

**Test Procedures Document for R-ICMS Iteration 4:**

**Regional Integrated Corridor Management System**

**Version: 4.0**

**Approval date: *12/9/2020***



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| **DOCUMENT CONTROL PANEL** | | |
| File Name: | R-ICMS-TPD-3.1.docx | |
| File Location: | [https://fldot.sharepoint.com/sites/](https://fldot.sharepoint.com/sites)  D5TSMO/DataInitiatives/ICMS/  /06 Testing/Iteration 4/  Iteration 4 – System Test Procedure/ | |
| Version Number: | 3.1 | |
| **Name** | | **Date** |
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**List of Acronyms and Abbreviations**

API Application Program Interface

CCTV Closed Circuit Television

DFE Data Fusion Environment

DMS Dynamic Message Signs

ETL Extract, Transform, Load

FDOT Florida Department of Transportation

FTP/SFTP File Transport Protocol / Secure File Transport Protocol

GIS Geographic Information System

GTFS General Transit Feed Specification

GTFS-RT General Transit Feed Specification – Real Time

IC Integration Case

IEN Information Exchange Network

IMC Intersection Movement Counts

ITS Intelligent Transportation System

ITSIQA Intelligent Transportation System Input Quality Assurance

JSON JavaScript Object Notation

JWT JSON Web Tokens

LDAP Lightweight Directory Access Protocol

ME Modeling Engine

PD Preliminary Design

PDR Preliminary Design Review

R-ICMS Regional Integrated Corridor Management System

SDD System Design Document

SOT Signal Optimization Tool

TAM Travel Advisory Message

TC Test Case

TSMO Transportation Systems Management and Operations

UI User Interface

# Scope

This document contains the testing procedures for the Regional Incident Corridor Management System Iteration 2. Details for the testing times and locations, required equipment, and overall testing strategy can be found in the Regional Incident Corridor Management System-System Test Plan.

# Reference Documents

The following documents, of the exact issue shown, form a part of this document to the extent specified herein. In the event of a conflict between the documents referenced herein and the contents of this document, this document shall be considered the superseding requirement.

|  |  |
| --- | --- |
| Document Name | Document Location |
| System and Subsystem Requirements Specification for R-ICMS for: Regional Integrated Corridor Management System: R‑ICMS-REQ-0.2 | Southwest Research Institute  FDOT R-ICMS Project SharePoint Site |
| BE521 - Executed Contract | Florida Department of Transportation  [D5prcustodian@dot.state.fl.us](mailto:D5prcustodian@dot.state.fl.us) |
| Regional Integrated Corridor Management System-System Test Plan: R‑ICMS-STP-3.1 | Southwest Research Institute  FDOT R-ICMS Project SharePoint Site |

# Test Case Detailed Procedures

This section provides the detailed test procedures. Each test case includes test case information, and detailed steps to be followed. The starting and ending times of each test case are to be collected and recorded. Upon the successful completion of each test case, tester and witness signatures will confirm the complete execution of the test steps.

## RICMS-IEN-1: Demonstrate the RICMS allows users to view the current status of the transportation network.

The objective of this test is to demonstrate the RICMS provides current status of the transportation network to authorized users.

### Requirements Tested

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Text** |
| 1.1.1 | The R-ICMS shall provide authorized users the capability to view current status of the transportation network. |
| 1.1.1.1 | The R-ICMS shall provide authorized users the capability to view current status of managed lane facilities in the corridor. |
| 1.1.1.6 | The R-ICMS shall provide an authorized user the capability to view traffic signal status as a selectable layer on a GIS-based map as available. |
| 1.1.1.6.1 | The R-ICMS shall allow clicking on a traffic signal icon to display a menu option allowing the user to view the intersection as part of the SOT user interface. |
| 1.1.1.8 | The R-ICMS shall display the status of the device that the icons represent. |
| 1.1.1.12 | The R-ICMS shall provide an authorized user the capability to view bus routes as a selectable layer on a GIS-based map as available. |
| 1.1.1.13 | The R-ICMS shall provide an authorized user the capability to view location, and current status of RSUs in the corridor as a selectable layer on a GIS-based map as available. |
| 1.1.9 | The R-ICMS shall provide an authorized user the capability to view information layers on a GIS-based map. |
| 1.1.9.1 | The R-ICMS GIS-based map shall allow for static and dynamic layers to be added or removed as necessary from view. |
| 1.1.1.15 | The R-ICMS shall allow a user to select global filtering options which will limit the data displayed on the GIS-based map as applicable. |
| 1.1.1.15.1 | The R-ICMS shall allow a user to select a global filter which limits the icons displayed by county. |
| 1.1.1.15.2 | The R-ICMS shall allow a user to select a global filter which limits the icons displayed by operating agency. |
| 1.1.1.15.3 | The R-ICMS shall allow a user to select a global filter which limits the icons displayed by contracted agency. |
| 1.1.1.15.4 | The R-ICMS shall allow a user to select a global filter which limits the icons displayed by device status. |
| 1.1.19 | The R-ICMS shall provide authorized users the capability to view the vehicle locations of available bus provider agencies in the region as a selectable layer on a GIS-based map. |
| 1.1.19.1 | The R-ICMS shall provide authorized users the capability to view transit vehicle locations as a selectable layer on a GIS-based map for transit providers, denoted as a unique icon located at the last known position of the vehicle. |
| 1.1.20 | The R-ICMS shall provide authorized users the capability to view the vehicle locations, denoted as a unique icon located at the last known position of the vehicle, of available rail provider agencies in the region as a selectable layer on a GIS-based map. |
| 31.1 | The DFE shall store GIS data in a GIS data store. |
| 31.1.1 | The DFE shall store unstructured data in an internal file system data store. |

### Test Script

|  |  |
| --- | --- |
| **Test Start Date and Time** | 11/17/2020 11:04 |

| **Step** | **Instruction** | **Expected Result** | **Pass/Fail** | **Req #** |
| --- | --- | --- | --- | --- |
| 1 | Log in to the R-ICMS user interface | User is logged into the test environment and the map page is displayed. |  |  |
| 2 | Select the Layers and Legend icons from the map display | The system displays the available layers | Pass  Fail | 1.1.9  1.1.9.1  31.1  31.1.1 |
| 3 | Select the Traffic Conditions layer | The system displays the traffic conditions for the available roadway network. | Pass  Fail | 1.1.1 |
| 4 | Clear the Traffic Conditions Layer and expand the DMS layer and select the Toll Lane layer | The system displays available toll lane designated DMS devices. | Pass  Fail | 1.1.1.1 |
| 5 | Clear the selected layers and expand the Transit layer | The system displays transit agencies as available sub-layers. |  |  |
| 6 | Expand the CFRTA layer and select Routes | The system displays the bus routes on the map | Pass  Fail | 1.1.1.12 |
| 7 | Select the Vehicle Position layer and zoom in to view vehicle icons | The system displays the last location of the bus vehicles on the map | Pass  Fail | 1.1.19  1.1.19.1 |
| 8 | Unselect the layers and expand the FDOT layer and select Routes | The system displays the rail routes on the map |  |  |
| 9 | Select the Vehicle Position layer | The system displays the last location of the train on the map | Pass  Fail | 1.1.20 |
| 10 | Double click to unselect the Transit layer and select Roadside Equipment | The system displays the devices and their status on the map. | Pass  Fail | 1.1.1.13 |
| 11 | Unselect the Roadside Equipment Layer and select Traffic Signals | The system displays the traffic signal devices and their status on the map. | Pass  Fail | 1.1.1.6 |
| **Map SOT Interface** | | | | |
| 12 | Navigate to **SR-434 and Trailwood** and select the traffic signal from the map | The system displays the info window |  |  |
| 13 | Select the traffic signal link to launch the SOT interface | The system displays the SOT interface below the map. | Pass  Fail | 1.1.1.6.1 |
| 14 | Close the SOT interface window, close the traffic signal info window, and unselect the Traffic Signals layer | The system hides the SOT interface and no layers are visible on the map. |  |  |
| **Map Global Filter** | | | | |
| 15 | Select the Home icon and Select the filter icon from the map display | The system will refresh the map to the default view and display a pop up with the available map filters |  |  |
| 16 | Select General Filter | The system displays the map filter options independent of layers | Pass  Fail | 1.1.1.15 |
| 17 | Select the Status option | The system populates the available options in the “Value” field |  |  |
| 18 | Select “Active” from the Value field and select Apply Filter | The system displays all layers that match the selected filter. | Pass  Fail | 1.1.1.15.4 |
| 19 | Select Clear Filter and select the County option | The system populates the available options in the “Value” field | Clay 11/17> Options incorrectly include some County IDs for ITSIQA data instead of a single value of County Name for each county |  |
| 20 | Select “Seminole” from the Value field and select Apply Filter | The system displays all layers that match the selected filter. | Pass  Fail | 1.1.1.15.1 |
| 21 | Select Clear Filter and select the Agency option | The system populates the available options in the “Value” field |  |  |
| 22 | Select “Central Florida Regional Transit Authority” from the Value field and select Apply Filter | The system displays all layers that match the selected filter. | Pass  Fail | 1.1.1.15.2  1.1.1.15.3 |
| 23 | Select Clear Filter to refresh the map display | The system displays the map with no layers displayed. |  |  |

|  |  |
| --- | --- |
| **Test End Date and Time** | 11/17/2020 11:49 |
| **Test Result (Pass/Fail)** | Pass |
| **Tester** | Natalie Coggeshall |
| **Approver** | Tushar Patel |

## RICMS-IEN-2: Demonstrate the RICMS allows users to view current weather data on the map.

The objective of this test is to demonstrate the RICMS provides current weather data to authorized users on the map display.

### Requirements Tested

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Text** |
| 1.1.1.7.1 | The R-ICMS shall provide color coded National Weather Service weather alerts. |
| 1.1.1.7.2 | The R-ICMS shall provide an authorized user the capability to view a weather radar overlay as a selectable layer on a GIS map. |
| 1.1.1.7.3 | The R-ICMS weather radar overlay shall be provided in a motion loop, indicating changing weather conditions in real-time. |
| 1.1.1.7.4 | The R-ICMS shall include a legend describing the weather alert types, and associated color codes. |
| ~~1.1.1.7.5~~ | ~~The R-ICMS shall provide configurable weather alert legend color codes to allow for changes to colors for the different conditions.~~ |
| 1.1.1.7.6 | The R-ICMS shall include a legend describing the weather radar overlay rainfall intensities and associated color codes. |
| ~~1.1.1.7.7~~ | ~~The R-ICMS weather radar overlay legend color codes shall be configurable in the system to allow for changes to colors for the different conditions.~~ |

### Test Script

|  |  |
| --- | --- |
| **Test Start Date and Time** | 11/17/2020 13:06 |

| **Step** | **Instruction** | **Expected Result** | **Pass/Fail** | **Req #** |
| --- | --- | --- | --- | --- |
| 1 | Log in to the R-ICMS user interface | User is logged into and the map page is displayed. |  |  |
| 2 | Select the Layers and Legend icons from the map display | The system displays the available layers |  |  |
| 3 | Expand the Weather layer | The system will display the available weather layers |  |  |
| 4 | Select the **Precipitation Layer** | The system will display the precipitation layer | Pass  Fail  **Note:** Did not display; will retry after lunch  Dinesh> Seems to be a glitch with NOAA services | 1.1.1.7.2  1.1.1.7.3 |
| 5 | Verify the symbology matches the weather specification | The symbology is verified. | Pass  Fail | 1.1.1.7.4  1.1.1.7.6 |
| 6 | Clear the selected layer and select the **Weather Warnings** layer | The system will display active weather warnings and watches | Pass  Fail | 1.1.1.7.1  1.1.1.7.8 |
| 7 | Verify the symbology matches the weather specification | The symbology is verified. | Pass  Fail | 1.1.1.7.4 |
| 8 | Clear the selected layer and select the **Weather Storm** layer | The system will display any active tropical storm warnings and watches | Pass  Fail | 1.1.1.7.1  1.1.1.7.8 |
| 9 | Verify the symbology matches the weather specification | The symbology is verified. | Pass  Fail  **2020.11.17>** Functionality was demonstrated; stability of the data source caused issue with GUI displaying the data  **2020.12.09 retesting> This was not testable; however, stores are not required. SwRI offers to demonstrate and maintain this in the future.** | 1.1.1.7.4 |
| 10 | Unselect all weather layers | Weather data is no longer displayed on the map. |  |  |

|  |  |
| --- | --- |
| **Test End Date and Time** | 11/17/2020 13:19 |
| **Test Result (Pass/Fail)** | Pass, except steps 8 and 9  **2020.12.09 retesting> Passed: Steps 8 and 9 were not testable; however, storms are not required. SwRI offers to demonstrate and maintain this in the future. This does not hold up system acceptance.** |
| **Tester** | Natalie Coggeshall |
| **Approver** | Tushar Patel |
| **Notes** | Need to proxy the weather data so it's not so intermittently displayed unless data was not received beyond a threshold/timeout of many minutes - steps 8 and 9 |

## RICMS-IEN-3: Demonstrate the RICMS allows users to manage event list data.

The objective of this test is to demonstrate the RICMS provides users with the ability to sort, filter and export event list data.

