FDOT

Technical Memorandum

SunGuide® Software System

Independent Validation and Verification Test Procedures for SunGuide Video Wall Subsystem and Driver

Version 5.0

July 01, 2015

Prepared for:

Florida Department of Transportation
Intelligent Transportation Systems Program
605 Suwannee Street, M.S. 90
Tallahassee, Florida 32399-0450

DOCUMENT CONTROL PANEL		
File Name:	*110209_Jupiter_Driver_Test_Procedure_v4.docx*	
File Location:	http://cosharepoint.dot.state.fl.us/sites/trafficoperations/its/software/Document Library/Testing/Jupiter Canvas 2015/IVV for Video Wall Subsystem and Driver.docx	
Version Number:	5.0	
	Name	**Date**
Created By:	Khue Ngo, PBS&J	11/30/2010
	Derek Vollmer, PBS&J	1/17/2011
	Clay Packard, PBS&J	1/20/2011
Reviewed By:	Vernell Johnson, PBS&J	1/21/2011
	Ron Meyer, PBS&J	1/21/2011
	Clay Packard, PBS&J	1/24/2011
	Ron Meyer, PBS&J	1/24/2011
	Derek Vollmer, PBS&J	2/9/2011
	Clay Packard, Atkins	4/16/2015
Modified By:	Clay Packard, PBS&J	1/21/2011
	Derek Vollmer, PBS&J	1/21/2011
	Ron Meyer, PBS&J	1/24/2011
	Karen England, PBS&J	1/25/2011
	Clay Packard, PBS&J	2/9/2011
	Philip Blaiklock, Atkins	4/15/2015
	Clay Packard, Atkins	4/16/2015
	Philip Blaiklock, Atkins	5/6/2015
	Philip Blaiklock, Atkins	6/5/2015
Completed By:	Kelli Moser, Atkins	7/8/2015

Table of Contents

List of Acronyms and Abbreviations

CRS.. Conference Room System
DMS ....Dynamic Message Sign
FDOT ....Florida Department of Transportation
GUI...Graphical User Interface
ICD ....Interface Control Document
IP...Internet Protocol
ITS.. Intelligent Transportation Systems
IV&V .... Independent Validation and Verification
SG .... SunGuide
SIM..Simulator
SQL... Structured Query Language
SwRI.. Southwest Research Institute®
TERL... Traffic Engineering Research Laboratory
TMC ....Transportation Management Center
UI..User Interface
URL...Uniform Resource Locator
VDD.. Version Description Document
XML.. Extensible Markup Language

1. Purpose

The objective of this test is to verify the correct operation of the Jupiter video wall GUI, subsystem and driver with the Jupiter Canvass Video Wall controllers and display output. The SunGuide Software Jupiter Canvass Video Wall Driver hotfix will be installed on SunGuide software versions 6.0 Patch 3 and an unreleased version 6.1.0.742 IV&V build, using both Oracle and SQL Server database products.

2. Summary of Results

First pass of testing (version 4.0 of this document)

The SunGuide software showed evidence of correct functionality of all of the system requirements; however, due to a timing issue within the firmware of the Jupiter video wall controller, the SunGuide software driver should be retested after Jupiter resolves that issue so that all test steps can be executed without a controller error impacting the expected behavior of either system. Furthermore, it is recommended that the SunGuide software driver be recompiled with an updated Jupiter application programmable interface to be provided by Jupiter that will support .NET 4.0. This way, the SunGuide software application server platform requirements do not have to be restricted from using .NET 4.5 for running the SunGuide Software Jupiter Canvass Video Wall Driver.

Second pass of testing (version 4.1 of this document)

Jupiter provided the new version 2.3.4094.78 of the Canvas software suite at the end of April 2015.

