

Using HiWayVU

Section A Startup and General Operation

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SmarTek Systems®

410-315-9727

sales@smarteksys.com

www.smarteksys.com

HiWayVU Version 10.5.4 Documentation List

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sales@smarteksys.com
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HiWayVU Significant Features

This document is one of several that describe the setup and operation of SmarTek Systems' HiWayVU Version 10.1.1 software. HiWayVU runs on Windows XP and Windows 7 (32 bit) and is used to collect and display highway traffic information from SmarTek Systems' SAS-1 multi-lane traffic sensor. The following major features are included in HiWayVU Version 10.1.1.

- 1) HiWayVU can collect and display data from up to 250 remote traffic monitoring stations. Each station is comprised of one or two SAS-1 sensors covering up to 10 traffic lanes and one Cabinet Watchdog (CWD) monitoring up to 4 voltages. While the "designed in" maximum number of station is 250, the actual maximum number with acceptable performance is dependent on the host computer capability (CPU speed and Memory).
- 2) HiWayVU communicates with each remote traffic station via TCP/IP network protocol using sockets. Each remote station has a specified IP address and port number.
- 3) HiWayVU can be set to monitor and log performance statistics around the clock. The two main measures of performance are 1) Connectivity measured as Percentage of Time Connected (i.e. Online % reported each hour) and 2) SAS-1 Poll Response Performance measured as Percentage of Responses compared to total number of times polled.
- 4) HiWayVU can be set to monitor and log around the clock all network socket events for all remote traffic station socket connections.
- 5) HiWayVU automatically tries to maintain socket connections for each remote traffic station. That is, if a socket connection breaks (common with wireless internet links using CDMA modems), HiWayVU detects the break and automatically tries to reconnect. Status of each network socket connection and data transfer is shown in a dedicated Network Connections Display using a "Green Board" approach to the display (i.e connected sockets status shows green, while disconnects and reconnect tries show yellow).
- 6) HiWayVU can be setup to operate using multiple instances (data collectors and data displays) sharing data on a common computer or across a local area network.
- 7) HiWayVU can be set to display jpg camera images that may be available from sources other than through the socket connection to the remote cabinet. Images to be displayed must conform to size requirements (320 x 240 pixels, jpg).

This descriptions of setup and operation assume that HiWayVU starts with a minimal parameter file template (at least one site) and a minimal set of area maps (at least one). These are supplied by SmarTek Systems. HiWayVU allows for easy addition of sites (up to 250) and maps (up to 20). The procedure for adding sites and maps is described in Section B.



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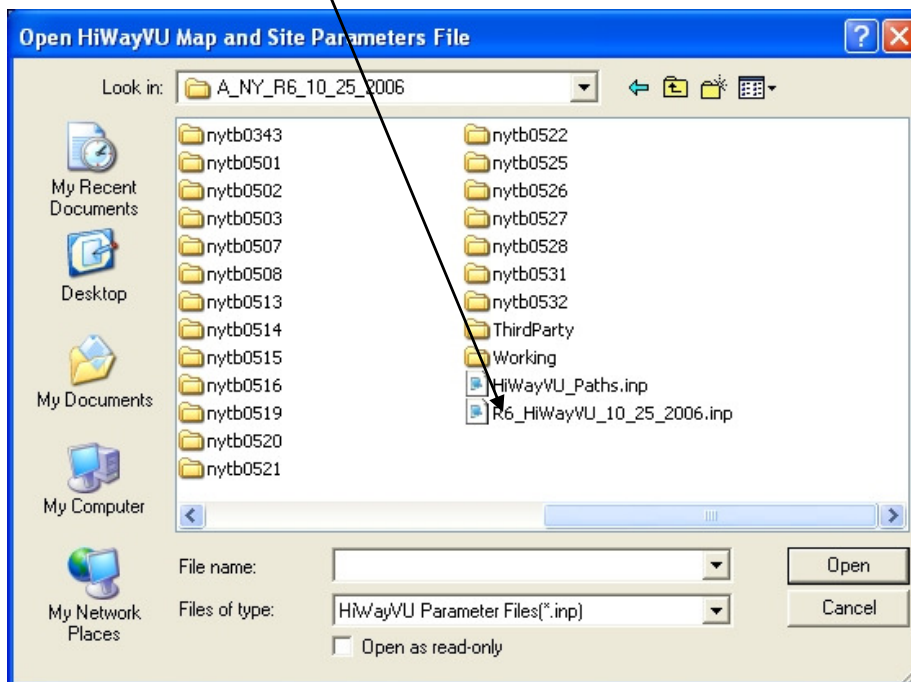
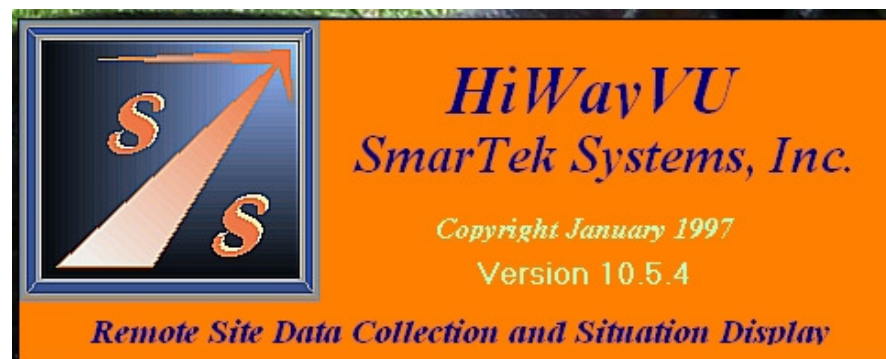
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HiWayVU Startup and Parameter Selection