### Requirements Tested

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Text** |
| 1.1.1.11 | The R-ICMS shall provide an event list that shall allow an authorized user the capability to view open, unconfirmed, and recently closed events in the region on the covered facilities. |
| 1.1.1.11.4 | The R-ICMS event list shall allow filtering on exposed columns. |
| 1.1.1.11.5 | The R-ICMS event list shall allow sorting on exposed columns |
| 1.1.1.11.5 | The R-ICMS event list shall allow for an authorized user to create custom filters to filter events into/from their event list. |
| 1.1.1.11.6 | The R-ICMS event list shall allow for an authorized user to search the event list for a specific string of text. |
| 1.1.1.11.8 | The R-ICMS shall allow an authorized user to create an event list report from the event list tab. |
| 1.1.1.11.9 | The R-ICMS shall allow an authorized user to filter the Event list to display only events that the user owns. |

### Test Script

|  |  |
| --- | --- |
| **Test Start Date and Time** | 11/17/2020 11:58 |

| **Step** | **Instruction** | **Expected Result** | **Pass/Fail** | **Req #** |
| --- | --- | --- | --- | --- |
| 1 | Log in to the R-ICMS user interface | User is logged into the test environment and the map page is displayed. |  |  |
| 2 | Select the **Event List** from the left drawer menu | The system displays the Event List in the main window. |  |  |
| 3 | Select the Sort option next to the ID column | Upon the first click, the column will be sorted in ascending order. | Pass  Fail | 1.1.1.11.5 |
| 4 | Select the Sort option again. | The sort will be in descending order. | Pass  Fail | 1.1.1.11.5 |
| 5 | Select the filter option for the Severity column | The system displays all of the available values and the Select All option is selected by default. | Pass  Fail | 1.1.1.11.4 |
| 6 | Click the Select All checkbox | The system unselects all values and the event list displays no records. The filter icon is displayed on the column header. | Pass  Fail | 1.1.1.11.4 |
| 7 | Select the checkbox for “Severe” | The system displays the “Severe” field as selected and the event list displays only those rows with a Severity of Severe. | Pass  Fail | 1.1.1.11.4 |
| 8 | Select the checkbox for “Minor” | The system displays the field as selected and the event list displays all rows with a Severity of Severe or Minor. | Pass  Fail | 1.1.1.11.4  1.1.1.11.5 |
| 9 | Select the filter option for the Status column | The system displays all of the available values and the Select All option is selected by default. | Pass  Fail | 1.1.1.11.4  1.1.1.11.5 |
| 10 | Click the Select All checkbox | The system unselects all values and the event list displays no records. The filter icon is displayed on the column header. | Pass  Fail | 1.1.1.11.4 |
| 11 | Select the checkbox for “Active” | The system displays the Status field as filtered and the event list displays only those rows with a Status of Active. | Pass  Fail | 1.1.1.11.4 |
| 12 | Select Unconfirmed | The system displays the chosen fields as selected and the event list displays only those rows with a valid status based on the value selected. | Pass  Fail | 1.1.1.11  1.1.1.11.4 |
| 13 | Select the Select All checkbox on the Status column and click above the grid | The system displays all event records with the Severe and Minor Severity and the filter icon is no longer displayed on the Status column. | Pass  Fail | 1.1.1.11.5 |
| 14 | Select the Select All checkbox on the Severity column | The system displays all event records and the filter icon is no longer displayed on the Severity column. | Pass  Fail | 1.1.1.11.5 |
| 15 | Select the filter option in the Owner column header | The system displays a text field to enter the username |  |  |
| 16 | Enter a valid username | The system displays only the matching records and the filter icon is shown. | Pass  Fail | 1.1.1.11.9 |
| 17 | Clear the value in the filter and select enter | All records are displayed again and the filter icon is no longer displayed |  |  |
| 18 | Enter a value in the Filter field above the grid | The system retrieves all records | Pass  Fail | 1.1.1.11.6 |
| 19 | Clear the value in the filter and select enter | All records are displayed again. |  |  |
| 20 | Select the Export icon from the event list display | The system displays a prompt for the user to select Excel or PDF | Pass  Fail | 1.1.1.11.8 |
| 21 | Select PDF | The system downloads the event report as an excel file |  |  |
| 22 | Open the download | Verify the columns and data match the event list data. | Pass  Fail | 1.1.1.11.8 |

|  |  |
| --- | --- |
| **Test End Date and Time** | 11/17/2020 13:05 |
| **Test Result (Pass/Fail)** | Pass |
| **Tester** | Natalie Coggeshall |
| **Approver** | Tushar Patel |



## RICMS-IEN-4: Demonstrate the RICMS supports a data analytics toolset for querying data.

The objective of this test is to demonstrate the RICMS supports a data analytics toolset for unstructured data in the data store.

### Requirements Tested

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Text** |
| 2.1.4.7 | The DFE shall store unstructured data in an internal file system data store. |
| 2.1.11 | The DFE shall provide a data analytics toolset. |
| 2.1.13 | The DFE shall provide the capability for an authorized user to query unstructured data. |
| 2.1.13.1 | The DFE shall provide access to unstructured data via a User Interface. |
| 2.1.14 | The DFE shall be modular and provide the capability for an administrator to install additional tools such as data analytics tools. |

### Test Script

|  |  |
| --- | --- |
| **Test Start Date and Time** | 11/17/2020 13:06 |

| **Step** | **Instruction** | **Expected Result** | **Pass/Fail** | **Req #** |
| --- | --- | --- | --- | --- |
| 1 | Type in the URL:  https://[10.32.92.130](https://www.google.com/url?q=https://utility1.bigdata:7183/cmf/login&sa=D&source=hangouts&ust=1601664696764000&usg=AFQjCNGkRnfuq_-3IszJyxeHx8pcvGL6rw):7183  and provide valid credentials | The system displays Cloudera Manager |  |  |
| 2 | Select Hue from left navigation menu | The system displays the Hue application, a web-based interactive query editor that enables you to interact with data warehouses. |  |  |
| 3 | Select Web UI>Hue Load Balanced (recommended) - gateway and provide credentials | The system displays the query editor | Pass  Fail | 2.1.11  2.1.14 |
| 4 | Select the HDFS icon in the left navigation pane to view folder structures | The system displays the available files in the user folder |  |  |
| 5 | Select Signal Controllers log file parameter | The system displays the file structure hierarchy as folders | Pass  Fail | 2.1.4.7 |
| 6 | Select DAT for the data type parameter |  |  |  |
| 7 | Select TRAF for the agency type parameter | The system displays the file structure hierarchy as folders |  |  |
| 8 | Select 2020 for the year parameter | The system displays the file structure hierarchy as folders |  |  |
| 9 | Select 11 for the month parameter | The system displays the file structure hierarchy as folders |  |  |
| 10 | Select 13 the date parameter | The system displays the files available |  |  |
| 11 | Select to open the log file for the day | The system displays a zip file for the binary data | Pass  Fail | 2.1.13  2.1.13.1 |

|  |  |
| --- | --- |
| **Test End Date and Time** | 11/17/2020 13:34 |
| **Test Result (Pass/Fail)** | Pass |
| **Tester** | Natalie Coggeshall |
| **Approver** | Tushar Patel |

## RICMS-IEN-5: Demonstrate the RICMS supports reporting and analytic functions.

The objective of this test is to demonstrate the RICMS provides users with dashboard, queries, and 6 identified reports.

### Requirements Tested

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Text** |
| 23.1 | The R-ICMS shall provide the capability to generate and manage reports. |
| 23.1.1 | The R-ICMS shall allow an authorized user to run reports from templates. |
| 23.1.2 | The R-ICMS report component shall be accessible via main menu navigation. |
| 23.1.2.1 | The R-ICMS report component shall be initially configured with 6 report templates. |
| 23.1.2.2 | The R-ICMS report component shall allow for an authorized user to be able to add new report templates after the system is deployed. |
| 23.1.2.3 | The R-ICMS report component shall provide the capability for a user to apply filters to filter data when running a report in the system. |
| 23.1.2.4 | The R-ICMS report component shall provide the capability for a user to generate a report in PDF, Word, and Excel formats. |
| 24.1.1 | The R-ICMS shall provide the capability for a user to select a pre-defined dashboard. |
| 24.1.1.1 | The R-ICMS shall provide the capability for a user with the ability to configure the data displayed on a dashboard. |

### Test Script

|  |  |
| --- | --- |
| **Test Start Date and Time** | 11/17/2020 13:35 |

| **Step** | **Instruction** | **Expected Result** | **Pass/Fail** | **Req #** |
| --- | --- | --- | --- | --- |
| 1 | Log in to the R-ICMS user interface |  |  |  |
| 2 | Select Report List from the left drawer menu | The system displays the available report listing | Pass  Fail | 23.1.2  23.1.2.1  24.1.1  24.1.1.1 |
| 3 | Select the Event Summary Report and click **Run Report** | The system prompts the user for credentials | Pass  Fail | 23.1  23.1.1 |
| 4 | Provide valid credentials to authenticate  NOTE: If not available in the cache | The system authenticates the user and displays the respective report parameters |  |  |
| 5 | Select the desired report parameters and select View Report | The system runs the report and displays the output | Pass  Fail | 23.1.2.3  24.1.1.1 |
| 6 | Select the Save icon | The system prompts the user to select the file format:  Word, Excel, PowerPoint, PDF, Tiff, CSV, etc.) | Pass  Fail | 23.1.2.4 |
| 7 | Select PDF | The report is downloaded to the desktop. | Pass  Fail | 23.1.2.4 |
| Add New Reports | | | | |
| 8 | Authorized User creates a new report template | A new report template is available to be deployed |  |  |
| 9 | Access the report server with valid credentials | Access is authenticated |  |  |
| 10 | Select the appropriate folder and select Upload to add the new report | The new report is visible as an item on the report server |  |  |
| 11 | Go to the security module and verify the permissions are available to the Administrators | The permissions are confirmed |  |  |
| 12 | Access the SQL server and perform an insert of the new report template to be visible in RICMS | The report is inserted into the list of available reports | Note: This should be more user friendly than a raw database insert |  |
| 13 | Return to the RICMS application and access the Report List from the left drawer menu | The system displays the available reports |  |  |
| 14 | Verify the new report is visible in the list | The new report is visible | Pass  Fail | 23.1.2.2 |

|  |  |
| --- | --- |
| **Test End Date and Time** | 11/17/2020 13:53 |
| **Test Result (Pass/Fail)** | Pass |
| **Tester** | Natalie Coggeshall |
| **Approver** | Tushar Patel |

## RICMS-IEN-6: Demonstrate the RICMS supports lane blockage diagrams for RICMS events.

The objective of this test is to demonstrate the RICMS provides users with the ability to create, and edit lane blockage diagrams for RICMS events.