This time, the Jupiter walls were noticeably more stable during testing compared to the previous tests. For most usage, they perform to specification. The exception remains the handling of tours. Initiating simultaneous tours on a single wall will work as expected for a minute or so, but frequently thereafter the tours freeze. And the display server will enter an unresponsive state, either timing out or returning a 404 Mimic error in response to SunGuide software's control commands. This often persists after disconnecting all SunGuide software traffic to the display server, and is only resolved by rebooting the display server. Since the tours start correctly, this appears to be a persistent issue in the Canvas software.

The 2x2 wall still has issues displaying video streams which the CRS handles correctly, but this was not as pronounced as last time. For this round of tests, URLs of these problematic streams were double checked to ensure compatibility on the 2x2 wall.

Third pass of testing (version 4.2 of this document)

Testing was performed against the two 6.0p3 systems (SQL Server and Oracle). The Canvas firmware and software was updated to 2.5.4446.520, intended to resolve the instabilities observed during previous testing. This version of the software also altered the URL format for accessing and controlling a wall. The SunGuide software driver was revised with this new format.

When tested against the SunGuide software server running an SQL Server database, it initially produced a benign error in the notification window whenever updating a layout. Although the layout updated on the wall itself, the error was distracting. Further, the Video Wall Control dialog would not auto-refresh its snapshot of the wall after loading a new layout. Finally, layout deactivations executed from SunGuide software often did not completely clear the sources on the wall.

Before continuing the tests against the Oracle 6.0p3 system, FDOT consulted with SwRI. They advised increasing the "packetTimeout" of each driver to 40 seconds (via the configuration file). Doing this completely resolved the first two issues, and resolved the third in most cases.

During the testing, it was discovered that one of the tour sources was incompatible with the 2x2 wall. This tour source was switched out with a different source for the Oracle part of this testing. Further, during the Oracle portion of testing there was initially an XML error when activating a tour. But this resolved by reloading the layout or refreshing geometry and could not be reproduced.

These issues aside, both walls were markedly more stable for this round of testing and remained almost always responsive to commands. Notably, simultaneous tours can be executed on each wall with no impact on stability.

3. Test Case 1 – Driver Installation and Configuration

3.1. Test Objectives

The objective of this test is to verify the installation, configuration, and starting of the Jupiter video wall driver by following the documentation provided with the driver.

3.2. Test Requirements

The installation testing below will demonstrate that the SunGuide software Jupiter Canvass Video Wall Driver can be installed and configured into the SunGuide software system versions 6.0 Patch 3 and 6.1.0.742.

3.3. Test Setup Conditions

The tests will be executed on the following four 6.x application servers:

Shorthand	SunGuide Version	Database Vendor	App Server – Database
S61	6.1.0.742	SQL Server	\D9_6_1_0_742_1
O61	6.1.0.742	Oracle	\D9_6_1_0_742_1
S60p3	6.0 patch 3	SQL Server	\D960P3
O60p3	6.0 patch 3	Oracle	\SGD9IVV2

There will be two Jupiter canvases targeted for testing:

- Canvas Primary 2X2
  - This is the large, 2x2 video wall in the TERL TMC.
  - IP address & port:
- Canvas Secondary CRS
  - This drives the auxiliary 42" monitor at TERL TMC.
  - IP address & port:

Requirements for the four servers include:

- SunGuide software systems have been fully installed, with video wall subsystem installed and configured.
- A Jupiter video wall controller exists and has been configured with the appropriate sources, windows, and layouts.
- The SunGuide Software VDD and Installation Notes are available for each version of the SunGuide software systems used for testing and have been followed in preparing the servers.

3.4. Test Procedures

Req. ID	Test Steps	Expected Results	Notes	Pass/Fail
682-2.2.2.1	Install and configure the driver following the provided documentation. Open the task manager on the computer hosting the driver.	The two Jupiter Canvas Drivers (for CRS and 2x2) appear in the executive handler list.	Pass – drivers appear in Executive Handler	**Pass** ☒ **Fail** ☐
	Open Executive Handler Viewer and start and stop the driver. Open Status logger viewer and change the filter to only display VideoWallSubsystem.	A log message shows the driver connected to the subsystem	Pass – log message appears for both drivers	**Pass** ☒ **Fail** ☐
Test End Date and Time		4/15/2015		
Tester		Vernell Johnson		
Witness		Philip Blaiklock		

Notes:

Two copies of the driver must be installed to two different folders, to support CRS and 2x2 at once.

