NA-MAN-004, describes NetAcquire server data processing capabilities including information on NetAcquire Publish/Subscribe

The MissionView Display manual and other help information is also available from the MissionView Display application's **Help** menu.

2. Quick Start

MissionView consists of two software applications. MissionView Designer creates drawings consisting of various graphical elements. MissionView Display displays and connects drawings with NetAcquire server data sources and manages multiple servers, offering access to configuration and status. This chapter provides a quick description of how to get started with MissionView Display. See NA-MAN-071 for details regarding MissionView Designer installation.

2.1 Installation

The installation software consists of a wizard-based installation program. A standard user may run the installer without administrator/root privileges.

2.1.1 *MissionViewDisplaySetup(.exe/.dmg/.sh)*

Display installers.

A detailed description of the installation process may be found in section 3. Troubleshooting procedures may be found in section 7.1.

2.1.2 *Java Runtime*

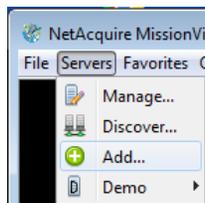
MissionView Display requires a 64-bit Java 8 Runtime Environment (JRE). If you require control over the runtime (NetAcquire Corporation recommends this), the JRE must be installed in advance, however, the installer also includes a compatible runtime. See section 3.2.

2.2 Getting Started

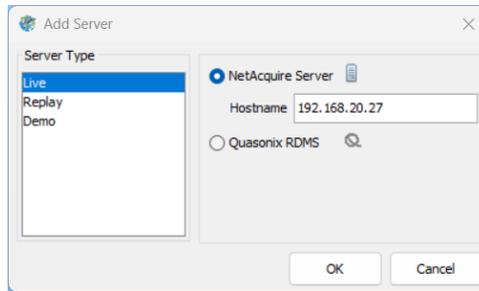
Follow these steps to get started using MissionView Display.

2.2.1 *Add a server*

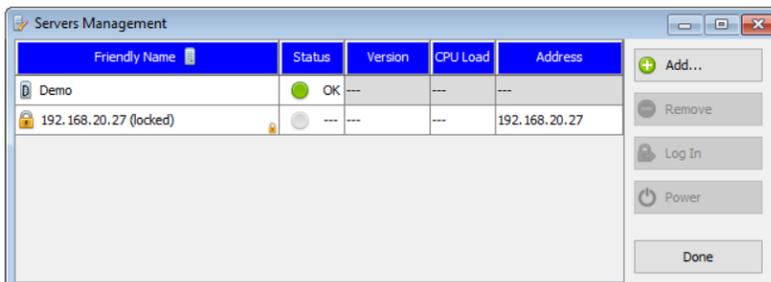
To add a server to MissionView Display, use the **Servers** menu, then click **Add...**



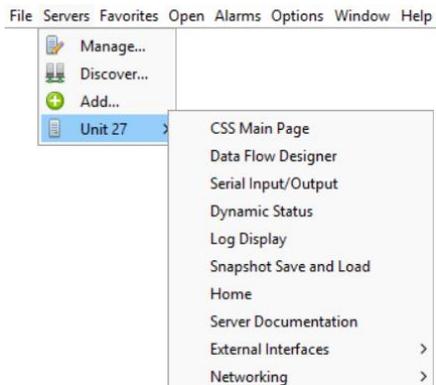
Fill in the hostname or address.



Click **OK** and your server will show up in Server Management.

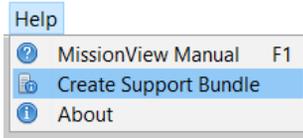


Log in to your server if required, then use the **Servers** menu to find the server and its controls/status pages.

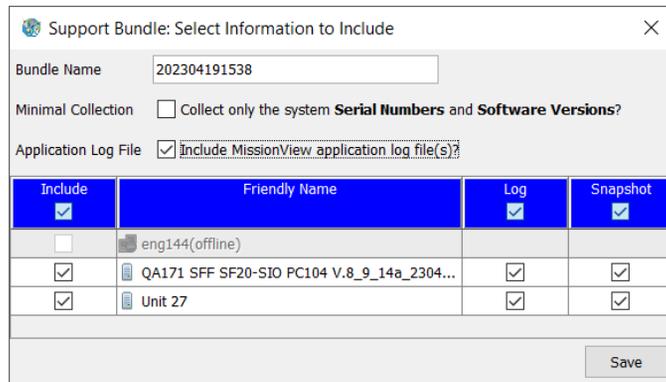


2.2.2 Creating a Support Bundle

To request technical support for your server(s) or MissionView use the **Help** menu and click **Create Support Bundle**.



Configure the bundle options:



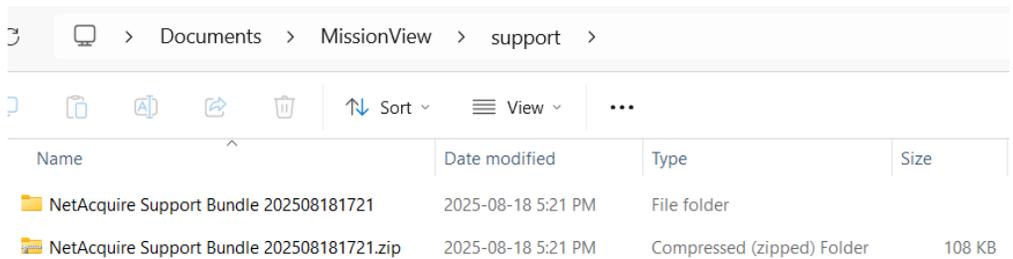
A screenshot of the 'Support Bundle: Select Information to Include' dialog box. The dialog has a title bar with a close button. It contains the following fields and options:

- Bundle Name:** 202304191538
- Minimal Collection:** Collect only the system **Serial Numbers** and **Software Versions**?
- Application Log File:** include MissionView application log file(s)?

Include	Friendly Name	Log	Snapshot
<input type="checkbox"/>	eng144(offline)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	QA171 SFF SF20-SIO PC104 V.8_9_14a_2304...	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Unit 27	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

At the bottom right of the dialog is a 'Save' button.

Click **Save** to gather and compress the data into a *Support Bundle* and the application will open the folder after saving. Use the zipped bundle when submitting a request.



3. Software Installation

3.1 Installation

3.1.1 User Privileges

To support all users on the same PC using MissionView Display, the software should be installed by a user with administrator/root privileges.

Standard users may install MissionView Display without administrator/root privileges, but the software will only be accessible to the installing user.

Updates and removal should be performed by the installing user.

3.1.2 Starting the Installer

a) Windows

Double-click the installer, e.g., `MissionViewDisplaySetup.exe`

b) Linux

As a standard user, execute the following from a shell prompt

```
sh /<path>/MissionViewDisplaySetup.sh
```

For root privileges, use `su` to open a *root* shell or use the `sudo -E` command:

```
sudo -E sh /<path>/MissionViewDisplaySetup.sh
```

Replace `<path>` with the location of the installation file.

c) macOS

Open the `MissionViewDisplaySetup.dmg` image file in the macOS Finder and launch *NetAcquire MissionView Installer*. If you encounter warnings when installing, see section 7.3.4 .

3.1.3 Installation Wizard

The installer presents a series of wizard screens. A **Check for new version** option is available on the Welcome screen and requires an Internet connection. If a new version exists, the installer will download and re-launch the newer installer.

After the Welcome screen, the wizard displays a Features List followed by a prompt for the installation type. Choose **All Users** to configure the software for all

users on the same PC. Windows users may be prompted for privilege elevation while the Linux install will only continue under root privileges (*sudo*).

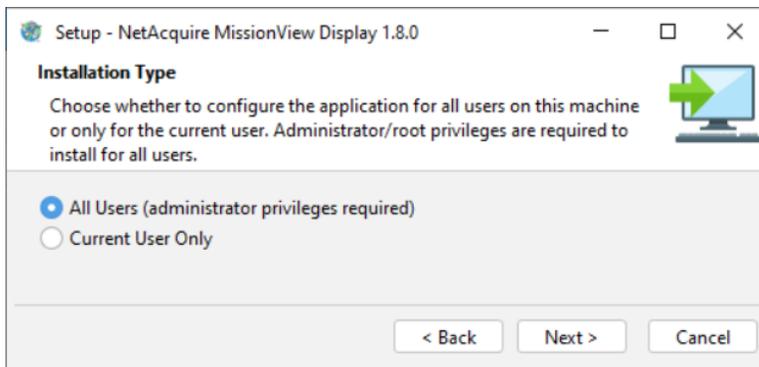


Figure 1—Installation Type

Current User Only configures shortcuts, registry keys, icons, and environment variables for the current user only.

The installer searches the system for a compatible Java runtime. If no suitable runtime is found, the installer uses the bundled runtime. To configure an alternate runtime, click **Cancel** to exit the installer and follow the instructions in section 3.2.

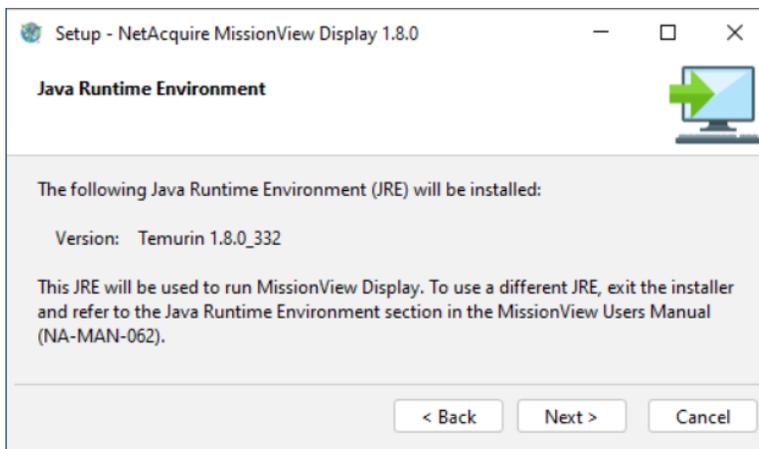


Figure 2—Java Runtime Detection

The wizard then prompts for a destination directory. The field is pre-populated with the recommended installation location.

Next, the wizard prompts for additional installation preferences.

- **Update Frequency:** Configures how often MissionView Display checks for a newer software version. See section 3.5.
- **Start** menu shortcuts (Windows): Configure the name of the **Start** menu group/folder under which application shortcuts are created.
- **Directory for Symbolic Links** (Linux): Configure symbolic links under the specified directory. `/usr/local/bin` is the default.
- **File Associations:** Configures MissionView Display as the default application for `.mv` files.

Proceed through the wizard screens until the installer completes the installation, clicking.

Click the **Finish** button on the final screen to exit the installer. Use the checkboxes on the final screen to optionally launch or open the demo drawings in MissionView Display

3.2 Java Runtime Environment (JRE)

3.2.1 Bundled JRE

The installer bundles a Java 8 Runtime Environment (JRE) for use on PCs that do not already have a suitable runtime. The bundled JRE (Amazon Corretto 8) is copied locally for use by MissionView Display only and will not affect other Java applications.

3.2.2 Shared JRE

If a separate JRE is used, install the JRE before installing MissionView Display. We recommend any of the following Java distributions:

- [Amazon Corretto 8](#)
- [Eclipse Temurin 8](#)
- [Oracle Java 8](#)

The JRE must be 64-bit and the patch version must be 203 or greater. On Linux, use the latest OpenJDK 1.8.0 package (graphical) available in the distro software repository. For further questions about Java distributions, please contact NetAcquire Corporation [Technical Support](#) at support@netacquire.com.

Note: Temurin 8 experiences issues accessing the macOS KeyChain, leading to failures communicating via HTTPS.

3.2.3 Specifying the JRE Before Installation

During installation, the installer searches the system for a compatible runtime. If one cannot be found, the installer will use the bundled JRE. The installation wizard displays JRE information for review before continuing.

If the installer cannot locate the shared JRE and the bundled JRE is undesirable, exit the installer and perform the platform-specific steps below before re-running the installer.

Windows

No special steps are required when installing Oracle's Java, but Temurin and Amazon Corretto require settings as follows.

a) Amazon Corretto 8 (recommended)

The following screen shows the default options. Ensure that the *Setup JAVA_HOME* option is **enabled**.



Figure 3—Amazon Corretto 8 Installation

b) Temurin 8

The following screen shows the default installation options. Use the settings seen in the image. When updating Java in the future, continue to make the same choice for each update.

- Add to *PATH*
- Set *JAVA_HOME* variable
- JavaSoft (Oracle) registry keys

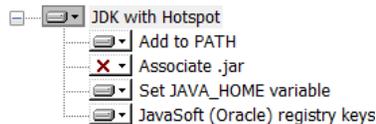


Figure 4—Eclipse Temurin 8 Installation

c) Manually Select Java

Specify the location of the JRE using the *JAVA_HOME* environment variable. The variable may be set permanently using the Windows control panel or temporarily from a command prompt. For example:

```
set JAVA_HOME=C:\Program Files\Eclipse Foundation\jdk-8.0.302.8-hotspot
```

Do not put double quotes around the path.

If the variable is set temporarily, the installer must be launched from the same command prompt. When the JRE information screen appears, confirm that the correct runtime was detected.

Linux

Specify the location of the JRE using the `JAVA_HOME` environment variable. For example, in a `bash` shell:

```
export JAVA_HOME=/usr/java/jdk1.8.0
```

Launch the installer from the same shell after setting `JAVA_HOME`. When the JRE information screen appears, confirm that the correct runtime was detected.

macOS

There is no way to override the JRE used during installation on macOS. Allow the installation to complete, then locate the installation directory (e.g., `/Applications/NetAcquire Corporation/MissionView`).

Remove the entire `.install4j/jre.bundle` subdirectory. Once the bundle is removed, MissionView Display will use the shared JRE. Every time the product is upgraded or reinstalled, `jre.bundle` must be removed again.

3.2.4 Changing the Preferred JRE After Installation

To change the preferred JRE *after* MissionView Display has been installed, create/edit the following file:

```
$MISSIONVIEW_DISPLAY_INSTALL_DIR\.install4j\pref_jre.cfg
```

The file should contain a single line specifying the absolute path to the JRE directory. For example:

```
C:\Program Files\Eclipse Foundation\jdk-8.0.302.8-hotspot
```

After configuring the preferred JRE, the `jre` or `jre.bundle` directory located under `$MISSIONVIEW_DISPLAY_INSTALL_DIR` may be deleted manually to save disk space or to prevent inadvertent use.

If the `pref_jre.cfg` file points to an invalid location, the application will revert to scanning for an acceptable runtime.

On macOS, neither `JAVA_HOME` nor `pref_jre.cfg` have any effect. The `jre.bundle` directory must be deleted to force MissionView Display to use the shared JRE.

3.2.5 Identifying the JRE Version

Use the **Help** menu in MissionView Display to open the **About** window. The **Java Runtime** field displays the currently active Java vendor and version.

3.3 Updating or Reinstalling

To add, update, or reinstall components, run the installer as described in section 3.1. Use the same user credentials that were used to run the original installation.

The upgrade overwrites previously installed files. If you wish to move the installation location, uninstall the previous version first.

The installer presents a subset of the screens described in section 3.1. Note that installed components are not removed during this process even if they are unchecked in the component selection screen.

Files under the installation directory are overwritten. If the installer needs to overwrite data files under the user's home directory, it will first prompt for confirmation.

3.4 Removing the Installation

3.4.1 Windows

To remove MissionView Display software on Windows, use the Windows *Apps and Features* control panel (click on Windows **Start** menu and search for "Add or remove programs"). Uninstall must be run with administrator privileges if the install was performed by an administrator.

3.4.2 Linux

To remove MissionView Display software on Linux, run the uninstall utility located under the installation directory (e.g., `/opt/netacquire/missionview`). If the install was performed by a standard user, simply run the utility located under the installation directory:

```
$HOME/netacquire/missionview/uninstall
```

If the install was performed by the 'root' user, uninstall must be run with root privileges. Use the `su` command to open a *root* shell or use the `sudo` command:

```
sudo -E /opt/netacquire/missionview/uninstall
```

3.4.3 macOS

To uninstall MissionView Display on macOS, launch *MissionView Display Uninstaller* from the Finder. Proceed through the remaining wizard screens until the uninstaller completes the software removal process.

3.5 Automatic Update Check

MissionView Display automatically checks for updates each time it runs based on the configured schedule. If an update is available, wizard screens step through the download process (Figure 5).

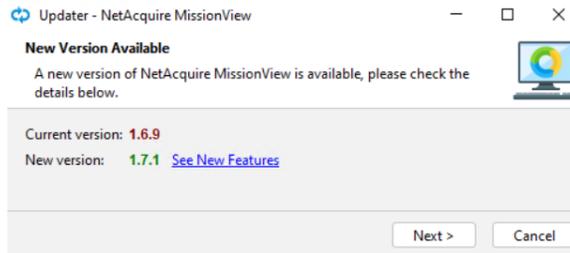


Figure 5—Update Available

Once the download completes, the new installer can be run immediately or saved for later. On Linux, if the current user is not *root*, then the installer must be saved and executed later as *root*. The instructions for running the installer can be found in section 3.1.

3.6 Manual Update Check

A manual update check can be run by selecting the *Check for MissionView Update* shortcut under the Windows **Start** menu; executing the */usr/local/bin/MissionViewUpdater* utility from a Linux shell prompt; or launching *MissionViewUpdater* from the macOS *Finder*. The update utility can also be used to modify the automatic update schedule.

Use the combo box on the first wizard screen to modify the automatic update schedule (Figure 6).

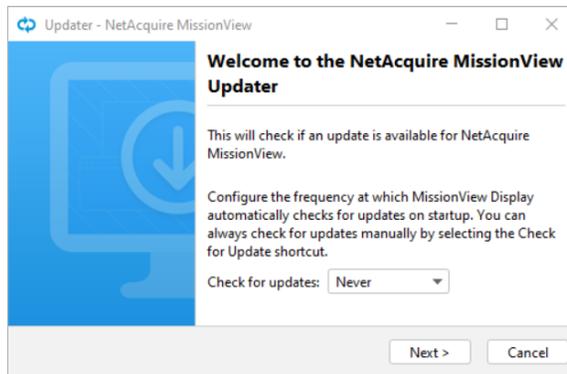


Figure 6—Update Schedule

Step through the wizard screens to check for and download an update if available.

3.7 MissionView Display Data Files

The installer places data files in the home directory of the user who performs the installation. The home directory is typically located at `C:\Users\<username>` on Windows, `/home/<username>` on Linux, and `/Users/<username>` on macOS.

Data file directories created by the installer are:

- **`$HOME\missionview`** – contains default workspace, configuration, and security files
- **`$HOME\Documents\MissionView`** – contains demo drawings, user layout and drawing files, and default log and alarms files

4. MissionView Display

MissionView Display provides configuration and control of NetAcquire systems and user-customizable real-time data displays. This chapter provides detailed information on everything related to MissionView Display.

4.1 Overview

MissionView Display provides a desktop-type environment for opening configuration and status pages, drawings, and various management options. This section discusses the use of MissionView Display and how to navigate these features.

4.1.1 Starting MissionView Display

On Windows, the MissionView Display application can be started by selecting the *MissionView Display* shortcut in the *NetAcquire MissionView* program folder.

On Linux, the MissionView Display application can be started by selecting the appropriate *MissionView Display* shortcut (available from different locations depending on the distribution or window manager in use).

On macOS, MissionView Display may be started by clicking its Dock icon (Figure 7).

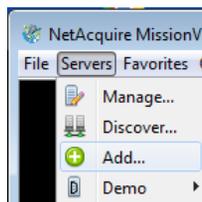


Figure 7—MissionView Dock Icon on macOS

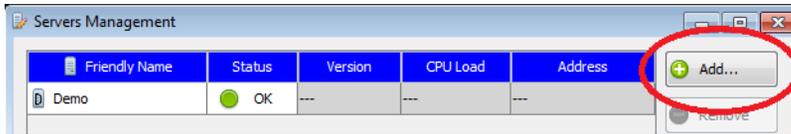
4.1.2 Servers Management

MissionView Display can manage and access all your servers at once. To do this, servers must be added to the active list of managed servers. Available servers can be automatically discovered via the MissionView Display **Servers Discovery** feature.

To add a server to MissionView Display, use the menu **Servers**, then **Add...**



or open Servers Management using the menu **Servers**, then menu item **Servers...** and use the **Add...** button to add a server.



Because server names are case insensitive, they must differ by more than case from any other server when they're being added. *Live* servers are added by entering their IP address (IPv4 or IPv6) or their DNS resolvable hostname.

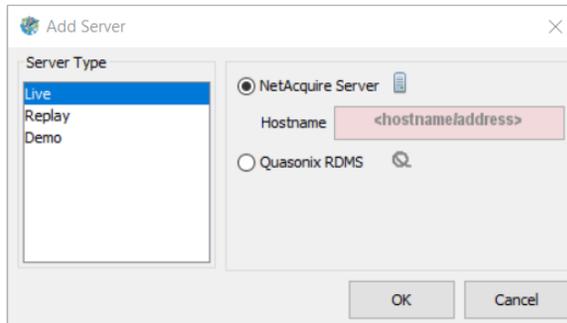


Figure 8—Add Server

- **Live**
 - A NetAcquire server or a Quasonix RDMS receiver. *Live* servers appear with their friendly name and their IPv4/IPv6 address or hostname in the Servers Management window.
- **Replay**
 - Simulated entry for replay of logged data (see section 4.2 for more information). Replay servers are used together with saved publication data to provide data replay capabilities within MissionView Display.
- **Demo**
 - Simulated entry that provides a set of virtual publications that can be used to aid in demonstration and testing when no Live server is available.

a) **Servers Management**

In addition to the **Add** button, Servers Management also provides a **Remove** button to remove a server from MissionView Display, a **Login** button to log into a

secure server, and a **Power** button to selectively restart, reboot, or shutdown a server.

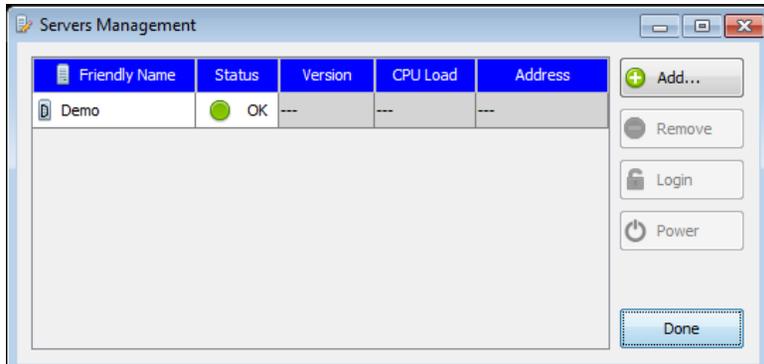


Figure 9—Servers Management

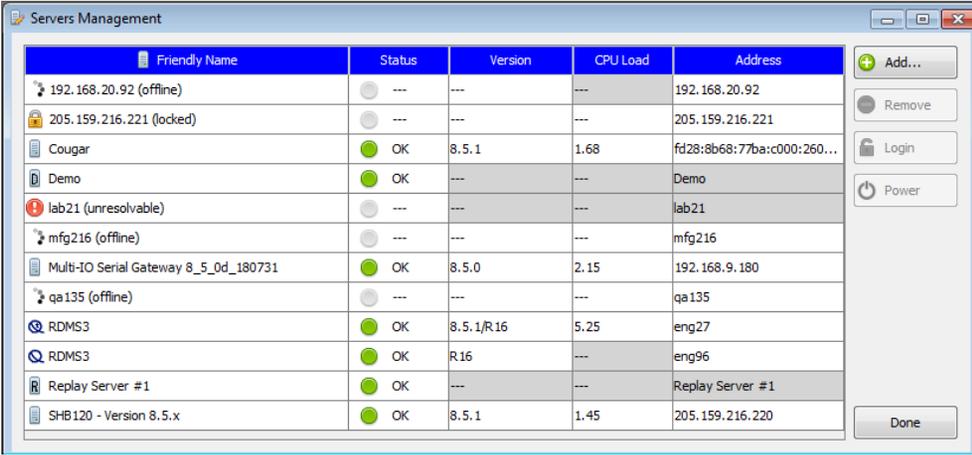
In some instances, servers may be added dynamically. For example, using a *favorite* (see section 4.1.3) may result in a server being added. This is because most favorites include information regarding their connected server. When this server isn't already present in the active servers list it is automatically added when the favorite is used.

Servers are presented throughout MissionView Display with names constructed from the system's friendly name and the hostname/IP address (IPv4 or IPv6) used to create the server originally. For example, a system with a friendly name of "Unit 12" may be presented as follows:

- **Unit 12 (lab)**
where `lab` is the hostname entered when creating the *Live* server and is a resolvable hostname that identifies the system on the network
- **Unit 12 (192.168.1.1)**
where `192.168.1.1` is the IPv4 address entered when creating the *Live* server and the IPv4 address that identifies the system on the network
- **Unit 12 (fd28:8b68:77ba:c000::dc)**
where `fd28:8b68:77ba:c000::dc` is the IPv6 address entered when creating the *Live* server and the IPv6 address that identifies the system on the network

b) Server States

Server connection state is automatically reflected in the Servers Management window. For example, the following server list shows servers in various states.



The screenshot shows a window titled "Servers Management" with a table of server information. The table has five columns: Friendly Name, Status, Version, CPU Load, and Address. The status column uses colored circles to indicate the server's state: a grey circle for offline/locked/unresolvable, and a green circle for OK. The CPU load column shows numerical values or dashes. The Address column shows IP addresses or hostnames. To the right of the table are several control buttons: Add..., Remove, Login, Power, and Done.

Friendly Name	Status	Version	CPU Load	Address
192.168.20.92 (offline)	---	---	---	192.168.20.92
205.159.216.221 (locked)	---	---	---	205.159.216.221
Cougar	OK	8.5.1	1.68	fd28:8b68:77ba:c000:260...
Demo	OK	---	---	Demo
lab21 (unresolvable)	---	---	---	lab21
mfg216 (offline)	---	---	---	mfg216
Multi-IO Serial Gateway 8_5_0d_180731	OK	8.5.0	2.15	192.168.9.180
qa135 (offline)	---	---	---	qa135
RDMS3	OK	8.5.1/R16	5.25	eng27
RDMS3	OK	R16	---	eng96
Replay Server #1	OK	---	---	Replay Server #1
SHB120 - Version 8.5.x	OK	8.5.1	1.45	205.159.216.220

Figure 10—Servers Management Server States

Table 1—Server States

Icon	Description
	An online live server. When MissionView Display can actively communicate with a server it is considered online. These servers are identified with no explicit state suffix after the server's name.
	An offline server. Offline servers will cause additional display information to appear in pages open to the server to indicate that the server is offline. Offline servers will be monitored for when/if they come online. Opening the MissionView Display application with previously connected pages will cause their load to be delayed until the server returns to the online state.
	Connecting. Server is transitioning from offline to another state.
	The demonstration server (Demo).
	A Replay server.
	Locked. A live server that has not been logged into.
	Unresolvable host. Unresolvable server names are those IP addresses that cannot be determined via lookup from the client PC. Check the name and DNS details for your network.
	An online Quasonix RDMS receiver.
	An online Quasonix RDMS TMoIP enabled receiver.
	Pre-Boot Authentication (PBA) environment. A supporting live server has booted into its PBA and requires user interaction to unlock the disk.
	Safe-Mode. A live server that is currently operating in safe mode.

In addition, and when applicable, live NetAcquire server rows also include the server's version information and CPU load. Other information may be appended to the name of the server to provide additional information, such as the following.