Start HiWayVU like any other Windows application from the Start menu or the Desktop. The HiWayVU version 10.1.1 splash window appears and after a couple of seconds a windows File Open dialog window appears. Navigate to the folder which holds the HiWayVU project files and folders. Click on the parameter file (.inp) to select it and then click Open.



Note: The HiWayVU_Paths.inp is not a parameter file.

After HiWayVU has been run for the first time and site parameters have been set, the project folder will contain a subfolder for each sensor site in HiWayVU (named using each site number, i.e. nytb0532). Each of these subfolders is used to contain any uploaded SAS-1 archive files (.ahx) and associated Header files (.hdr) used separately for archive decoding and conversion. The project folder may also contain the Working, Download, and ThirdParty subfolders (default names) depending on setup selections by the previous user. (Folder path selection will be described in the following pages).



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HiWayVU Folder Paths Setup – One Instance Default Paths

After selecting HiWayVU parameters, the Paths Setup window will appear automatically the first time HiWayVU is run or if the HiWayVU_Paths.inp file is not found in the HiWayVU project folder. Use this setup window to specify the Work, Target Download, and the ThirdParty subfolders for HiWayVU operation. After setup, these paths and subfolders are kept in the HiWayVU_Paths.inp file.

The Work subfolder is where HiWayVU “looks” to get data and image files for updating map icon status and site traffic data and camera image displays.

The Target Download subfolder is where HiWayVU puts sensor data files and camera image files obtained from each remote traffic cabinet.

The Third Party subfolder is where HiWayVU puts data and image files copied from the Target Download subfolder. This folder is used to make data and image files available for third party use.



For a single instance of HiWayVU operating as both the “Data Collector” and the “Traffic Information Display”, the Work subfolder and the Target Download subfolder should be set to the same location. For the Paths Setup window above, the Work and Target Download subfolder are both set to “Working”. The Third Party subfolder is set to “ThirdParty”. After clicking OK, the paths and subfolders are created if they don’t already exist, the HiWayVU_Paths.inp file is created or updated in the project folder, and HiWayVU’s Main display window is opened.

The paths Setup window can be opened to change the path and/or folder names by clicking the Files/Setup Data and Image Folders menu item in HiWayVU’s Main display.



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HiWayVU Main Display

Clickable Color Coded Site Icons

The screenshot shows the HiWayVU software interface. On the left is a map of a road network with several color-coded site icons. On the right is a detailed data panel for a selected site (HH Site 1-502). The data panel includes a camera image, socket status, traffic data file time, SAS-1 message times, traffic data readout, cabinet watchdog data, cabinet voltage readout, map selection buttons, and latitude/longitude readout.