### Requirements Tested

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Text** |
| SS2-001 | The R-ICMS shall display the SunGuide Event lane blockage data as a dynamically created lane blockage diagram for each cardinal approach using the available event data ingested into the R-ICMS system. |
| SS2-002 | The R-ICMS shall display the lane blockage diagram to users within the event details for SunGuide events. |
| SS2-003 | The R-ICMS shall include the number of lanes, lane types and lane blockage status for each individual lane in the lane blockage diagram for SunGuide events. |
| SS2-004 | The R-ICMS shall provide users the capability to create lane blockage diagrams for R-ICMS events within the event details. |
| SS2-005 | The R-ICMS event details shall display the lane blockage diagram with the default approach and number of lanes based on the roadway and direction specified by the R-ICMS event location. |
| SS2-006 | The R-ICMS shall update the lane blockage diagram when there is a change to the R-ICMS event location. |
| SS2-007 | The R-ICMS event shall include the capability to edit the number of approaches in the lane blockage diagram for R-ICMS events. |
| SS2-008 | The R-ICMS shall prevent the user from modifying the default approach in the lane blockage diagram for R-ICMS events. |
| SS2-009 | The R-ICMS shall provide the ability for the user to specify the Roadway, Direction and Number of Lanes when adding additional approaches in the lane blockage diagram for R-ICMS events. |
| SS2-010 | The R-ICMS shall provide the ability for a user to edit the number of lanes for additional approaches in the lane blockage diagram for R-ICMS events. |
| SS2-011 | The R-ICMS shall provide the capability to designate each lane type in the lane blockage diagram for R-ICMS events. |
| SS2-012 | The R-ICMS shall provide the capability to designate each lane status in the lane blockage diagram for R-ICMS events. |
| SS2-013 | The R-ICMS shall include the capability to add/remove lanes in the lane blockage diagram for R-ICMS events. |
| SS2-014 | The R-ICMS shall include the capability to add/remove approaches in the lane blockage diagram for R-ICMS events. |
| SS2-015 | The R-ICMS shall include the capability to edit lane types in the lane blockage diagram for R-ICMS events. |
| SS2-016 | The R-ICMS shall include the capability to edit lane blockage status in the lane blockage diagram for R-ICMS events. |
| SS2-017 | The R-ICMS shall display the lane blockage diagram in the event location section of the event details. |

### Test Script

|  |  |
| --- | --- |
| **Test Start Date and Time** | 11/27/2020 14:00 |

| **Step** | **Instruction** | **Expected Result** | **Pass/Fail** | **Req #** |
| --- | --- | --- | --- | --- |
| 1 | Log in to the R-ICMS user interface | User is logged into the test environment and the map page is displayed. |  |  |
| 2 | Select the **Event List** from the left drawer menu | The system displays the Event List in the main window. |  |  |
| 3 | Select a SunGuide event from the list and double click to view event details | The system displays the event details and the lane blockage data as read only | Pass  Fail | SS2-001  SS2-002  SS2-003 |
| 4 | Access the SunGuide system and retrieve the same event |  |  |  |
| 5 | Verify the SunGuide lane blockage data for the selected event in the SunGuide system matches and is not editable. | The lane blockage details match what is displayed in RICMS | Pass  Fail | SS2-001  SS2-002  SS2-003 |
| 6 | Close the event details | The event details are no longer displayed and the event list is shown. |  |  |
| 7 | Select **New Event** | The system displays the map and a location selector tool |  |  |
| 8 | Select the event location by clicking the **Place Event** tool and dropping the pin on the map. | The system populates the location details |  |  |
| 9 | Populate the required data and scroll down to the lane blockage section | The default approach is displayed with the lane blockage options | Pass  Fail | SS2-004  SS2-005 |
| 10 | Select the desired lane blockage details and select save | The system saves the approach data |  |  |
| 11 | Select to add additional lanes to the default approach | The system will not allow the lanes to be modified for the default approach | Pass  Fail | SS2-008 |
| 12 | Select Add Approach | The system displays a prompt to select the roadway, direction and number of lanes | Pass  Fail | SS2-007  SS2-009 |
| 13 | Select the desired values | The system will display the lanes selected and the available lane blockage options |  |  |
| 14 | Select the desired lane blockage details and select save | The system saves the new approach data | Pass  Fail | SS2-011  SS2-012  SS2-013  SS2-015  SS2-016 |
| 15 | Add additional lanes to the secondary approach | The system displays the new lanes and lane blockage options | Pass  Fail | SS2-010  SS2-014 |
| 16 | Select the desired lane blockage details and select save | The system saves the new approach data | Pass  Fail | SS2-017 |

|  |  |
| --- | --- |
| **Test End Date and Time** | 11/17/2020 14:07 |
| **Test Result (Pass/Fail)** | Pass |
| **Tester** | Natalie Coggeshall |
| **Approver** | Tushar Patel |

## RICMS-IEN-7: Demonstrate the RICMS supports CCTV video capabilities for available devices.

The objective of this test is to demonstrate the RICMS provides users with the ability to locate and view CCTV video from available devices for all RICMS and SunGuide events.

### Requirements Tested

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Text** |
| SS3-001 | The R-ICMS shall receive CCTV video data from an external data source. |
| SS3-002 | The R-ICMS shall provide the ability to display the Nearest CCTV video for SG events in the event details. |
| ~~SS3-003~~ | ~~The R-ICMS shall display a Nearest CCTV field in the event details for users to specify the camera for an R-ICMS event~~ |
| ~~SS3-004~~ | ~~The R-ICMS shall perform a geospatial query to identify the available cameras based on the selected location of an R-ICMS event~~ |
| ~~SS3-005~~ | ~~The R-ICMS shall provide a configurable distance parameter to perform a geospatial query of nearest CCTV based on event location.~~ |
| SS3-006 | The R-ICMS shall display a tooltip message showing "Video Unavailable" over the disabled Display Camera button if the URL cannot be accessed. |
| SS3-007 | The R-ICMS shall link the CCTV IDs from SunGuide with the associated URL in CCTV configuration to provide CCTV video for SunGuide events |
| SS3-008 | The R-ICMS shall provide access to CCTV video from the event details page for SunGuide events. |
| SS3-009 | The R-ICMS shall provide access to CCTV video from the camera info window when displayed on the map. |
| SS3-010 | The R-ICMS shall provide access to CCTV video from the SG event info window when displayed on the map. |

### Test Script

|  |  |
| --- | --- |
| **Test Start Date and Time** | 11/17/2020 14:10 |

| **Step** | **Instruction** | **Expected Result** | **Pass/Fail** | **Req #** |
| --- | --- | --- | --- | --- |
| 1 | Log in to the R-ICMS user interface | User is logged into the test environment and the map page is displayed. |  |  |
| 2 | Select the Layers and Legends icons from the map and select Cameras from the list | The system displays all camera devices on the map |  |  |
| 3 | Select a camera icon | The system displays the info window with the video playback option. | Pass  Fail | SS3-001 |
| 4 | Close the info window and unselect the Camera Layer |  |  |  |
| 5 | Select the Event List icon from the map | The system displays the event list on the map page |  |  |
| 6 | Search for SunGuide event **982547** and select to view the event details | The system displays the event details |  |  |
| 7 | Verify the View Camera icon is displayed in the event details | The event details provides access to the Nearest CCTV | Pass  Fail | SS3-002  SS3-007  SS3-009 |
| 8 | Select the View Camera icon | The system displays the camera feed as pop-up video player | Pass  Fail | SS3-008 |
| 9 | Close the player | The video player is no longer displayed |  |  |
| 10 | Click on the selected event on the map | The system displays the info window. |  |  |
| 11 | Verify the camera feed is displayed in the info window. | The video is available | Pass  Fail | SS3-010 |
| 12 | Close the info window | The system displays the Event list data |  |  |
| 13 | Search for RICMS event **R593** and the refresh icon to view the event details | The system displays the RICMS event details |  |  |
| 14 | Verify the View Camera icon is displayed as disabled the event details | RICMS events do not support CCTV live video | Pass  Fail | SS3-002  SS3-007  SS3-009 |
| 15 | Hover over the View Camera icon | The system displays a warning message that the video is unavailable | Pass  Fail | SS3-006 |

|  |  |
| --- | --- |
| **Test End Date and Time** | 11/17/2020 14:21 |
| **Test Result (Pass/Fail)** | Pass |
| **Tester** | Natalie Coggeshall |
| **Approver** | Tushar Patel |
| **Notes** | Need to retest step 15 for consistency – it failed the first attempt |

## RICMS-IEN-8: Demonstrate the RICMS supports Travel Advisory Messages (TAM) from the map display.

The objective of this test is to demonstrate the RICMS provides users with the ability to locate and view TAM characteristics from the map display.

### Requirements Tested

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Text** |
| SS4-001 | The R-ICMS shall ingest TAM data from the SunGuide Connected Vehicle Subsystem (CVS) |
| ~~SS4-002~~ | ~~The R-ICMS shall display SunGuide Traveler Advisory Messages as a list on the map page of the R-ICMS system in a table format.~~ |
| SS4-003 | The RICMS shall display active TAM messages on the map as a selectable GIS layer |
| ~~SS4-004~~ | ~~The RICMS shall include the message, start time, duration, and priority in the TAM List.~~ |
| ~~SS4-005~~ | ~~The RICMS shall provide the capability for Users to select a TAM from the list to display that TAM presentation region(s) on the map.~~ |
| SS4-006 | The R-ICMS shall allow users to only select a single TAM at a time. |
| ~~SS4-007~~ | ~~The R-ICMS shall allow users to select a TAM from the map and display that TAM as selected in the TAM list table.~~ |
| SS4-008 | The R-ICMS shall display TAM data in an InfoWindow when the TAM presentation region is selected on the map. |
| ~~SS4-009~~ | ~~The R-ICMS will remove the presentation regions displayed on the map when users close the TAM list.~~ |
| SS4-010 | The R-ICMS will remove the presentation regions displayed on the map when user deselects the active TAM layer. |
| SS4-011 | The R-ICMS shall display the associated presentation regions for a unique TAM in the same color. |
| SS4-012 | The R-ICMS shall display each TAM presentation region polygon as semi-transparent with an outline surrounding the spatial boundaries of the presentation region. |
| SS4-013 | The R-ICMS will display a single icon in the geographic center of the TAM polygon. |
| SS4-015 | The R-ICMS will display the active directionality or directionalities of a TAM (up to 8 different directions). |

### Test Script

|  |  |
| --- | --- |
| **Test Start Date and Time** | 11/17/2020 14:22 |

| **Step** | **Instruction** | **Expected Result** | **Pass/Fail** | **Req #** |
| --- | --- | --- | --- | --- |
| 1 | Log in to the R-ICMS user interface | User is logged into the test environment and the map page is displayed. |  |  |
| 2 | Select the Layers and Legend icons from the map display | The available layers are displayed for selection |  |  |
| 3 | Select the TAM layer | The system will display the TAM polygons on the map | Pass  Fail | SS4-001  SS4-003 |
| 4 | Verify the polygons match the specification | The polygon attributes match the specification. | Pass  Fail | SS4-011  SS4-012  SS4-013  SS4-015 |
| 5 | Select a TAM polygon from the map | The system displays the info window for the selected polygon | Pass  Fail | SS4-008 |
| 6 | Select an alternate TAM polygon from the map | The system displays the info window for the selected polygon | Pass  Fail | SS4-006 |
| 7 | Select the Map Layers Filter and select the TAM filter tab | The system displays the TAM filter options |  |  |
| 8 | Select N from the Travel Direction, select All from the Status filter options and select Apply Filter | The system displays the matching TAM polygons |  |  |
| 9 | Close the Map Filter and unselect the TAM layer from the layers list | All TAM polygons are removed from the map display | Pass  Fail | SS4-010 |

|  |  |
| --- | --- |
| **Test End Date and Time** | 11/17/2020 14:28 |
| **Test Result (Pass/Fail)** | Pass |
| **Tester** | Natalie Coggeshall |
| **Approver** | Tushar Patel |

## RICMS-IEN-9: Demonstrate the RICMS supports event ownership, transit events and related event association.

The objective of this test is to demonstrate the RICMS provides the ability to transfer ownership of an event to an authorized user and create a relationship of an RICMS event to a SunGuide event.