- *insecure comms*
 - Server is not set up to encrypt all communications.
- *https failure*
 - Unable to set up proper HTTPS connection with server. Check certificates.
- *proxy-auth-failure*
 - Invalid or missing authentication information for the proxy server. Provide proxy login details via *Global Network Settings* (see 4.9.2).

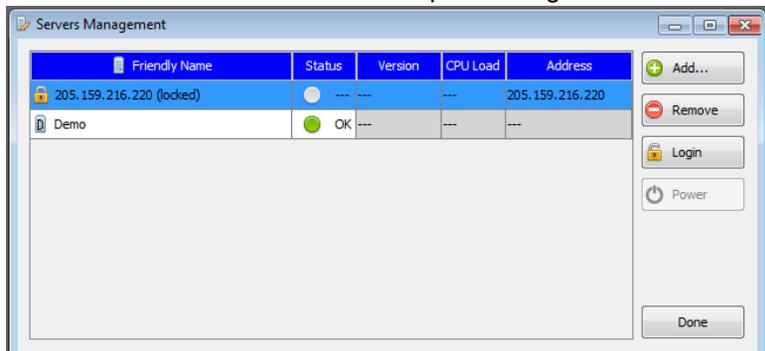
c) **Sorting**

Click any of the table header cells to sort the contents of the table.

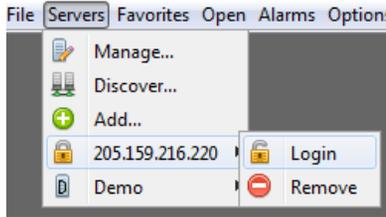
d) **Server Login**

Log in using one of the following methods.

- Servers Management
 - **Select** the locked server, then **Click** the Login button, or
 - **Double-Click** the locked server to open the login screen



- Menus
 - Login options appear in the server's main menu and various right-click menus such as on tab headers.
 - **Select** the locked server and **Click** the Login item.



For all options, a login dialog will appear, offering the appropriate type of authentication.

Password Authentication

Enter a valid username and password and press the **Login** button.

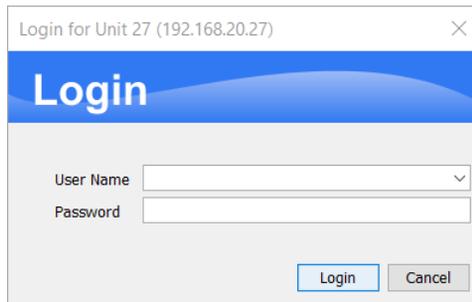


Figure 11—Server Login

Client Certificate Authentication

MissionView Display uses the local computer's certificate key store for the operating system to find a list of acceptable certificates for the server. Select a certificate from the ones displayed and press the **OK** button.

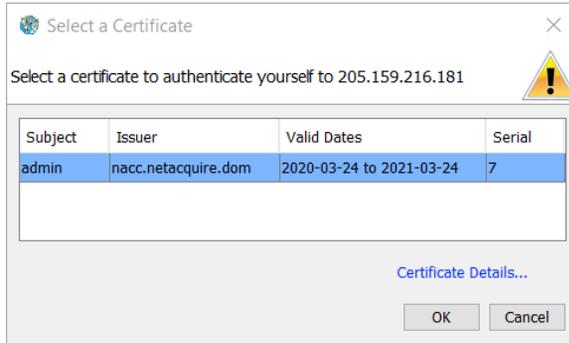


Figure 12—Select Certificate Login

As with an offline server, loading will be delayed until successful user log-in. Once the log-in successfully completes, the server transitions to the online state.

Note: When changing certain security settings on a server *prior to server version 8.9.0*, NetAcquire Corporation recommends closing any MissionView Display pages you may have open to the server except the Security Manager where the changes will be made. A list of the sensitive operations follows.

- **HTTPS** operation enable/disable
- **Encrypt API** enable/disable
- Changing **Authentication Type** between certificate/password

e) Multi-Server Login

If you have multiple servers to log in to and they all share the same authentication, you may select multiple entries and log in. Sites that enable Central Authentication for their NetAcquire servers or sites that use the same authentication for user accounts across all servers will be able to quickly log into all servers at once. Multi-server login is not currently available for Certificate Authentication.

To use multi-server login, select multiple locked servers and click **Login**. The Login button will disable if any of the servers are not locked or require certificate authentication.

MissionView Display will select one server to log into and, upon success, attempt to log in to the rest of the selected servers, displaying and logging any failures it encounters.

f) **Pre-Boot Authentication (PBA)**

A server found in pre-boot authentication will appear with a special icon in the Servers Management window.

Friendly Name	Status	Version	CPU Load	Address
192.168.20.27 (pre-boot auth)	⦿ ---	---	---	192.168.20.27

Figure 13—PBA Entry in Servers Management

Servers in PBA populate a single link in its **Servers** menu. This link leads to the PBA configuration page where users can log in and manage the PBA disk environment.

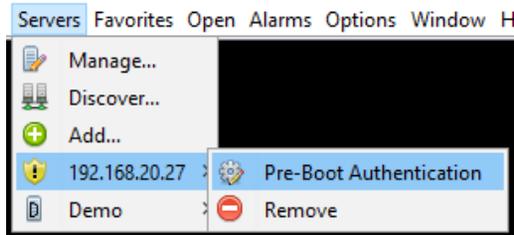


Figure 14—PBA Link

g) **Note that reboots into PBA from the Security Manager page will open into a separate page within MissionView Display. Once a server leaves PBA and boots into standard environment, it will appear in its normal state within MissionView DisplayServer Logout**

It is sometimes useful to log out from a server. For example, if you would like to log in as a different user or if you simply want to log out to return the server to the locked state. Servers that are secured and are identified as online include a **Logout** button this purpose. Select one or more servers to log out from.

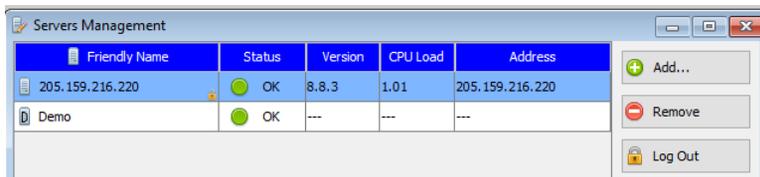


Figure 15—Server Logout

Click **Logout** and the current user will be logged out, returning all logged out servers to the locked state.

h) **Server Restart**

To restart, reboot, or shut down a server, use *Servers Management*. Select an online server and select the **Power** button to bring up the restart dialog. Select the appropriate button for the desired operation.

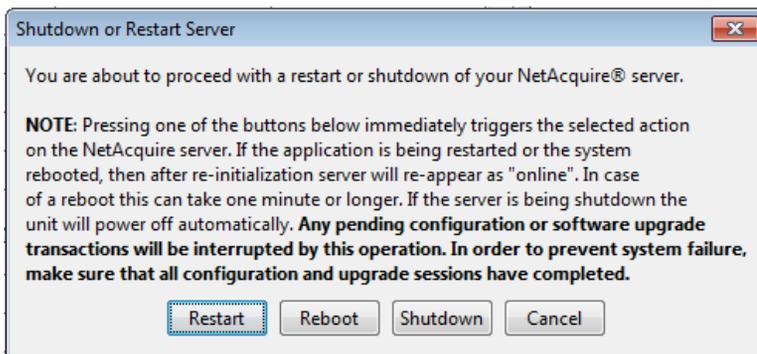
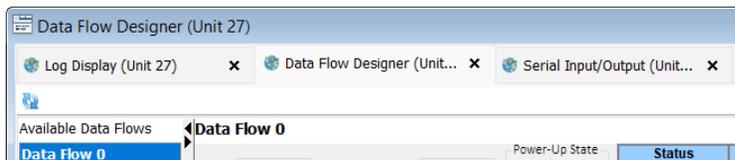


Figure 16—Server Restart Dialog

4.1.3 **Tabbed Views**

Pages that users open from servers, web, etc., all open in tabbed views.



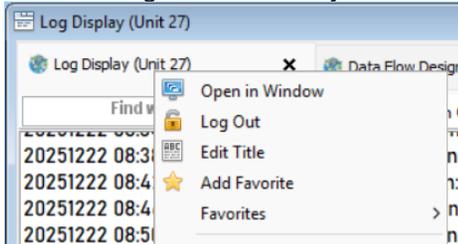
Standard user interface drag and drop support allows for tabs to be moved around, both within the MissionView Display desktop and across the operating system desktop (including across monitors in multi-monitor configurations) generally. For instance:

- Drag tabs left/right to reorder
- Drag tabs between MissionView Display views (internal or external)
- Drag tabs onto the MissionView Display *desktop* to cause them to open in a new tabbed view
- Drag tabs onto the operating system desktop to open into an external window

4.1.4 External Tabbed Views

Pages within the MissionView Display desktop can be opened into an external window. To open content into a separate window, use one of these methods.

1. Right-click a single tab and choose **Open in Window** to open the content from the single tab externally.



2. Use the hamburger menu (☰) and select **Open in Window** to open the content from the single tab externally.
3. Right-click the tabbed view's title border and select **Open in Window** to open all the tabs externally.

Once open in an external window, the window can be moved or docked on other monitors. External windows provide a top-level hamburger menu that provides the option to return the entire tabbed view to the MissionView Display desktop while each tab's hamburger menu provides an option to return a single tab to the MissionView Display desktop.

4.1.5 Servers Discovery

MissionView Display is also able to automatically discover *live* servers. Both NetAcquire servers and Quasonix RDMS receivers periodically send discovery announcements on the network and MissionView Display listens for these

announcements. To view the list of automatically discovered servers use the menu **Servers**, then menu item **Discover...** to open the following window.

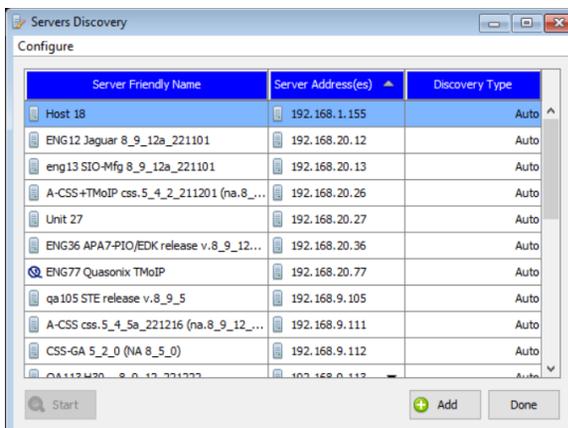


Figure 17—Server Discovery

Servers Discovery lists all the automatically discovered servers. Each line represents a single physical unit, and each unit (line) may include multiple server addresses (network interface addresses). The first column in the table identifies the friendly name of the discovered server while the second column includes the list of network addresses associated with the server. This list includes multiple server addresses for servers with multiple network interfaces and/or IPv4/IPv6 address assignments. Use the table header to sort the rows by column information.

Servers may not automatically announce their presence on the network. This can happen for servers with earlier software versions or when the server configuration explicitly disables the announcement feature. In these cases, Servers Discovery can be used to manually scan the connected network. Manually scanning involves explicit network queries and these occur via TCP. Successful queries result in the manually detected servers being added to the discovered server list (the final column in the table represents these servers as manually discovered via the *Manual* identifier).¹

¹ Quasonix RDMS receivers always issue announcements. As a result, they are not discovered via manual scans.

The manual scan characteristics must be set up prior to starting the scan and this is done by selecting the **Configure** menu item in Servers Discovery.

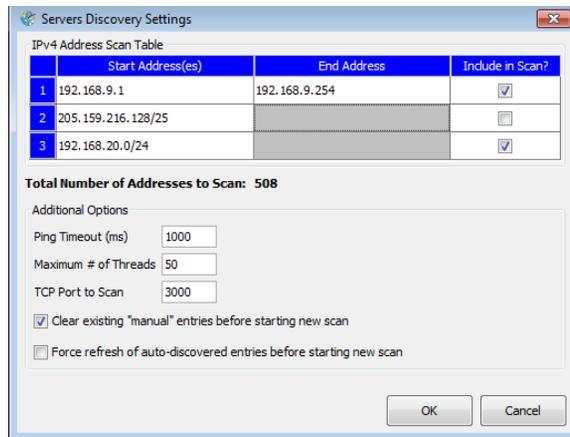


Figure 18—Servers Discovery Settings

Table 2—Servers Discovery Settings

<p>IPv4 Address Scan Table</p>	<p>Up to three ranges of IPv4 addresses may be configured. These ranges are used to isolate the manual scan to specific portions of the IPv4 network. Specify each range explicitly with a start and end address (all addresses within the range are scanned) or by using CIDR notation (Classless Inter-Domain Routing). An example start and end range is as follows: "192.168.9.1" and "192.168.9.254". This specifies a scan for all addresses in the 192.168.9.0/24 subnet. A similar notation for specifying this range in CIDR notation is to use "192.168.9.0/24". When CIDR notation is used in the "Start Address" column the "End Address" column value is disabled (<i>i.e.</i>, the CIDR notation fully specifies the start and end addresses).</p> <p>Ranges can also be flagged for optional inclusion in the scan by selecting the "Include in Scan?" checkbox.</p>
---------------------------------------	---

Ping Timeout (ms)	Each target query times out after the specified timeout (in milliseconds). Reducing the timeout value will reduce the amount of time it takes to complete the manual scan. Valid values are between 10 (10ms) and 10000 (10s).
Maximum # of Threads	Once started, manual scanning occurs in the background. This parameter specifies the number of threads to use while scanning. Each thread performs a single target address scan. Increasing the number of threads may reduce the amount of time it takes to complete the manual scan. This is primarily dependent on the number of processing cores on the machine where MissionView Display is running. Valid values are between 5 and 100.
TCP Port to Scan	This parameter identifies the TCP port number to use during manual scans. This value typically never needs to be changed. Valid values are between 1 and 65535.
Clear existing manual entries	Selecting this option results in the removal of all pre-existing manual entries in the discovered server list prior to starting a new manual scan.
Force refresh of auto-discovered entries	Selecting this option results in a refresh of all auto-discovered servers prior to starting a new manual scan.

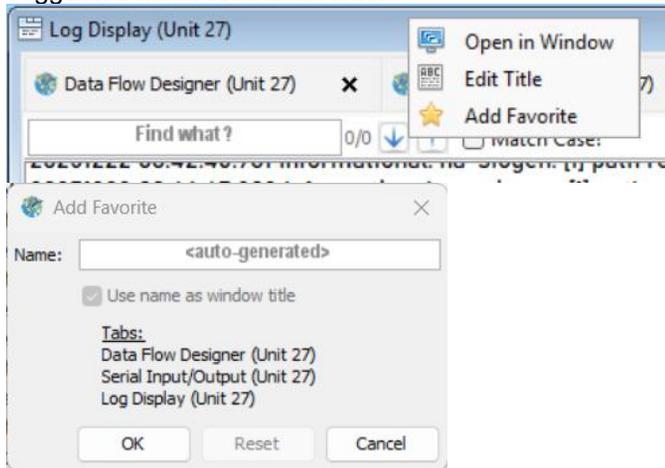
After configuring the manual scan settings, a manual scan can be started by pressing the **Start** button. While the scan is underway a progress bar is visible, indicating how close the scan is to completing. A completion dialog appears when the scan is complete.

Discovered servers can be added to the actively managed server list by selecting the row and pressing the **Add** button. Multiple rows can be selected at once. Servers with multiple server addresses are added with the address currently listed in the server's "Server Address(es)" column. When successfully added, the servers will appear as new rows in Servers Management.

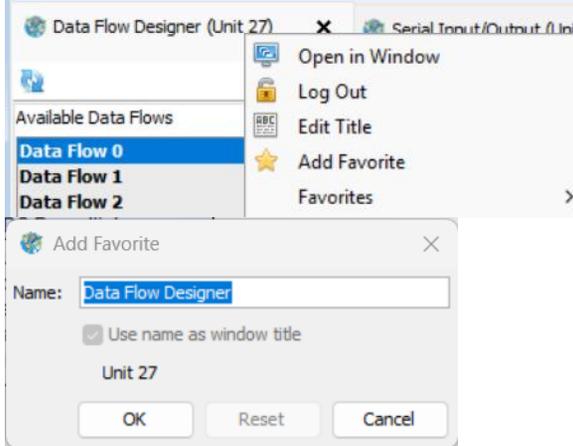
4.1.6 Favorites Management

MissionView Display supports the ability to assign shortcuts to open pages. These shortcuts are referred to as *favorites*. A favorite includes a reference to the target window, including the window's size, location and default title, the window's type (e.g., a drawing window or a server's configuration/status window, etc.), and the window's associated server (if it has one). Users can add favorites in a couple of ways.

1. Add a favorite by right-clicking on the view's top border. If the view has multiple tabs, the popup editor will provide some context and not provide any suggested name for the favorite.



2. Add a favorite by right-clicking on a tab heading.



Once added, a favorite can be used by double-clicking it in the list of favorites displayed in Favorites Management (see Figure 19 below), or from any of the favorites menus that appear throughout the application.

Favorites Management displays the contents of each favorite (on the right) and offers a **Remove** button to remove favorites from MissionView Display and an **Edit** button to edit a favorite.

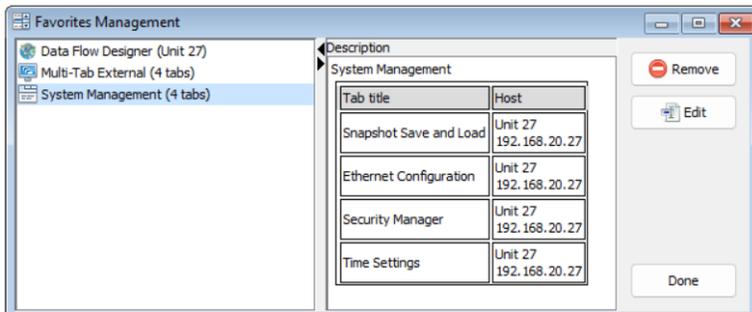
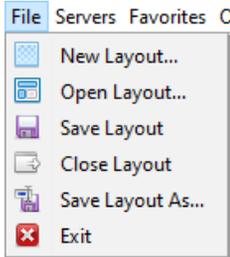


Figure 19—Favorites Management

4.1.7 Menus

The MissionView Display application menus provide access to top-level features.

a) File

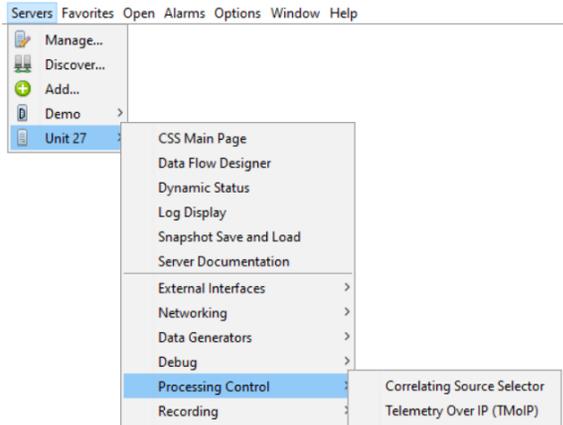


The **File** menu offers access to layout functionality. See section 4.11 for information on layouts.

- **New Layout...**
 - Creates a new, blank layout workspace with no server list
- **Open Layout...**
 - Opens an existing layout
- **Save Layout**
 - Saves the current layout (if a layout is already open)
- **Close Layout**
 - Closes the current layout (if a layout is already open), reverting to the default workspace
- **Save Layout As...**
 - Save the current workspace to a layout file
- **Exit**
 - Exits MissionView Display application

b) Servers

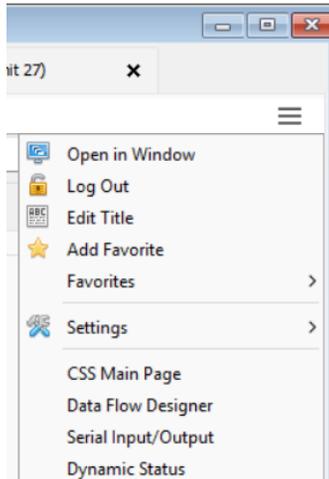
The **Servers** menu provides access to Servers Management, **Add...** servers menu item, and the list of current servers. To customize the layout of this menu, see section 8.1.



Each server entry displays a list of sub-menu items, separated into three groups.

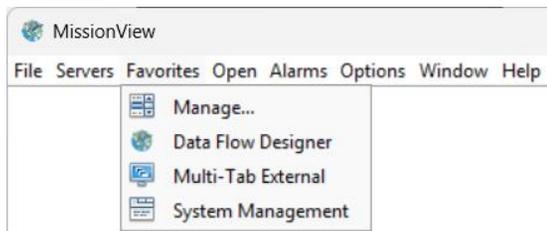
1. Server's quick links (as described in NA-MAN-001)
2. Server's complete set of page links, categorized in sub-menus corresponding to the groups presented on the server's home page in advanced mode (also described in NA-MAN-001)
3. Common tools, drawing, and status

In addition to accessing server features from the main **Servers** menu (and sub-menus), one can also access server features through the button at the top-right of most pages/views by clicking the pop-up menu button ☰.



c) **Favorites**

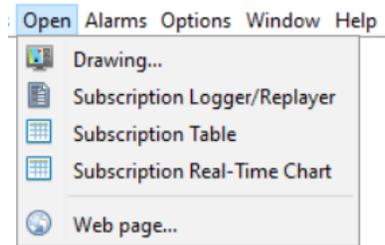
The **Favorites** menu provides access to Favorites Management, **Add...** favorites menu item, and the list of currently defined favorites.



Selecting a favorite from this list will open the target(s) associated with the favorite.

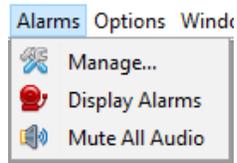
d) **Open**

The **Open** menu displays universally accessible items. These include Drawings (see 4.4), Subscription Logger/Replayer (see 4.2 and 4.5), Subscription Table (see 4.2 and 4.3), Subscription Real-Time Chart (see 4.4), and Web pages.



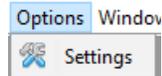
e) **Alarms**

The **Alarms** menu provides access to management and display of Alarms. See section 4.6 for details.



f) **Options**

The **Options** menu displays general options for the MissionView Display application.

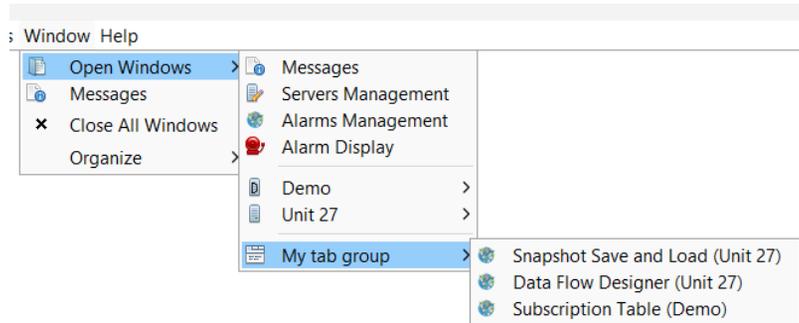


- **Settings**

- View and configure global MissionView Display application settings. See section 4.9 for further details.

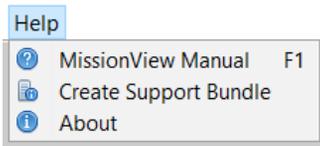
g) Window

The **Window** menu displays a list of currently open tabbed views and tabbed windows, both by server and by view. Selecting an item from this list will restore the target and select the tab.



h) Help

The **Help** menu provides access to information and support.



- **MissionView Manual**
 - A navigable and searchable copy of the manual
- **Create Support Bundle**
 - Used to capture information from servers and MissionView when needing technical support. See 4.10 for details about requesting support for servers or MissionView.
- **About**
 - Opens **About** with information about the MissionView Display application and NetAcquire Corporation contact information

i) Desktop Right-Click

Select menus are also available via right-click on any *empty* area of the desktop within MissionView Display.

4.1.8 Messages

MissionView Display provides a **Messages** view that displays various types of information for users.

```
[2022-12-27 14:50:14]: INFO: NetAcquire MissionView
  Version: 1_7_2
  Build: 122322
[2022-12-27 14:50:14]: INFO: Preload Certificate Stores
[2022-12-27 14:50:15]: INFO: Preload Certificate Stores - complete
[2022-12-27 14:50:15]: INFO: Demo Online
[2022-12-27 14:50:26]: INFO: Save Layout: C:\Users\scottm\.missionview\.init.mv
[2022-12-27 14:50:26]: INFO: Load: C:\Users\scottm\Documents\MissionView\demo.mv
[2022-12-27 14:50:27]: INFO: Load: C:\Users\scottm\Documents\MissionView\Satellite.g
[2022-12-27 14:50:27]: INFO: Loading drawing
C:\Users\scottm\Documents\MissionView\Satellite.g
[2022-12-27 14:50:27]: INFO: Load: C:\Users\scottm\Documents\MissionView\Avionics.g
[2022-12-27 14:50:27]: INFO: Loading drawing
C:\Users\scottm\Documents\MissionView\Avionics.g
```

Each message will appear with some source or priority level such as INFO, WARNING, etc., with additional highlight coloring of problematic items.

When messages appear with severity levels of warning or higher (e.g., severe), a notification icon will flash at the right-upper-most position within the MissionView Display application's main menu area.

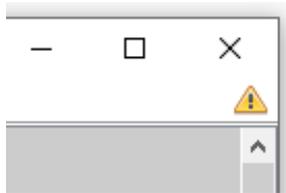


Figure 20—Notification Icon

Click on this icon to dismiss the warning and open **Messages**.

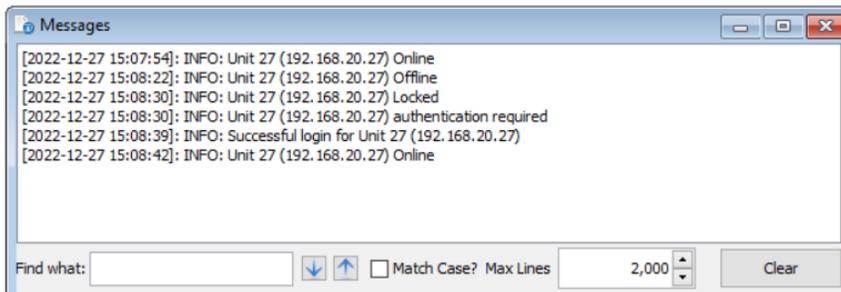


Figure 21—Messages

4.2 Data Sources

Data Sources in MissionView Display come from Publications. A Publication represents any source of data that can be used throughout MissionView Display pages regardless of its source. For instance,

- **NetAcquire servers** can provide measurements (aka *Subscriptions*), that are available in MissionView Display as Publications.
- **RDMS servers** provide status data that are available in MissionView Display as Publications.

Users receive feedback about Publications both visually and in the Messages view. Visual cues take the form of icons that show the state of the Publication, such as “Disconnected”.

Icon	Description
	Live, connected to a server, data received.
	Connected to a server, no data received.
	Disconnected from server. <i>E.g.</i> , server went offline or publication became unavailable or could not be found.
	Configured, no server selected. <i>E.g.</i> , page open with no server indicated.

Figure 22—Publication States

Messages in the Message view will indicate when important events have occurred. For instance, if a server is restarted, messages about lost connection(s) will appear.

4.3 Subscription Table

The Subscription Table displays a set of subscription values in an instant view and rolling table (historical) view (most recently received value(s) at the top or bottom).

To open a Subscription Table, select from one of the following menu options.