JPG Image Display

TCP/IP Socket Status

Traffic Data File Time

SAS-1 Message Times

Traffic Data Readout

CWD Message Time

Cabinet Voltage Readout

Map Selection Buttons

Latitude/Longitude Readout

The HiWayVU Main Display is a map based situation display with color coded icons for display and alerting of traffic and/or cabinet voltage situations. Left Clicking an icon will select the site for detailed traffic data display, cabinet voltages, and jpg camera images if available. HiWayVU can use up to 20 maps for coverage of different areas and different levels of detail. Additional sections will describe parameter setup procedures for each site and will describe how to add additional maps and site icons as needed. To begin HiWayVU data collection and display, open the Network Connection Display by clicking the Network/NetworkConnections Display menu item. Note that once all HiWayVU parameters and site parameters are set for operation, HiWayVU startup can be set to bypass the parameter file selection and to start data collection and display automatically. This will be described later in this section.



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HiWayVU Network Connections Display

SmarTek Systems Network Connections Situation Display 4/26/2011 3:52:17 PM

Site Number	Site Name	Mess Lgth	Activity Time	EOR Time	Connect	Status	Command Sent	On Line %
Site # 0501	HH Site 1-501				Connect	..Socket Closed		
Site # 0503	HH Site 1-503				Connect	..Socket Closed		
Site # 0507	HH Site 2-507				Connect	..Socket Closed		
Site # 0508	HH Site 2-508				Connect	..Socket Closed		
Site # 0513	HH Site 3-513				Connect	..Socket Closed		
Site # 0515	HH Site 3-515				Connect	..Socket Closed		
Site # 0516	HH Site 3-516				Connect	..Socket Closed		
Site # 0519	HH Site 4-519				Connect	..Socket Closed		
Site # 0521	HH Site 4-521				Connect	..Socket Closed		
Site # 0522	HH Site 4-522				Connect	..Socket Closed		
Site # 0525	HH Site 5-525				Connect	..Socket Closed		
Site # 0526	HH Site 5-526				Connect	..Socket Closed		
Site # 0527	HH Site 5-527				Connect	..Socket Closed		
Site # 0528	HH Site 5-528				Connect	..Socket Closed		
Site # 0531	HH Site 6-531				Connect	..Socket Closed		
Site # 0532	HH Site 6-532				Connect	..Socket Closed		

Errors/Actions Log-Off | SAS/CWD Message Log-Off | SAS IDs Log-Off | Save Image | Enable Audible Alert | Acknowledge Alert | Connect All | Close

Connect
Disconnect
Button

All Sites with a valid IP Address and Set to Try to Connect are listed in the Network Connections Window. Each row (site) shows “Connect” or “Disconnect” in the Connect column. To open or close the network socket connection between HiWayVU and each site, click the Connect/Disconnect field in the Connect column or just click the Connect All or the Disconnect All button in the lower right area of the window. The Connect All button changes to the Disconnect All button when clicked.



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HiWayVU Network Connections Display

SmarterTek Systems Network Connections Situation Display 4/26/2011 1:00:16 PM

Site Number	Site Name	Mess Lgth	Activity Time	EOR Time	Connect	Status	Command Sent	On Line %
Site # 0501	HH Site 1-501	139	12:59:50 PM		Disconnect	2. Socket Connected	{(SAS0000,FLOW=L,"}	100.0
Site # 0503	HH Site 1-503	0			Disconnect	2. Socket Connected	{(SAS0000,FLOW=L,"}	100.0
Site # 0507	HH Site 2-507				Disconnect	5. Socket Error..21060..Connection timed out	Will Try to Reconnect	0.0
Site # 0508	HH Site 2-508	0			Disconnect	2. Socket Connected	{(SAS0000,FLOW=L,"}	100.0
Site # 0513	HH Site 3-513				Disconnect	5. Socket Error..21060..Connection timed out	Will Try to Reconnect	0.0
Site # 0515	HH Site 3-515				Disconnect	5. Socket Error..21060..Connection timed out	Will Try to Reconnect	0.0
Site # 0516	HH Site 3-516				Disconnect	5. Socket Error..21060..Connection timed out	Will Try to Reconnect	0.0
Site # 0519	HH Site 4-519				Disconnect	5. Socket Error..21060..Connection timed out	Will Try to Reconnect	0.0
Site # 0521	HH Site 4-521				Disconnect	5. Socket Error..21060..Connection timed out	Will Try to Reconnect	0.0
Site # 0522	HH Site 4-522				Disconnect	5. Socket Error..21060..Connection timed out	Will Try to Reconnect	0.0
Site # 0525	HH Site 5-525				Disconnect	5. Socket Error..21060..Connection timed out	Will Try to Reconnect	0.0
Site # 0526	HH Site 5-526				Disconnect	5. Socket Error..21060..Connection timed out	Will Try to Reconnect	0.0
Site # 0527	HH Site 5-527				Disconnect	5. Socket Error..21060..Connection timed out	Will Try to Reconnect	0.0
Site # 0528	HH Site 5-528				Disconnect	4. Socket Connecting		0.0
Site # 0531	HH Site 6-531				Disconnect	4. Socket Connecting		0.0
Site # 0532	HH Site 6-532				Disconnect	4. Socket Connecting		0.0