4. Test Case 2 – User Functionality from SunGuide Software GUI

4.1. Test Objectives

The objective of this test is to verify normal operation of the video wall and the SunGuide software system's GUI.

4.2. Test Requirements

The table below lists all of the SunGuide Video Wall requirements. Of the requirements in the list below, we will be testing all except three of them that are deemed not applicable to the driver. The requirements not tested are 8.4.7.1, 8.4.7.2, and a portion of 8.4.7.4.3. They pertain to the Status logging of error messages, user permissions, and the scale of the GUI representation of the wall.

FEAT (req#)	Req Name	Requirement Text
8.4.7	Video Wall	The SunGuide software shall manage the display of a video wall controller following the latest release of the SunGuide software ICD and the manufacturer's specified protocol.
8.4.7.1	Video Wall Controller Error Reporting	The SunGuide software shall report errors in performing any management functions of the video wall controller by presenting a description of the error to the user and in the Status Logger.
8.4.7.2	Video Wall Controller Permissions	The SunGuide software shall support the management of user permissions to manage which users can perform management functions of the video wall controller
8.4.7.3	Video Wall Controller Connection	The SunGuide software shall connect to one or more video wall controllers at a configured host and port
8.4.7.4	Video Wall Controller Management	The SunGuide software shall provide management functions of the video wall controller to approved users
8.4.7.4.1	Video Wall Controller Selection	The SunGuide software shall allow the selection of a configured video wall controller to manage
8.4.7.4.2	Video Wall Controller Layouts	The SunGuide software shall present to the user the configured names of all of the configured layouts available from selected video wall controller
8.4.7.4.2.1	Video Wall Controller Layout Activation	The SunGuide software shall allow the activation of any of the presented layouts on the selected video wall controller
8.4.7.4.2.2	Video Wall Controller Layout DeActivation	The SunGuide software shall the deactivation of the selected layout on the selected video wall controller
8.4.7.4.3	Video Wall Controller Geometry	The SunGuide software shall present the video wall geometry of the video wall controller that graphically depicts all display viewers currently active on the selected video wall controller

FEAT (req#)	Req Name	Requirement Text
		that are used for display on the video wall with the operator selected scale of 1/2, 1/5, 1/10, 1/20, or 1/50
8.4.7.4.3.1	Video Wall Controller Geometry Update Request	The SunGuide software shall allow the user to request an update of the video wall geometry from the selected video wall controller
8.4.7.4.3.2	Video Wall Controller Geometry Update	The SunGuide software shall broadcast updated video wall geometry information via the SunGuide databus when updated video wall geometry is provided by the video wall controller
8.4.7.4.4	Video Wall Controller Sources	The SunGuide software shall present to the user the configured names of all display sources configured in the video wall controller that are used for display on the video wall
8.4.7.4.5	Video Wall Controller Switching	The SunGuide software shall allow users to manually switch any display source configured in the selected video wall controller to any display viewer used for display in the selected video wall controller
8.4.7.4.6	Video Wall Controller Touring	The SunGuide software shall allow users to select a Video Switching configured tour for display in a display viewer of the selected video wall controller. The touring function will automatically switch a source by source name at the configured interval of the tour until another source or tour is selected for display on the same display viewer.