- Click **Servers** then **<hostname>**, then **Subscription Table**
 - Opens connected to the **<hostname>** server

- Click **Open** and then **Subscription Table**
 - Opens with no server connection
 - Use the **Server** menu item to connect to a server

Configure subscriptions following the same procedure as found in Logger/Replayer section 4.5. Once configured, the table will immediately begin displaying values.

There are two views available in Subscription Table.

1. **Instant View** – shows the current value, vertically oriented

Name	Timestamp	Default
✓ F18/Pitch	2025-08-15 17:04:29.8150000 UTC	14.00
✓ F18/Roll	2025-08-15 17:04:29.8150000 UTC	5.84
✓ F18/Yaw	2025-08-15 17:04:29.8150000 UTC	9.64

Each row displays the current name, timestamp, and current value of a subscription.

2. **Historical View** – shows a configurable number of values for each subscription, horizontally oriented

Timestamp	✓ F18/Pitch	✓ F18/Roll	✓ F18/Yaw
2025-08-15 17:04:59.1310000 UTC	20.68	48.09	6.22
2025-08-15 17:04:59.1940000 UTC	20.60	47.85	6.28
2025-08-15 17:04:59.2560000 UTC	20.51	47.61	6.34
2025-08-15 17:04:59.3170000 UTC	20.43	47.36	6.40
2025-08-15 17:04:59.3800000 UTC	20.34	47.12	6.46
2025-08-15 17:04:59.4430000 UTC	20.26	46.87	6.52
2025-08-15 17:04:59.5060000 UTC	20.18	46.62	6.58
2025-08-15 17:04:59.5680000 UTC	20.09	46.37	6.64
2025-08-15 17:04:59.6300000 UTC	20.01	46.12	6.70

The table header (or **Name** column cells) also provides visual indications of whether a subscription is live (connected) or not (disconnected). In the following example the *tock* subscription is disconnected while the other subscriptions are

all connected. Header tooltips include the column's publication name and, if available, the publication's type and units string. The units value is specified in the telemetry map where the publication is defined. The publication type is also specified in the map or indirectly via the server's publisher component.

Timestamp	✔ Satellite/Pitch	✔ Satellite/Roll	✔ Satellite/Yaw	✘ tick
2024-12-10 23:07:52.9999595 UTC	5.44 Deg	-47.50 Deg		28
2024-12-10 23:07:52.9999670 UTC	5.44 Deg	-47.44 Deg		28
2024-12-10 23:07:52.9999685 UTC	5.44 Deg	-47.44 Deg	13.87 Deg	28
2024-12-10 23:07:52.9999713 UTC	5.39 Deg	-47.44 Deg	13.87 Deg	28
2024-12-10 23:07:52.9999810 UTC	5.33 Deg	-47.38 Deg	13.87 Deg	28

The table view can be changed using the **Instant/Historical** buttons and paused/un-paused using the **Pause** control.



4.3.1 Right-Click Menu and Selections

Right-clicking on the tables brings up a menu.

- **Chart** – open a chart to the currently selected rows/columns
- **Pause** – pause or resume the display
- **Format** – submenu for selecting the display format for subscription values (the *Default Value* in the Instant view and each subscription column in the Historical view):
 - **Decimal/ASCII** – numeric (Decimal) and octet sequences (ASCII) formatting
 - **Binary** – binary formatting (numeric and octet sequences)
 - **Octal** – octal formatting (numeric and octet sequences)
 - **Hexadecimal** – hexadecimal formatting (numeric and octet sequences)
- **Columns** – submenu for specifying visibility of optional columns:
 - **Timestamps** – show or hide timestamp column
 - **Hexadecimal** (Instant view) – show or hide Hexadecimal column
 - **Binary** (Instant view) – show or hide Binary column
- **Instant/Historical** – alternative control to change views
- **Unsubscribe** – unsubscribe the selected publication(s)
- **Subscriptions...** – opens the subscription selection popup
- **Settings...** – opens the table settings popup

- **Copy** – copy selected rows (Instant view) or columns (Historical view)
- **Copy value(s)** – copy selected rows (Instant view) or columns (Historical view) **values only**

✓ F18/Pitch	✓ F18/Roll	✓ F18/Yaw
10.20	14.51	105.06
10.12		
10.03		
9.95		
9.86		
9.78		
9.70		
9.61		
9.53		
9.44		
9.36		
9.28		
9.19		
9.11	11.31	103.91

NOTE: The table will maintain the current history of updates while paused. When un-paused, the table will immediately be updated with the most recent updates.

The **Clear** button  will clear the data in the table.

4.3.2 Settings

Select the **Settings** menu item to bring up the **Subscription Table Settings** dialog.

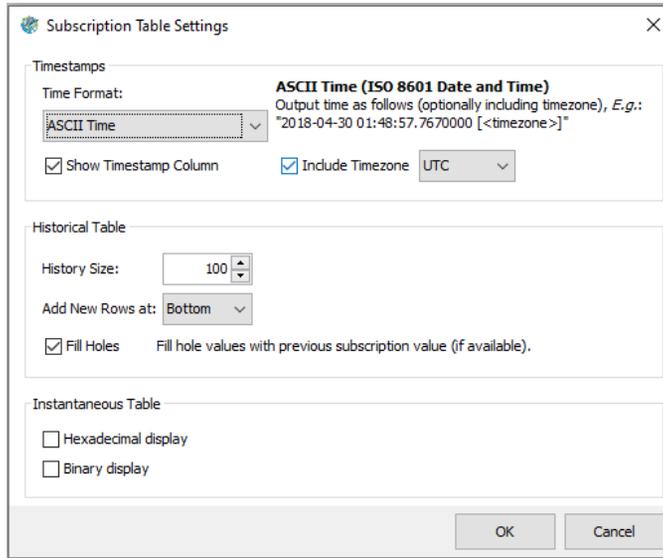


Figure 23—Subscription Table Settings

The *Subscription Table* configurable settings are defined in the following table.

Table 3—Table Settings

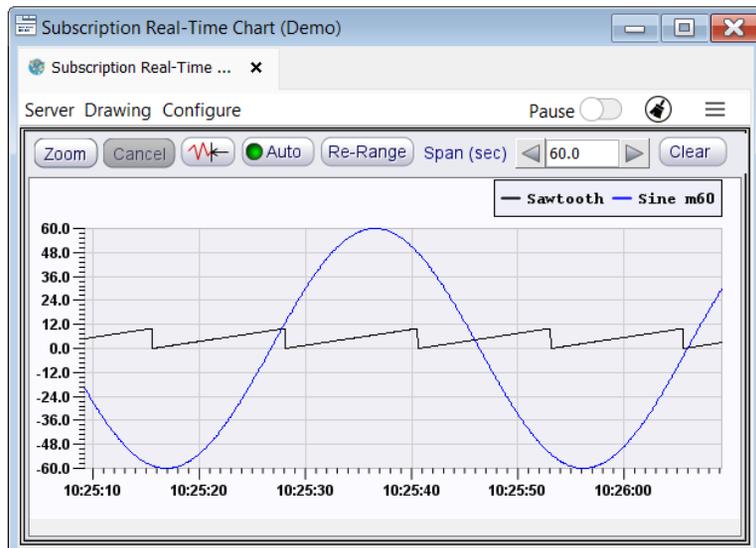
Time Format	<p>Specifies the presentation format for the timestamp value in the Timestamp column.</p> <ul style="list-style-type: none"> • ASCII Time Format with ISO 8601 date followed by time, optionally including timezone. • Windows File Time Native format for subscriptions. 64-bit integer representing the number of 100 nanosecond ticks since January 1, 1601 (UTC). • Excel Serial Time Commonly used by Excel. The number of fractional days that have elapsed since January 1, 1900 at midnight. <p>See also 4.9.7 .</p>
Include Timezone	<p>When the “ASCII Time” format is selected this setting determines whether the selected time zone is included in the display. The time zone used is either UTC or the local time zone.</p>
Show Timestamp Column	<p>Determines whether the Timestamp column is visible.</p>
History Size	<p>How many rows to display in the table (thereby maintaining this number of subscription values for the most frequently updating subscription).</p>
Add New Rows at	<p>Where the table should place new rows when subscription updates arrive (top or bottom).</p>
Fill Holes	<p>Determines whether subscriptions other than the one for which an update was received should place their previously received value in the row with the new update. <i>I.e.</i>, should the table be sparse (only received values) or should the table be filled with previous values for those not received for a timestamp?</p>

Hexadecimal display	Adds hexadecimal formatted column to the Instant view.
Binary display	Adds binary formatted column to the Instant view.

4.4 Subscription Real-Time Chart

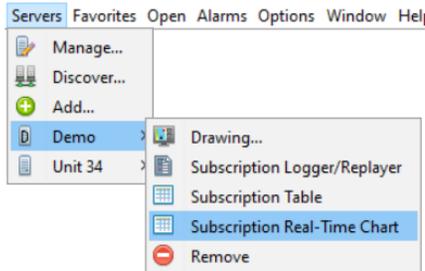
The Subscription Real-Time Chart provides a charting view with additional configurable options and value investigation capabilities.

- Zoom in/out
- Scroll or drag historical data area
- Auto scrolling/auto scaling



The subscription real-time chart can be opened in several ways.

- From the **Subscription Table** by selecting rows/columns and charting the selections.
- Using the **Servers** menu. Appears at bottom of any server menu. For instance:



- From the **Open** main menu item, followed by connecting to a server.

4.4.1 Controls/Features

Several controls and features are available to manipulate the chart. Using these features are considered transient; changes made to the right-click editor discussed later will mark the drawing as *modified*. You can save this chart (as a standalone drawing) separately at any time.

- **Zoom** – Pressing Zoom allows a user to select an area to zoom in by lassoing with the mouse. The Zoom button will appear green while waiting for a selection action. You can zoom in as many times as desired.



- **Cancel** – Pressing this button will zoom all the way out, back to 1:1.
- **Auto** – Disables/Enables auto scroll and auto scale. On enable, the last set auto scale will be re-applied. Actions such as dragging the chart data area, scrolling, or zooming will automatically disable this **Auto** feature to allow you to control the chart manually.
- **Re-Range** – Attempts to bring the plots back into the visible y-axis range.
- **Span** – Sets the displayed data area of the x axis (in seconds).

- **Clear** – Clears the current data buffer.
- **Scrollbar** – The Time axis can be moved to halt auto mode and scroll back/forward in time up to the buffer ends. A scrollbar for the y axis will appear as needed.
- **Mouse Drag** – Left-click and drag the data area to scroll the data area around. A scrollbar for the y axis will appear as needed.

4.4.2 Menus

- The **Server** menu provides connect/disconnect for a server, as well as a quick link to open a **Subscription Table**.
- When the chart is initially opened, the **Drawing** menu will only offer **Save As...** until you have saved this chart as a separate drawing.
- **Configure** contains an item to open the **Subscription Selection** popup.

4.5 Subscription Logger/Replayer

MissionView Display supports logging and playback of subscription data. Data files are written and read in ASCII text with a comma separated values (CSV) format. The CSV files can be conveniently opened in many third-party applications, including Microsoft Excel (see section 4.5.6). Throughout this manual the logging entity is referred to as the *Logger* and the playback entity is referred to as the *Replayer*.

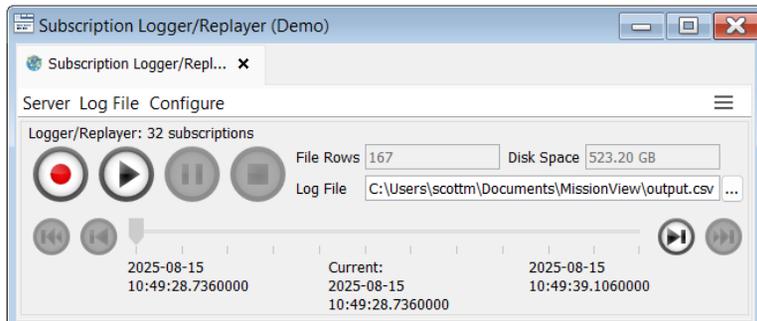
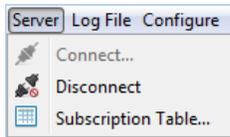


Figure 24—Subscription Logger/Replayer

Open the Subscription Logger/Replayer from either the main **Open** menu or under a specific server in the **Servers** menu. Opening to a specific server will

automatically configure the Logger to that server. You can change the server by using the Subscription Logger/Replayer's **Server** menu.



- **Connect...**
 - If no server has been set or you have disconnected already, use this option to connect to a server in the list.
- **Disconnect**
 - Disconnect from the server and shut down any subscriptions currently in use.
- **Subscription Table...**
 - Open a table view to subscriptions.

4.5.1 Configuring Subscriptions

Both logging and playback require selection of a set of subscriptions. Open the configuration dialog by clicking the **Configure** menu and selecting **Subscriptions...**

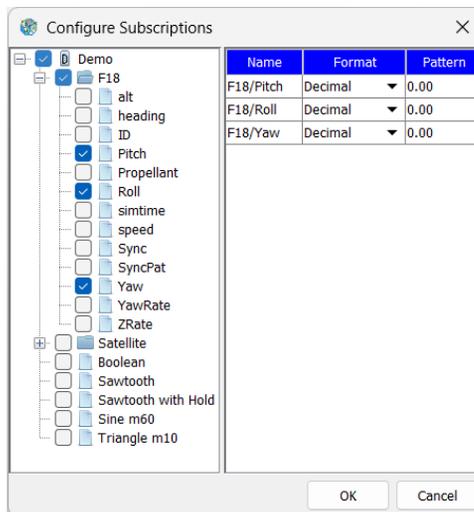


Figure 25—Configure Subscriptions

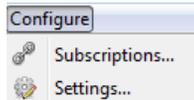
Select subscriptions by checking the box next to those you want to log. The table on the right contains format options (as applicable) for each subscription.

When using custom formatting, the **Base** column indicates the number base to format values and the **Floating Point Format** column provides entry of a format to use for floating-point values.

Configuration of subscriptions can only occur when the Logger is stopped and/or when it is not connected to a Replay server. When connected to a Replay server the ability to log subscription data is unavailable. This is represented by the disabled “Start Logger” button. In addition, the entire set of logged subscriptions is published when connected to a Replay server.

4.5.2 Logging

Configure the Logger by clicking the **Configure** menu.



And selecting **Settings...**

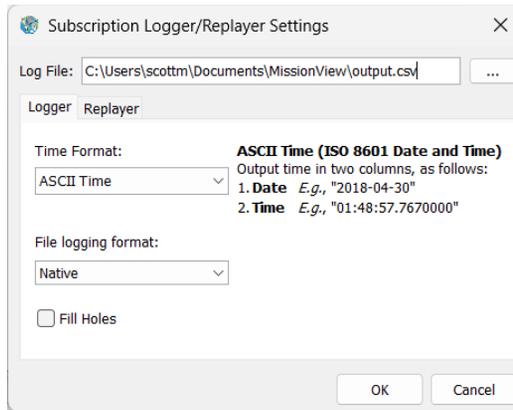


Figure 26—Subscription Logger/Replayer Settings

a) Log File

Select a file to log subscriptions into. You may also configure this file from the main page’s **Log File** field. The ellipses button to the right opens a file explorer dialog.

b) Time Format

Select a format for the subscription timestamps. See also 4.9.7 .

- ASCII Time
 - Two column format with ISO 8601 date followed by time.
- Windows File Time
 - Native format for subscriptions. 64-bit integer representing the number of 100 nanosecond ticks since January 1, 1601 (UTC).
 - **Note:** Currently not a supported format for playback.
- Excel Serial Time
 - Commonly used by Excel. The number of fractional days that have elapsed since January 1, 1900 at midnight
 - **Note:** Currently not a supported format for playback.

c) File Logging Format

Select a numeric format for logging to file.

- Native
 - MissionView Display uses a native format to write numbers.
- Custom Format
 - Enter a unique format. Each subscription may have a different format. See Table 4 for details.
- High Performance
 - When logging extremely high-speed/volume subscriptions, use this format. This format optimizes the speed of conversion of floating-point values to text. This format requires a fixed selection for number of decimal places and does fast formatting.

Table 4—Custom Format Settings

Base	<p>The numeric base in which the value should be displayed. Options:</p> <ul style="list-style-type: none">• Binary• Octal• Decimal<ul style="list-style-type: none">○ Numeric types only• ASCII<ul style="list-style-type: none">○ Octet sequence types only
-------------	--

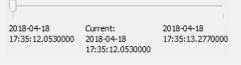
	<ul style="list-style-type: none"> Hexadecimal 																
<p>Floating Point Format</p>	<p>Format string for floating point values. Applies only when the base is Decimal and the publication is a floating-point type.</p> <p>The format string has features for controlling numeric display including integer (123), fixed-point (123.4), scientific notation (1.23E4), percentages (12%), <i>etc.</i></p> <p>Some characters in the format string are used literally—they output unchanged during formatting. Symbols, on the other hand, specify aspects of number formatting. The following table lists common symbols.</p> <table border="1" data-bbox="602 646 1083 959"> <thead> <tr> <th>Symbol</th> <th>Meaning</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Digit</td> </tr> <tr> <td>#</td> <td>Digit, zero shows as absent</td> </tr> <tr> <td>.</td> <td>Decimal separator or monetary decimal separator</td> </tr> <tr> <td>-</td> <td>Minus sign</td> </tr> <tr> <td>,</td> <td>Grouping separator</td> </tr> <tr> <td>E</td> <td>Separates mantissa and exponent in scientific notation.</td> </tr> <tr> <td>%</td> <td>Multiply by 100 and show as percentage</td> </tr> </tbody> </table> <p>For example:</p> <ul style="list-style-type: none"> 0 will format values as an integer 0.00 will format values as “3.14” #,##0.0 will format values as “1,234.0” <p>A detailed reference for the format string is available in <i>java.text.DecimalFormat</i> at https://docs.oracle.com/javase/8/docs/api/java/text/DecimalFormat.html.</p> <p>Caution: Playback functionality can be affected by custom formats that add characters such as commas, non-numeric characters, <i>etc.</i> <i>E.g.</i>, a format “0,000 cm” will cause playback to fail.</p>	Symbol	Meaning	0	Digit	#	Digit, zero shows as absent	.	Decimal separator or monetary decimal separator	-	Minus sign	,	Grouping separator	E	Separates mantissa and exponent in scientific notation.	%	Multiply by 100 and show as percentage
Symbol	Meaning																
0	Digit																
#	Digit, zero shows as absent																
.	Decimal separator or monetary decimal separator																
-	Minus sign																
,	Grouping separator																
E	Separates mantissa and exponent in scientific notation.																
%	Multiply by 100 and show as percentage																

d) Fill Holes

By default, the Logger records values when they arrive, leaving blank CSV cells if other subscriptions do not have values for recorded timestamp. You may opt to fill these 'holes' with the previously received value for a subscription. Not recommended for high-speed/volume subscriptions.

4.5.3 Controls

The primary controls on the Logger/Replayer operate on the two major pieces of functionality, Logger and Replayer. More details regarding these buttons and their operation appear in subsequent sections.

Button	Description
	Start logging configured subscriptions (record)
	Start playing back configured log file (playback)
	Pause current operation (logging or playback)
	Stop current operation (logging or playback)
	Skip backward/forward during playback
	Step backward/forward during playback
	Slider provides jump-to access within playback.

4.5.4 Logging Operations

Press the record button to begin logging subscriptions. While logging, you may pause, resume, and stop logging. While logging, the view will display the number of rows of subscriptions created in the file and total disk space remaining for the disk the file exists on.

NOTE: Pausing logging will create gaps in the logged data.

a) Log File Header

The log file contains a versioned header along with the rows of subscription data. The header provides critical information for the playback of logged subscriptions as a set of key/value pairs.

Key	Example	Description
Format	1	Header format version
Host	Unit 27 (192.168.20.27)	Name of the server
File Creation	Tue Apr 1 12:51:23 PDT 2018	Time the logger began logging (local PC time)
Timezone	UTC	Time zone from global settings
Units	<user provided units>	Units assigned to subscriptions.
Type	Real64	Value type for each subscription.

b) Log File Data

Following the header, each row in the file contains a timestamp (1 or 2 columns) and the values of any subscriptions received with a matching timestamp. If subscriptions receive multiple values for the same timestamp, the Logger places subsequent values in a new row.

4.5.5 Errors

If problems occur with the logged subscriptions, a notification icon will flash in the upper-right corner of the Logger/Replayer. Clicking the button will open a status dialog that shows the current status of the subscription(s) from an application-wide point-of-view. This dialog will update dynamically when left open. In addition to the standard Publication states, the following may appear.

Icon	Description
	Server is offline

4.5.6 Importing Logged Data to Microsoft Excel

Double-Click the file to open it automatically in Excel (on supported platforms), or start Excel and then open the file.

- **Note:** Time and/or date cells may need to be formatted since Excel may pick a non-optimal time format.

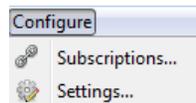
After opening the output file, a few header rows are visible followed by the column names and subsequent rows containing received values. This example demonstrates using the Logger's ASCII time option.

4.5.7 Playback (Replayer)

After creating or loading a log file, the subscription data can then be played back via the **Replayer** function. The Replayer associates logged subscription data with the connected server. If replaying to a live server, the data source will be switched to only what is in the log file. Any subscriptions previously active on the server and not in the log file will appear as if they have lost their connection during playback.

Alternately, a replay server can be used to play back data. A replay server may be used when: 1) no live servers are available, or 2) live servers are available but are otherwise inappropriate for replaying subscription data (*i.e.*, their live subscription data is already being used by another display – *e.g.*, a drawing). See section 4.1.2 for information on creating replay servers.

Configure the Replayer by clicking the **Configure** menu.



And selecting **Settings...**

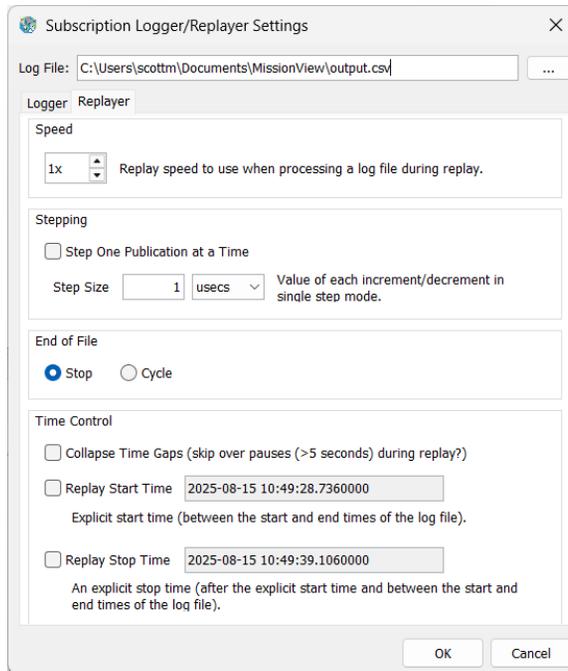


Figure 27—Subscription Logger/Replayer Settings

Table 5—Replayer Settings

<p>Speed</p>	<p>When set to 1x (the default) subscription data is replayed in real-time (<i>i.e.</i>, adjacent rows in the logged file are replayed such that the time duration between their row timestamps exactly matches the duration between when each row’s subscription data is published by the connected server). This time duration can be sped up or slowed down by adjusting this setting. A value of 10x informs the Replayer to replay data ten times as fast; a value of .1x informs the Replayer to replay data ten times slower.</p>
---------------------	---

<p>Step One Publication at a Time</p>	<p>When this is checked single step operations (forward or backward) will replay publications one at a time. For example, a log file with multiple publications per line will result in each individual publication being published for every step operation. When checked the Step Size setting is disabled.</p>
<p>Step Size</p>	<p>Determines the step size (in the time units specified) to use when single stepping. For example, the default step size of 1 usec means that one microsecond of data is skipped on every step (forward or backward). Note: depending on the characteristics of the logged data stepping may or may not result in subscription data being published by the connected server. Typically, a one microsecond step size results in each step operation publishing a single line of data from the log file.</p>
<p>End of File</p>	<p>Determines whether the Replayer cycles back to the beginning of the file when it reaches the end of the file. If configured to Stop Replayer may also automatically switch the connected server back to its live publication data (for Live servers only). This latter behavior is controlled by the associated global setting (see section 4.9).</p>

<p>Collapse Time Gaps</p>	<p>Determines whether to skip over long time gaps when replaying subscription data. These time gaps may represent periods when the <i>Logger</i> was paused (during initial creation of the logged data) or otherwise when there are large delays between incoming subscriptions during logging.</p> <p>The fixed time gap duration is five seconds. If a gap of at least this duration is encountered while replaying data the Replayer will immediately skip ahead to the next available logged data.</p>
<p>Replay Start Time</p>	<p>Optional: Determines the start time (bounded by the logged data's start and end time – or the configured end time if specified) used by the Replayer.</p> <p>Specify the start time in the following standard Java date format: "yyyy-MM-dd'T'HH:mm:ssX". For e.g., 2018-03-01T14:52:09.667Z</p>
<p>Replay Stop Time</p>	<p>Optional: Determines the end time (bounded by the logged data's start – or the configured start time if specified - and end time) used by the Replayer.</p> <p>Specify the start time in the following standard Java date format: "yyyy-MM-dd'T'HH:mm:ssX". For e.g., 2018-03-01T14:56:19.398Z</p>

When started, the Replayer predetermines various characteristics of the logged subscription data including the set of named subscriptions along with various other attributes (e.g., the timestamp of the first and last logged subscription data). This information is used to control the connected server's notion of available publications.

NOTE: Only one Subscription Logger/Replayer can be open to a server at a time.

While playing back data, the pause and stop buttons affect the played back data. If playing back through a live server, stopping playback will automatically

transition back to the live data source from the server (based on the associated global setting – see section 4.9 for details).

Logged subscription values can be replayed by stepping forward and backward through the file.

After pressing the play button, the Replayer immediately begins reading the log file (identified in the **Log File** field) and replaying the logged subscription values. Press the *Pause* or *Stop* buttons to correspondingly pause or stop replaying of logged subscription values. Whenever the Replayer is running (*i.e.*, in the started or paused states) the control panel’s title indicates this by appending the *Replaying* label as follows: “Logger/Replayer (Replaying)”.

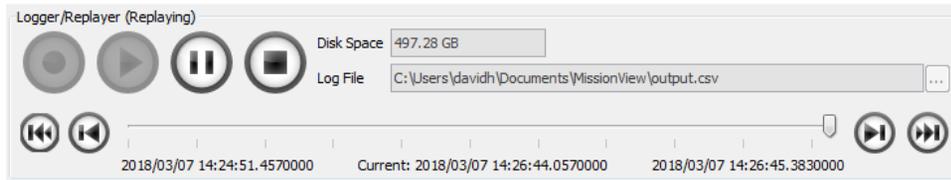


Figure 28—Subscription Logger/Replayer (Replaying)

a) Slider

While the Replayer is running or paused the slider’s pointer can be dragged to reset the replay position. When released the Replayer will continue replay from the logged subscription data matching the time in the log file.

b) Skipping

When the Replayer is running or paused, the skip buttons may be used to skip forward or backward in the logged subscription data. The skip interval is equal to 10% of the time span of logged data as indicated by the timestamps of the first and last rows in the log file.

For example, if the logged subscription data represents one full hour (60 minutes) the skip interval is six minutes.

c) Stepping

When the Replayer is paused (only), the step buttons may be used to step forward or backward in the logged subscription data. The step interval is configurable via the **Step Size** setting (see section 4.3.2 for details).

NOTE: All but the step forward stepping and skipping buttons are disabled when Logger/Replayer is stopped. The step forward button may be used to start the Replayer when it is otherwise stopped.

4.6 Alarms

The alarm system provides three important features to notify users of critical events.