Errors/Actions Log-Off SAS/CWD Message Log-Off SAS IDs Log-Off Save Image Enable Audible Alert Acknowledge Alert Disconnect All Close

After clicking the Connect All button, it changes to the Disconnect All button. HiWayVU begins to make a network socket connection to each IP Connect enabled site. Each successful socket connection is indicated with green color and status text in the Status column. Data transfer will begin in a few seconds. Unsuccessful socket connections and disconnected sockets are indicated with yellow color and status text in the Status column.



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sales@smarterksys.com

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HiWayVU Network Connections Display

Site Number	Site Name	Mess Lgth	Activity Time	EOR Time	Connect	Status	Command Sent	On Line %
Site # 0501	HH Site 1-501	139	12:59:50 PM		Disconnect	2..Socket Connected	{SAS0000,FLOW=1,,"}	100.0
Site # 0503	HH Site 1-503	0			Disconnect	2..Socket Connected	{SAS0000,FLOW=1,,"}	100.0
Site # 0507	HH Site 2-507				Disconnect	5..Socket Error..21060..Connection timed out	Will Try to Reconnect	0.0
Site # 0508	HH Site 2-508	0			Disconnect	2..Socket Connected	{SAS0000,FLOW=1,,"}	100.0
Site # 0513	HH Site 3-513				Disconnect	5..Socket Error..21060..Connection timed out	Will Try to Reconnect	0.0
Site # 0515	HH Site 3-515				Disconnect	5..Socket Error..21060..Connection timed out	Will Try to Reconnect	0.0
Site # 0516	HH Site 3-516				Disconnect	5..Socket Error..21060..Connection timed out	Will Try to Reconnect	0.0
Site # 0519	HH Site 4-519				Disconnect	5..Socket Error..21060..Connection timed out	Will Try to Reconnect	0.0
Site # 0521	HH Site 4-521				Disconnect	5..Socket Error..21060..Connection timed out	Will Try to Reconnect	0.0
Site # 0522	HH Site 4-522				Disconnect	5..Socket Error..21060..Connection timed out	Will Try to Reconnect	0.0
Site # 0525	HH Site 5-525				Disconnect	5..Socket Error..21060..Connection timed out	Will Try to Reconnect	0.0
Site # 0526	HH Site 5-526				Disconnect	5..Socket Error..21060..Connection timed out	Will Try to Reconnect	0.0
Site # 0527	HH Site 5-527				Disconnect	5..Socket Error..21060..Connection timed out	Will Try to Reconnect	0.0
Site # 0528	HH Site 5-528				Disconnect	4..Socket Connecting		0.0
Site # 0531	HH Site 6-531				Disconnect	4..Socket Connecting		0.0
Site # 0532	HH Site 6-532				Disconnect	4..Socket Connecting		0.0

For successful socket connections, the data transfer activity (bytes) is shown in the Message Length Column (Mess Lgth) and the Activity Time column. The fields in these columns should show constant activity. HiWayVU automatically tries to reconnect disconnected sockets approximately every 25 seconds. Additional connection actions and command sent information is shown in the Command Sent column. To indicate a broken or unsuccessful socket connection, the HiWayVU Connections Window Icon will alternate between the normal Red/Blue color and Red/Yellow color. Acknowledge the error condition by clicking the Acknowledge button.