4.3. Test Setup Conditions

- The tests will be performed against the four application servers and two target walls defined in the previous test case.
- Five layouts are already created for the wall under test. The layouts have the following names, with the following windows.
    - o Quad Streaming Video (4 VideoStream windows)
    - o SG(2) Workstations and Sims (4 VideoStream windows, 3 CPShare windows)
    - o TERL Primary (8 VideoStream windows, 4 IP Sources, 1 CPShare window)
    - o Many2one2many (4 VideoStream, 4 IP Sources)
- Several video sources are already created to reflect the different streams that may occur in the field.
    - o Below are the names of internal IP sources available in Canvas at the time of testing:
        - ▪ AXIS Q6044 ██ H.264
        - ▪ AXIS Q6045 ██ H.264
        - ▪ Bosch 500 Series ██ (h264)
        - ▪ Bosch MIC 7000 ██ H.264
        - ▪ Bosch VG5-7130 ██ H.264

- - - - Cohu 3120HD ███ H.264
        - Cohu 3920HD
        - GC-ICL4 Fixed Bullet ███ (h264)
        - GC-ICPO PTZ Dome ███ (h264)
        - GC-IMPO PTZ Dome ██ (h264)
        - iMPath i4000-Cohu Springhill ███ mpeg2 ███
        - iMPath-i5110-MastArmCam ███ H.264
          Teleste MPC-E1 ███ mpeg2 ███
        - TKH Siqura 820 ███ H.264
        - VBrick 4200-Cohu Springhill ██ mpeg2 ███
    - o Below are the names of the external VideoStreams available in Canvas at the time of testing:
        - D4Vbrick75_mm27_27
        - D4Vbrick75_sawgrass_16
        - D4Vbrick75_tollPlaza_25
        - D4Vbrick95_129_132
        - D4Vbrick95_hills_45
        - D4Vbrick95_MM158_160
        - D4VbrickI95-I595_22
        - D6Impath24
        - D6Impath3
        - D6Impath45
        - D6Impath826_FLPike_111
        - D6Impath95_NW151_236
        - D6ImpathUS1_TPike_132
- Three CPShare sources are already created with the following names:
    - o SGWorkstation1
    - o SGWorkstation2
    - o DMS-SIM
- Encoders: Impath i4022, Impath i5110ET, Teleste MPC-E1, Vbrick 9170-4200 (MPEG2), Vbrick 9174-4200 (MPEG4), Bosch VG4 AutoDome
- The layout for "TERL Primary" has been activated on the target video wall. This should be accomplished by activating "TERL Primary" with the Canvas Client and restarting the video wall subsystem.
- The logging level of VideoWallSystem should be set to "slDetail" using the ExecHandlerViewer.
- Video Switching Subsystem is running to support Video Tours.
- The StatusLogViewer application should be running and able to view VideoWallSystem detail-level log messages.

4.4. Jupiter Functionality Test Script

Summary	Test Steps	Expected Results	Notes	Pass/Fail
The below sequences of steps were executed against each target app server & wall configuration in this order, unless otherwise noted: 1. S60p3 CRS & S60p3 2x2 (in parallel) 2. O60p3 CRS & O60p3 2x2 (in parallel)				**Pass** ☒ **Fail** ☐
8.4.7.3	Log into the Operator Map as a user with permission to control the video wall. Right click on the map and select Video Switching | Video Wall Control.	The list of sources should contain the sources configured in Canvas.	-S60p3 CRS: OK -S60p3 2x2: OK -O60p3 CRS: OK -O60p3 2x2: OK	**Pass** ☒ **Fail** ☐
8.4.7.4 8.4.7.4.1 8.4.7.4.3.1	For "Current Wall", select the target canvas and then click "Refresh Geometry."	The wall geometry should depict the window viewers displayed in "TERL Primary."	-S60p3 CRS: OK -S60p3 2x2: OK -O60p3 CRS: OK -O60p3 2x2:OK	**Pass** ☒ **Fail** ☐
8.4.7.4.3.2	Using the Canvas Mimic window, add a streaming video window to the target wall, then change its size. Return to the Operator Map Video Wall window and click "Refresh Geometry."	The Operator Map Video Wall window should update to reflect the position and size of the window altered with the Canvas Client. The StatusLogViewer should display a message logged by VideoWallSystem stating that a wallGeometryUpdateMsg was received with the updated information for the layout. The log message begins "XML is <wallGeometryUpdateMsg…"	-S60p3 CRS: OK -S60p3 2x2: OK -O60p3 CRS: OK -O60p3 2x2: OK	**Pass** ☒ **Fail** ☐