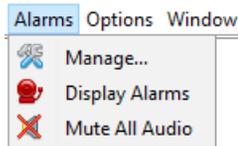
- **Visual Display**
A table displaying the customized alarm shows the current or latched state of the alarm.
- **Audible Option**
Optionally attach sounds to specific alarms or limits within an alarm.
- **Logged Events**
Transitions of the alarm between limits are logged to a file for later reference.

Users can create any number of alarms and attach them to various publications. Alarm configurations are also persisted to the file system and this file's name and location is configurable.

Select the file through the main menu **Options**, then **Settings**. Select **Alarms** in the list and you will find the configuration for the **Alarms File** (see section 4.9.8). Changing this value requires a MissionView Display application restart to take effect. The persisted file contents are only ready once, during MissionView Display application start.

4.6.1 Managing Alarms

Open Alarm Management by clicking **Alarms** in the main menu and then **Manage...**



Click **Add** to add a new alarm. A selection tree will open that displays all the servers in the server list and all their publications. Select a publication and click **OK**.

Next, choose a limit type.

a) **Single-Range**

A simple ranged comparison where the alarm triggers when the publication value exceeds an upper or lower limit.

Low	<value>	High
-----	---------	------

b) **Double-Range**

A more complex ranged comparison with two sets of upper and lower limits. Conceptually one can think of this alarm as having a 'warning' inner limit and a 'critical' outer limit.

Very Low	Low	<value>	High	Very High
----------	-----	---------	------	-----------

c) **Comparison**

Compares the publication value to a user-entered value using a logical expression. *E.g.*, "Is 'Speed' > 10?"

4.6.2 Configuring Alarms

Once added, the alarms will appear in the alarm management page. The asterisk in the title indicates that the alarm configuration has not been saved. Click on an

alarm to display its configuration in the editor pane. The alarm types all use the same basic layout.

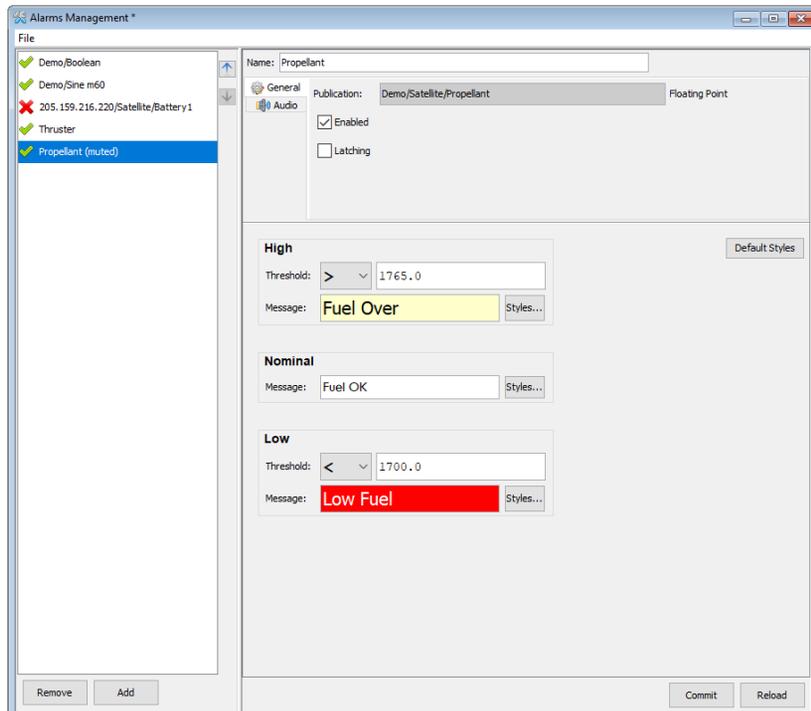


Figure 29—Alarm Management

a) **Name**

Alarms receive a name based on the server and publication, but the name can be changed to something more useful. The name is used for display throughout MissionView Display.

b) **Enabled**

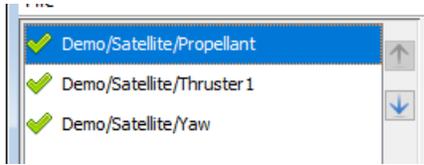
Alarms can be disabled. To keep many alarms resident but only have a few active, deselect the **Enabled** checkbox to turn them off.

c) **Latching**

Alarms can latch a value when they trigger. For instance, if the alarm should 'stick' in a triggered state, enable this feature by selecting the **Latching** checkbox. If an alarm value exceeds a bound, the triggered state will remain until dismissed by the user. For double-range alarms, the latched trigger will always be promoted to the outer limit (*i.e.*, outer bound has precedence).

d) **Up/Down Buttons**

The two buttons next to the list of alarms allow for moving the alarms around in the list.



The order of the list determines the order alarms appear in the display table as well.

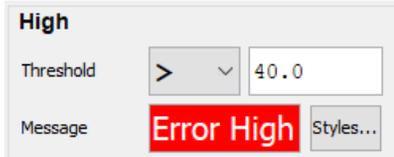
e) **Limit Editors**

Each bounded box in the editor represents a limit or is a placeholder for an un-triggered state.

- **Nominal, Undetected** – Not triggered, within bounds.
- **Detected** – Comparison returns true.
- **Low, Very Low** – Low-side bounds.
- **High, Very High** – High-side bounds.

f) Threshold Drop-Downs

The threshold comparison indicates when the logical test triggers the limit. For instance, in the case of the following configuration, the limit triggers when the value moves above 40.0.



High
Threshold > 40.0
Message **Error High** Styles...

The comparison alarm type offers a drop-down with a list of logical operators that can be used against the value entered.

Table 6—Alarm Comparison Operations



Operator	Description
>	Greater than user value
>=	Greater than or equal to user value
<	Less than user value
<=	Less than or equal to user value
==	Equal to user value
!=	Not equal to user value
Change	Any change to the publication. Best used when latching is enabled.

g) Comparison Values

Set the values for the limits by entering a value in the field(s). Changing the limit values will broaden or narrow a range or change the simple comparison value.

h) Example Ranged Alarm

The following alarm compares a publication's value using a Single-Range alarm. If the publication drops below -40.0 or rises above 40.0, the alarm will trigger.

The figure shows a configuration interface for a Single Range Alarm. It is divided into three sections: High, Nominal, and Low. The High section has a Threshold of 40.0 and a Message of 'Error High'. The Low section has a Threshold of -40.0 and a Message of 'Error Low'. The Nominal section has a Message of 'Nominal'. Each section has a 'Styles...' button next to the message field.

Figure 30—Single Range Alarm Example

i) Example Comparison Alarm

The following alarm compares the current publication value to one, thus treating it as a Boolean value.

The figure shows a configuration interface for a Comparison Alarm. It is divided into two sections: Detected and Undetected. The Detected section has a Value of 1 and a Message of 'Thrusting'. The Undetected section has a Message of 'Coast Phase'. Each section has a 'Styles...' button next to the message field.

Figure 31—Comparison Alarm Example

4.6.3 Audio/Audible Alarms

Alarms and their individual limits can have audio attached to them. Click on the **Audio** tab for an alarm to see the audio options.

Supported audio formats: **AIFC, AIFF, AU, SND, WAV.**

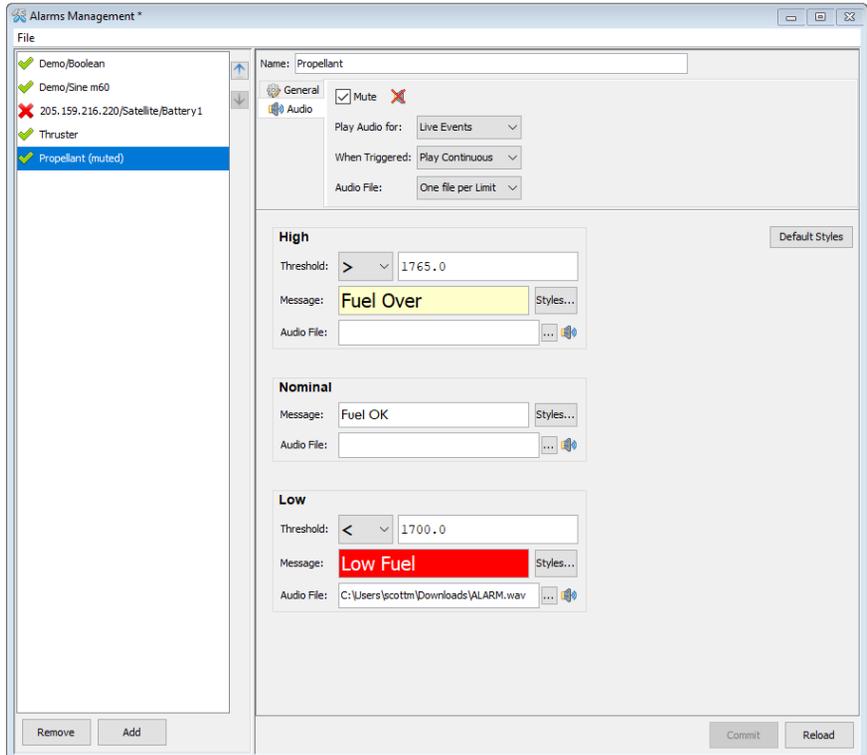
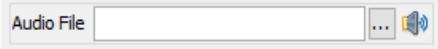


Figure 32—Audio Configuration

Table 7—Audio Options

Setting	Description
Mute	Mute all audio for this alarm.
Play Audio For	<ul style="list-style-type: none"> • Live Events Each limit exceeded will play audio. • Latching Events Only latching events will play audio. Once released/acknowledged, audio will play for the next latching event.
When Triggered	Choose whether the audio plays once or continuously (looping).
Audio File	<ul style="list-style-type: none"> • One file per Limit

	<p>Each limit can have a separate audio file. When selected, the limit editors will display an audio file selection field.</p> <ul style="list-style-type: none"> One file per Alarm Use one audio file for all limits. Use the field to select a file. The speaker button will play the selected file to sample. 
--	--

4.6.4 Alarm Display Options

In addition to setting operators and limit values, display options or *look and feel*, can also be configured. For each limit, the following characteristics can be changed: descriptive text, colors (background and font), and font.



Figure 33—Alarm Display Options

- Descriptive Text** – Use the text field to change the text.
 - E.g.*, “Error High” may be changed to user-appropriate text such as “OVER PRESSURE”.
- Colors** – Click the **Styles...** button next to the text to pop up a menu, then click on **Background Color** or **Font Color** to open a color chooser

and select your colors.



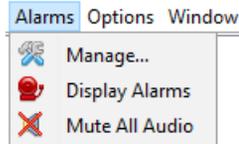
- **Font** – Click the **Styles...** button next to the text to pop up a menu, and then click on **Font** to open a font chooser and select your font type, style, and size.

a) **Default Styles**

Use the **Default Styles** button to return all the customizations to their defaults.

4.6.5 *Displaying Alarms*

Open the **Alarm Display** from the main menu **Alarms** by clicking on **Display Alarms**.



The Alarm Display will open, showing all the configured alarms. Each row presents one alarm with the configured look and feel. Click any table header cell to sort the alarms (sorting is manual, not dynamic as values update). Use filtering in the menu below to display only triggered alarms. Filter settings are persistent within the current layout.

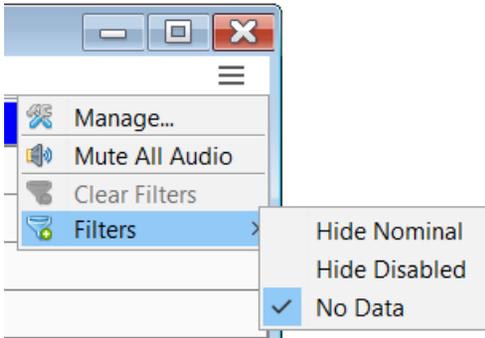
Name	Value	State	Latched
Demo/Boolean	0.0	Nominal	<input type="checkbox"/>
Demo/Sine m00	-59.353	Low	<input type="checkbox"/>
205.159.216.220/Satellite/Ba...		<No Data>	<input type="checkbox"/>
Thruster	1.0	Thrust	<input type="checkbox"/>
Propellant	1,694.85	Low Fuel	<input type="checkbox"/>

Figure 34—Alarm Display

The table visually separates alarms in different states and makes the user aware of latching values and those alarms that have audio enabled (or muted).

a)  **Menu**

The Alarm Display provides a menu at the top-right.



- **Manage...** opens or focuses Alarm Management.
- **Mute All Audio** will temporarily disable audio for all alarms. When all alarms mute, a notification will appear at the upper-right of the main application window. Clicking the notification opens or brings focus back to the Alarm Display.
- **Clear Filters** removes any filtering of the alarms.
- **Filters**
 - **Hide Nominal** will hide any enabled alarm that is ‘nominal’ (not triggered).
 - **Hide Disabled** will hide all disabled alarms.
 - **No Data** will hide any enabled alarms without an active data source (e.g., offline servers, servers not currently in Servers Management)

Table 8—Alarm Display Table

Column	Description
Name	Name of the alarm.
Value	The current value of the alarm. This field <u>always</u> updates to the latest value.
State	The current state of the alarm. Latching alarms will <u>remain latched</u> in a triggered state. Disabled alarms appear grayed-out. Audio-enabled alarms show a speaker icon, or muted-speaker icon.

Latched	When an alarm latches, the timestamp of the current latched state will appear. Click on the cell to release the latch. Note: If a limit is still triggered (e.g., still exceeds the upper bound), the alarm will immediately latch again.
----------------	---

4.6.6 Alarm Log

In addition to display, an alarm log is written to your *Documents/MissionView/alarms* folder. The log file uses comma separate values format (CSV) and records the following information.

Table 9—Alarm Log Format

Column	Description
1	Trigger Time – Local PC Time
2	Trigger Time – Publication Timestamp (server-based)
3	Alarm Name
4	Value when triggered
5	State String (E.g., OVER PRESSURE)
6	Brief descriptive text to help identify the alarm limit conditions. E.g., a single-range alarm might appear as, “Outer Low(<1000.0) Outer High(>1050.0)”
7	Reset – Added when a latched alarm has been acknowledged/unlatched. Entry indicates the value and time of the most recently received value when the unlatching occurred.

4.7 Drawings

MissionView Display supports opening drawings, configuring certain drawing features, and connection of data sources.

Configuring drawings from MissionView Display is often more convenient than making drawing changes from MissionView Designer. We recommend using MissionView Designer for creation of a drawing and the addition of graphical components, and then transitioning to Display to refine positions, sizes, and the general look-and-feel of the drawing and its graphical components.

4.7.1 Opening a Drawing

To open a drawing, select from one of the following menu options:

- Click **Servers**, then **<hostname>**, then **Drawing**
 - Opens connected to the **<hostname>** server
- Click **Open** and then **Drawing**
 - Opens with no server connection

Here's an example drawing with the "Satellite.g" drawing open.

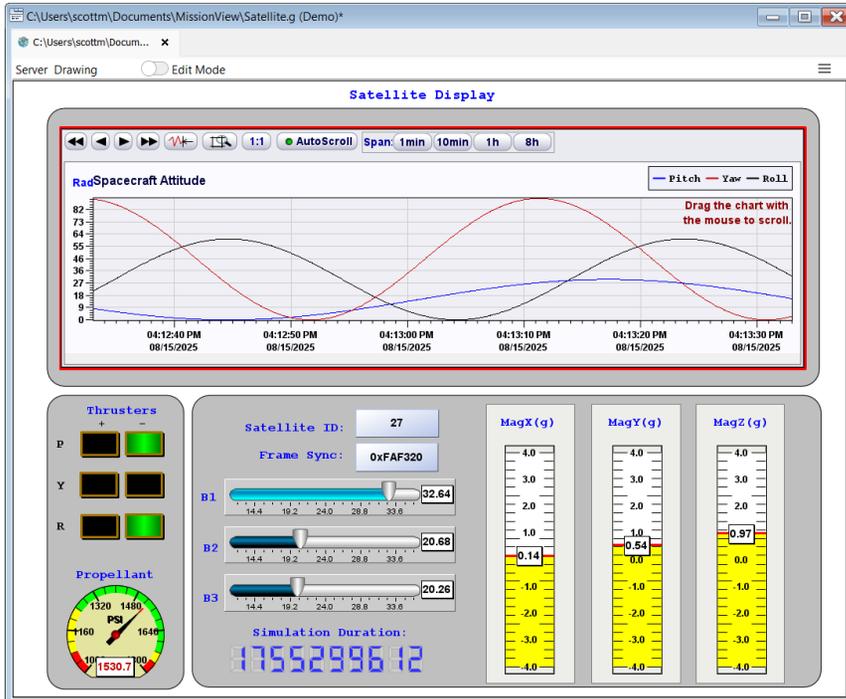


Figure 35—Example Drawing (Satellite.g)

4.7.2 Editing Drawings (Properties)

MissionView separates editing into manual property-based and physical positioning/sizing. Properties and move/resize are most conveniently accomplished using MissionView Display (rather than MissionView Designer).

At any time, right-click an object in a drawing to explore and configure properties (right-clicking highlights the object with a red rectangle and displays the object's properties in an edit dialog).

a) **Basic Properties**

Basic Properties displays the properties most commonly used to configure the graphical object.

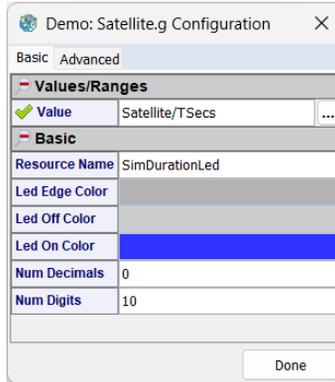


Figure 36—Graphical Object Configuration (Basic)

b) **Advanced Properties**

Advanced Properties displays the full hierarchical tree of drawing resources. Clicking on any folder in the tree will display all properties at the selected level while clicking a property will display a single property.

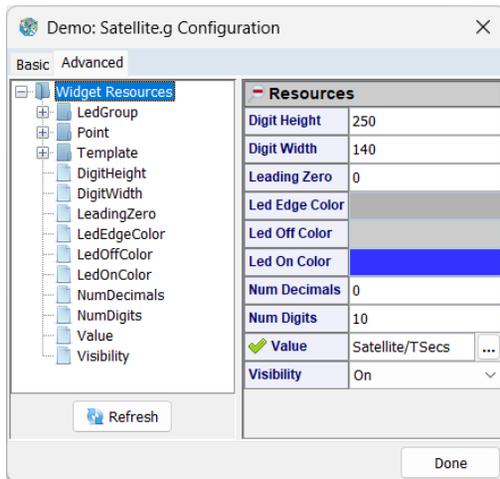


Figure 37—Graphical Object Configuration (Advanced)

c) Customizer

Configuration for more complex graphical objects may be presented with a wizard-like view. For example, chart configuration breaks up the properties into elements such as plots, axes, basic-chart, *etc.*, making the configuration simpler to understand. Advanced properties can be found on the **Resource View** tab.

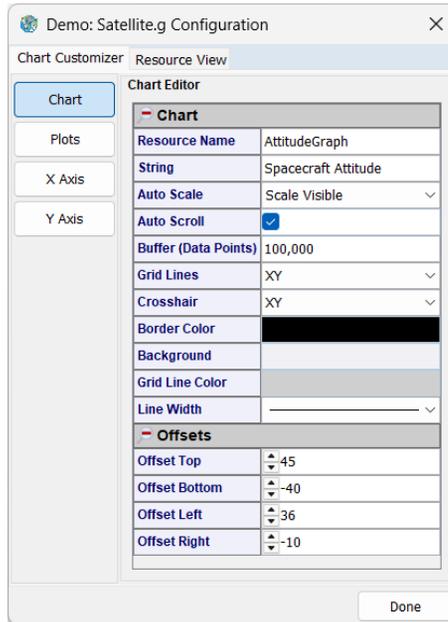


Figure 38—Graphical Object Configuration (Customizer)

d) Resource Name

Each graphical object has a resource name field. By default, MissionView Designer **does not** assign resource names to graphical objects. The user should add a useful name that will make identification easier should there be a need to later reference some component of a drawing. For instance, if a drawing has ten identical dials, all with blank names; it will be harder to troubleshoot an issue (error message) with a particular dial. Providing a *unique* resource name for graphical objects allows MissionView Display to show these unique names whenever issues arise, such as a publication becoming disconnected when a user restarts a server data flow.

4.7.3 Property Sheets

The property sheets display the properties of a graphical object using a table-like view. Properties with fixed-set values appear with a list of visual options and properties. For example, colors appear with a color chooser.

Any of the properties in the sheet can be assigned to an explicit literal value. In addition, the primary value-properties have been predesignated as expecting to be connected to a dynamic NetAcquire server publication.

a) **Setting Properties**

Properties can be edited like any spreadsheet: click in the cell and change the value.

While editing, you will see a **Pencil** icon indicating an edit is in process. Once you click enter or leave the cell, the icon will clear and the value is applied.

The on-screen drawing effect of the value change is immediate.



For properties, such as color or fixed-set values like line-width, the editor will provide a drop-down or a popup to select non-numeric settings (*e.g.*, color).

For popup editors, the cursor will change to a hand as you hover over the cell.

b) **Assigning Publications**

Some properties are predesignated as likely to receive NetAcquire server publications—these properties are *publication-aware*. The property sheet displays these with a special editor with an **ellipsis (...)** button and (when blank) hint text to indicate that a publication name is normally provided.



Users can assign publications in two ways:

1. Typing a name into the cell assigns a publication to the property. If the drawing is attached to a server, the publication will automatically begin updating the drawing.
2. Clicking on the ellipsis opens a list of publications currently available on the server.
 - a. **Link Publication** (or double-click on publication name) links the selected publication to the property.
 - b. **Unlink Publication** unlinks any currently linked publication from the publication. See section c) for an alternate menu option for unlinking.

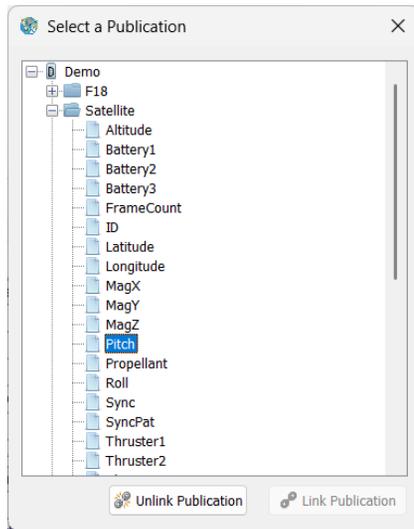


Figure 39—Publication Selection Dialog

Once linked, the property editor for a publication will display the state of the connection to the publication using an icon.

State	Status Display and Name
Connected	 Value F18/alt 
Disconnected	 Value invalid-name 

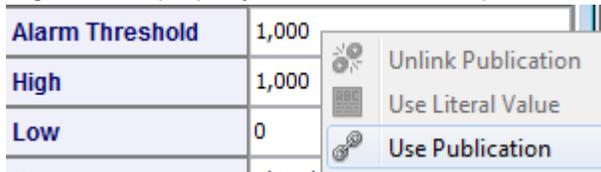
Connected publications automatically begin updating the drawing.

c) **Assigning Publication-Awareness**

In addition to properties predesignated as likely to receive publications, many other properties can be linked to a publication by making them publication-aware. Any property that has a standard editor can be made publication-aware.²

Publication-aware properties can also be switched back to literal values. The following example demonstrates changing a property between literal and publication-awareness.

1. Right-click a property cell or its label to open the value menu.



2. Click **Use Publication** to make the property publication-aware.



3. Right-click again and click **Use Literal Value** to return the property back to a standard property.

The value menu also provides **Unlink Publication**, providing an alternate means to clear the assigned publication name.

4.7.4 Editing Drawings (Move and Resizing)

To enable moving and repositioning of graphics, click the **Edit Mode** button in the menu bar at the top of the page.



toggling this box unlocks the graphics so items/objects can be moved and resized.

a) **Move**

To move a graphic, start by clicking (left or 'normal' click) to select and select and highlight the object, then drag the object anywhere in the drawing with the

² There are some cases where properties cannot have publications assigned. For example, dynamically assigned properties (see section 5) or properties identifying fonts.

mouse. You can also move a selected graphic using your keyboard arrow keys. Using **<ctrl>** and **<arrow>** will move five times the minor rate of just arrows.

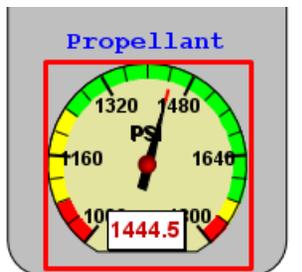


Figure 40—Selected Object in Edit Mode

b) Resize

To resize a selected object, grab the highlight rectangle as you would a Window and drag it to the size desired.

c) Resizable Exceptions

There are a few objects that do not resize, such as text fields; a text field's size is based on the font chosen.

4.7.5 Default Drawing Scaling

Drawings open in MissionView Display with a size that attempts to match their native size when the drawing is created as *fixed scale, no stretch*.

When resizable, MissionView Display opens new drawings to a default size, after which users may resize the drawing.

The following table summarizes default drawing sizes:

Drawing Scale Attribute	Window Size
Fixed Scale, No Stretch	Drawing size (from MissionView Designer)
Resize, No Stretch	Default: 75% of the size of the main MissionView Display window
Resize, Stretch	Default: 75% of the size of the main MissionView Display window

4.7.6 Text Formatting

Graphical objects offer a wide variety of formats to define the display format of numeric text. Format specifications derive from the C language's *printf* statement. For more details see https://en.wikipedia.org/wiki/Printf_format_string

For details about time formats in graphical objects, see
<http://www.cplusplus.com/reference/ctime/strftime/>.

4.8 Charts and Graphs

MissionView provides a variety of charts and graphs for displaying changing values. MissionView distinguishes charts from graphs.

Real-time Chart is the term used when a scrolling time axis is supported. Some real-time charts are interactive and provide facilities for zoom in/out and mouse-based dragging.

2D Graph is the term used when data is display with a fixed set of samples within a drawing without scrolling. Each arriving value populates the 'next' bar or point until reaching the last, then the location for the next arriving value rotates back to the first bar or point again.

Real-time Charts are the most common type of chart or graph.

4.8.1 Example Real-Time Chart Drawing

A predefined drawing is available (file `nachart.g`) containing a preconfigured chart. This drawing can be used for quick-look display of charts (*i.e.*, graphical plots of server-provided data) without needing to create a drawing from scratch in MissionView Designer.

4.8.2 Real-Time Chart Customizer

Real-time Charts present a right-click customizer in place of a basic view, making their sophisticated structure simpler to navigate. The chart customizer presents the following categories in the editor via selectable panes.

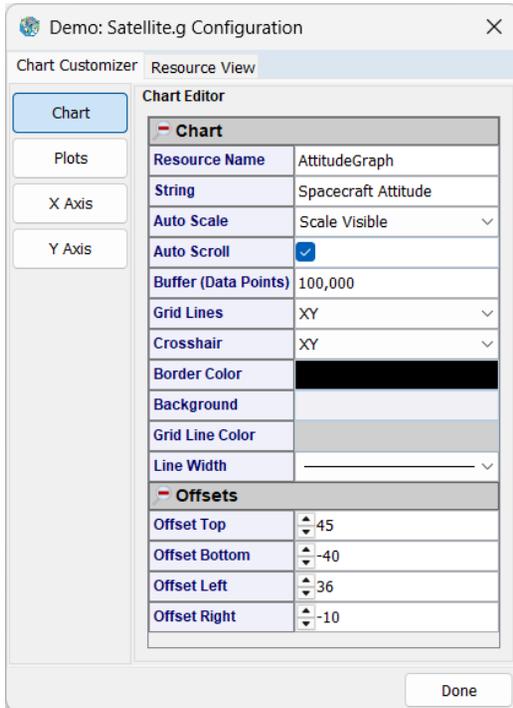


Figure 41—Chart Customizer

The Chart pane displays the top-level chart properties such as legend title, auto-scroll/scale, *etc.* Key chart properties are described below.