### Requirements Tested

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Text** |
| 1.1.5.3.3.1 | The R-ICMS shall ensure that ownership of an event may only be transferred to an authorized user. |
| 1.1.30 | The R-ICMS shall allow authorized users to associate SunGuide events with R-ICMS events. |
| 8.1.1 | The R-ICMS shall provide transit event information through suggested response plans to SunGuide. |

### Test Script

|  |  |
| --- | --- |
| **Test Start Date and Time** | 11/17/2020 14:29 |

| **Step** | **Instruction** | **Expected Result** | **Pass/Fail** | **Req #** |
| --- | --- | --- | --- | --- |
| 1 | Log in to the R-ICMS user interface | User is logged into the test environment and the map page is displayed. |  |  |
| 2 | Select the **Event List** from the left drawer menu | The system displays the Event List in the main window. |  |  |
| 3 | Select an RICMS Event from the event list | The system displays the event details |  |  |
| 4 | Select the Owner field and verify “EPICUSER3” is not displayed | The system does not display users who do not have valid permissions. | Pass  Fail | 1.1.5.3.3.1 |
| 5 | Select The Owner field and select “EPICUSER2” and select Save | The system validates the user permissions and saves the event details and logs the activity in the event history. | Pass  Fail | 1.1.5.3.3.1 |
| 6 | Select the Associate Event icon | The system displays a list of the Active SunGuide events |  |  |
| 7 | Select the desired SunGuide event and click Associate Event | The system displays the selected event in the Associated Event field. | Pass  Fail | 1.1.30 |
| 8 | Close the event details and select New Event from the event list | The system displays the event details and the location selector |  |  |
| 9 | Select a location for the event and make the event type: Transit | The system updates the location details |  |  |
| 10 | Complete the required fields and select Save | The system assigns an event ID and updates the map with the symbology |  |  |
| 11 | Verify the event symbology reflects a Transit Event | Transit events can be logged in the system | Pass  Fail | 8.1.1 |

|  |  |
| --- | --- |
| **Test End Date and Time** | 11/17/2020 14:33 |
| **Test Result (Pass/Fail)** | Pass |
| **Tester** | Natalie Coggeshall |
| **Approver** | Tushar Patel |



## RICMS-DFE-1: Demonstrate data can be ingested / stored by the RICMS

The objective of this test is to demonstrate the RICMS can ingest and store data from data sources.

### Requirements Tested

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Text** |
| 2.1.1 | The DFE shall receive data from external systems shown in the TSM&O Data Sources Table. |
| 2.1.2 | The DFE shall ingest data from the data sources shown in the TSM&O Data Sources Table 7. |
| 2.1.2.1 | The DFE shall retrieve data from each data source specified in the TSM&O Data Sources Table 7. |
| 2.1.2.2 | The DFE shall follow the protocol of each data source specified in the TSM&O Data Sources Table 7. |
| 2.1.2.3 | The DFE shall receive data from data sources specified in the TSM&O Data Sources Table 7 according to the update interval specified |
| 2.1.2.5 | The DFE shall request data not received due to temporary lost connections if the data source supports such a request. |

### Test Script

|  |  |
| --- | --- |
| **Test Start Date and Time** | 11/17/2020 09:06 |

| **Step** | **Instruction** | **Expected Result** | **Pass/Fail** | **Req #** |
| --- | --- | --- | --- | --- |
| 0 | **Preconditions:**   1. Testing computer needs to be on the same network as the Kafka broker 2. Verify Python 3 is installed    1. Open Command Prompt Window    2. Type “python --version” and press enter    3. If the result is: “command not found” or your version is 2.X, download and install latest python version from https://www.python.org/downloads    4. Install python modules       1. Open command window: right-click windows > select Run > type cmd       2. Type: pip install kafka-python and select enter to run 3. Ensure scripts saved to accessible local folder    * 1. Download the files available from a secured location. 4. In file explorer, open the subfolder named RICMS\_DFE\_1. 5. Access the script executable: delete\_fdot\_from\_gridfs and double click to launch the file 6. An authorized Kubernetes Administrator should restart all drivers prior to executing this procedure in a testing environment.    1. Administrator should first ensure that Ubuntu bash shell is installed and that kubectl is properly configured for the target kubernetes cluster.    2. Open Windows powershell    3. Type: \restart\_drivers.ps1    4. Wait for the script to finish (may take a few minutes). The script is finished when “Drivers restarted” is displayed in the screen. | |  |  |
| 1 | Access the script executable: Kafka\_test.bat and double click to launch the file | The script will execute the Kafka queries with the defined parameters and generate output files in the same directory the file was run. |  |  |
| **GTFS - Transit Data** | | | | |
| 2 | Open the file *kafka\_sample\_records\_transit\_real\_time\_trip\_updates\_current \_<<YYYMMDD>>.txt* | A text file is displayed with data message headers and the requested XML data. |  |  |
| 3 | Search for:  *agency-id:* | Verify the search is successful, CFRTA and FDOT data is available and received-date-time message header has a recent date and time. | Pass  Fail | 2.1.1  2.1.2  2.1.2.1  2.1.2.2  2.1.2.3  2.1.2.6 |
| 4 | Open the file *kafka\_sample\_records\_transit\_real\_time\_trip\_updates\_archive \_<<YYYMMDD>>.txt* | A text file is displayed with data message headers and the requested XML data. |  |  |
| 5 | Search for:  *agency-id:* | Verify the search is successful, CFRTA and FDOT data is available and received-date-time message header has a recent date and time. | Pass  Fail | 2.1.1  2.1.2  2.1.2.1  2.1.2.2  2.1.2.3  2.1.2.6 |
| 6 | Open the file *kafka\_sample\_records\_transit\_real\_time\_vehicle\_positions\_current\_<<YYYMMDD>>.txt* | A text file is displayed with data message headers and the requested XML data. |  |  |
| 7 | Search for:  *agency-id:* | Verify the search is successful, CFRTA and FDOT data is available and received-date-time message header has a recent date and time. | Pass  Fail | 2.1.1  2.1.2  2.1.2.1  2.1.2.2  2.1.2.3  2.1.2.6 |
| 8 | Open the file *kafka\_sample\_records\_transit\_real\_time\_vehicle\_positions\_archive\_<<YYYMMDD>>.txt* | A text file is displayed with data message headers and the requested XML data. |  |  |
| 9 | Search for:  *agency-id:* | Verify the search is successful, CFRTA and FDOT data is available and received-date-time message header has a recent date and time. | Pass  Fail | 2.1.1  2.1.2  2.1.2.1  2.1.2.2  2.1.2.3  2.1.2.6 |
| 10 | Open the file *kafka\_sample\_records\_transit\_static\_<<Agency>>\_<<YYYMMDD>>.txt* | A text file is displayed with data message headers and the requested XML data. |  |  |
| 11 | Search for:  *agency-id:* | Verify the search is successful, CFRTA and FDOT data is available and received-date-time message header has a recent date and time. | Pass  Fail | 2.1.1  2.1.2  2.1.2.1  2.1.2.2  2.1.2.3  2.1.2.6 |
| **National Weather Service - Alerts** | | | | |
| 12 | Open the file *kafka\_sample\_records\_nws\_weather\_alert\_<<YYYMMDD>>.txt* | A text file is displayed with data message headers and the requested XML data. |  |  |
| 13 | Search for:  *“id”:* | Verify the search is successful, CFRTA and FDOT data is available and received-date-time message header has a recent date and time. |  |  |
| **SunGuide - Connected Vehicle data** | | | | |
| 14 | Open the file *kafka\_sample\_records\_sunguide\_cvs\_<<message Type>>\_<<YYYMMDD>>.txt* | A text file is displayed with data message headers and the requested XML data. |  |  |
| 15 | Search for:  *rseTamStatus* | Verify the search is successful and the message header has a recent date and time. | Pass  Fail | 2.1.1  2.1.2  2.1.2.1  2.1.2.2  2.1.2.3  2.1.2.6 |

|  |  |
| --- | --- |
| **Test End Date and Time** | 11/17/2020 09:16 |
| **Test Result (Pass/Fail)** | Pass |
| **Tester** | Natalie Coggeshall |
| **Approver** | Tushar Patel |

## RICMS-DFE-2: Demonstrate the RICMS can transform and store data source data.

The objective of this test is to demonstrate RICMS can load and store transformed data from the data sources into JSON format.

### Requirements Tested

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Text** |
| 2.1.2.7 | The DFE shall transform the data received from each data source into the format to be defined in the Critical Design Review. |
| 2.1.2.9 | The DFE shall append the data with a date and time stamp that the data was received from the server's system clock. |
| 2.1.2.10 | The DFE shall append or associate the data with a geolocation reference or region corresponding to the location represented by the data when appropriate. |
| 2.1.2.11 | The DFE shall load the transformed data received from each data source into the Data store. |
| 2.1.4 | The DFE shall store specified transformed data received from external systems. |
| 2.1.9 | The DFE shall store and provide data source metadata. |
| 2.1.9.1 | The DFE shall store a list of data source instances and history. Capture dates applicable, schema changes, etc. |
| 2.1.12 | The DFE shall index data sets. |

### Test Script

|  |  |
| --- | --- |
| **Test Start Date and Time** | 11/17/2020 09:27 |

| **Step** | **Instruction** | **Expected Result** | **Pass/Fail** | **Req #** |
| --- | --- | --- | --- | --- |
| 0 | **Preconditions:**   1. Testing computer needs to be on the same network as MongoDB 2. Verify Python 3 is installed    1. Open Command Prompt Window    2. Type “python --version” and press enter    3. If result is: “command not found” or your version is 2.X, download and install latest python version from https://www.python.org/downloads    4. Install python modules       1. Open command window: right-click windows > select Run > type cmd       2. Type: pip install pymongo and select enter to run 3. Ensure scripts saved to accessible local folder    * 1. Download the files available from a secured location. 4. In file explorer, open the subfolder named RICMS-DFE-2. 5. Change the directory of the command prompt to RICMS-DFE-2. | |  |  |
| 1 | From the command prompt, type:  mongo\_test.bat | The script will execute the Mongo queries with the defined parameters and generate output files in the same directory the file was run. |  |  |
| **SunGuide - TAM data** | | | | |
| 2 | Open the output file: sunguide\_tam\_current\_mongodb\_sample\_records\_YYYYMMDDHHMMSS.txt | File is posted to same directory. |  |  |
| 3 | Perform a search for:  *Collection: tam\_current*  And "receivedDateTime" | Verify that data is retrieved from MongoDB with a datetime stamp. | Pass  Fail | 2.1.2.7  2.1.2.9  2.1.2.10  2.1.2.11  2.1.4  2.1.9  2.1.9.1  2.1.12 |
| 4 | Open the output file: sunguide\_tam\_historical\_mongodb\_sample\_records \_YYYYMMDDHHMMSS.txt | File is posted to same directory. |  |  |
| 5 | Perform a search for:  *Collection: tam\_historical*  And "receivedDateTime" | Verify that data is retrieved from MongoDB with a datetime stamp. | Pass  Fail | 2.1.2.7  2.1.2.9  2.1.2.10  2.1.2.11  2.1.4  2.1.9  2.1.9.1  2.1.12 |
| **National Weather Alerts** | | | | |
| 6 | Open the output file: nws\_weather\_alert\_current\_mongodb\_sample\_records \_YYYYMMDDHHMMSS.txt | File is posted to same directory. |  |  |
| 7 | Perform a search for:  *Collection: weather\_alert\_current*  And "receivedDateTime" | Verify that data is retrieved from MongoDB with a datetime stamp. | Pass  Fail | 2.1.2.7  2.1.2.9  2.1.2.10  2.1.2.11  2.1.4  2.1.9  2.1.9.1  2.1.12 |
| 8 | Open the output file: nws\_weather\_alert\_historical\_mongodb\_sample\_records\_YYYYMMDDHHMMSS.txt | File is posted to same directory. |  |  |
| 9 | Perform a search for:  *Collection: weather\_alert\_historical*  And "receivedDateTime" | Verify that data is retrieved from MongoDB with a datetime stamp. | Pass  Fail | 2.1.2.7  2.1.2.9  2.1.2.10  2.1.2.11  2.1.4  2.1.9  2.1.9.1  2.1.12 |
| **GTFS - Transit** | | | | |
| 10 | Open the output file: transit\_static\_mongodb\_sample\_records s\_YYYYMMDDHHMMSS.txt | File is posted to same directory. |  |  |
| 11 | Perform a search for:  *DB: transit | Bucket: static*  And "receivedDateTime" | Verify data is retrieved from MongoDB with a datetime stamp. | Pass  Fail | 2.1.2.7  2.1.2.9  2.1.2.10  2.1.2.11  2.1.4  2.1.9  2.1.9.1  2.1.12 |
| 12 | Open the output file: transit\_trip\_updates\_current\_mongodb\_sample\_records\_YYYYMMDDHHMMSS.txt | File is posted to same directory. |  |  |
| 13 | Perform a search for:  *Collection: trip\_updates\_current*  And "receivedDateTime" | Verify that at least 3 iterations of 5 sample records are retrieved from MongoDB with a datetime stamp. | Pass  Fail | 2.1.2.7  2.1.2.9  2.1.2.10  2.1.2.11  2.1.4  2.1.9  2.1.9.1  2.1.12 |
| 14 | Open the output file: transit\_trip\_updates\_historical\_mongodb\_sample\_records\_YYYYMMDDHHMMSS.txt | File is posted to same directory. |  |  |
| 15 | Perform a search for:  *Collection: trip\_updates\_historical*  And "receivedDateTime" | Verify that 3 iterations are retrieved from MongoDB with a datetime stamp. | Pass  Fail | 2.1.2.7  2.1.2.9  2.1.2.10  2.1.2.11  2.1.4  2.1.9  2.1.9.1  2.1.12 |
| 16 | Open the output file: transit\_vehicle\_positions\_current\_mongodb\_sample\_records\_YYYYMMDDHHMMSS.txt | File is posted to same directory. |  |  |
| 17 | Perform a search for:  *Collection: vehicle\_positions\_current*  And "receivedDateTime" | Verify that 3 iterations of 5 sample records are retrieved from MongoDB with a datetime stamp. | Pass  Fail | 2.1.2.7  2.1.2.9  2.1.2.10  2.1.2.11  2.1.4  2.1.9  2.1.9.1  2.1.12 |
| 18 | Open the output file: transit\_vehicle\_positions\_historical\_mongodb\_sample\_records\_YYYYMMDDHHMMSS.txt | File is posted to same directory. |  |  |
| 19 | Perform a search for:  *Collection: vehicle\_positions\_historical*  And "receivedDateTime" | Verify that 3 iterations of 5 sample records are retrieved from MongoDB with a datetime stamp. | Pass  Fail | 2.1.2.7  2.1.2.9  2.1.2.10  2.1.2.11  2.1.4  2.1.9  2.1.9.1  2.1.12 |

|  |  |
| --- | --- |
| **Test End Date and Time** | 11/17/2020 09:40 |
| **Test Result (Pass/Fail)** | Pass |
| **Tester** | Natalie Coggeshall |
| **Approver** | Tushar Patel |