Summary	Test Steps	Expected Results	Notes	Pass/Fail
8.4.7.4.2	Right click on the map and select Video Switching | Video Wall Control. Click on "Manage Layouts."	The list of all available layouts should be displayed	-S60p3 CRS: OK -S60p3 2x2: OK -O60p3 CRS: OK -O60p3 2x2: OK	**Pass** ☒ **Fail** ☐
8.4.7.4.2.1 8.4.7.4.2.2 8.4.7.4.3.2	Select "SG(2) Workstations and Sims" and click "Activate." Select "SG(2) Workstations and Sims" and click "Deactivate."	The video wall display in the Operator Map should reflect the new geometry of "SG(2) Workstations and Sims." The wall should also display this canvas. After the deactivation, the Jupiter video wall should have no windows displayed. And the Operator Map Video Wall window should have no viewers displayed.	-S60p3 CRS: OK* -S60p3 2x2: OK* -O60p3 CRS: OK** -O60p3 2x2: OK * Often have to hit deactivate Twice for all windows to clear ** Occasionally have to hit deactivate for all windows to clear, but this usually works correctly.	**Pass** ☒ **Fail** ☐
8.4.7.4.4	From the Canvas Admin UI, add a source. On operator map, Refresh Geometry. Compare the configured sources in the Canvas software to the sources list in the SunGuide Video Wall Control dialog. Return to the Canvas Server and remove the source. Repeat the previous step.	All sources currently configured in the Canvas controller should appear in the sources list in the Video Wall Control dialog	-S60p3 CRS: OK -S60p3 2x2: OK -O60p3 CRS: OK -O60p3 2x2: OK	**Pass** ☒ **Fail** ☐

Summary	Test Steps	Expected Results	Notes	Pass/Fail
8.4.7.4.3	Click on "Manage Layouts." Select "TERL Primary" and click "Activate." Compare the configured viewers in the Canvas software to the viewers in the SunGuide Video Wall Control dialog	All display viewers configured in the controller should appear in the viewer GUI in the Video Wall Control dialog	-S60p3 CRS & S60p3 2x2: Video Wall Control graphic will not update until hitting Refresh Geometry. -O60p3 CRS: OK -O60p3 2x2: OK	**Pass ☒ Fail ☐**
8.4.7.4.3 8.4.7.4.4	Open the Status Logger Viewer and view the messages sent between the driver and the controller	The driver should pass information to the subsystem that contains information about all display viewers… …and display sources.	-S60p3 CRS: OK -S60p3 2x2: OK -O60p3 CRS: OK -O60p3 2x2: OK	**Pass ☒ Fail ☐**
8.4.7.4.5	Click on source "TKH Siqura 820 13.20 H.264" then click on the top left window in the video wall display. Click on the same source then click on the top right window in the video wall display.	Both viewers in the Operator Map video wall display should display "Switching…" followed by TKH Siqura 820 13.20 H.264" The top right and left viewers on the Video wall should display video from this new source.	-S60p3 CRS: OK -S60p3 2x2: OK -O60p3 CRS: OK -O60p3 2x2: OK	**Pass ☒ Fail ☐**
8.4.7.4.5	Click on source "Bosch VG5-7130 13.8 H.264" then click on the top right window in the video wall display.	The top right viewer in the Operator Map video wall display should display "Switching…" followed by the video for this new source.	-S60p3 CRS: OK -S60p3 2x2: OK -O60p3 CRS: OK -O60p3 2x2: OK	**Pass ☒ Fail ☐**