Table 10—Chart Properties

Property	Description
Resource Name	The name of the chart object. Used only for identification.
Title	If a title is present (<i>e.g.</i> , interactive chart), text to display in the title.

Auto Scale	<p>Auto-scaling for all plots within the chart.</p> <ul style="list-style-type: none"> • Disabled (you may need to set the Low/High values for each Y axis to indicate the initial Y axis range) • Scale (expand only) – the range can grow but will not shrink. • Scale to Buffer – scales to min/max within the entire data buffer, not just the visible area. <ul style="list-style-type: none"> ○ Warning: can be CPU intensive. • Scale Visible – scales the axis to the visible data. <ul style="list-style-type: none"> ○ Warning: can be CPU intensive. <p>Auto Scale Delta</p> <p>Auto Scale Delta controls the amount of change when scaling.</p> <ul style="list-style-type: none"> • Positive values indicate a fixed amount to scale by. <i>E.g.</i>, value of 10 will increase by increments of 10. • Negative values represent a percent increase based on the current y-axis range. <i>E.g.</i>, -0.10 means the axis should scale by 10% of its current range.
Auto Scroll	<p>Enables or disables the chart's auto-scroll when the values reach the edge of the chart area.</p>
Buffer (Data Points)	<p>Controls the maximum number of samples per plot stored in the chart's data history buffer. When new samples are pushed into the chart and the size of the data buffer is exceeded, the oldest samples are discarded to maintain the requested maximum number of samples in the buffer.</p>
Grid Lines	<p>Which grid lines to display (X, Y).</p>
Crosshair	<p>Style of the mouse crosshair visual.</p>
Border Color	<p>Color of the border surrounding the chart's data area.</p>
Background	<p>Background color for the chart's data area.</p>

Grid Line Color	Color for the grid lines.
Line Width	Width of the grid lines.
Offsets	Specifies offsets top/bottom/left/right from the outer edges of the charting area. When adding axes or changing fonts, these offsets can create more/less room at the outer edges of the chart. <i>E.g.</i> , positioning a y-axis on the right side of a chart may require changing offsets to accommodate the extra space requirement.

a) Plots

The **Plot** pane displays the list of plots present in the chart.

Plots can be added and removed with the **Add** and **Remove** buttons. An added plot will populate with no publication assigned and with default settings such as color, high/low values, and linked y axis.

Each plot represents a trace in the chart. Select a plot to edit by clicking on the plot in the list.

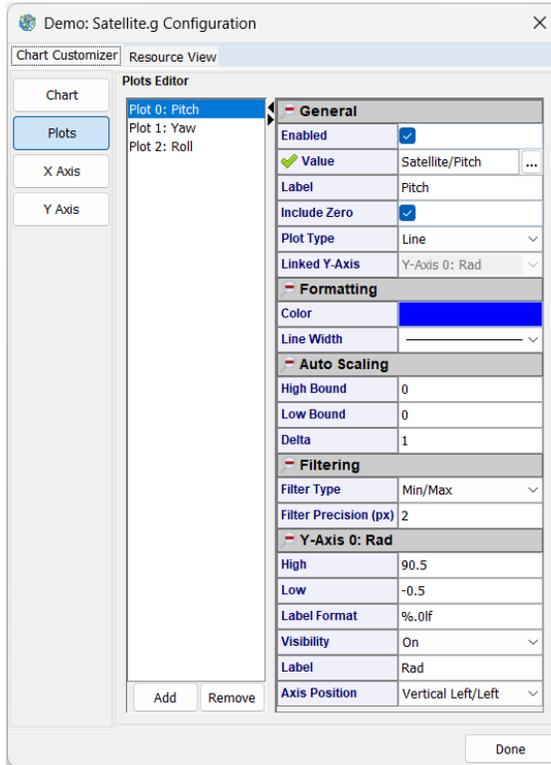


Figure 42—Plots Customizer

Table 11—Plot Properties

Property	Description
Value	Value of the current entry. This property is intended to accept a publication name.
Enabled	Hide or show the plot.

Label	Label text for the legend.						
Include Zero	Should the Plot's Y-Axis be forced to include zero (0). Affects how scaling operates.						
Color	Color for the plot's trace.						
Line Width	Width of the trace's lines.						
Plot Type	Changes how a trace is displayed. <i>E.g.</i> , line, bar, step, markers, etc.						
Filter Type	<p>Specifies the type of a filter to be used for plots that display a large number of data points. For example, when a plot shows 50000 data samples on a display that has only 1000 pixels in width, the plot will display 50 data points per each horizontal pixel. In this case, for rendering efficiency a filter can be used to combine the values of the data samples that fall within the same pixel into a single data sample (or two data-samples for the Min/Max filter). Using a filter increases performance and decreases the CPU load by decreasing the number of plot segments and markers that need to be rendered.</p> <table border="0"> <tr> <td style="vertical-align: top;">None</td> <td>Disables data filtering to draw all data samples. Not recommended for charts with large number of data samples.</td> </tr> <tr> <td style="vertical-align: top;">Min/Max</td> <td>Combines multiple data samples into two data samples that hold the minimum and maximum values of the combined samples.</td> </tr> <tr> <td style="vertical-align: top;">Average</td> <td>Combines multiple data samples into a single data sample by averaging the values of the combined samples.</td> </tr> </table>	None	Disables data filtering to draw all data samples. Not recommended for charts with large number of data samples.	Min/Max	Combines multiple data samples into two data samples that hold the minimum and maximum values of the combined samples.	Average	Combines multiple data samples into a single data sample by averaging the values of the combined samples.
None	Disables data filtering to draw all data samples. Not recommended for charts with large number of data samples.						
Min/Max	Combines multiple data samples into two data samples that hold the minimum and maximum values of the combined samples.						
Average	Combines multiple data samples into a single data sample by averaging the values of the combined samples.						

	Discard	Plots the first encountered data sample, discarding any other samples that fall onto the same pixel in the horizontal direction
Filter Precision (px)		Specifies the horizontal interval (in pixels) for combining multiple data samples. The default is 2 pixels, which will cause all data samples in each 2-pixel interval to be combined in one or two data samples depending on the filter type.
Linked Y-Axis		Associates the plot with a specific Y axis in a chart with multiple Y axes. When the plot range is changed, the range of the associated axis will also change to display the same range, and vice versa. Once a Y axis has been linked, the axis properties are displayed beneath the plots for convenience.

b) **X-Axis**

Displays properties for the X axis.

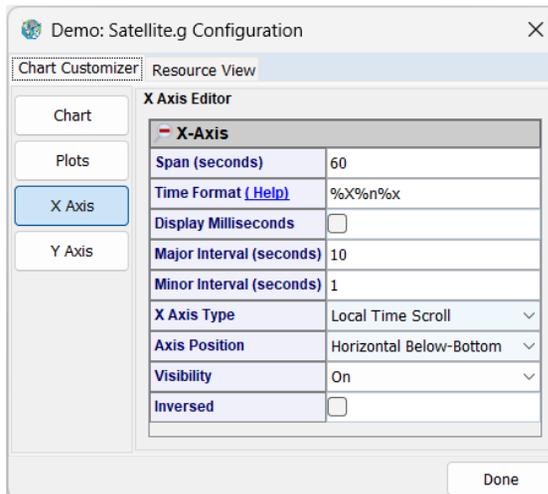


Figure 43—X-Axis Customizer

Table 12—X-Axis Properties

Property	Description
Span (Seconds)	Sets the desired number of seconds of data to show. For example, setting Span to 60 for a chart's time axis will display 60 seconds worth of data, bounded by the size of the chart buffer.
Time Format	Time formatting for the timestamps. Default uses %X, representing Time. <i>E.g.</i> , "14:55:02" or "12:55:02 PM" depending on PC localization settings. %T displays ISO-8601 Time. For complex formats, you may use "%n" to create new lines within the format. See section 4.7.6 for details on formatting.
Display Milliseconds	Sets a format that will append milliseconds to the Time Format . NetAcquire recommends using a Time Format of %T when displaying milliseconds.
Major Interval	How many seconds apart to place major interval ticks. Negative values indicate a fixed number of ticks for the span of the chart.
Minor Interval (seconds)	How many seconds apart to place minor interval ticks. Negative values indicate a fixed number of ticks for the span of the chart.
X Axis Type	Type of axis to use.
X Axis Position	Location to show the X Axis.
Visibility	Hides/shows this axis.
Inversed	When checked, inverts the data in the chart.

c) X-Axis for Relative Charts

For a Relative Chart, an advanced setting under X-Axis known as Time Origin controls the zero-value for the chart. This value must be provided as a floating-point value for Unix Epoch (number of seconds since January 1, 1970 UTC).

d) **Y-Axis**

Displays the list of Y axes present in the chart.

Y axes can be added and removed with the **Add** and **Remove** buttons. An added axis inherits property values from the last axis in the chart prior to the addition.

Select an axis to edit by clicking on the axis in the list.

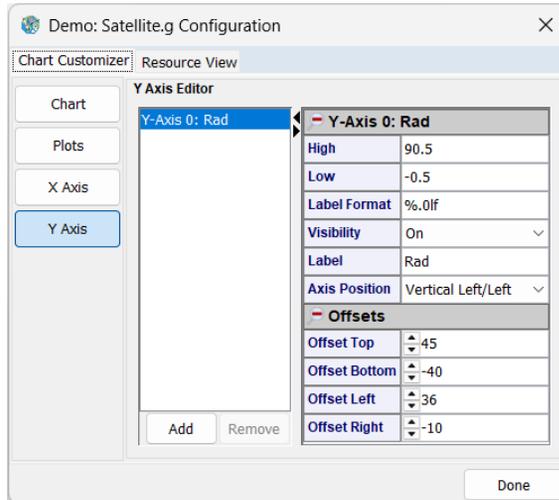


Figure 44—Y-Axis Customizer

Table 13—Y-Axis Properties

Property	Description
High	High value starting point for range.
Low	Low value starting point for range.
Label Format	Format for label values. <i>E.g.</i> , “%.1f”. See section 4.7.6 for details on formatting.
Visibility	Hide/show this axis.
Label	Label for this axis instance.
Y Axis Position	Where to place this axis instance.
Offsets	Specifies offsets top/bottom/left/right from the outer edges of the charting area. When adding axes or changing fonts, these offsets can create more/less room at the outer edges of the chart. <i>E.g.</i> , positioning a y-axis

	on the right side of a chart may require changing offsets to accommodate the extra space requirement.
--	---

4.8.3 2D Graph Customizer

A 2D Graph displays data in a fixed set of samples within a drawing. Each arriving value populates the 'next' bar or point until reaching the last, then the location for the next arriving value rotates back to the first bar or point again.

2D Graphs present a right-click customizer in place of a basic view, making their sophisticated structure simpler to navigate. The graph customizer presents the following categories.

Table 14—2-D Graph Properties

Property	Description
Resource Name	Name of the graph. Used to identify the graph within the drawing.
Samples	How many samples (bars) to display.
Value	Value of the current sample. Attach a publication to populate in iterative manner.
Background	Background color of the non-data area.
Bar Color	Color of the bars.
Bar Outline	Border color for bars.

Table 15—X-Axis Properties

Property	Description
Label	Axis label text.
Label Visible	Show or hide the label for the axis.
Label Font	Font for the axis label text.
Grid Visible	Show or hide the gridlines that extend from the X axis to indicate bar delineation.
Initial Bar Value	The value for the first bar.
Bar Increment	The amount to add to Initial Bar Value for each subsequent bar in the graph.

Initial Label Interval	The bar to display the first label on. <i>E.g.</i> , Initial Bar Value of 1.75 and Bar Increment of 0.25. Setting this value to “1” will result in the second bar displaying a label of “2”, skipping labeling from the first bar.
Label Interval	How far apart (number of samples) to space the major ticks/labels. <i>E.g.</i> , “4” indicates to place a major tick and label on every 4 th bar.
Major Ticks	Show or hide the major ticks on the axis.
Major Labels	Show or hide the labels for the major ticks.
Major Label Font	Font for the major tick labels.
Minor Ticks	Show or hide the minor ticks.

Table 16—Y-Axis Properties

Property	Description
High	High value for graph range.
Low	Low value for graph range.
Label	Axis label text.
Label Visible	Show or hide the label for the axis.
Label Font	Font for the axis label text.
Grid Visible	Show or hide the gridlines that extend from the Y axis to indicate range delineation.
Major Ticks	Show or hide the major ticks on the axis.
Major Label Font	Font for the major tick labels.
Format	Format for the values on the major ticks. For format details, please see Section 4.7.6 .

Table 17—Data Area Properties

Property	Description
Background	Non-gradient background color (or color to gradient into).
Gradient Type	Type of gradient, or None.
Gradient Color	Color for the gradient shading.
Offsets	Offsets around the data area of the graph.

4.9 Global Settings

MissionView Display maintains several categories of configuration settings as global settings. These settings can be used as configurable defaults for various individual configurations. For example, the Subscription Logger/Replayer supports various configuration parameters and users may want to configure global defaults for these parameters to minimize re-configuration within individual Subscription Logger/Replayers.

Use the **Options** menu and the **Settings** sub-menu to bring up the **Global Settings** dialog (Figure 45 below).

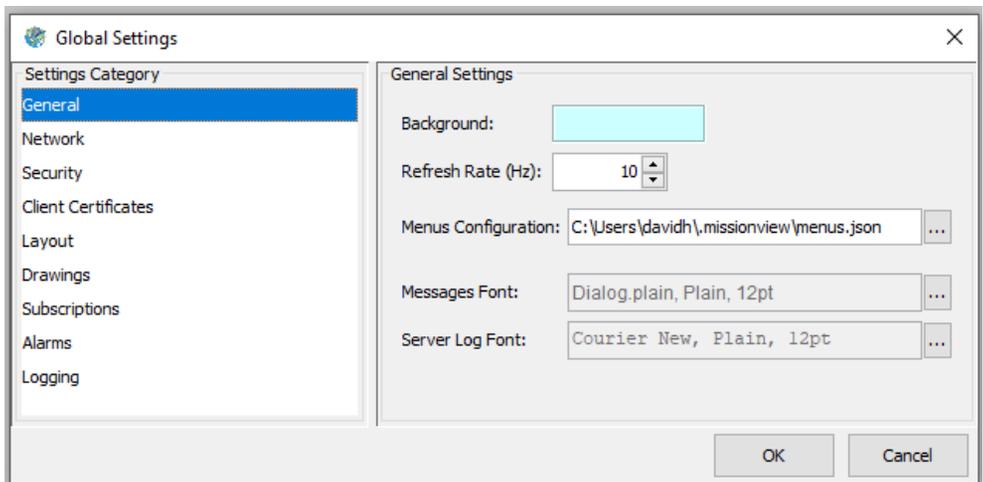


Figure 45—Global Settings Dialog

4.9.1 General Settings

This category includes settings that apply to general MissionView Display operation.

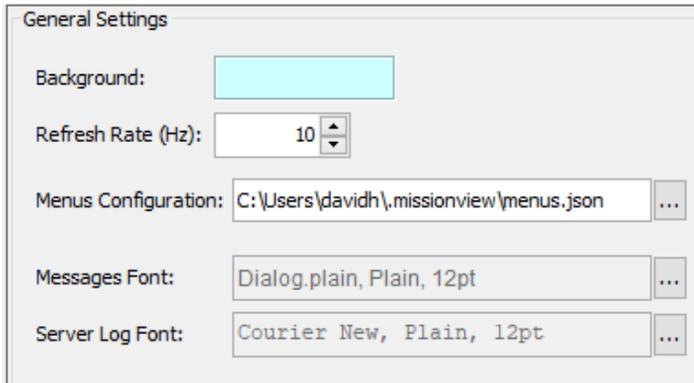


Figure 46—General Settings

Table 18—General Global Settings

Background	The background color of the desktop. Click on the color to open a color chooser to select the color.
Refresh Rate (Hz)	This setting configures most refresh rates for various MissionView Display application views. For example, this rate indicates how often the drawings are updated graphically (repainted). Note: This setting has no effect on how fast MissionView can ingest data. This setting only changes how fast some UI displays are refreshed to reflect current data.
Menus Configuration	Users may customize the organization of the Servers and Open Windows menus by providing a JSON file. Enter the filename in this field. See section 8.2.1 for details regarding the file format.
Messages Font	Font to be used in the <i>Messages</i> view.
Server Log Font	Font to be used in all server <i>Log Display</i> pages.

4.9.2 Network Settings

This category includes settings related to the network.

Configure HTTP proxy settings using this category. After changing the proxy address or port, you may be prompted to restart the application to ensure the settings take effect on any servers that have already been added.

Authenticating proxy servers will trigger a login prompt to appear when you start MissionView Display once a server is contacted through the proxy. If incorrect login credentials are provided, or the login is skipped, this section can be used to provide proxy login credentials.

The Servers Management view will indicate any errors if the proxy fails to connect.

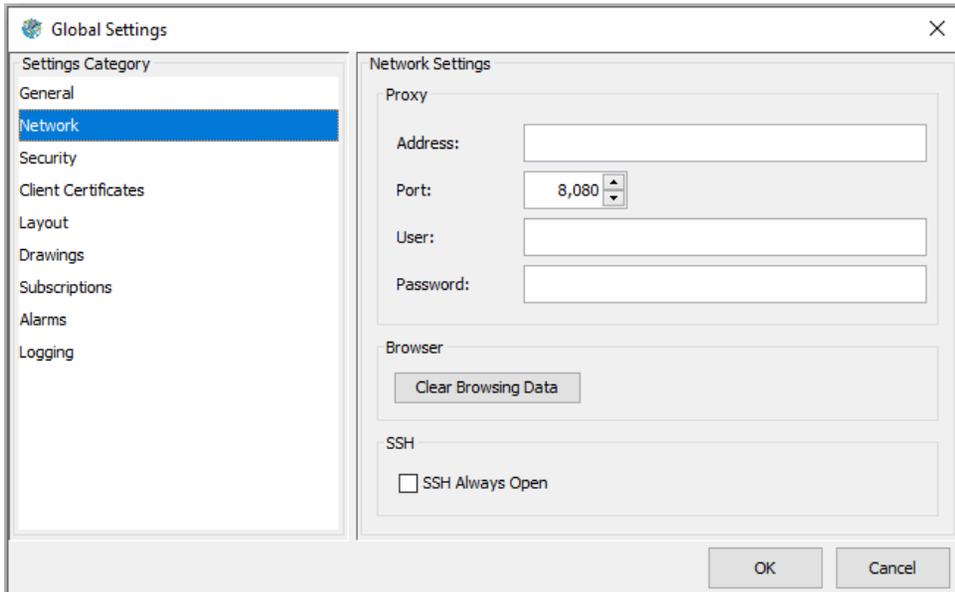


Figure 47—Network Settings

Table 19—Network Global Settings

Address	Address of the HTTP proxy server.
Port	HTTP proxy server port. Default: 8080
User	Username when communicating with an authenticating HTTP proxy. This username is not stored beyond the application runtime.
Password	Password when communicating with an authenticating HTTP proxy. This password is not stored beyond the application runtime.
Clear Browser Data	Clear cached browser data files.
SSH Always Open	Should an SSH connection be kept open whenever servers are online? If checked, the SSH connection used for NaCMD will always be available, otherwise the SSH connection will be made on first use of NaCMD and only kept open while drawings are in use.

4.9.3 Security

This category is used to configure security settings within MissionView Display.

Note: These settings can be overridden or locked out using application options on startup, allowing administrators to restrict what ordinary users are able to configure with respect to security.

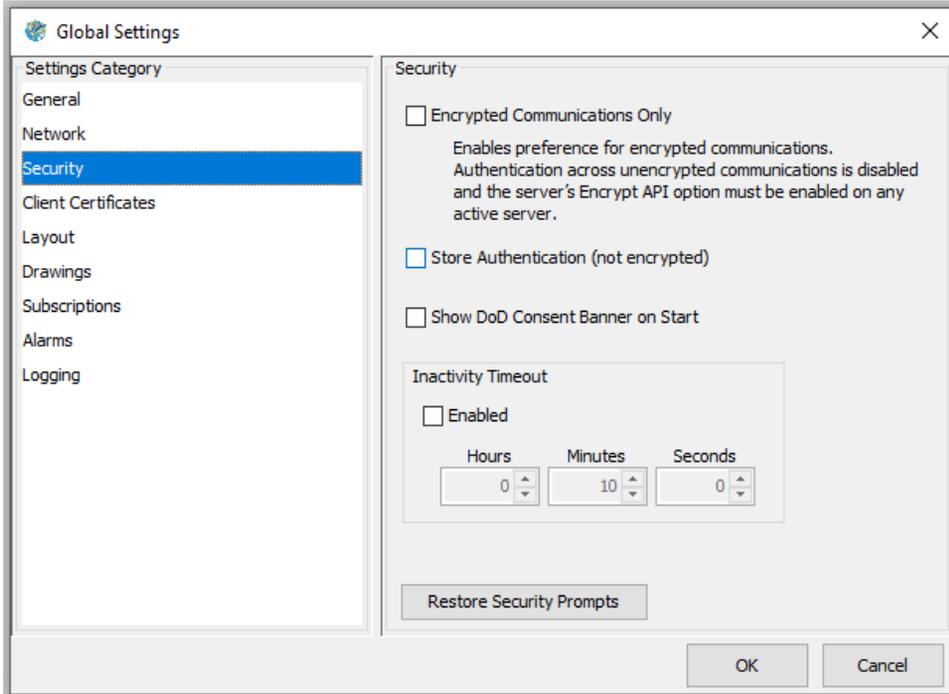


Figure 48—Security Settings

Table 20—Security Global Settings

Encrypted Communications Only	<p>Enables preference for encrypted communications. Authentication across unencrypted communications is disabled and the server's <i>Encryption and Authentication</i> option³ must be active on any active server.</p> <p>Option may be disabled.</p>
Store Authentication (not encrypted)	<p>Indicates whether MissionView Display should continue to store login credentials. This legacy option, when enabled, results in the application storing logins locally in an unencrypted format. If upgrading from an existing installation, the application will prompt if you would like to delete this file and no longer store this login information. New installations will not store login information by default.</p> <p>Option may be disabled.</p>
Show DoD Consent Banner on Start	<p>Should the DoD “consent of use” acceptance banner be displayed on application start? When displayed, user must accept the terms, or the application will shut down.</p>
Inactivity Timeout	<p>Enables a time limit after which user inactivity will cause a logout of all servers that require authentication. Minimum: 1 minute. Maximum: 2 hours.</p> <p>If timeout is disabled, MissionView Display will stay logged into all servers and will keep connections alive until the user explicitly logs out.</p> <p>Any mouse or keyboard activity in MissionView Display is considered activity regardless of whether any server pages are open.</p>
Restore Security Prompts	<p>Restore security prompts. Any security prompts such as “Store Authentication?” will be re-enabled and presented again on the next application start.</p>

³ The relevant setting on server versions prior to version 9.0 is *Encrypt API*.

4.9.4 Client Certificates

This category provides basic import/export capability for Client Certificates. Client certificates must be of type PKCS #12⁴. All certificates in the appropriate OS key store are displayed.

Use the **Import...** button to select a file that represents a client certificate in PKCS #12 format (*.pfx/.p12* file extensions). After successful import the certificate will be available to use for certificate-based login to any server that advertises a certificate authority (CA) that matches the issuer of the imported client certificate.

Use the **Delete...** button to remove the selected client certificate from the OS key store.

Use the **Certificate Details...** button to view the details of the currently selected client certificate.

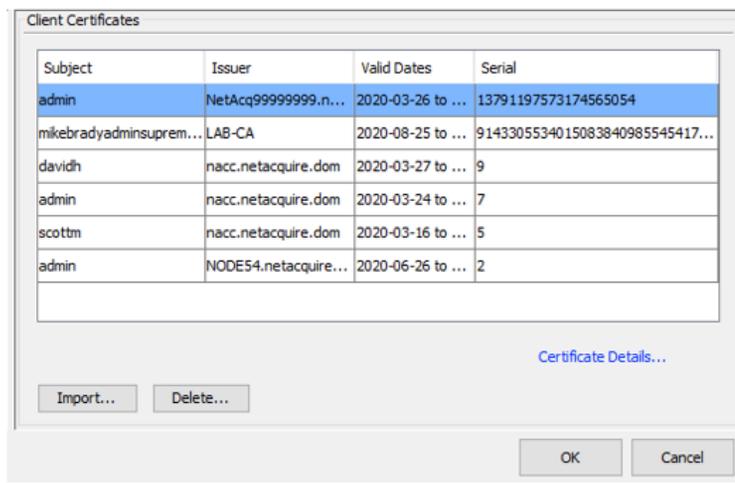


Figure 49—Client Certificate Settings

⁴ See https://en.wikipedia.org/wiki/PKCS_12 for an overview.

4.9.5 Layout Settings

This category includes settings that apply to the visual display of the MissionView Display application, including settings related to application persistence (*i.e.*, layouts).

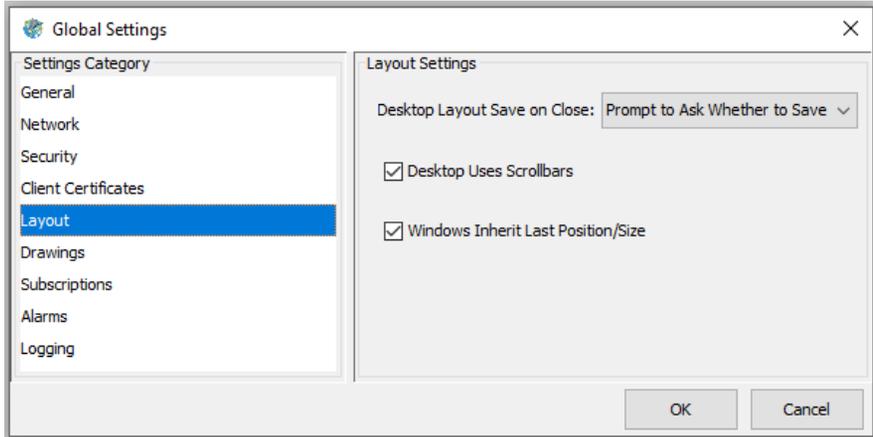


Figure 50—Layout Settings

Table 21—Layout Global Settings

Desktop Layout Save on Close	<p>This setting determines whether the active layout is automatically saved when MissionView Display is closed, or whether confirmation is required instead.</p> <p>NOTE: The MissionView Display application state is always saved on close when no custom layout is active.</p>
Desktop Uses Scrollbars	<p>This setting determines whether main application display scrollbars are used when views within the display extend beyond the bounds of the main display.</p> <p>This setting is convenient when using layouts saved on other machines and when these layouts represent large resolution displays. In this case the layout is loaded with scrollbars visible so the main display can be scrolled to views that might otherwise be off screen.</p> <p>When this setting is off, layouts loaded from systems with larger resolution displays will result in no scrollbars being visible and all persisted views moved within the bounds of the main application display.</p>
Windows Inherit Last Size	<p>When opening views such as web and configuration pages, this option will cause the views to open to the last-used size. For instance, resizing a web page or the server's dynamic status page implies that the next time the page is opened, the current size should be used.</p>

4.9.6 Drawings Settings

This category includes settings that apply to MissionView Display drawings.