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HiWayVU Network Connections Display

Site Number	Site Name	Mess Lgth	Activity Time	EOR Time	Connect	Status	Command Sent	On Line %
Site # 0501	HH Site 1-501	139	12:59:50 PM		Disconnect	2..Socket Connected	{SAS0000.FLOW=1,}	100.0
Site # 0503	HH Site 1-503	0			Disconnect	2..Socket Connected	{SAS0000.FLOW=1,}	100.0
Site # 0507	HH Site 2-507				Disconnect	5..Socket Error..21060..Connection timed out	Will Try to Reconnect	0.0
Site # 0508	HH Site 2-508	0			Disconnect	2..Socket Connected	{SAS0000.FLOW=1,}	100.0
Site # 0513	HH Site 3-513				Disconnect	5..Socket Error..21060..Connection timed out	Will Try to Reconnect	0.0
Site # 0515	HH Site 3-515				Disconnect	5..Socket Error..21060..Connection timed out	Will Try to Reconnect	0.0
Site # 0516	HH Site 3-516				Disconnect	5..Socket Error..21060..Connection timed out	Will Try to Reconnect	0.0
Site # 0519	HH Site 4-519				Disconnect	5..Socket Error..21060..Connection timed out	Will Try to Reconnect	0.0
Site # 0521	HH Site 4-521				Disconnect	5..Socket Error..21060..Connection timed out	Will Try to Reconnect	0.0
Site # 0522	HH Site 4-522				Disconnect	5..Socket Error..21060..Connection timed out	Will Try to Reconnect	0.0
Site # 0525	HH Site 5-525				Disconnect	5..Socket Error..21060..Connection timed out	Will Try to Reconnect	0.0
Site # 0526	HH Site 5-526				Disconnect	5..Socket Error..21060..Connection timed out	Will Try to Reconnect	0.0
Site # 0527	HH Site 5-527				Disconnect	5..Socket Error..21060..Connection timed out	Will Try to Reconnect	0.0
Site # 0528	HH Site 5-528				Disconnect	4..Socket Connecting		0.0
Site # 0531	HH Site 6-531				Disconnect	4..Socket Connecting		0.0
Site # 0532	HH Site 6-532				Disconnect	4..Socket Connecting		0.0

Logging Status Indicators – On or Off

Errors/Actions Log-Off SAS/CWD Message Log-Off SAS IDs Log-Off Save Image Enable Audible Alert Acknowledge Alert Disconnect All Close

During operation of HiWayVU, SAS-1/CWD Message Logging and Errors/Actions Logging can be enabled by clicking any of the following menu items in the File menu:

- Log All Connection Errors/Actions (Default is Disabled)
- Log All SAS-1/CWD Messages (Default is Disabled)
- Enable Online Percentage Stats File (Default is Enabled)
- Log All SAS-1 Received Message IDs (Default is Disabled)

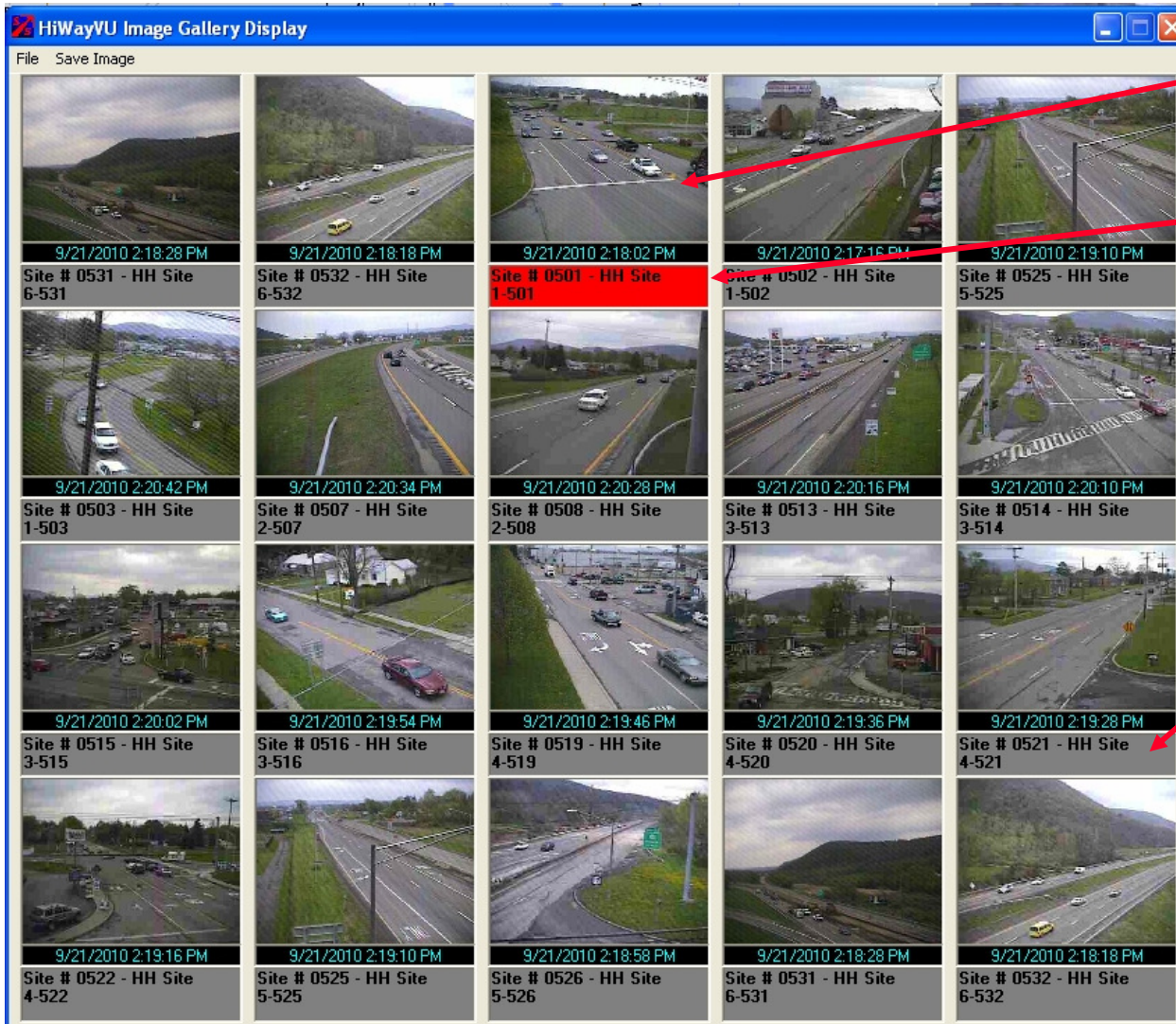
Additional sections of this document will describe in detail how to use, process, and interpret the log files listed above.