## RICMS-DFE-3: Demonstrate that transformed data can be filtered and accessed by data consumers through a representational state transfer (REST API) web services interface

The objective of this test is to demonstrate the RICMS provides the ability for internal and external consumers to request and receive data using filtered parameters on an individual basis.

### Requirements Tested

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Text** |
| 3.1.5.1 | The DFE shall provide an interface to the transformed data stored in the Data Store. |
| 3.1.6.1 | The DFE shall return the data requested by a data access request. |
| 3.1.6.3 | The DFE shall filter the data requested by the filter parameters used in the request. |
| 2.1.13.2 | The DFE shall provide the ability to query on a specified date range. |
| 2.1.13.3 | The DFE shall provide the ability to query on a specified time range. |
| 2.1.13.4 | The DFE shall provide the ability to query on a specified spatial range. |
| 1.1.1.7.8 | The R-ICMS shall provide an authorized user with a National Weather Service weather alert. |
| SS4-014 | The R-ICMS shall provide an API for external user access to the TAM data. |

### Test Script

|  |  |
| --- | --- |
| **Test Start Date and Time** | 11/17/2020 09:45 |

| **Step** | **Instruction** | **Expected Result** | **Pass/Fail** | **Req #** |
| --- | --- | --- | --- | --- |
| 1 | Access the provided **API\_test.bat** file and save locally. | File is saved locally. |  |  |
| 2 | Open Windows Explorer and double click the file to run the curl statements in a command prompt window. | The file will query the REST API for each of the Iteration 4 data sources and store the output files for each collection in the same directory the bat file was executed from. | Pass  Fail | 3.1.5.1 |
| **SunGuide - TAM Data** | | | | |
| 3 | Open the **tam\_current** file in Notepad**.** | The file output is displayed in JSON format. |  |  |
| 4 | Perform a search for:  "\_meta": {  "receivedDateTime" | Verify that tam data is available from the API. | Pass  Fail | 3.1.6.1  3.1.6.3  2.1.13.2  2.1.13.3  2.1.13.4  SS4-014 |
| 5 | Open the **tam archive** file in Notepad**.** | The file output is displayed in JSON format. |  |  |
| 6 | Perform a search for:  "\_meta": {  "receivedDateTime" | Verify that tam data is available from the API. | Pass  Fail | 3.1.6.1  3.1.6.3  2.1.13.2  2.1.13.3  2.1.13.4  SS4-014 |
| **Transit Static Data** | | | | |
| 7 | Open the **transit\_static\_current** file in Notepad**.** | The file output is displayed in JSON format. |  |  |
| 8 | Perform a search for:  "\_meta": {  "receivedDateTime" | Verify that transit static data is available from the API. | Pass  Fail | 3.1.6.1  3.1.6.3  2.1.13.2  2.1.13.3  2.1.13.4 |
| 9 | Open the **transit\_static\_archive** file in Notepad | The file output is displayed in JSON format. |  |  |
| 10 | Perform a search for:  "\_meta": {  "receivedDateTime" | Verify that transit static data is available from the API. | Pass  Fail | 3.1.6.1  3.1.6.3  2.1.13.2  2.1.13.3  2.1.13.4 |
| **Transit Vehicle Data** | | | | |
| 11 | Open the **trip\_updates\_current** file in Notepad. | The file output is displayed in JSON format. |  |  |
| 12 | Perform a search for:  "\_meta": {  "receivedDateTime" | Verify that transit trip data is available from the API. | Pass  Fail | 3.1.6.1  3.1.6.3  2.1.13.2  2.1.13.3  2.1.13.4 |
| 13 | Open the **trip\_updates\_archive** file in Notepad. | The file output is displayed in JSON format. |  |  |
| 14 | Perform a search for:  "\_meta": {  "receivedDateTime" | Verify that transit trip data is available from the API. | Pass  Fail | 3.1.6.1  3.1.6.3  2.1.13.2  2.1.13.3  2.1.13.4 |
| 15 | Open the **vehicle\_positions\_current** file in Notepad. | The file output is displayed in JSON format. |  |  |
| 16 | Perform a search for:  "\_meta": {  "receivedDateTime" | Verify that transit vehicle data is available from the API. | Pass  Fail | 3.1.6.1  3.1.6.3  2.1.13.2  2.1.13.3  2.1.13.4 |
| 17 | Open the **vehicle\_positions\_archive** file in Notepad. | The file output is displayed in JSON format. |  |  |
| 18 | Perform a search for:  "\_meta": {  "receivedDateTime" | Verify that transit vehicle data is available from the API. | Pass  Fail | 3.1.6.1  3.1.6.3  2.1.13.2  2.1.13.3  2.1.13.4 |
| National Weather Service (NWS) -Weather Alerts | | | | |
| 19 | Open the **weather\_alert\_current** file in Notepad. | The file output is displayed in JSON format. |  |  |
| 20 | Perform a search for:  "\_meta": {  "receivedDateTime" | Verify that **weather\_alert\_current** data is available from the API. | Pass  Fail | 1.1.1.7.8  3.1.6.1  3.1.6.3  2.1.13.2  2.1.13.3  2.1.13.4 |
| 21 | Open the **weather\_alert\_archive** file in Notepad. | The file output is displayed in JSON format. |  |  |
| 22 | Perform a search for:  "\_meta": {  "receivedDateTime" | Verify that **weather\_alert\_archive** data is available from the API. | Pass  Fail | 1.1.1.7.8  3.1.6.1  3.1.6.3  2.1.13.2  2.1.13.3  2.1.13.4 |

|  |  |
| --- | --- |
| **Test End Date and Time** | 11/17/2020 09:56 |
| **Test Result (Pass/Fail)** | Pass |
| **Tester** | Natalie Coggeshall |
| **Approver** | Tushar Patel |

## RICMS-DFE-4: Demonstrate that transformed data can be accessed by data consumers through a subscription service

The objective of this test is to demonstrate the RICMS provides the ability for internal and external consumers to request and receive data using filtered parameters on a subscription basis.

### Requirements Tested

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Text** |
| 3.1.5.2 | The DFE shall provide an interface to the transformed data input streams. |
| 3.1.6.4.1 | The DFE shall provide a subscription service interface to provide data feeds to data consumers |

### Test Script

|  |  |
| --- | --- |
| **Test Start Date and Time** | 11/17/2020 09:57 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Step** | **Instruction** | | **Expected Result** | **Pass/Fail** |
| 0 | **Preconditions:**   1. Testing computer needs to be on the same network as the API subscription service 2. Verify Python 3 is installed    1. Open Command Prompt Window    2. Type “python --version” and press enter    3. If result is: “command not found” or your version is 2.X, download and install latest python version from https://www.python.org/downloads    4. Install python modules       1. Open command window: right-click windows > select Run > type cmd       2. Type: pip install websocket-client and select enter to run 3. Ensure scripts saved to accessible local folder    * 1. Download the files available from a secured location. 4. In file explorer, open the subfolder named RICMS-DFE-4 | |  |  |
| **GTFS - Transit Data** | | | | |
| 1 | Open the subscription\_service\_test.bat and double click to launch the file (*Leave the script to run and move to second step*) | The script will establish web socket connections to the all routes and generates the output files in the same directory the file was run |  |  |
| 2 | Pre-requisite: *Restarting drivers require Kubernetes Admin Privileges. Hence an authorized Kubernetes Administrator has to run this script.*  Find the script delete\_fdot\_from\_gridfs.bat and double click to launch the file. | The script will delete the FDOT transit state data file from the DB . |  |  |
| 3 | Find the script restart\_drivers.ps1 and double click to launch the file. | The script will restart the transit static driver and sunguide cvs driver for the data to flow again through the Kafka topic. (*may take few minutes and is finished when “Driver Restarted” is displayed on the screen*) |  |  |
| 4 | Open the file *subscription\_sample\_records\_tripupdates\_<<YYYMMDD>>.txt* | A text file is displayed with the requested JSON data. |  |  |
| 5 | Search for:   1. *“trip\_update”* 2. *“responseTimestamp”* | Verify the search is successful. | Pass  Fail | 3.1.5.2  3.1.6.4.1 |
| 6 | Open the file *subscription\_sample\_records\_vehiclepositions\_<<YYYMMDD>>.txt* | A text file is displayed with the requested JSON data. |  |  |
| 7 | Search for:   1. *“ vehicle”* 2. *“responseTimestamp”* | Verify the search is successful. | Pass  Fail | 3.1.5.2  3.1.6.4.1 |
| 8 | Open the file *subscription\_sample\_records\_TransitStatic\_<<YYYMMDD>>.txt* | A text file is displayed with the requested JSON data. |  |  |
| 9 | Search for:  *"agency\_id": “FDOT"* | Verify the search is successful,  FDOT data is available | Pass  Fail | 3.1.5.2  3.1.6.4.1 |
| **National Weather Service - Alerts** | | | | |
| 10 | Navigate back to the parent folder RICMS-DFE-4 and go to the sub folder NWS, find the script NWS\_test\_websocket.bat and double click to launch the file. | The script will establish web socket connections to the required weather service routes and generates the output files in the same directory the file was run |  |  |
| 11 | Open the file *subscription\_sample\_records\_WeatherAlerts\_<<YYYMMDD>>.txt* | A text file is displayed with the requested JSON data. |  |  |
| 12 | Search for:   1. “@type: wx:Alert” 2. *“responsetimestamp”: <time> (at the bottom of the file)* | Verify the search is successful  The data type is wx: Alert and updated time is recent one. (*sometimes if there are no any active recent alerts, we will not be able to get any data)* | Pass  Fail | 3.1.5.2  3.1.6.4.1 |
| **SunGuide - Connected Vehicle data** | | | | |
| 13 | Open the file subscription*\_sample\_records\_TamStatus\_<<YYYMMDD>>.txt* | A text file is displayed with the requested JSON data. |  |  |
| 14 | Search for:   1. providerName: “cvs” 2. “receivedDateTime”: <timestamp> | Verify the search is successful,  The providerName should be cvs, and the timestamp should be recent. | Pass  Fail | 3.1.5.2  3.1.6.4.1 |

|  |  |
| --- | --- |
| **Test End Date and Time** | 11/17/2020 10:07 |
| **Test Result (Pass/Fail)** | Pass |
| **Tester** | Natalie Coggeshall |
| **Approver** | Tushar Patel |

## RICMS-DFE-5: Demonstrate the RICMS supports data source activity logging and statistics for maintenance support.

The objective of this test is to demonstrate the RICMS provide access to data source logs and history by support personnel.