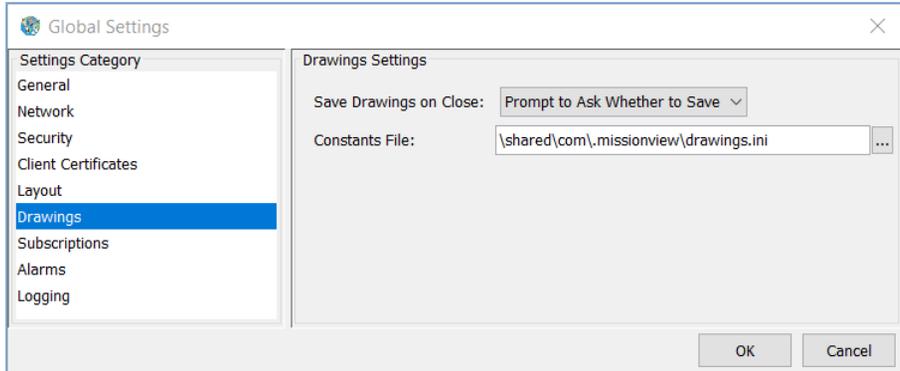


Figure 51—Drawings Settings

Table 22—Drawings Global Settings

Save Drawings on Close	This setting determines whether drawings with unsaved changes are automatically saved when a drawing is closed (including when MissionView Display itself is closed) or whether confirmation is required instead.
Constants File	Path to the INI file that defines Constant values. See section 5.2. Changing this requires a MissionView Display application restart to take effect. The persisted file contents are only ready once, during MissionView Display application start.

4.9.7 Subscriptions

This category includes settings that apply to MissionView Display subscription related displays, specifically subscription logging/replaying and subscription table operations.

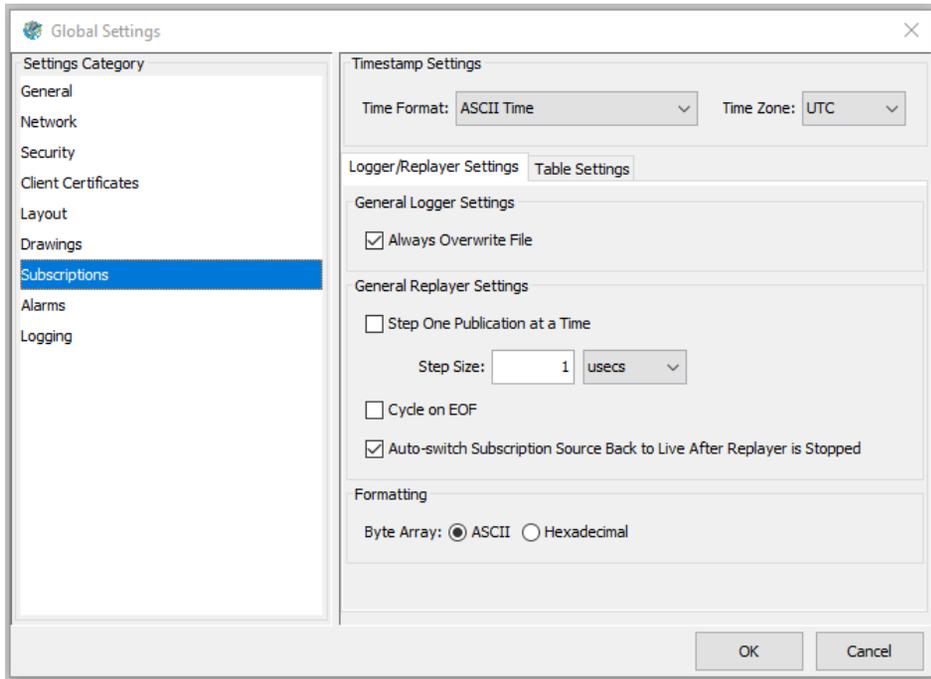


Figure 52—Subscriptions Settings



Figure 53—Timestamp Settings

Timestamp settings are global to both Logger/Replayer and Table operation and the default formatting for timestamp display is configured here.

Table 23—Timestamp Settings

Timestamp Settings	
Time Format	<p>This setting indicates the default time format used by the Logger and Table when logging and displaying subscription timestamps.</p> <ul style="list-style-type: none"> • ASCII Time Format with ISO 8601 date followed by time in specified time zone. • Windows File Time Native format for subscriptions. 64-bit integer representing the number of 100 nanosecond ticks since January 1, 1601 (UTC). • Excel Serial Time Commonly used by Excel. The number of fractional days that have elapsed since January 1, 1900 at midnight. <p>NOTE: Only files created by Logger with ASCII Time are compatible with the Replayer. ASCII Time is the default setting for this reason.</p>
Time Zone	<p>When the “ASCII Time” format is selected this setting determines the selected time zone to use when formatting time for logging and/or table display. The time zone used is either UTC or the local time zone.</p>

Logger/Replayer settings establish defaults configurations for the Subscription Logger/Replayer display/operation.

Figure 54—Logger/Replayer Settings

Table 24—Logger/Replayer Settings

Logger Settings	
Always Overwrite File	This setting determines whether the specified log file is automatically overwritten when the Logger is started or whether confirmation is required instead.
Replayer Settings	
Step One Publication at a Time	This setting indicates whether the Replayer plays back one publication at a time when single stepping. When this setting is not checked Replayer plays back publications based on the Step Size setting(s).
Step Size	This setting specifies the default step size when the Replayer is single stepping. Valid values are dependent on the units (microseconds, milliseconds, seconds, minutes, or hours).

Cycle on EOF	This setting indicates whether Replayer should automatically cycle around to the beginning of the log file when it reaches the end. The default behavior is to stop playing back data when Replayer reaches the end of the log file.
Auto-switch Subscription Source Back to Live After Replayer is Stopped	This setting indicates whether a live server automatically begins advertising (and publishing) its live publications when Replayer is stopped. When configured this way, subscribers (e.g., a drawing) will automatically switch to processing live data when it otherwise has been processing replayed data.

Table settings establish default configurations for the Subscription Table display/operation.

Figure 55—Table Settings

Table 25—Table Settings

Default View	Select which table view will be selected by default when a table is opened new.
---------------------	---

History Size	This setting indicates how many rows to display in the historical table view.
Refresh Rate (Hz)	Controls the refresh rate for the Instant table view.
Formatting:Byte Array	Default format when displaying raw bytes.
Formatting:Mark Stale Values	Enables or disables the marking of stale values in the historical table view. Stale values are values that are present prior to any new connection event for any/all subscriptions (e.g., when the connected server is restarted, or a new login succeeds). When enabled historical value cells that are stale are displayed with the configured background color.
Subscription Browser link options	By default, the server's Subscription Browser link will open the Subscription Table . To open the legacy Subscription Browser, change the option with this drop-down.

4.9.8 Alarms Settings

This category includes default settings that apply to MissionView Display alarm configuration and display.

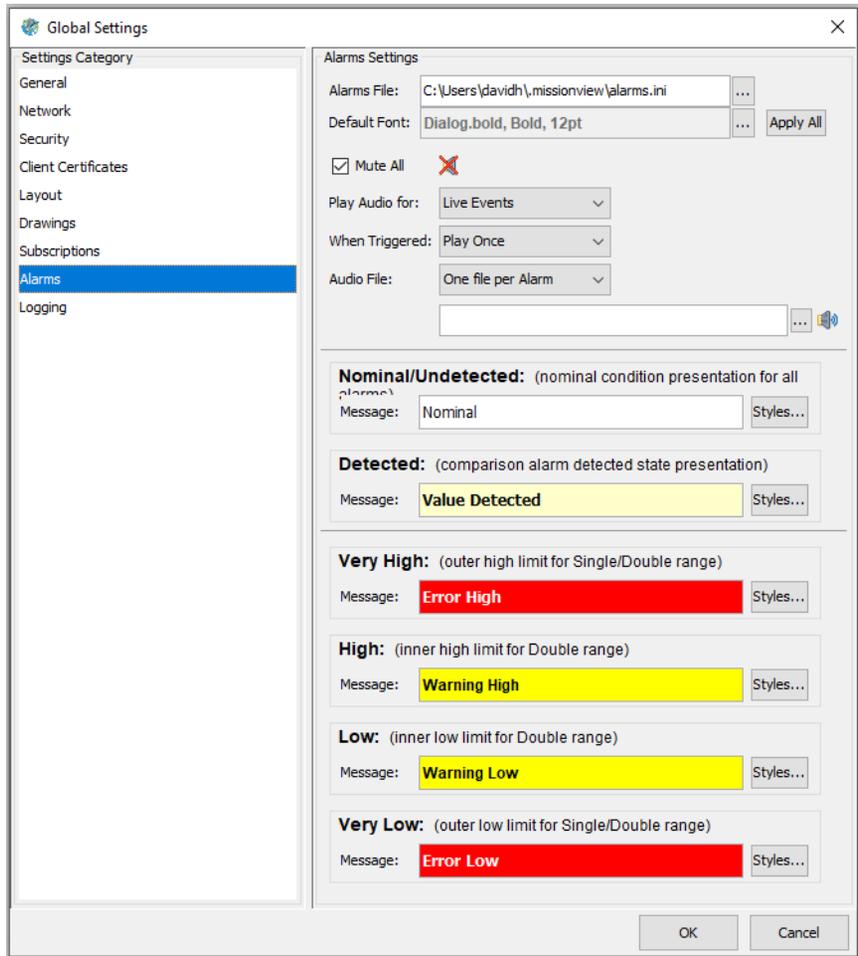


Figure 56—Alarms Settings

The *Alarms* configurable settings are defined in the following table. See 4.6 for details regarding the configuration of alarm display options.

Table 26—Alarms Settings

Alarm File	<p>Path to the INI file that defines the Alarm values. See 4.6.</p> <p>Changing this requires a MissionView Display application restart to take effect.</p>
Default Font	<p>Font to use for any table cells not part of the limits. <i>E.g., Name, Value, Latched.</i></p> <p>Use the Apply All button to apply the default font to all Limits.</p>
Mute All	<p>Mutes or unmutes all alarms and saves the state for next MissionView Display application start.</p>
Play Audio For	<ul style="list-style-type: none"> • Live Events Each limit exceeded will play its audio. • Latching Events Only latching events will play audio. Once released/acknowledged, audio can play for the next latching event.
When Triggered	<p>Choose whether the audio plays once or continuously (looping).</p>
Audio File	<ul style="list-style-type: none"> • One file per Limit Each limit can have a separate audio file. When selected, the limit boxes will display an audio file selection field. • One file per Alarm Use one audio file for all limits. <p>Use the field to select a file. The speaker button will play the selected file to sample.</p> <div style="border: 1px solid #ccc; padding: 5px; width: fit-content;"> Audio File <input style="width: 150px;" type="text"/> ...  </div>

Table 27—Alarms—Limit Settings

Default Font	Font to use for any table cells not part of the limits. <i>E.g., Name, Value, Latched.</i>
Nominal/Undetected	The default options for Nominal (for Single/Double range) and Undetected (for Comparison) conditions alarm states.
Detected	The default options for Detected (for Comparison) condition alarm states.
Very High	The default options for Outer High (for Double range) and High (for Single range) conditions alarm states.
High	The default options for Inner High (for Double range) condition alarm states.
Low	The default options for Inner Low (for Double range) condition alarm states.
Very Low	The default options for Outer Low (for Double range) and Low (for Single range) conditions alarm states.

4.9.9 Logging

This category provides audit logging configuration unless the system administrator has taken control of logging configuration. Changes to the logging configuration require application restart. For details regarding System Administrator control of audit logging, see section 1.

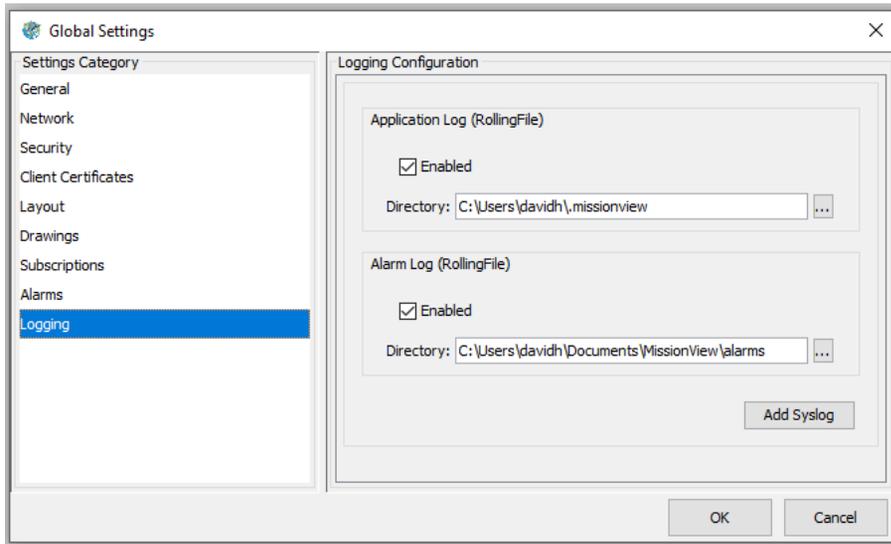


Figure 57—Logging Settings

a) Application Log

The application writes log messages to a file by default. The file will roll over to a new file at 25MB. You may configure the directory where this file should reside. You may disable the Application Log by unchecking the **Enabled** box, e.g., if you want to send events to syslog instead.

b) Alarm Log

The application writes alarm events to a file by default. Alarm event capturing to file can be disabled by unchecking the **Enabled** box.

c) Syslog Additions

Syslog targets can be defined in addition to, or in place of, the Application Log file. Click **Add Syslog** to add these targets.

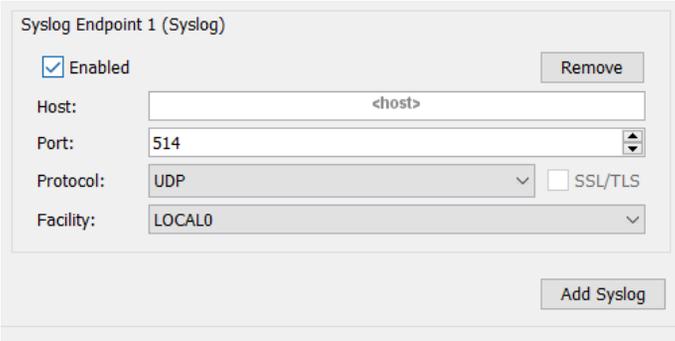


Figure 58—Logging Syslog Settings

Fill in the **Host** and **Port** of your syslog server and select the **Protocol**. Select the **Facility** of your choice as required for your situation. Up to three Syslog endpoints can be configured. You may disable the Syslog endpoint by unchecking the **Enabled** box.

4.10 Support Bundles

If you find yourself in need of technical support for your server(s) or MissionView, you can create a support bundle to capture system information to send to NetAcquire Corporation. This information provides useful information that assists support personnel with your request.

The creation of a support bundle will gather information and files that you choose into a local folder and then compresses the data into a file that you can send to NetAcquire Corporation.

The following pieces of information are available in the bundle collection.

- **MissionView**
 - o Version information
 - o Application log file(s) (if using a local log file)
- **Server(s)**
 - o System information (*Server System Information* page data)
 - o Application log file
 - o Current configuration state (*i.e.*, configuration snapshot)

To create a support bundle, open the **Help** menu and select **Create Support Bundle** to open the configuration.

Include	Friendly Name	Log	Snapshot
<input type="checkbox"/>	eng144(offline)	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	QA171 SFF SF20-SIO PC104 V.8_9_14a_2304...	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Unit 27	<input type="checkbox"/>	<input type="checkbox"/>

Figure 59—Support Bundle Configuration

The configuration will reflect the current set of servers and their active states.

Support bundles are saved to the local user's *MissionView support* folder. On Windows this is:

- (%HOME%\Documents\MissionView\support)
- Example path: c:\users\myname\Documents\MissionView\support

Once the support bundle is completed, the support folder will be opened to the location with the compressed file.

Table 28—Support Bundle Configuration Settings

Option	Description
Bundle Name	This field is prepopulated with a value based on the current time. If you prefer to use your own identifier to append to the bundle name, change this value.
Minimal Collection	If you have data sensitivities due to security concerns, you may opt to either edit the data collected, or use this minimal option. When selected only serial number and software version data will be included.
Include	Specify the server(s) you would like to include in the support bundle. Use the checkbox in the table header to cycle through Online servers, All servers, and None .
Log	Optionally include the server's application log file.
Snapshot	Optionally capture a snapshot of the current system configuration to include. This snapshot is not saved to the system but is copied to the local PC.

4.11 Application Persistence

MissionView Display opens in the same state as its last shutdown, keeping a particular workspace seamless across application runs. MissionView Display also supports the use of saved workspaces, known as *Layouts*.

4.11.1 Layouts

A layout defines a beginning state for the MissionView Display application. Layouts are stored in JSON format. Creating a layout can be accomplished in two ways:

1. Click **File** and then **New Layout...**
 - a. Creates a new, empty layout with no server list. Use this option to start from a blank workspace.
2. Click **File** and then **Save Layout As...**
 - a. Saves the current workspace information to a new layout. Use this option to derive a layout from an existing layout or workspace.

a) Drawing File Paths in Layouts

Layouts keep track of any associated drawings using relative file system paths. Relative paths assist with portability of layouts between different PCs and different users.

The following example demonstrates creating a simple layout that can be transferred between PCs:

1. Create a folder “MyLayout”, with subfolder “Drawings”.
2. Click **File** and then **New Layout...**, saving layout as “my-layout.mv” to the MyLayout folder.
3. Click **Favorites** and then **Drawing...** to open the Avionics.g drawing found in your Documents/MissionView folder.
4. In the drawing’s menu click **Drawing** and then **Save As...** to save the drawing as “Avionics” to the new folder MyLayout/Drawings.
5. From the MissionView Display application menu, click **File** and then **Save Layout** to save this layout.

The “MyLayout” folder can now be copied to a different location on the same PC or some other PC. Since the layout uses relative paths to refer to the drawing, the drawing must be moved along with the layout or exist in the same location relative to the layout file at the target location.

If MissionView Display cannot find a drawing, an error message will display indicating the path and a message will be logged in **Messages**. When this occurs, use the main **Drawing** menu and the **Open...** sub-menu item to bring up the open file dialog in order to locate the drawing file or to select another drawing file.

4.11.2 Example Layout

MissionView Display comes pre-packaged with an example layout “demo.mv” found in the Documents/MissionView folder. This layout presents two drawings connected to a demonstration data source.

4.12 Help

Help documentation includes the *NetAcquire MissionView Users Manual* (this manual). These pages include the following features:

1. Full document hierarchy and convenient traversal capability
2. Search by keyword

4.12.1 MissionView Manual (MissionView Display Chapter)

In MissionView Display, click on the **Help** menu and then **MissionView Manual** to display the MissionView Display chapter of the MissionView manual.

MissionView Display manual documentation pages are designed to be displayed optimally regardless of the size of the view. Each page provides navigation capabilities for traversing table of contents pages.

When the table of contents tab is highlighted the currently active help section's table of contents entries are shown. Use the first link in the list to traverse up to the next highest level in the table of contents.

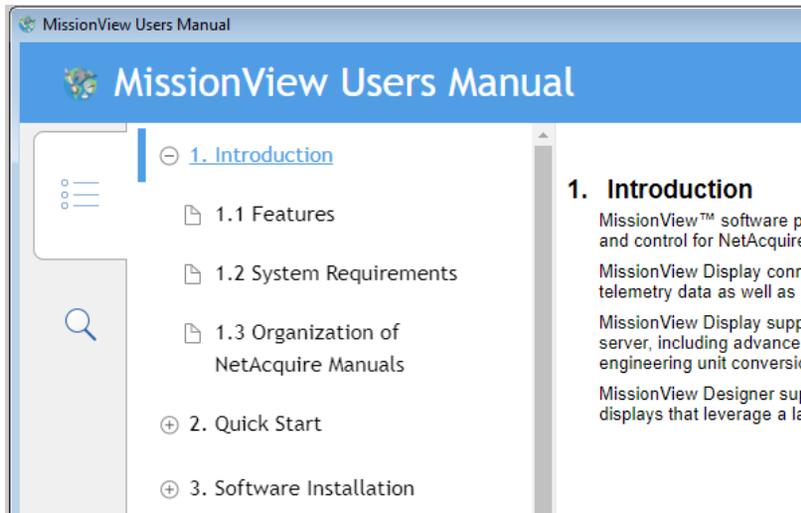


Figure 60—MissionView Manual Help Page Navigation

Page by page traversal is also possible via the previous and next buttons located at the upper right portion of each page.



Figure 61—Previous and Next Page Navigation

Search capability is also available. Enter the search term and press the **Enter** key:

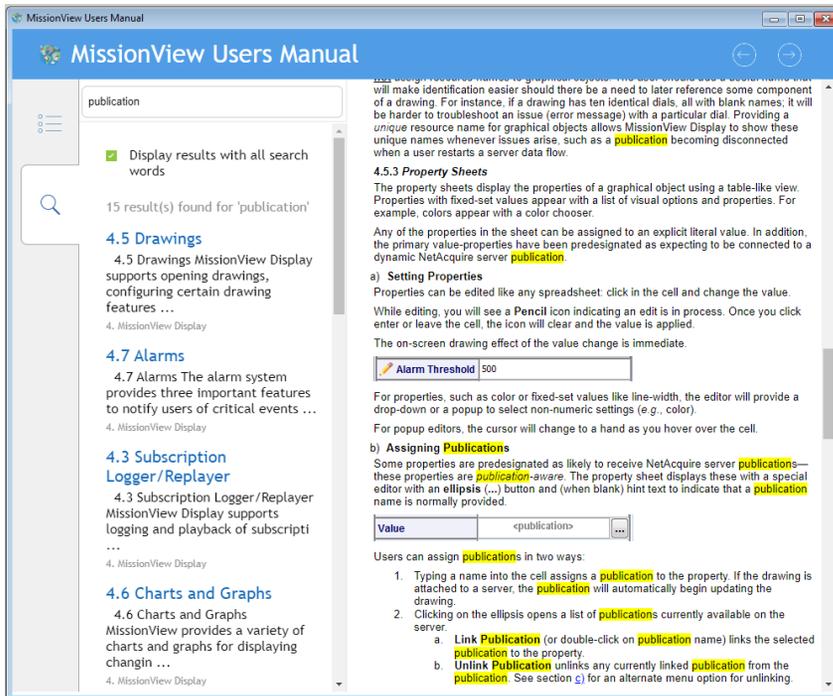


Figure 62—MissionView Manual Help Search

5. Drawings

5.1 Drawing Actions

An **action** can be attached to a graphical object to perform specific operations when interaction occurs at run-time. For example, clicking on a button in a drawing can issue a command to the connected NetAcquire server. This command might include starting or stopping NetAcquire server entities or saving or loading a configuration snapshot.

Actions can only be added from MissionView Designer. However, once added, actions can be edited from MissionView Display. See section 5.1.4 for information on editing actions in MissionView Display.

Right-clicking on a control will bring up the editor. Actions (if present) can be seen in the **Action** tab. This example has added the ability to start Data Flow instance 1.

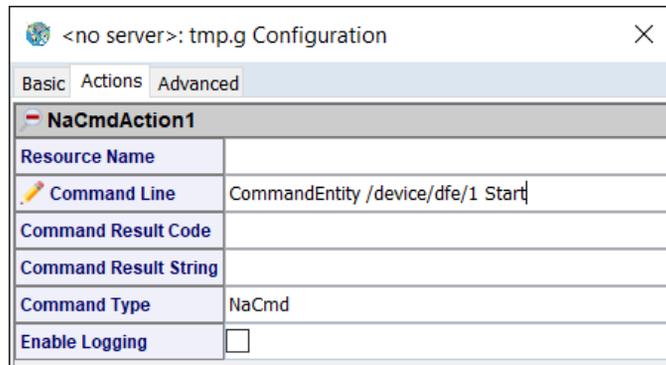


Figure 63—NaCmd in MissionView Display

Connect the drawing to the appropriate NetAcquire server and once connected, press the button to send the command. The data flow will start if it was previously in a stopped state. Otherwise, an error will be displayed, with information regarding the cause of the failure.

5.1.1 Input Handling and Action Commands

Graphical objects such as buttons, sliders, and meters can react to input events and these objects are sometimes referred as *input graphical objects*. These types of objects offer two types of actions.

- **Input Command** (*recommended choice*)
 - Can be activated if the object's **DisableInput** property is false (*i.e.*, input is enabled).

- **Command**

- Can always be activated. Best used for Actions that always apply regardless of UI state.

It is recommended that action commands be added as *Input Commands* for any input graphical object (*i.e.*, any graphical object with a **DisableInput** property). This provides a convenient way to disable commanding and all other input processing on the graphical object (simply set the **DisableInput** property to true).

For non-input graphical objects (or for input graphical objects where action commands should still take effect when **DisableInput** is enabled) add action commands via the *Add Commands* menu item.

5.1.2 NaCmd Action

This action provides an interface for performing remote invocation of the server-side **nacmd** utility, thereby supporting the ability to trigger server configuration, commanding, and statusing from MissionView drawings. This command is only relevant when connected to a live server. Command line content and syntax for the **nacmd** utility are defined in *NA-MAN-065*. Please consult this manual for detailed information regarding **nacmd** semantics.

Specify a value in the **CommandLine** parameter field indicating the **nacmd** command to run on the connected server. Each of the **CommandLine**, **CommandResultCode**, and **CommandResultString** parameter fields may contain *reference paths* to graphical objects.

a) Reference Paths

Reference paths provide a way to reference a resource within the drawing by using macro-like text. For example, in the parameter **CommandLine**, you may want to use a value from within the drawing such as the state of a toggle button (pressed:1, not-pressed:0). Similarly, command results (both the result code and the result text) may optionally be *sent* to appropriate graphical objects in the drawing. Parameter fields that contain reference paths take the form:

[\$]<object-name>/[<resource-path>/]<resource-name>

E.g., “\$MyToggleButton/OnState” or “\$MyButton/Label/String”

These references indicate the graphical object and its resource to retrieve a value from, or to populate a result to (the former for **CommandLine** and the latter for **CommandResultCode/CommandResultString**).

For example, a graphical object with name ‘Command’ and value resource name of ‘TextString’ can be referenced as ‘*Command/TextString*’. Specifying the **CommandLine** as ‘*CommandEntity /device/dfe/0 \$Command/TextString*’ would then result in the following ‘nacmd’ invocation on the connected server: ‘*nacmd CommandEntity /device/dfe/0 Start*’. Note the use of ‘\$’ as a prefix when

referencing a graphical object resource. This is needed in **CommandLine** parameter field references only since this field typically treats everything as regular text. Parameter field values for this parameter that require use of the '\$' character (e.g., for passing through to the connected server) can instead reference the dollar sign as '\\$' (these references are ignored when attempting to match graphical object resource references).

Example

In this example the **Command Line** property contains a reference to the toggle button's **OnState** resource as a parameter value to use in the action's **SetString** command (in this case the registry key being set must already exist on the server). Pressing the toggle button will now set the button's value (either 0 or 1) in the specified registry key.