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HiWayVU Image Gallery Display



Click in the image field to select site for traffic data display in HiWayVU Main Display

Site alerts are shown in Image Gallery using same color coding as used for map icons.

Click in upper/lower part of the site description field to move up/down through sites to set image/site for display

The Image Gallery can display up to 20 selectable site images with corresponding site icon status color codes. To display the Image Gallery click the Settings/Show Image Gallery menu item in the HiWayVU Main Display. The Image Gallery checks every 2 seconds for new image files. After setting up the image/site allocation for each display frame in the gallery, save the allocation by clicking the File/Save Image Allocation menu item.



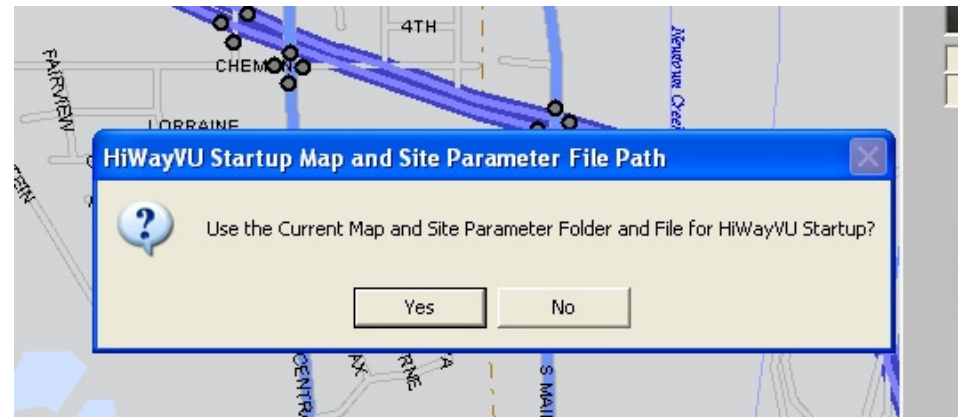
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Setting HiWayVU to Bypass Parameter Selection



Once HiWayVU has been configured for operation, startup can be set to bypass the parameter file selection and start data collection and display automatically. On the HiWayVU Main display select the File/Set Start Up Parameter Path menu item. The user will then be asked whether to use the current parameter folder path or not. Answering Yes will set the start up parameter file path and the next time HiWayVU runs there will be no need to select the parameter folder or file.



To remove the parameter file start up path from HiWayVU, repeat the above procedure and answer No to the question.



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