### Requirements Tested

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Text** |
| 3.1.7 | The DFE shall report status information of permitted data sources. |
| 3.1.7.2 | The DFE shall report the first date and time represented by the data loaded for each data source. |
| 3.1.7.3 | The DFE shall report the last date and time represented by the data loaded for each data source. |
| 3.1.7.4 | The DFE shall report the ranges of missing data for data sources based on temporal coverage. |

### Assumptions

|  |
| --- |
| **Assumption** |
| Not Applicable |

### Test Script

|  |  |
| --- | --- |
| **Test Start Date and Time** | 11/17/2020 10:08 |

| **Step** | **Instruction** | **Expected Result** | **Pass/Fail** | **Req #** |
| --- | --- | --- | --- | --- |
| 1 | Log in to the R-ICMS user interface | User is logged into the test environment and the map page is displayed. |  |  |
| 2 | Access the Report List from the left drawer menu | The system displays a list of available reports |  |  |
| 3 | Select the Missing Data Report and select **Run Report** | The system displays the report parameter page |  |  |
| 4 | Specify the date range for the report or leave the default values | The system displays the selected report parameters |  |  |
| 5 | Specify the data source/data type or click **Select All** in the values list | The system displays the selected report parameters  Clay – Note> Need to discuss if desired to range default range from 1 year in the past to just 1 month in the past. |  |  |
| 6 | Select Run Report | The system generates the Missing Data Report  Note – Clay> Report uses both old and new FODT logo. Need to replace old FDOT logo with R-ICMS logo. | Pass  Fail | 3.1.7  3.1.7.4 |
| 7 | Close the report | The system returns the user to the Report List |  |  |
| 8 | Select the Data Source History Report and select **Run Report** | The system displays the report parameter page |  |  |
| 9 | Specify the data source/data type or click **Select All** in the values list | The system displays the selected report parameters |  |  |
| 10 | Select Run Report | The system generates the Data Source History Report | Pass  Fail | 3.1.7  3.1.7.2  3.1.7.3 |
| 11 | Close the report | The system returns the user to the Report List |  |  |

|  |  |
| --- | --- |
| **Test End Date and Time** | 11/17/2020 10:14 |
| **Test Result (Pass/Fail)** | Pass |
| **Tester** | Natalie Coggeshall |
| **Approver** | Tushar Patel |

## RICMS-DFE-6: Demonstrate the RICMS supports data availability status information

The objective of this test is to demonstrate the RICMS collection and logging of availability and errors in the data stores.

### Requirements Tested

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Text** |
| 2.1.5 | The DFE shall collect and store availability status information of each data source within the Data Store. |
| 2.1.5.2 | The DFE shall monitor and log the availability of the Data Store. |
| 2.1.5.3 | The DFE shall collect and store errors detected by each data store. |
| 2.1.5.4 | The DFE shall collect and store available data storage capacity for each data store. |

### Assumptions

|  |
| --- |
| **Assumption** |
| ArcCatalog is installed and available |

### Test Script

|  |  |
| --- | --- |
| **Test Start Date and Time** | 11/17/2020 10:15 |

| **Step** | **Instruction** | **Expected Result** | **Pass/Fail** | **Req #** |
| --- | --- | --- | --- | --- |
| 1 | Access Kibana with credentials | The system displays the Kibana dashboard |  |  |
| 2 | Select Discover from left navigation | The system displays the ability for users to enter search criteria |  |  |
| 3 | Add filter for “heartbeat-\*” and specify date range | The system retrieves all information for data store availability |  |  |
| 4 | Expand log entries to inspect the IP address and verify monitor.status = “up” | The system displays the availability of all data stores | Pass  Fail | 2.1.5  2.1.5.2 |
| 5 | Modify the filter for “filebeat-\*” | The system retrieves all information for data feed availability |  |  |
| 6 | Produce a login failure on the SQL server: | System will validate the credentials provided are not valid and produce an error. |  |  |
| 7 | Add a search for ”agent.hostname: “RICMS-SQL16-DEV” | The system retrieves the log records |  |  |
| 8 | Verify error log is created | The error is published in the monitoring log | Pass  Fail | 2.1.5.3 |
| 9 | Modify the filter for “metricbeat-\*” | The system retrieves all information for data store availability |  |  |
| 10 | Add a search for ”agent.hostname:gateway1.bigdata and metricset.name:filesystem” | The system retrieves the log records |  |  |
| 11 | Select Refresh | The system refreshes the data displayed |  |  |
| 12 | Expand a log entry | The details of the log entry are displayed |  |  |
| 13 | Verify and confirm the “system.filesystem.used.bytes” and “system.filesystem.used.pct” amounts | The system display the total space used for the selected data store. | Pass  Fail | 2.1.5.4 |

|  |  |
| --- | --- |
| **Test End Date and Time** | 11/17/2020 10:24 |
| **Test Result (Pass/Fail)** | Pass |
| **Tester** | Natalie Coggeshall |
| **Approver** | Tushar Patel |

## RICMS-DFE-7: Demonstrate the RICMS supports data capacity expansion

The objective of this test is to demonstrate the RICMS can support additional data capacity storage as needed.

### Requirements Tested

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Text** |
| 2.1.4.6 | The DFE shall be able to expand the capacity of data stores. |

### Assumptions

|  |
| --- |
| **Assumption** |
| The worker node was prepared in advance and the certificate for the node was added to the cluster’s certificate store. |

### Test Script

|  |  |
| --- | --- |
| **Test Start Date and Time** | 2020/11/17 10:25 |

| **Step** | **Instruction** | **Expected Result** | **Pass/Fail** | **Req #** |
| --- | --- | --- | --- | --- |
| 1 | Log into Cloudera manager:  In browser open https://10.32.92.130:7183  Enter the credentials for the admin user | The Cloudera manager main page is displayed. |  |  |
| 2 | Click on the HDFS service from the Cloudera Manager home page and note the original capacity of HDFS. | The Configured Capacity is displayed in the HDFS Summary section of the page |  |  |
| 3 | Choose Hosts -> Add Hosts and make sure Add hosts to cluster is selected | The cluster RICMS should already be chosen |  |  |
| 4 | Select Continue | The Setup workflow is displayed |  |  |
| 5 | In Cloudera manager UI press Continue | The workflow proceeds to the next step and the **Specify Hosts** page is displayed |  |  |
| 6 | On the Specify Hosts page, type ITSSD5ICMSCDHW3.d5-its.tsmo.dot.state.fl.us and press the Search button | Search results will appear below the Search button and the host to add will appear listed and selected/checked. |  |  |
| 7 | Select Continue | The workflow proceeds to the next step and the **Specify Repository** page is displayed |  |  |
| 8 | On the **Specify Repository** page make sure the Repository Location is set o Cloudera Repository and select Continue | The workflow proceeds to the next step and the **Accept JDK License** page is displayed |  |  |
| 9 | On the **Accept JDK license** page check the box to Install Oracle Java, and press Continue | The workflow proceeds to the next step and the **Enter Login Credentials** page is displayed |  |  |
| 10 | On the Enter Login Credentials page - select the following parameters   1. Login To All Hosts As: root 2. Authentication Method: All hosts accept same password 3. Enter Password: <provide root password> 4. Confirm Password: <provide root password> 5. Press continue | The workflow proceeds to the next step and the **Install Agents** page is displayed |  |  |
| 11 | Pause on the **Install Agents** page for the installation to complete | After agents are installed the wizard will automatically proceed to the **Install Parcels** page. |  |  |
| 12 | Pause on the **Install Parcels** page for the installation to complete | After parcels are installed the wizard will automatically proceed to the Inspect Hosts for Correctness page. |  |  |
| 13 | Select Continue | A confirmation message is displayed when complete |  |  |
| 14 | On the Select Host Template page, choose None as host template and leave checkbox checked (by default) and select Continue | The system displays a confirmation message that the node was successfully added. |  |  |
| 14 | Select Finish |  |  |  |
| **Configure Roles** | | | | |
| 15 | Go to Hosts -> All Hosts | All available hosts are displayed on the page |  |  |
| 16 | Check the checkbox next to ITSSD5ICMSCDHW3.d5-its.tsmo.dot.state.fl.us | The record is selected |  |  |
| 17 | In the Actions for Selected (1) menu choose Apply Host Template | The system displays the **Apply Host Template** dialog box |  |  |
| 18 | In the Apply Host Template dialog  Choose Host Template -> HadoopWorker (RICMS) and **check the Deploy client configurations** and start newly created roles. | The selected data is displayed |  |  |
| 19 | Press Confirm | The system will run a process to complete the role configuration |  |  |
| 20 | Select Close | The pop is no longer displayed |  |  |
| 21 | Return to the Cloudera Manager main page and select Clusters -> HDFS on the top menu ribbon bar | The Configured Capacity is displayed in the HDFS Summary section of the page | Pass  Fail | 2.1.4.6 |

|  |  |
| --- | --- |
| **Test End Date and Time** | 11/17/2020 10:40 |
| **Test Result (Pass/Fail)** | Pass |
| **Tester** | Natalie Coggeshall |
| **Approver** | Tushar Patel |

## RICMS-MON-1: Demonstrate that the Monitoring Service can create and resolve alerts.

The object of this test is to demonstrate that the RICMS provides the ability to create and resolve alerts related to data store availability, invalid data retrieval, fatal errors, and system metrics.

### Requirements Tested

|  |  |
| --- | --- |
| Requirement ID | Requirement Text |
| 2.1.1.2 | The DFE shall alert when valid data is not received for a data source. |
| 2.1.5.2 | The DFE shall monitor and log the availability of the Data Store. |
| 43.1 | The R-ICMS shall provide automated monitoring capabilities to alert operators of outages. |

### Assumptions

|  |
| --- |
| Assumption |
| The needed Elasticsearch Watchers are loaded in Kibana. |
| The tester has access to Kibana. |
| The tester has access to the RICMS website. |
| The tester has access to the test machine. |
| The tester has access to a PowerShell terminal. |
| The tester has access to the Kubernetes cluster and has permission to use the kubectl command. |
| The test machine has all needed test files. |
| The test machine has XML Tester installed and the user has access to it. |
| The Monitoring AlertThreshold is set to a lower value for testing. |
| The driver used for testing has access to the test machine. |
| The IP of the test machine is known. |