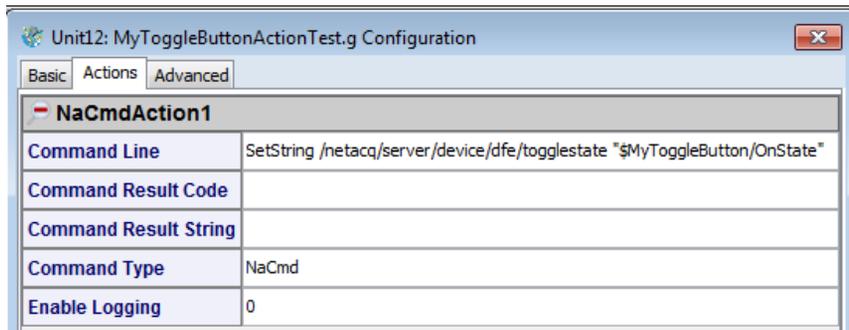


Figure 64—ToggleButton NaCmd Command Line with Parameter

Table 29—NaCmd Action Parameters

Parameter	Description
CommandType	This is the string "NaCmd". This value should never be modified. Default: NaCmd
CommandLine	This is the textual string representing the naCmd command line (see <i>NA-MAN-065</i> for detailed syntax and semantic definitions. Reference graphical object resource value replacements with any number (according to the specific naCmd command to be sent) of '\$<object-name>[/<resource-path>]/<resource-name>' references. Default: <blank>

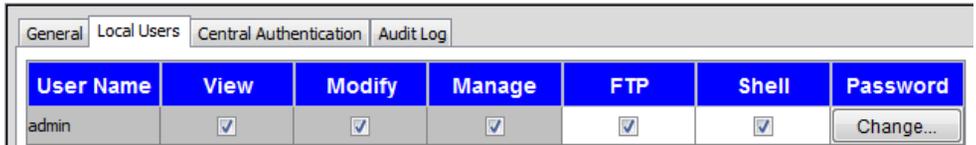
CommandResultCode	This an optional, graphical object resource reference. When specified correctly the remote nacmd invocation result code (the exit code) is set as the value of the referenced resource. Default: <blank>
CommandResultString	This an optional, graphical object resource reference. When specified correctly the successful remote nacmd invocation result (the result text) is set as the value of the referenced resource. The referenced resource value is not set if the remote invocation fails (<i>i.e.</i> , a non-zero result code is returned, or a timeout occurs). The referenced resource and the textual result must be able of compatible types. For example, a resource of type string will accept any/all textual results. However, a resource of numeric type (<i>e.g.</i> , a graphical meter object's value resource) may only accept a textual result if the result can be converted successfully to a number. Default: <blank>
EnableLogging	This parameter is a number and when the number is something other than '0' (zero) NaCmd actions will be logged to Messages .

b) Server Requirements

An *NaCmd* action uses user credentials when issuing the command on the connected server because these commands are issued over a secure shell (SSH) session. These user credentials are the same credentials used when the server requires *Encryption and Authentication* (secure mode) and a successful login has occurred (see section 4.1.2 c)). In addition to valid user credentials the

user must also have the **Shell** permission enabled. Enabling shell permission is done from the server's **Security Manager** page on the **Local Users** tab:

Security Manager



User Name	View	Modify	Manage	FTP	Shell	Password
admin	<input checked="" type="checkbox"/>	Change...				

Figure 65—Local Users Enabled Shell Permission

A drawing with a connected secure server that has successfully been logged into should never result in *NaCmd* action failure due to authentication. **However**, a connected server without authentication will result in a failed *NaCmd* command action due to authentication failure. Failure will happen when:

- **admin** user password has been changed at some point
- server does not require authentication

In this state, a connection cannot be achieved. Two options are available to resolve this issue.

1. Enable authentication (**required**)
2. Ensure the **admin** user's credentials are correctly saved when issuing *NaCmd* actions to a non-secure server and the **admin** user's password is *not* the default password

Note: the *NaCmd* server authentication failure will never happen on NetAcquire servers running software version 8.8.0 (and higher) and configured to operate in HTTPS mode. In this case the 'admin' user's password is not needed and therefore does not need to be saved.

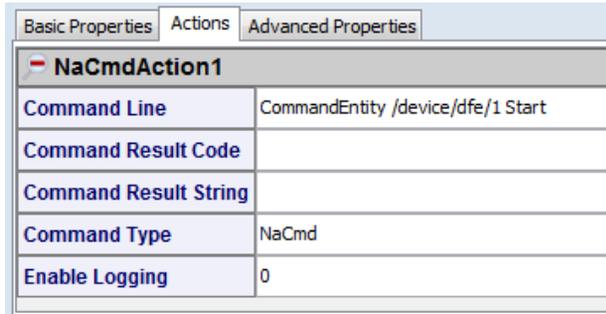
5.1.3 'GoTo' Action

The **GoTo** action can be used to automatically open a named drawing in the existing drawing. Simply attach a **GoTo** action to an input graphical object (e.g., button) and the specify the target drawing file in the **DrawingFile** parameter field. Fill in the field using either an absolute path or a path relative to the path of the current drawing (the one you are configuring). Do not change any of the other parameter field values.

When the action is performed, the referenced drawing file will open in the existing drawing (the drawing is not resized).

5.1.4 Editing Actions

Actions that have been added in MissionView Designer can be edited in MissionView Display. Simply right-click on the graphical object to bring up the customizable display properties.



NaCmdAction1	
Command Line	CommandEntity /device/dfe/1 Start
Command Result Code	
Command Result String	
Command Type	NaCmd
Enable Logging	0

Figure 66—Edit NaCmd Command Action

5.2 Drawing Constants

Constants are predefined values that are used within a drawing to:

- Auto-fill action commands during submission
- Define resource values
- Define publications

5.2.1 Constants File

Constants are defined in a text file (INI file format) and you can point MissionView Display to wherever you store this file (see section 4.9.6). The Constants file supports three sections:

1. Constants

- a. Defines fixed values that can be used throughout the rest of the file as auto-replacements.

2. Overrides

- a. Supports overriding settings in the drawing such as text, colors, positions, *etc.*

3. Publications

- a. Defines publications for resources.

5.2.2 Constants Section

The Constants section provides values that are used by other sources such as *NaCmd* actions and value definitions in the other Constants file sections.

The Constants section supports scoping entries for constants in three ways to allow using a single file for more than one drawing.

1. Global

Global values can be used by all drawings and objects. If you define a constant `Message = Hello`, an entry for `${Message}` will be replaced at runtime with “Hello”.

2. Widget

Widget scoped values take precedence over Global values and are constants that are categorized by the name of the graphical object (the *Resource Name* that you give it). These constants will only be applied to graphical object actions that match by name, but they apply to all drawings.

3. Drawing

Drawing scoped values are the highest precedence and start with \$ symbol followed by the filename of the drawing (without extension). For

e.g., `$MyDrawing`. Drawing scope is an extension of the Global and Widget scopes and restricts constants to a specific drawing.

Using a Constant value requires defining a value with the auto-replacement syntax:

```
${name-of-the-constant}
```

For example, an *NaCmd* action could use an auto-replacement to define a registry path at runtime:

```
CommandEntity /device/dfe/${instance} Start
```

a) **Auto-Replacement Application**

Auto-replacement of values occurs just once, supporting just a single-level of replacement; nesting of auto-replacement is not supported.

These auto-replacement values may be used in the following places.

- *NaCmd* action commands
 - Replacement happens when the command executes
- Overrides section definitions
 - Replacement happens during drawing load
- Publications section definitions
 - Replacement happens during drawing load

5.2.3 Overrides Section

The Overrides section defines the values of resources. For instance, to set the number in a Value display named “MyDisplay”:

```
MyDisplay.Value = Hello
```

Definitions operate by their path from the parent object, such as “MyDisplay” in the previous example. Overrides permit use of both drawing-scope and auto-replacements in the value being defined.

To find a resource path, use the right-click editor for any object and click the **Advanced** tab to see the resource tree.

Overrides support the following values:

- Numeric
 - All values in drawings are interpreted as floating-point
- Text
- Color
 - Designate colors using either web style (#00ff22) or hexadecimal value (0x00ff22)
- Triplet
 - For values such as positions or other x/y/z values, designate with three values separated by comma. For *e.g.*, 100, 200, 600

a) **Precedence**

Drawing features overridden can still be edited and set directly, but the overrides will always be loaded at drawing load-time. Changes after loading (manual or publication-based) will replace the override value but be lost when the drawing loads again.

5.2.4 Publications Section

The Publications section sets publications for resources, providing an alternative to the pattern found in 4.7.3 . Definitions in the Publications section permit use of both drawing-scope and auto-replacements in the value being defined. For example:

```
MyValueObject.Value = ${domain}/velocity
```

5.2.5 File Format

Constants are defined in a text file with INI style format. The example here demonstrates the use of auto-replacement and scoping.

```
[Constants]
Tooltip = Click for Info
Instance = 4
CommandLine = CommandEntity /device/dfe/${Instance}
Domain = SubDomain2
MyWidget.Domain = Domain1
$MyDrawing.Domain = Domain2

[Overrides]
$MyDrawing.Label1.BodyColor = #00ffaa
$MyDrawing.Label1.Point = 400, -100, 0
Button2.TooltipString = ${Tooltip}

[Publications]
```

```
Label11.Value = Boolean  
$MyDrawing.Label18.BodyColor = ${Domain}/publication_color
```

a) Selecting Constant File

Select the file through the main menu **Options**, then **Settings**. Select **Drawings** in the list and you will find the configuration field for the **Constants File** (see section 4.9.6). Changing this value requires a MissionView Display application restart to take effect. The persisted file contents are only ready once, during MissionView Display application start.

5.3 Drawing Dynamics

Dynamics represent a real-time operation that can be performed on a display property (resource). For instance, a value display can change color when the value exceeds certain thresholds. Dynamics are *attached* to resources to change their behavior.

5.3.1 Editing Dynamics from MissionView Display

Once you have added one or more dynamics to your drawing, it's recommended that dynamics editing is performed in MissionView Display.

Start by opening the drawing in MissionView Display. When a dynamic has been added to a graphical object in a drawing, the graphical object's *Transforms* tab will additionally display each dynamic in its own section.

Use the dynamic section of the property sheet to change dynamic settings and thresholds such as colors, ranges, *etc.* Using the Avionics.g *Speed Display* as an example:

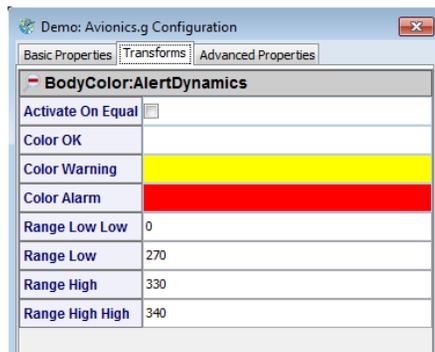


Figure 67—Dynamics in Transforms Tab

5.3.2 Constraining/Unconstraining

MissionView Display will automatically **constrain** (bind) a dynamic's standard *InputValue* resource to the *Value* property of the associated graphical object.

Once the constraining has occurred, the *InputValue* resource will appear as if it has been replaced by *Value*.

The following description of explicit constraining/unconstraining is an advanced topic and is typically not needed.

To unconstrain a resource, click the **Advanced Properties** tab and navigate to the resource. Using the Avionics.g *Speed Display* as an example, navigate to *BodyColor:AlertDynamics/Value*.

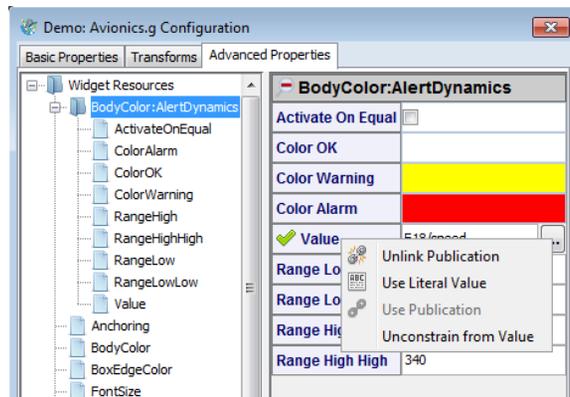


Figure 68—Dynamics (Unconstraining) in Advanced Properties

1. Right-click the **Value** resource as shown in Figure 69.
2. Click **Unconstrain from Value**.
 - a. The resource will unbind from *Value* and operate like any other resource. Additionally, the name will revert to *InputValue*. For instance, you can manually set a value, connect *InputValue* to a publication, *etc.*
 - b. Once a resource is unbound, it will not automatically be constrained on startup.

- The right-click menu will now offer **Constrain to Value** to reverse the operation.

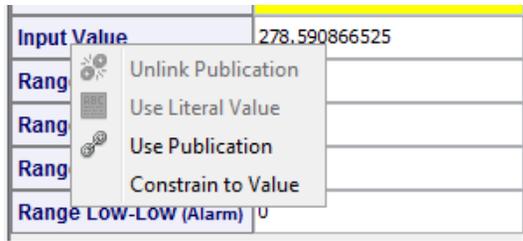


Figure 69—Performing a Constrain to Value

5.3.3 Dynamics Example: Avionics

The *Avionics.g* drawing (Figure 70) contains several value display objects that use color alert dynamics.

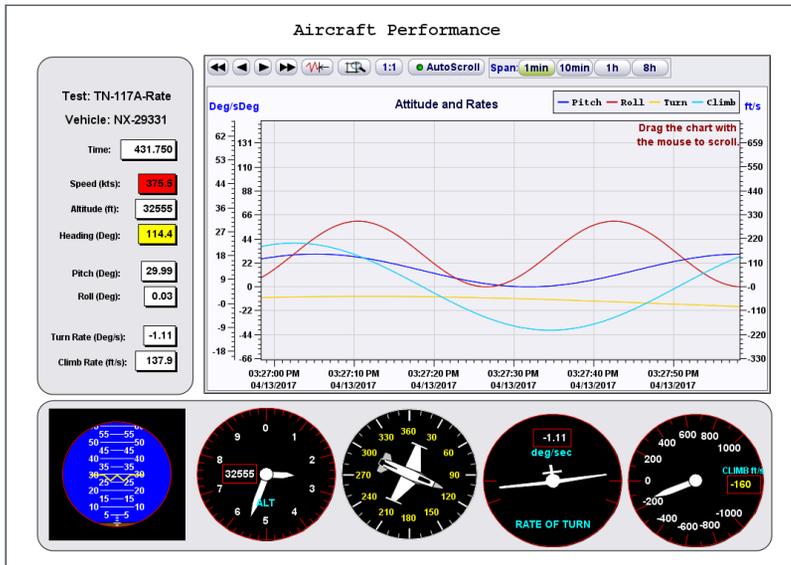


Figure 70—Avionics Drawing

The body color of the *Speed*, *Altitude*, and *Heading* values change from white to yellow to red in response to the input value.

The *Range High* and *Range Low* properties define the threshold at which the color switches between *Color OK* (white) and *Color Warning* (yellow). The *Range High High* and *Range Low Low* properties define the threshold between *Color Warning* (yellow) and *Color Alarm* (red). See Figure 67.

5.3.4 Dynamics Example: Satellite

The Satellite.g drawing (Figure 71) contains several slider objects that use color alert and blinking alert dynamics.

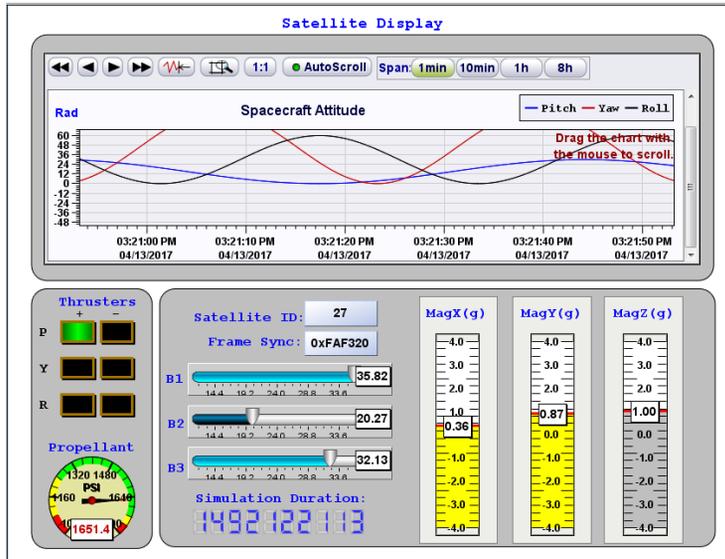


Figure 71—Satellite Drawing

The horizontal *B1*, *B2*, and *B3* sliders use an alert dynamic to change brightness in response to input values below the specified thresholds. *Range Low Low* (22) is the threshold between dark (Color Alarm) and medium blue (Color Warning). *Range Low* (26) is the threshold between medium (Color Warning) and bright

blue (Color OK). *Range High* and *Range High High* are set to a value beyond the maximum value (not used). These properties are shown in Figure 72.

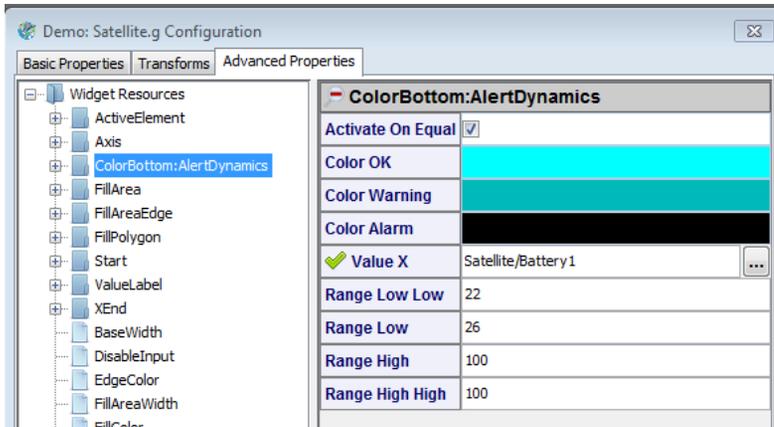


Figure 72—Satellite Drawing Alert Dynamics

The vertical *MagX*, *MagY*, and *MagZ* sliders use a blinking alert dynamic to flash the color of the level indicator (yellow and silver) when the input value falls outside of the defined range (Figure 73).

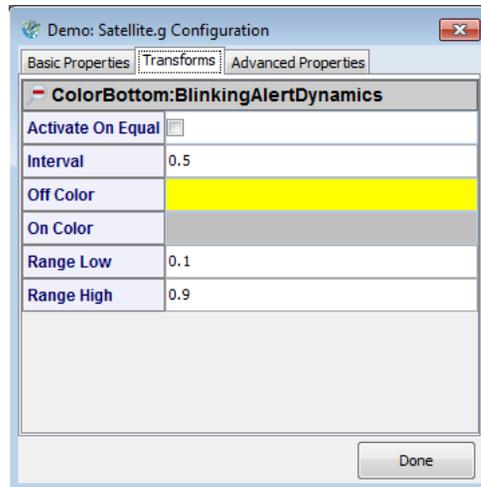


Figure 73—Satellite Drawing Blinking Alert Dynamics

6. Security

This chapter covers security topics pertaining to MissionView Display.

6.1 Client Certificates

MissionView Display communicates with a certificate key store and this key store's format and access is unique to each supported operating system. The key store represents the collection of installed certificates used as credentials for authorizing various system-based services. In the MissionView Display context the key store provides TLS/SSL client certificates to use whenever contacting a NetAcquire server configured for certificate-based authorization.

Operating System	Key Store
Windows	Current user certificate key store
Linux	Network Security Services (NSS)
Mac	Keychain Access

Servers operating in HTTPS (TLS/SSL) will require interaction with the key store and if no acceptable certificate is found, MissionView Display will not be able to provide a certificate to the server for login/authentication.

Certificates can be installed in advance into the key store using OS specific tools and utilities. Client Certificates may also be installed using the **Global Settings** dialog and this capability provides a consistent look and feel across all supported operating systems.

6.1.1 Linux NSS Login Requirement

The local user's NSS database may be created with password protection. If a password is required, MissionView Display will prompt for the password during application startup. If the password is not provided, MissionView Display will use a transient (and initially empty) certificate store to communicate via HTTPS. Any changes to this store will be lost when the application is closed.

6.2 Server Certificates

Servers operating in HTTPS (TLS/SSL) will require interaction with the key store and if no acceptable certificate or root authority is found, MissionView Display will prompt the user to accept a server's certificate.

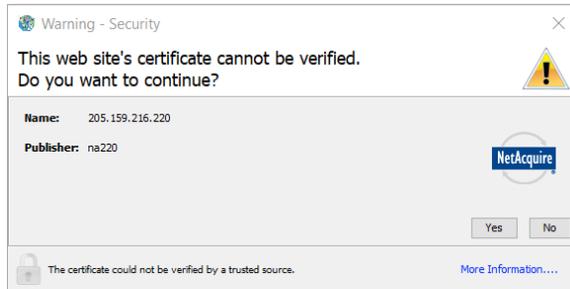


Figure 74—Server Certificate Acceptance Dialog

Use the **More Information...** button to inspect the server's certificate. To accept the certificate, click the **Yes** button.

Depending on the operating system, a checkbox may appear with an option to permanently store the certificate. Checking this box will cause a request to store the certificate, handing off the action to the key store. Windows users will see an automatic handoff to the key store.

The key store (or operating system) may then ask for further authorization to import the certificate or to log into the key store. Failure or denial to permanently store the certificate will not prevent MissionView Display from communicating with the server for the runtime of the application.

6.3 Application Security Configuration

The security settings described in section 4.9.3 *Global Security Settings* can be defined and locked by a system administrator. MissionView Display supports startup arguments to enable and control specific functionality, including security.

6.3.1 Installation

To secure an installation, install the application as an administrator for all users. The installing administrator should ensure that the install location is properly security-controlled, ensuring a standard user cannot modify the contents of the installation without proper privilege elevation.

Once the application is installed, there are a few steps to be taken to configure security. Various patterns can be used to consolidate security, such as using a network-common location for certain security files that all workstations can reference.

The following configuration steps are covered in the next few subsections.

1. Startup Arguments
2. Logging Setup

6.3.2 Startup Arguments

MissionView Display accepts startup arguments to control behaviors such as,

- Security. For example,
 - Must the application talk only to encrypted systems?
 - Are all security settings 'locked' to the user and only controllable by an administrator?
- Logging
 - Where is the application logging configuration found and how is it configured?

The startup arguments are defined in a properties file made up of key-value pairs. Often these start with a prefix such as “-D”. For example,

```
-DmySetting=myValue
```

The application comes with a default properties file titled `MissionViewDisplay.vmoptions`. Property files may reference other property files, creating a “chain”, allowing an administrator to point to another file location.

a) File Location(s)

Startup arguments are declared in *vmoptions* files. In the following examples, `<installation>` may be `C:\Program Files\NetAcquire Corporation\MissionViewDisplay\Display`, or on Linux a likely path is `/opt/netacquire/missionviewdisplay/Display/`.

- `<installation>\Display\MissionViewDisplay.vmoptions`
 - This file contains the default settings and is replaced during any upgrade.

Changes to this file will be lost when upgrading MissionView Display; please use the *custom.vmoptions* file for your own settings.

- `<installation>\Display\custom.vmoptions`
 - This file is optional; create it to set your own arguments for the application.

The *vmoptions* files support directives to include other *vmoptions* files. For instance, you may choose to set the *custom.vmoptions* to point to:

- A common network file for all workstation users
 - This option is ideal for securing multiple installations within a facility, centralizing security.
- Another local file
 - Allows a user to define a property file outside the install area that can be easily modified at any time.

6.3.3 Security Lock and Defaults

Several arguments define security defaults and locks. The use of these arguments follows the rules below. As a concrete example, we'll use the feature from **Global Security Settings** named **Encrypted Communications Only**.

Two forms of argument exist for security settings.

- **Default**, e.g., `-Dmv.encrypt=true`
- **Lock**, e.g., `-Dmv.encrypt.lock=true`

The **Default** argument provides the application with a value to *start* with. If a user chooses to configure the application for something different using the **Global Settings**, the following precedence is respected.

1. User value
2. Startup Argument

If the **Lock** argument is set to **true**, then the user cannot change the setting from within the application and precedence is reversed, allowing administrators to explicitly control the application security and override any user preference.

1. Startup Argument
2. User value

For instance, to force security to maximum and prevent the user from disabling any security, the following options might be used:

```
-Ddisa.stig=true  
-Dlog4j2.configurationFile=//files/security/logger.xml
```

6.3.4 Arguments

All arguments defined within this document start with `-D` but have been presented here **without** the prefix for easier reading. Each argument will have an equal sign followed by the value:

```
-D<arg>=<value>
```

a) Value Types

- Boolean: “true”, “false”
- Path: /example/filesystem/path
- URL: http://myfile

6.3.5 Security Arguments

Argument	Type	Description
disa.stig	Boolean	<code>-Ddisa.stig=true</code> Forces security settings to maximum. Any explicit settings for the following arguments are ignored. <ul style="list-style-type: none">• <code>mv.consent=true</code>• <code>mv.encrypt=true</code>• <code>mv.auth.store=false</code>• <code>mv.security.lock=true</code>• <code>mv.inactivity.enabled=true</code>• requires use of <code>log4j2.configurationFile</code> This setting additionally ensures that the application will shut down automatically if audit logging fails, either on startup or during operation.
availability.override	Boolean	<code>-D availability.override=true</code> If availability must override the application shutting down for security, set this value to <i>true</i> .
log4j2.configurationFile	Path	<code>-Dlog4j2.configurationFile=//files/security/logger.xml</code> A path to the logger configuration file. Use path separator “/” for paths in this parameter. Required when disa.stig=true specified.
mv.security.lock	Boolean	<code>-Dmv.security.lock=true</code> Locks out the ability to change security features from within the application.

mv.encrypt	Boolean	-Dmv.encrypt=true Overrides the Encrypted Communications Only feature in the <i>Global Security Settings</i> . Ensures authentication information cannot be passed over unencrypted communications channels.
mv.encrypt.lock	Boolean	-Dmv.encrypt.lock=true Locks out the ability to change the Encrypted Communications Only feature in the <i>Global Security Settings</i> .
mv.auth.store	Boolean	-Dmv.auth.store=true NOTICE: Enables the <i>unencrypted</i> storage of login credentials. Set to false to ensure this setting is disabled.
mv.auth.lock	Boolean	-Dmv.auth.lock=true Locks out the ability to change the storage of unencrypted login credentials.
mv.browse.external	Boolean	-mv.browse.external=false Prevents users from being able to browse to non-server targets.
mv.consent	Boolean	-Dmv.consent=true Option to display DoD banner and require consent. Default consent banner formatted in accordance with DTM-08-060.
mv.consent.url	URL	-Dmv.consent.url=<url> A URL to text or simple HTML page containing a consent banner/inquiry the user must accept before using the application.
mv.mdns.enabled	Boolean	-Dmv.mdns.enabled=false Disables mDns incoming traffic processing. Server auto-discovery disables. Provides DoS attack safety.
mv.inactivity.enabled	Boolean	-Dmv.inactivity.enabled=true

		Enable inactivity timeout.
mv.inactivity.timeout	Time string	-Dmv.inactivity.timeout=PT10M ISO-8601 string indicating a duration of time ⁵ . Format PnDTnHnMn.nS . ⁶

6.3.6 Other Arguments

Argument	Type	Description
extBrowser	Boolean	-DextBrowser=true Indicates that MissionView Display should use an external browser. Default defers to Java to find an appropriate browser.
extBrowserPath	Path	-DextBrowserPath=<path> Provide an explicit path to a browser. Implicitly sets <i>extBrowser=true</i> . For example, Firefox may exist at <i>/usr/bin/firefox</i> . Do not use quotes for the path.

6.3.7 Audit Logging

Control of audit logging constitutes a critical piece in the security chain when needing to trace potential security problems during or after the fact. Administrators may set up logging to prevent unauthorized changes by application users. Logging configuration may also be customized to fit specific requirements.

a) Logging Configuration

NetAcquire Corporation recommends starting with MissionView Display's **default logging configuration file** and modifying the file to fit your needs.