Summary	Test Steps	Expected Results	Notes	Pass/Fail
8.4.7.3	From Canvas, activate the layout "Quad Streaming Video" and then restart the video wall controller. Wait for the controller to startup, then double click on the server shortcut to activate the server. Wait for the wall to display viewers. In SunGuide, click refresh geometry.	The geometry should appear and should depict the geometry currently displayed on the wall.	-S60p3 CRS & S60p3 2x2: layout does not re-load post reboot -O60p3 CRS & O60p3 2x2: layout does not re-load post reboot	**Pass** ☒ **Fail** ☐
8.4.7.4.2.1	Click on "Manage Layouts," then select "Many2one2many" and click activate.	The newly activated layout should appear on the wall.	-S60p3 CRS: OK -S60p3 2x2: OK -O60p3 CRS: OK -O60p3 2x2: OK	**Pass** ☒ **Fail** ☐
8.4.7.4.5	Select the source "Bosch VG5-7130 13.8 H.264" then click on the top left window.	Video from this source should display on the top left viewer.	-S60p3 CRS: OK -S60p3 2x2: OK -O60p3 CRS: OK -O60p3 2x2: OK	**Pass** ☒ **Fail** ☐

Summary	Test Steps	Expected Results	Notes	Pass/Fail
8.4.7.4.6	From the VideoWall Switching control dialog, click on tour "Jupiter Tour" and then click on the top left window.	The video wall viewer selected should switch to the various video sources configured in the tour.	Using tour "Philip" which switches between two sources, 013_Cohu 3920HD-iMpath and 001_AXIS Q6045 13.24 H.264 -S60p3 CRS: OK -S60p3 2x2: OK* -O60p3 CRS: OK** -O60p3 2x2: OK** * One video source which is OK on the CRS shows as Disconnected on 2x2 (013_Cohu 3920HD-iMpath). Mark Lucas notes that this source has issues with the 2x2 wall. Switched out to 009_TKH HSD621 for O60p3 portion of test. ** Both app servers initially threw error: "An error has occurred while trying to handle a received XML request." But reloading layout or refreshing geometry resolved the issue during test. Could not reproduce.	**Pass** ☒ **Fail** ☐
8.4.7.4.6	Click on the tour "Jupiter Tour" and then click on the top right window.	Both viewers should show their tours independently on the configured switching interval.	-S60p3 CRS: OK -S60p3 2x2: OK* -O60p3 CRS: OK** -O60p3 2x2: OK** * One video source which is OK on the CRS shows as Disconnected on 2x2 (013_Cohu 3920HD-iMpath). Mark Lucas notes that this source has issues with the 2x2 wall. Switched out to 009_TKH HSD621 for O60p3 portion of test. ** One or more video sources on 2x2 will occasionally drop out as 'disconnected' but this is transitory.	**Pass** ☒ **Fail** ☐

Test End Date and Time	6/5/2015
Tester	Philip Blaiklock

Witness	

Notes:

General observations

SunGuide software can bring in Canvasses as a 'source' and display them onto the target wall. But SunGuide software sees the canvas as a uniform window – SunGuide software cannot modify sources within the canvas. Thus these tests were performed using Canvas 'Layouts' in place of canvasses. They get the job done but are not as user-friendly as canvasses. Grid-based layout is nowhere near as precise as when defining a canvas. Furthermore, sources in a layout cannot stretch beyond aspect ratio to fill the cell. Jupiter might consider improvements to allow SunGuide software direct access to the canvasses.

First pass of testing (version 4.0 of document)

On morning of 4/13/2016 the large 2x2 wall entered a very slow, unresponsive state. The mimic interface was slow in bringing up the current layout, and loading layouts was sluggish at best. SunGuide software repeatedly throws timeout errors when attempting to talk with this wall. Rebooting the wall server would not help. However, two days later this resolved itself for unknown reasons. Jupiter acknowledges the issue and is providing a fix by the end of the month.

Once the fix is provided by Jupiter, the display server will be much more operational to support the testing of the SunGuide Software Jupiter Canvass Driver. The driver will then be retested and the results will be much easier to interpret without this Jupiter issue distracting from obtaining clean test results of the driver.

Second pass of testing (version 4.1 of document, with updated Jupiter firmware/software suite)

This time, the Jupiter walls were noticeably more stable during testing compared to the previous tests. For most usage, they perform to spec. The exception remains the handling of Tours.