### Test Script

|  |  |
| --- | --- |
| Test Start Date and Time | 11/17/2020 15:23 PM |

| Step | Instruction | Expected Result | Pass/Fail | Req # |
| --- | --- | --- | --- | --- |
| Fatal Error Monitoring | | | | |
| 0 | Login to Kibana and navigate to the Watcher section. Navigate to the Management tab (Cog wheel at the bottom) and then click on the “Watcher” section. Verify that the fatal-error Watcher is running. | The fatal-error Watcher is running. |  |  |
| 1 | Login into the RICMS website as SwriUser2. | The user is logged on. |  |  |
| 2 | Clear any notification if any are present by clicking the notification bell in the top right and then click away. | Notifications are cleared if present. |  |  |
| 3 | Using a PowerShell terminal, apply a bad config file for the Response Plan Selection Service using the following command: kubectl apply -f bad-response-plan-selection.yaml | The Response Plan Selection Service config is set to point at an invalid URL. |  |  |
| 4 | Restart the Response Plan Selection Service by deleting the pod using the following command: kubectl delete pod –-selector=”app= response-plan-selection-service” | The Response Plan Selection Service is restarted, and the bad config value is now used. |  |  |
| 5 | Navigate back to the RICMS website and wait a minute or until a notification displays. Verify that the alert reports a fatal error from the Response Plan Selection Service. | The new alert reports a fatal error from the Response Plan Selection Service. | Pass  Fail | 43.1 |
| 6 | Re-deploy the good config file for the Response Plan Selection Service by running the following command in a PowerShell window: kubectl apply -f response-plan-selection.yaml | The Response Plan Selection Service config is updated with the original config value. |  |  |
| 7 | Restart the Response Plan Selection Service by deleting the pod using the following command: kubectl delete pod –selector=”app= response-plan-selection-service” | The Response Plan Selection Service is restarted, and the original config value is now used. |  |  |
| Invalid Data Monitoring | | | | |
| 8 | Navigate back to Kibana and verify that the invalid-data watcher is running. | The invalid-data Watcher is running. |  |  |
| 9 | Start XML Tester by double clicking the application icon. | The XML Tester window is open. |  |  |
| 10 | Configure the XML Tester by ensuring the Host value is set to 10.32.90.157 and the Port value is set to 8009 and the “Server” radio button is selected. | The XML Tester form fields are configured. |  |  |
| 11 | Press the Connect button in the XML Tester window. | The status in the lower left corner of the window displays “Waiting for connection on port 8009”. |  |  |
| 12 | Update the SunGuide RMS Driver config to point at the XML Tester by running the following command in a PowerShell window: kubectl apply -f xml-tester-sunguide.yaml | The SunGuide RMS Driver config is updated with the new XML Tester host value. |  |  |
| 13 | Restart the SunGuide RMS Driver by deleting the pod using the following command: kubectl delete pod --selector="app=sunguide-rms-driver" | The SunGuide RMS Driver is restarted, and the new host value is now used. |  |  |
| 14 | Verify a connection is established in the XML Tester window. | Status now reads:  “Connection established from: <SunGuideRmsDriverHost>” |  |  |
| 15 | In the XML Tester window, type the letter “x” in the large text box area used for sending messages. Press the button that resembles an envelope to send the message. | The letter “x”, which is invalid XML, is sent to the SunGuide RMS Driver. |  |  |
| 16 | Navigate back to the RICMS website and wait a minute or until a notification displays. Verify that the alert reports an invalid data retrieval from the SunGuide DMS Driver. | The new alert reports an invalid data retrieval from the SunGuide RMS Driver. | Pass  Fail | 2.1.1.2 |
| 17 | Re-deploy the original config file for the SunGuide RMS Driver by running the following command in a PowerShell window: kubectl apply -f sunguide.yaml | The SunGuide RMS Driver config is updated with the original host value. |  |  |
| 18 | Restart the SunGuide DMS Driver by deleting the pod using the following command: kubectl delete pod --selector="app=sunguide-rms-driver" | The SunGuide RMS Driver is restarted, and the original host value is now used. |  |  |
| 19 | Navigate back to the RICMS website and wait a minute or until a notification displays. Verify that the notification is a resolution to the previous alert. | The new notification is a resolution to the previous alert. | Pass  Fail  Note – Clay> Alert was received after a longer wait. R-ICMS team wants to investigate further | 2.1.1.2 |
| Data Store Monitoring | | | | |
| 20 | Navigate back to Kibana and verify that the data-store watcher is running. | The data-store Watcher is running. |  |  |
| 21 | Using a PowerShell terminal, apply a bad config file for the Data Store Heartbeat using the following command: kubectl apply -f bad-elastic-stack.yaml | The Data Store Heartbeat config is updated with a bad config value.  To simulate an unavailable Data Store, the port of SQL server host is changed to an incorrect value. Because the port is now incorrect, the Data Store Heartbeat will report the SQL server as “down”. |  |  |
| 22 | Restart the Data Store Heartbeat by deleting the pod using the following command: kubectl delete pod –-selector=”app=heartbeat” | The Data Store Heartbeat is restarted, and the bad config value is now used. |  |  |
| 23 | Navigate back to the RICMS website and wait a minute or until a notification displays. Verify that the alert reports a connection was lost to the SQL server. | The new alert reports a connection was lost to the SQL server. | Pass  Fail | 43.1, 2.1.5.2 |
| 24 | Re-deploy the original config file for the Data Store Heartbeat by running the following command in a PowerShell window: kubectl apply -f heartbeat.yaml | The Data Store Heartbeat config is updated with the original port value. |  |  |
| 25 | Restart the Data Store Heartbeat by deleting the pod using the following command: kubectl delete pod –-selector=”app=heartbeat” | The Data Store Heartbeat is restarted, and the original port value is now used. |  |  |
| 26 | Navigate back to the RICMS website and wait a minute or until a notification displays. Verify that the notification is a resolution to the previous alert. | The new notification is a resolution to the previous alert. | Pass  Fail | 43.1, 2.1.5.2 |
| CPU Monitoring | | | | |
| 27 | Verify that the monitoring alert threshold is set to a lower value for testing using the following command in a PowerShell terminal: kubectl describe configmap monitoring-service | Verify that AlertThreshold is set to 0. |  |  |
| 28 | Navigate back to Kibana and verify that the cpu-utilization watcher is running. | The cpu-utilization watcher is running. |  |  |
| 29 | Edit the watcher by clicking on the pencil icon. | An edit page is opened for the watcher. |  |  |
| 30 | Update the alert threshold percentage for CPU utilization from 95 to .01. | The alert threshold percentage for CPU utilization is changed from 95 to .01. |  |  |
| 31 | Click the “Save watch” button. | The watcher is saved, and the user is navigated back to the watcher list. |  |  |
| 32 | Navigate back to the RICMS website and wait a minute or until a notification displays. Verify that the notification reports a CPU utilization alert. | The new notification reports a CPU utilization alert. | Pass  Fail | 43.1 |
| 33 | Edit the watcher and revert the alert threshold percentage back to 95. | The watcher change is reverted. |  |  |
| RAM Monitoring | | | | |
| 34 | In the Watcher list, verify that the ram-utilization watcher is running. | The ram-utilization watcher is running. |  |  |
| 35 | Edit the watcher by clicking on the pencil icon. | An edit page is opened for the watcher. |  |  |
| 36 | Update the alert threshold percentage for RAM utilization from 95 to .01. | The alert threshold percentage for RAM utilization is changed from 95 to .01. |  |  |
| 37 | Click the “Save watch” button. | The watcher is saved, and the user is navigated back to the watcher list. |  |  |
| 38 | Navigate back to the RICMS website and wait a minute or until a notification displays. Verify that the notification reports a RAM utilization alert. | The new notification reports a RAM utilization alert. | Pass  Fail | 43.1 |
| 39 | Edit the watcher and revert the alert threshold percentage back to 95. | The watcher change is reverted. |  |  |
| Disk Space Monitoring | | | | |
| 40 | In the Watcher list, verify that the disk-space-utilization watcher is running. | The disk-space-utilization watcher is running. |  |  |
| 41 | Edit the watcher by clicking on the pencil icon. | An edit page is opened for the watcher. |  |  |
| 42 | Update the alert threshold percentage for Disk Space utilization from 95 to .01. | The alert threshold percentage for Disk Space utilization is changed from 95 to .01. |  |  |
| 43 | Click the “Save watch” button. | The watcher is saved, and the user is navigated back to the watcher list. |  |  |
| 44 | Navigate back to the RICMS website and wait a minute or until a notification pops up. Verify that the notification reports a Disk Space utilization alert. | The new notification reports a Disk Space utilization alert. | Pass  Fail | 43.1 |
| 45 | Edit the watcher and revert the alert threshold percentage back to 95. | The watcher change is reverted. |  |  |

|  |  |
| --- | --- |
| **Test End Date and Time** | 11/17/2020 15:59 |
| **Test Result (Pass/Fail)** | image003Pass |
| **Tester** | Clay Weston |
| **Approver** | Tushar Patel |

## RICMS-DSS-1 Initial (Pre-simulation) Event Evaluation

The system will perform initial event evaluation for response plan consideration using the selection settings, including filtering of response plans based on device status.

### Requirements Tested

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Text** |
| 4.1.1.1 | The R-ICMS shall evaluate the current performance of the network. |
| 5.1.3.2 | The R-ICMS shall determine if and which response plans should be evaluated by the External Modeling Engine. |
| 10.1.1.12 | R-ICMS response plans originated from SunGuide events will include the original SunGuide event ID in the response plan to aid in R-ICMS/SunGuide event association. |
| 23.2 | The R-ICMS shall provide evaluation data to the DFE Subsystem. |
| 24.5.1.1 | The R-ICMS shall store the timestamp when a rule is triggered and a response plan is selected. |

### Test Script

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| --- | --- |
| Test Start Date and Time | 11/18/2020 09:18 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Step** | **Instruction** | **Expected Result** | **Pass/Fail** | **Req #** |
| 0 | **Definitions:**   1. Test Area – The test area for these tests will be along I-4 Westbound between 46A/H E Thomas Jr Pkwy and W Lake Mary Blvd.   **Preconditions:**   1. SunGuide version 7.2 (patched with hotfixes) is running and providing event data to the DFE.    1. Locations are configured to allow events locations to be set within the Test Area. 2. The Response Plan Selection Service is running. 3. The Response Plan Selection Service is running in Verbose mode. 4. Valid applicability settings are defined for the Test Area. 5. Kibana is configured to receive logs of the Response Plan Selection Service. 6. Requires user with access to and familiarity with Kibana. 7. The Response Plan Database is accessible via SQL Server Management studio to review database items.   **Related queries:**  Kibana filters: `kubernetes.container.name is one of response-plan-selection-service` and `Properties.FormattedMessage exists` | |  |  |
| Event not on Configured Roadway | | | | |
| 1 | Create an Active SunGuide event at a location that **is not** on I-4 Westbound.  Note the SunGuide event ID. |  |  |  |
| 2 | Review the log message with template  Ending evaluation for event {eventId}, evaluation {evaluationId}: {stage} {reason}  Note the ‘reason’. | The system will not process the event further because the event is not on a configured roadway. | Pass  Fail | 10.1.1.12 |
| 3 | Close the event in SunGuide | Event is closed |  |  |
| No Response Plans divert around event location | | | | |
| 4 | Create an Active SunGuide event at a location that **is** on I-4 Westbound, but **not** within a region that any response plans affect.  Note the SunGuide event ID. |  |  |  |
| 5 | Review the log message with template  Verified event is on monitored roadway {eventLocationDesc} for event {eventId}, evaluation {evaluationId}, step {rpsStep} | The system will note that the event occurred on a monitored roadway | Pass  Fail | 10.1.1.12 |
| 6 | Review the log message with template  Ending evaluation for event {eventId}, evaluation {evaluationId}: {stage} {reason}  Note the ‘reason’. | The system will not process the event further because no response plans will divert around this location. | Pass  Fail | 5.1.3.2 10.1.1.12 |
| 7 | Close the event in SunGuide |  |  |  |
| No congestion at event location \*Using live ITSIQA data could cause the following test to be modified due to congestion” | | | | |
| 8 | Create an Active SunGuide event at a location that **is not** in the Test Area but **is** within a region that any response plans affect.   * I-4 Westbound * MM 102   Note the SunGuide event ID. | This will show that a response plan will not be triggered for an event location that is in a location with a response plan route around it but the congestion is outside of response plan coverage. |  |  |
| 9 | Review the log message with template  Using selection settings id {selectionSettingsId} for event {eventId}, evaluation {evaluationId}, step {rpsStep}, location {location}, mile marker {mileMarker} | Message Template shows that it is using selection settings for that event location and it matches the SunGuide event ID. | Pass  Fail | 10.1.1.12 |
| 10 | Review the Verbose log message(s) with template  Link {linkId} is NOT congested for {eventId}: speed {currentSpeed} >= {congestedSpeedMph} and >= {congestedSpeedTarget} [{historicalNormThresholdPercent}\*{historicalNorm}] | None of the upstream links are congested. |  |  |
| 11 | Review the log message with template  Ending evaluation for event {eventId}, evaluation {evaluationId}: {stage} {reason}  Note the ‘reason’. | The event has been rescheduled to evaluate again at the configured delay because no congestion was found. | Pass  Fail | 5.1.3.2 |
| No response plans divert around congestion | | | | |
| 12 | Use the event from the previous step.  Indicate congestion on the links beyond (e.g. further upstream than) the configured diversion routes by changing a debugging value for the necessary links.  On a web browser go to {baseUrl}/api/response-plan/selection/swagger  Under Debug choose /api/response-plan/selection/debug/speed-threshold  Click Try it out button and enter the linkId **127654218** into the linkId field  Enter a speedThreshold value of **80** (mph)  Click Execute  Wait for the rescheduled evaluation from the previous step to occur.  (Alternatively, use the debug route to force a reevaluation)  {baseUrl}/api/response-plan/selection/debug/force-evaluate | This step simulates congestion on a link by making the historical norm much higher than existing conditions. |  |  |
| 13 | Review the log message with template  Congested link ids {congestedLinks} for event {eventId}, evaluation {evaluationId}, step {rpsStep} | The system found congested links and will proceed to the next step. |  |  |
| 14 | Review the log message with template  Ending evaluation for event {eventId}, evaluation {evaluationId}: {stage} {reason} | The system could not find a diversion route around the congested links and lists the reason as “No candidate response plans for event” | Pass  Fail  **2020.12.09> Not testable without Aimsun providing additional upstream congestion** | 5.1.3.2 |
| 15 | Close the event in SunGuide |  |  |  |
| Best case: Plans exist that route around the congestion. | | | | |
| 16 | Reset any changed speed values to their previous values using the same route as before (‘/api/response-plan/selection/debug/speed-threshold’)  To reset a value, use ‘null’ as the speedThreshold value.  Indicate congestion on a link known to be in the **Test Area**  Use ITSIQA link: **781831571** |  |  |  |
| 17 | Create an Active SunGuide event at a location that **is** in the Test Area.   * Roadway/Direction: I-4 Westbound * Reference Point: **ICMTest4**   Note the SunGuide event ID. |  |  |  |
| 18 | Review the log message(s) with template  Congested link ids {congestedLinks} for event {eventId}, evaluation {evaluationId}, step {rpsStep} | The system found congested links and will proceed to the next step. | Pass  Fail | 4.1.1.1 10.1.1.12 |
| 19 | Review the log message with template  Candidate response plans {candidateResponsePlans} for event {eventId}, evaluation {evaluationId}, step {rpsStep} | The system found candidate response plans that can route around the congested links. | Pass  Fail | 5.1.3.2 |
| 20 | Review the log messages on the filtering process to show filtering rules being run.  Templates:  No signals are participating in an active timing plan for route {routeId}, event {eventId}  Route volume/capacity is within the threshold {volumeOverCapacity} < {volumeOverCapacityThreshold} for route {routeId}, event {eventId}  Found enough DMS signs (required: {requiredDmsPercent}, actual: {percentAvailable}) for route {routeId}, event {eventId}  No signals have signal plans that have changed too recently for route {routeId}, event {eventId}  Found enough changeable signals (required: {requiredSignalsPercent}, actual: {percentChangeable}) for route {routeId}, event {eventId}  All {totalCount} critical signals have the configured timing plans for route {routeId}, event {eventId} | The system used the values in the log message to filter the candidate response plans to a smaller list to submit to the simulation engine.  The values used were determined by the settings based on Response Plan Selection Settings for the roadway.  Certain overrides may be in place for this test due to this being a test system. Any overrides are logged with: "OVERRIDE: IsDmsAvailable is set to {overrideValue}" "OVERRIDE: IsSignalChangeable is set to {overrideValue}" "OVERRIDE:SignalHasTimingPlan is set to {overrideValue}"  Concepts tested:   * Any signal in active plan * Is diversion route over capacity * Has enough DMS available * Has a recently changed signal (15 minute interval) * Has enough critical changeable signals * All signs have appropriate timing plans | Pass  Fail | 4.1.1.1 5.1.3.2 |
| 21 | Use the Swagger page to retrieve the results from the API  Under the ResponsePlanSelection section, use the `/api/response-plan/selection/evaluations/{evaluationId}` route.  Note the Response JSON. | The evaluation details are available to external sources with the appropriate permissions. |  | 23.2 |
| 22 | Use the following query on the RPS database and note the values Started, Ended, and Reason, and ReevaluationTimestamp columns:  SELECT ev.SourceId,ev.CenterId,eval.[Id],eval.[Stage],[SettingsId],[Started],[Ended],[Reason],[ItsiqaLinkId],[ItsiqaLinkLength],[ItsiqaMileMarker],[ReevaluationTimestamp] FROM [Evaluations] eval JOIN [Events] ev on ev.[Id] = eval.RpsEventId ORDER BY eval.[Id] DESC | The relevant timestamps are recorded for this stage of event evaluation. | Pass  Fail | 24.5.1.1 |