When MissionView Display starts, if no logging configuration has already been set up, a file will be extracted to <user>/**.missionview/logger.xml**. This file provides the logging defaults for the application. Before editing this file directly, you may use the **Logging** category of **Global Settings** to:

- Disable or change file-based logging location
- Add and configure syslog endpoints

⁵ See https://en.wikipedia.org/wiki/ISO_8601.

⁶ See https://en.wikipedia.org/wiki/ISO_8601#Durations.

Note: Future application versions may require modifications to the logging setup. If you provide the file location using startup arguments, MissionView will not try automatically upgrade the configuration, but may notify you that you should contact NetAcquire for details.

b) Logging Configuration File

Once you have finished editing the logging configuration within MissionView Display, follow these steps to secure the logging configuration within MissionView Display.

1. **Move** the configuration file to a location under control of your system administrator or security officer. This location must be readable by MissionView Display. You may use a network location to provide centralized logging configuration for multiple installations.
2. **Define** path to the logging configuration file with a startup argument.

For custom or more advanced logging configurations, please [contact NetAcquire Corporation](#) directly for information regarding proper file setup.

6.3.8 Fully Secured Example Configuration

A fully secured application should use a property file minimally containing the following settings.

```
-Ddisa.stig=true  
-Dlog4j2.configurationFile=<path-to-file>  
-Dmv.mdns.enabled=false
```

In addition to these settings, the logging configuration file will be located somewhere secure and be set to use centralized logging (syslog). Optionally, the local file logging may be turned off.

a) Centralized Security Configuration

The settings above can be centralized by customizing the MissionView Display installation. All installations reference an optional custom.voptions file that must be placed in the same location as MissionViewDisplay.voptions. *E.g.*,

```
C:\Program Files (x86)\NetAcquire  
Corporation\MissionView\Display
```

Within the custom.voptions file, add an include to point to a central file location that is read-only. For instance,

```
-include-options \\fileserver\secure\central.voptions
```

This centralized vmoptions file can then be used to configure all MissionView Display applications in your facility. The logging configuration file could reside in the same location.

6.4 TLS v1.0 and v1.1 deprecation

Beginning with Java 8 update 291, [TLS versions 1.0 and 1.1 are disabled by default](#). These older TLS versions have been deprecated and superseded by versions 1.2 and 1.3. NetAcquire server software version 7.x only supports older TLS versions.

6.4.1 How do I re-enable TLS1.0 and TLS1.1?

Contact NetAcquire Corporation technical support for information on how to modify your Java security settings to enable these older TLS versions.

Visit <https://netacquire.com/tech-support/>, or email support@netacquire.com.

7. Diagnostics

There are several ways to diagnose installation issues and in-system communications problems. This chapter provides an overview of some tools.

7.1 Client System Requirements

7.1.1 *Operating System Compatibility*

MissionView Display is compatible and tested with the following 64-bit operating systems.

- **Windows** 10 or higher
- **macOS** Sierra, High Sierra, Mojave
- **Linux** CentOS/Red Hat 6 and newer, Fedora 25 and newer

a) **Legacy Linux Distributions**

Some older distributions of Linux do not support web browser capabilities within MissionView Display and require an external browser instead.

7.1.2 *Java*

MissionView Display requires a Java 8 runtime environment. NetAcquire Corporation recommends any one of the following Java distributions.

- [Amazon Corretto 8](#)
- [Temurin 8](#)
- [Oracle Java 8](#)

For questions about Java distributions, please contact NetAcquire Corporation at [Technical Support](#) or email support@netacquire.com.

7.2 Installation

This section describes error conditions and messages that may occur during installation, upgrade, or uninstallation.

7.2.1 *Windows-Specific*

This section describes installation error conditions and messages specific to Windows.

"You must have administrator privileges to install this program"

- Right-click the installer and select "Run as administrator". If this does not open a UAC elevation prompt, Windows UAC settings may be preventing the automatic UAC elevation prompt. If this cannot be corrected through

the Windows control panel, log onto the machine directly as administrator and run the installer.

- Administrator privileges are required when installing the software for "All Users" or upgrading/uninstalling an installation created by an administrator.

Missing Shortcuts

In some cases, **Start** menu shortcuts may not get created properly until the current users logs out and back in again, or the machine is rebooted.

"This app can't run on your PC"

The PC is running a 32-bit version of Windows, but the installer is 64-bit only. Please contact NetAcquire Corporation technical support for information about 32-bit support.

7.2.2 Linux-Specific

This section describes installation error conditions and messages specific to Linux.

Legacy Linux Distributions

Some Linux distributions like CentOS 6 have legacy runtimes and security libraries that create limitations within MissionView Display. If the browsing capabilities are curtailed, MissionView Display will attempt to fall back to using the system's default browser.

If you receive an error dialog regarding browsing, you can test to see if MissionView Display has found an alternate by using the Open... menu; simply provide the address of a web page or intranet target. If MissionView Display successfully opens an external browser, you can thereafter prevent the initial error dialog from opening by adding a startup parameter.

You may also direct the MissionView Display application to use a specific browser by providing an executable path, for instance if MissionView Display cannot find an appropriate alternative. Within your MissionView Display installation directory (e.g., */opt/netacquire/missionview/Display/*) you may find the file *custom.vmoptions*. If this file does not exist, create a new file with this name and then populate it. See section 1 for details on specifying options that control browsing.

"ELF not found.

The architecture or bitness (32/64) of the bundled JVM might not match your machine."

```
Unpacking JRE ...
Preparing JRE ...
bin/unpack200: 1: bin/unpack200: ELF[1][1]: not found
bin/unpack200: 2: bin/unpack200: not found
bin/unpack200: 3: bin/unpack200: /lib64/ld-linux-x86-64.so.2
GNU[1]: not found
bin/unpack200: 8: bin/unpack200: Syntax error: ")" unexpected
Error unpacking jar files. The architecture or bitness (32/64)
of the bundled JVM might not match your machine.
```

- MissionView requires 64-bit Linux.

"Could not display the GUI. This application needs access to an X Server."

- Both the MissionView installer and MissionView products must run under an X window system such as KDE or GNOME.
- If the system is using the OpenJDK JRE, verify that the JRE includes graphical support. The installed package should be *java-1.8.0-openjdk* or *openjdk-8-jre*, and not just *java-1.8.0-openjdk-headless* or *openjdk-8-jre-headless*.
- If "`sudo sh MissionViewSetup.sh`" fails, try "`sudo -E sh MissionViewSetup.sh`". The `-E` option preserves the required X window environment variables in the *root* shell.
- Security settings may prevent the *root* user from running X applications. Run "`xhost +`" to disable X access control temporarily and then run the installer with "`sudo -E`". After installation is complete, restore X access control by running "`xhost -`".
- Run "`su`" to open an interactive *root* shell then run the installer.

7.3 MissionView Display

This section describes error conditions and messages that may occur when using MissionView Display.

7.3.1 All Operating Systems

Notification Icon

- Any time you see the notification icon at the bottom-right of the MissionView Display application, open **Messages** and check for problems.
- Problem entries will be styled with bold and colored font.

Application Log File(s)

- MissionView Display creates log files that capture the contents of **Messages**, more details about failures, and additional internal logging that can help with diagnostic efforts.
- The log files are written to a custom user directory (\$HOME\Documents\MissionView\logs). The file with the latest date is the relevant log file.
 - Example path:
c:\users\myname\Documents\MissionView\logs\missionview.v0.log
- When communicating problems to NetAcquire Corporation support, you may be asked for recent log files to aid in determining the problem.

Drawing Graphics Not Updating

- Right-click the problem graphical object to bring up the properties, then check for publication error icons. Additionally, check **Messages** for any problems.
- If the server is online, click the ellipsis button to open the publication list, then check for the presence of the publication.

nacmd command failed (exit code: -1): Auth fail



- Current user does not have Shell permissions on the connected server. See NA-MAN-001 for details regarding granting permissions.

User Name	View	Modify	Manage	FTP	Shell	Password
admin	<input checked="" type="checkbox"/>	Change...				
ftp	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Change...

"No suitable Java Virtual Machine could be found on your system.

The version of the JVM must be at least 1.8.

Please define INSTALL4J_JAVA_HOME to point to a suitable JVM."

- Run "java -version" to determine the default Java version. If the java command is not found or if the reported version is not 8, then install Java 8.
- On Linux, use the package manager (rpm, yum, dnf, or apt) to install the latest Java version from the software repository. The software repositories for older distributions, particularly those near end-of-life, might not support Java 8. If this is the case, use one of the methods described below.
- The latest installers for Windows, Linux, and macOS are available on java.com. Download the latest 1.8 micro-version for the appropriate platform/architecture.
- If the above methods are not feasible, then reinstall MissionView. If no compatible JRE is found, the installer will install a private JRE for use with MissionView.

Firewall blocks Display from accessing the network

- MissionView Display connects to the NetAcquire server on several well-known port numbers (80, 443, and 22) and a few uncommon port numbers (e.g., 3000 and 11112).
- To avoid connection problems, grant outgoing access to MissionView Display.

Display takes a long time (> 10 seconds) to start up

- MissionView Display may be checking for software updates on startup. If the connection to <http://updates.netacquire.com> is slow, the hostname cannot be resolved, or the server is unreachable, this can cause a noticeable delay on startup.
- If the connection problem cannot be resolved, then disable automatic update checks by running the update utility. See section 3.5.

"Unable to get the local host address. Name or service not known."

- The default host name of the machine must resolve to an IP address. If MissionView Display cannot resolve the default host name, the above error appears on start up. Normally, host names are automatically

configured through DHCP. If this is not happening, a static host file entry can be used to work around the issue.

- Use the "hostname" command to determine the default host name (e.g., myHostName), then edit "/etc/hosts" (Linux or macOS) or "c:\windows\system32\drivers\etc\hosts" (Windows) and add or modify the following entry:

```
# loopback address entry
127.0.0.1 localhost myHostName
```

Cannot connect to server or load applets

- Secure mode might be enabled (login required) and the NetAcquire server version might be older than 8.3.4.
- Verify that the firewall is not blocking MissionView Display. Add an exception rule if necessary.

"The JVM could not be started. The maximum heap size (-Xmx) might be too large or an antivirus or firewall tool could block the execution."

"java.lang.UnsatisfiedLinkError: could not load i4inst from <path>"

The security (virus) scanner may have quarantined or removed some installation files. Check the security scanner's log or quarantine area for MissionView files. If files have been quarantined, add them to the scanner's whitelist, submit the files to the security vendor for analysis, then either restore the files or reinstall MissionView.

7.3.2 Windows Specific

This section describes MissionView Display error conditions and messages specific to Windows.

Long delays starting MissionView Display or when adding a live server

- MissionView Display performs reverse name lookup operations on the server list to ensure uniqueness of each server in the list. This lookup can take a long time if they fail (either due to Windows NetBIOS failures or other network misconfigurations). Ensure that name lookups work correctly by observing no delays when running the following Windows command from a command prompt:

```
nbtstat -A <server-ip-address>
```
- If delays occur in the previously run command then disable NetBIOS over TCP/IP in the Windows network configuration.

"LoadLibrary failed with error 87: The parameter is incorrect."

- This error occurs on certain graphical display configurations.
- Add the following line to the *custom.vmoptions* file (section 6.3.2):
-Dsun.java2d.d3d=true

7.3.3 Linux-Specific

This section describes MissionView Display error conditions and messages specific to Linux.

Application does not launch and no error dialogs appear

- MissionView Display can be launched from “*MissionView Display*” application menu shortcuts; however, if the application does not launch, try running the executable from a shell prompt to see console messages. The messages may describe the problem.
- To run MissionView Display from a shell, use the *MissionView Display* symbolic links, or run the launch scripts directly from the installation directory:

```
/opt/netacquire/missionview/Display/MissionViewDisplay
```

Failure to communicate via HTTPS

“Identity store configuration for 'nssSecmodDirectory' /<user>/.pki/nssdb is invalid” or,

“Failed to configure HTTPS (SSL/TLS): java.security.ProviderException: Could not initialize NSS”

- The NSS database either does not exist at the indicated path or has some other issue being opened.
- If your NSS database is stored somewhere else, please contact NetAcquire Corporation for further steps, otherwise you may follow these steps to correct the NSS database.
- Case 1: folder does not exist: /<user>/.pki/nssdb
 - Open bash shell

```
cd ~
touch .pki/nssdb/secmod.db
certutil -N -d sql:.pki/nssdb
```

- Case 2: folder exists: /<user>/.pki/nssdb.
 - **Warning:** these steps will replace your existing NSS database
 - Open bash shell

```
cd ~
rm -rf .pki/nssdb
mkdir -p .pki/nssdb
touch .pki/nssdb/secmod.db
certutil -N -d sql:.pki/nssdb
```

Web page and MissionView Manual windows are blank

"ERROR:sandbox_linux.cc(344)] InitializeSandbox() called with multiple threads in process gpu-process."

- Both the MissionView User Manual (Help menu) and Web Page (Open menu) functions use the Chromium browser engine to display content. Chromium is incompatible with some video cards/drivers.
- Run MissionView Display from a shell window to see console messages associated with the blank windows.
- Try opening a second instance of the window, leaving the initial blank window open in the background. The second window may open correctly in some cases.
- The other alternative is to use an external browser to view web content.

"Browser Load Failed:

/home/devuser/.missionview/.jxbrowser/libbrowsercore-common64.so: /lib/x86_64-linux-gnu/libc.so.6: version `GLIBC_2.14' not found (required by /home/devuser/.missionview/.jxbrowser/libbrowsercore-common64.so)"

- The GNU C runtime library on the system is too old. Minimum required version is 2.14. See section 7.2.2 .
- See the [JxBrowser System Requirements](#) page for a list of supported Linux distributions and versions.

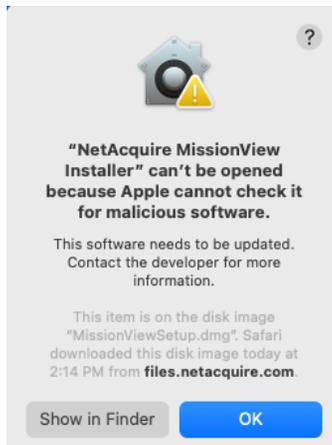
“Browser Load Failed:

Missing dependencies have been detected. Check the log for details.”

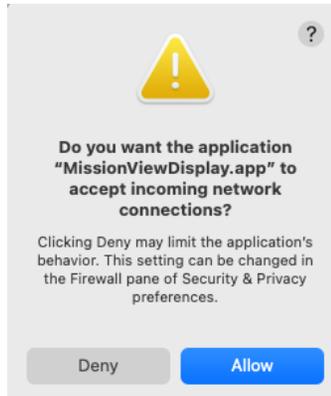
- Run MissionView Display from a shell window to see console messages associated with the failed browser load. The messages should include a list of missing dependencies (.so shared libraries).
- Install the packages associated with the missing libraries. For example, if the missing dependency is *libXss.so*, run “sudo yum install libXScrnSaver” on Fedora/RHEL/CentOS.

7.3.4 macOS-Specific

MissionView Display is offered as a stand-alone application and is not signed with any Apple Store certifying authority. On install you may encounter a warning. To bypass this warning, you can run the installer a second time or [see Apple’s website for more details](#).



When starting MisisonView Display, you may also need to permit the application to accept incoming connections. This warning also occurs due to Apple Store signing.



a) **Temurin Java**

Temurin 8 experiences issues accessing the macOS KeyChain, leading to failures communicating via HTTPS.

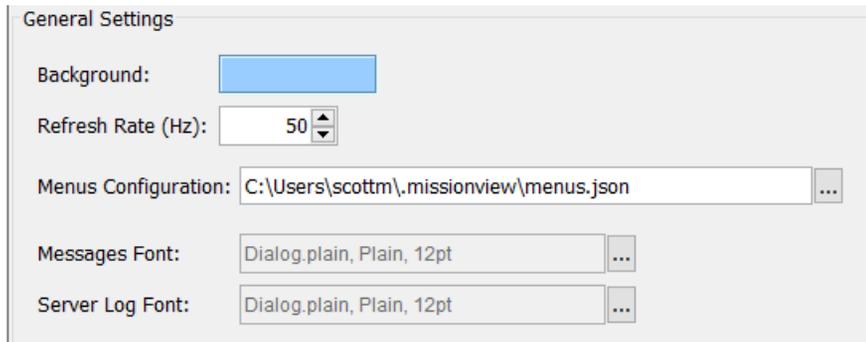
8. Other Topics

8.1 Port Use

Port	Protocol	Description
22	SSH/SFTP	Used when <i>Encryption and Authentication</i> is enabled on NetAcquire servers ⁷
80	HTTP	HTTP port (if permitted by security settings)
443	HTTPS	HTTPS port
3000	NAIO	Streaming data (if NetAcquire server is not using <i>Encryption and Authentication</i> , if permitted by security settings)
5353	mDNS	Server Discovery (if permitted by security settings)
11112	CORBA	CORBA (if NetAcquire server is not using <i>Encryption and Authentication</i> , if permitted by security settings)

8.2 Menu Customization

MissionView Display users may customize the organization of the **Servers** and **Open Windows** menus by providing a customization information in the form of a JSON file. To configure the file location, use the **General** tab of the **Global Settings** dialog.



⁷ The relevant setting on server versions prior to 9.0 is *Encrypt API*

8.2.1 File Format

The file must adhere to JavaScript Object Notation (JSON) syntax. The following links contain details about JSON.

- <https://www.json.org/>
- [ECMA-404 JSON data interchange syntax](#)

The file can contain arbitrarily named JSON Objects to indicate the submenu(s) with one of two options at the final submenu level.

- Value “regex” with array of regular expressions (not case sensitive)
- Array of literals (case sensitive)

Regular expressions follow Java pattern rules, <https://docs.oracle.com/javase/8/docs/api/java/util/regex/Pattern.html> but must be specified in valid JSON. *E.g.*, a backslash must be double specified.

These values will be checked against the following information from any server.

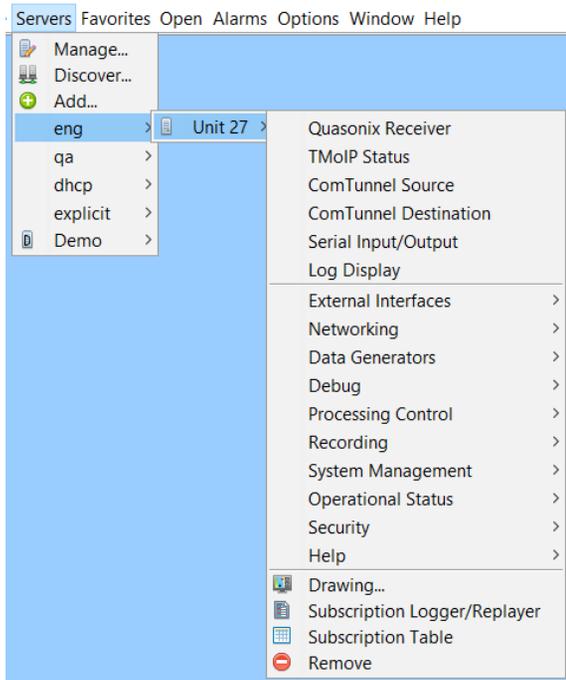
- User-entered hostname
- IP address
- DNS name

Example:

```
{
  "eng": {
    "regex": [
      "eng.*"
    ]
  },
  "qa": {
    "regex": [
      "qa.*"
    ]
  },
  "dhcp": {
    "regex": [
      "172\\..*"
    ]
  },
  "explicit": [
    "192.168.30.141"
  ]
}
```

In this example, any server with information that starts with “eng” will be placed into the **eng** submenu. The **dhcp** regular expression specifies that any value starting with “172.” Will be placed in the **dhcp** submenu. The **explicit** value uses an array of literals that must match exactly.

The result:



8.3 Performance Optimization

8.3.1 Drawing Performance

Drawings containing graphical objects that have historical data can create performance issues within MissionView Display if not configured reasonably or properly.

a) Charts

Combining large chart spans (displayed time) with large buffer sizes can lead to long recalculation times to display the chart based on the large volume of data points.

While there is no hard and fast rule for what values to use, NetAcquire Corporation recommends trying to balance reasonable values if performance issues arise. For example, setting the buffer to ten million and trying to display the entire buffer as it updates with new values could result in problematic performance.

Some auto-scaling configurations (e.g., in particular “Scale Visible”) can be very CPU intensive. Specific performance is determined by data sample(s)/plot(s)

update frequency, buffer size, drawing refresh rate, *etcetera*. If performance sufficiently degrades MissionView will display a warning message about its inability to continue drawing with the current rate of incoming data. Turning off auto-scaling will typically help with a return to nominal performance.

8.3.2 Refresh Rate (Hz)

MissionView Display has global settings for refresh rate. These settings relate only to how fast displays are repainted for visuals such as drawings, tables, *etc*. This setting does **not** affect internal processing of data updates. Regardless of this setting, MissionView Display will receive all data at full speed.

The default setting of 20Hz provides a rate pleasant to the human eye as normal animation. If the PC is very fast or a quicker response in painting is desired, set the value higher.

8.3.3 Overflow Notifications

MissionView Display monitors data input and utilization rates. If the MissionView Display application finds itself falling behind the rate of input, notifications will appear in **Messages**. These messages may appear in extreme-rate situations. If you see these messages appear, data loss may occur.

8.3.4 Subscription Logger

Logging of extreme-rate publications requires special consideration.

Note that, if the PC running MissionView Display is older or does not have much memory, trying to log more than one million updates per second might not be reasonable. This section assumes a capable PC.

a) Log File Formatting

Formatting floating-point values into text uses extra processing resources, and MissionView Display offers a high-performance formatting option described in the Logger section (4.5.2). When logging floating point values at high data rates, use this high-performance formatting option with a reasonable setting for precision.

b) Byte Arrays

Logging larger byte arrays or strings can require additional overhead, and so take care when logging these in extreme-rate situations.

8.3.5 Data Flow Publishers

a) Using Publisher's Timestamp Source

Beginning with NetAcquire server software version 8.4.0, publishers include a new setting called Timestamp Source that offers higher accuracy time tagging.

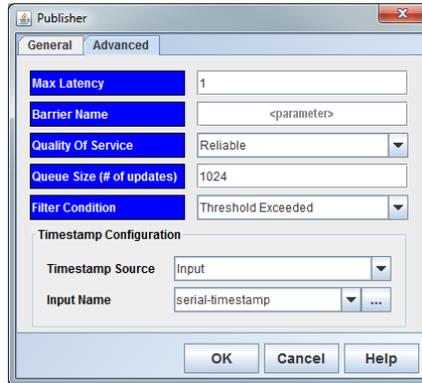


Figure 75—Data Flow Publisher Timestamp Configuration

This setting accepts a parameter that is typically a hardware-derived timestamp value. For example, this timestamp is typically supplied as a decommutator output (which is turn is received by the decommutator from the serial channel's pull reader).

NetAcquire Corporation recommends using this feature in order to provide more accurate time tags to network clients such as MissionView Display. The default if this is not done is that a publisher will use current system time at the point in time when the publication is sent to the client.

b) Multi-Publisher Timestamping and Ordering

Each data flow publisher operates **independently** and **asynchronously**. Data updates that flow out of a single publisher will be published with timestamps in ascending order.

Partitioning data across publishers helps create namespace organization (via domains), but this can also create complications. For instance, assume a packet of data is decommutated and half of its data is routed to publisher **A** and half to publisher **B**. For instance, this example shows two separate publishers **A** and **B**.

Publisher
Map Name = telemetry
QoS = Reliable
Domain = Tlm
Timestamp = serial-timestamp
Max Latency = 1

Publisher
Map Name = avionics
QoS = Reliable
Domain = Av
Timestamp = serial-timestamp
Max Latency = 1

While the client will receive properly timestamped updates, these publishers operate asynchronously of one another, which means that ordering of updates may be out-of-sequence when they reach the client.

For most cases where MissionView is displaying or graphing data, this out-of-order situation does not matter. When logging, however, the resulting log file may have lines with timestamps transition backwards and forwards in time when publisher mingling occurs.

c) **Multi-Publisher Logging/Replay**

Logger indicates out-of-sequence timestamps as an information message. The resulting log files are still perfectly accurate. Replayer, however, drops out-of-order data during playback.

8.4 Restrictions

Certain features and (re)configuration scenarios are not supported within MissionView Display.

8.4.1 *MissionView 1.9.0 Drawing Versions*

Drawings saved in MissionView Designer or Display version 1.9.0 are not compatible with any MissionView version prior to v1.9.0.

8.4.2 *Offline Server Behavior*

NetAcquire server versions 7.5.10 and earlier exhibit problems with MissionView Display's offline server handling of closing applets to the server. Server versions 7.5.10 and earlier applet pages will display server state dialogs when a server goes offline.

8.4.3 *Old Windows Themes*

Old-style Windows themes such as Windows Classic may cause display issues.

8.4.4 *Dynamic Status Page*

NetAcquire server versions prior to 7.4 exhibit loading problems with the dynamic status page. Only portions of the page initialize.

8.4.5 *Subscription Replayer*

Replayer uses time-based operations, expecting a forward-moving sequence of timestamps. Replayer will drop any out-of-sequence timestamps and no updates associated with out-of-sequence times will occur.

9. Limited Warranty

This product is warranted against defects in materials and workmanship for one year from the date of shipment from NetAcquire Corporation. If the product is not in good working order, Purchaser should notify NetAcquire Corporation or its authorized representative immediately. NetAcquire Corporation will repair or replace, at its sole option, any product found to be defective during the Warranty period.

NetAcquire Corporation and its suppliers' entire liability and your exclusive remedy shall be, at NetAcquire Corporation's option, either (a) return of price paid, or (b) repair or replacement of the Product that does not meet NetAcquire Corporation's limited warranty. This limited warranty does not include service to repair damage resulting from accident, disaster, misuse, or modification by parties other than NetAcquire Corporation or its authorized representative. The postage, insurance, and shipping costs incurred in presenting or shipping the Product for service are the responsibility of the Purchaser. Input and output buffers are excluded from this limited warranty.

NetAcquire Corporation reserves the right to make changes in the hardware and software specifications identified in the Product documentation without notice.

EXCEPT TO THE EXTENT PROHIBITED BY APPLICABLE LAW, NO OTHER WARRANTIES, WHETHER EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, SHALL APPLY TO THIS PRODUCT. THE PRODUCT IS SOLD "AS IS". UNDER NO CIRCUMSTANCES SHALL NETACQUIRE CORPORATION BE LIABLE FOR CONSEQUENTIAL DAMAGES SUSTAINED IN CONNECTION WITH SAID PRODUCT AND NEITHER ASSUMES NOR AUTHORIZES ANY REPRESENTATIVE OR OTHER PERSON TO ASSUME FOR IT ANY OBLIGATION OR LIABILITY OTHER THAN SUCH AS IS EXPRESSLY SET FORTH HEREIN.

YOU ARE RESPONSIBLE FOR DETERMINING WHETHER A BACKUP SYSTEM IS NECESSARY. IF A BACKUP SYSTEM IS NECESSARY YOU ARE RESPONSIBLE FOR PROVIDING THE BACKUP SYSTEM.

Before returning this product, you must receive a Return Material Authorization (RMA). Returned product will not be accepted without this authorization. Unit must be shipped prepaid in its original container. If non-permanent modifications have been made to the unit, restore it completely to its original operating configuration. Permanent modification will void the Warranty. Warranty field service is available on an emergency basis. Travel expenses (travel time, per diem expense, and related airfare) are the responsibility of the purchaser.