|  |  |
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| Test End Date and Time | 11/18/2020 10:41 |
| Test Result (Pass/Fail) | Investigating 12 – 16; 17 – 22 passed  2020.12.09> passed step 11 and step 14 is not testable |
| Tester | Adam Dylla |
| Approver | Tushar Patel |

## RICMS-DSS-2 Simulation Engine Interaction

The system will send the applicable response plan data obtained from the GIS server to the Simulation Engine and await the score data callbacks from the Simulation Engine.

### Requirements Tested

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| --- | --- |
| **Requirement ID** | **Requirement Text** |
| 5.1.3.3 | The R-ICMS shall send a set of recommended response plans to the External Modeling Engine for evaluation. |
| 5.1.3.4 | The R-ICMS shall request future network conditions for the "do nothing" case from the external Modeling Engine. |
| 5.1.3.5 | The R-ICMS shall request future network conditions for a set of proposed response plans from the external Modeling Engine. |
| 5.1.3.6 | The R-ICMS shall request predictions with a rolling horizon of 30 minutes in the future from the External Modeling Engine. |
| 5.1.3.7 | The R-ICMS shall provide MOEs for each evaluated response plan for specified time horizons. |
| 5.1.3.8 | The R-ICMS shall evaluate the predicted transportation network conditions to compute predicted performance. |
| 5.1.3.9 | The R-ICMS shall compute an aggregate score for each response plan prediction. |
| 16.1.1.5 | The R-ICMS shall evaluate the impact on the transportation network of alternative response plans. |
| 16.1.1.6 | The R-ICMS shall receive the predicted response plan data from the External Modeling Engine for the alternative response plan scenarios. |
| 16.1.1.7 | The R-ICMS shall evaluate the measures of performance for the transportation network for response plans. |
| 18.1 | The R-ICMS shall coordinate the activation of traffic signal timing plans. |
| 18.1.1.1 | The R-ICMS shall evaluate traffic signal timing plans for specified arterial corridors. |
| 18.1.1.2 | The R-ICMS shall send recommended traffic signal timing plans to the External Modeling Engine for evaluation. |
| 18.1.1.3 | The R-ICMS shall provide the External Modeling Engine with identified corridors for optimization of traffic signal timing plans. |
| 18.1.1.4 | The R-ICMS shall support receiving results from the simulation of traffic signal timing plan recommendations from the External Modeling Engine. |
| 23.3 | The R-ICMS shall store model accuracy data. |
| 24.5 | The R-ICMS system performance, irrespective of the modeling engine, shall be in compliance with the KPI that is specified in the scope of work. |
| 24.5.1.2 | The R-ICMS shall store the timestamp when R-ICMS sends modelling tasks to the External Modelling Engine. |
| 24.5.1.3 | The R-ICMS shall store the timestamp when the External Modelling Engine sends results back to the R-ICMS. |
| 24.5.1.4 | The R-ICMS shall store the timestamp when R-ICMS evaluates results, calculates MOEs, and sends results to the DFE. |

### Test Script

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| Test Start Date and Time | 11/18/2020 10:59 |

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| --- | --- | --- | --- | --- |
| **Step** | **Instruction** | **Expected Result** | **Pass/Fail** | **Req #** |
| 0 | **Definitions:**   1. Test Area – The test area for these tests will be along I-4 Westbound between 46A/H E Thomas Jr Pkwy and W Lake Mary Blvd.   **Preconditions:**   1. SunGuide version 7.2 (patched with hotfixes) is running and providing event data to the DFE.    1. Locations are configured to allow events locations to be set within the Test Area. 2. The Response Plan Selection Service is running. 3. The Response Plan Selection Service is running in Verbose mode. 4. Valid applicability settings are defined for the Test Area. 5. Kibana is configured to receive logs of the Response Plan Selection Service. 6. Requires user with access to and familiarity with Kibana. 7. The Response Plan Database is accessible via SQL Server Management studio to review database items.   **Related queries:**  Kibana filters: `kubernetes.container.name is one of response-plan-selection-service` and `Properties.FormattedMessage exists` | |  |  |
| 1 | Use the most recent event from DSS-1 or create a new Active SunGuide event at a location that is in the **Test Area**.  If creating a new event, adjust the speed thresholds as necessary to trigger the proper response plans to be sent for simulation.  Note the SunGuide event ID. |  |  |  |
| 2 | Review the log message with template  Filtered response plans MaxSimulations=…  Review the log message with template  Sent {count} response plans to simulation engine: {simulationPack} for event {eventId}, evaluation {evaluationId}, step {rpsStep}  Note the number of response plan jobs received.  Note the response plan IDs that were used. | The system sent the set of response plans to the simulation engine.  The system limited the number of response plans to the configured limit with the expectation that the do-nothing plan will also be simulated and returned. | Pass  Fail | 5.1.3.3 |
| 3 | Wait for the scores to be received from the Simulation Engine.  Review the log messages with template  Score posted for event {eventId}, evaluation {evaluationId}, plan id {planId}: {score} | The simulation engine performs the evaluation of future network conditions for the do-nothing plan and the submitted response plans  The system should receive messages for each response plan sent plus the do-nothing scenario.  Scores are shown in each message. | Pass  Fail | 5.1.3.3 5.1.3.4 5.1.3.5 5.1.3.6 5.1.3.7 5.1.3.8 5.1.3.9 16.1.1.5 16.1.1.6 16.1.1.7 18.1 18.1.1.1 18.1.1.2 18.1.1.3 18.1.1.4 |
| 4 | Review the log message with template  All scores posted for event {eventId}, evaluation {evaluationId}. | All computed overall scores were received for this evaluation of the event and can now be sent to individuals for evaluation. | Pass  Fail | 5.1.3.9 |
| 5 | Use the following queries on the RPS database and note the SentToSimulationEngine and ReceivedAllSimulationScores columns:  SELECT ev.SourceId,ev.CenterId,eval.[Id] as EvaluationId,eval.SentToSimulationEngine,eval.ReceivedAllSimulationScores FROM [Evaluations] eval JOIN [Events] ev on ev.Id = eval.RpsEventId ORDER BY ev.[Id] DESC  SELECT ev.SourceId,ev.CenterId,eval.[Id] as EvaluationId,rp.[Id] as ResponsePlanId,rp.DiversionRouteId,rp.SimulationEngineId,score.OverallScore,score.ScoreReceived,score.Calibrated,score.ModelName,score.Confidence,score.DelaySeconds,score.Flow,score.SpeedMph,score.TravelTimeSeconds FROM [ResponsePlans] rp JOIN [Evaluations] eval ON eval.Id = rp.EvaluationId JOIN [Events] ev on ev.Id = eval.RpsEventId LEFT JOIN [Scores] score on score.ResponsePlanId = rp.Id ORDER BY eval.[Id] DESC | The relevant timestamps are recorded for this stage of event evaluation. | Pass  Fail | 23.3 24.5 24.5.1.2 24.5.1.3 24.5.1.4 |

|  |  |
| --- | --- |
| Test End Date and Time | 11/18/2020 11:03 |
| Test Result (Pass/Fail) | Pass |
| Tester | Adam Dylla |
| Approver | Tushar Patel |

## RICMS-DSS-3 Suggestion of Response Plans to ICM Managers

Upon receiving the scores from the Simulation Engine, the system will notify ICM managers of the plans and allow for selection of a plan, including selection of the ‘do-nothing’ plan.

### Requirements Tested

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| --- | --- |
| **Requirement ID** | **Requirement Text** |
| 5.1 | The R-ICMS shall recommend response plans for the user to review. |
| 5.1.3.10 | The R-ICMS shall provide evaluated response plans which exceed the aggregated score threshold to authorized users. |
| 10.1.1.1 | The R-ICMS shall allow authorized users to select an evaluated response plan. |
| 10.1.1.2 | The R-ICMS shall present attributes and evaluation MOEs with the response plan during selection. |
| 17.1 | The R-ICMS shall send updated incident response plans which exceed the aggregated score threshold to authorized users. |
| 17.1.1.1 | The R-ICMS shall provide updated evaluated response plan lists to authorized users. |
| 24.5.1.5 | The R-ICMS shall store the timestamp when IEN displays results of simulation to authorized users. |
| 24.5.1.6 | The R-ICMS shall store the timestamp when an authorized user selects a plan. |

### Test Script

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| Test Start Date and Time | 11/18/2020 11:08; Step 2 retested 11/19/2020 12:38 |

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| --- | --- | --- | --- | --- |
| **Step** | **Instruction** | **Expected Result** | **Pass/Fail** | **Req #** |
| 0 | **Definitions:**   1. Test Area – The test area for these tests will be along I-4 Westbound between 46A/H E Thomas Jr Pkwy and W Lake Mary Blvd.   **Preconditions:**   1. SunGuide version 7.2 (patched with hotfixes) is running and providing event data to the DFE.    1. Locations are configured to allow events locations to be set within the Test Area. 2. The Response Plan Selection Service is running. 3. The Response Plan Selection Service is running in Verbose mode. 4. Valid applicability settings are defined for the Test Area. 5. Kibana is configured to receive logs of the Response Plan Selection Service. 6. Requires user with access to and familiarity with Kibana. 7. The Response Plan Database is accessible via SQL Server Management studio to review database items.   **Related queries:**  Kibana filters: `kubernetes.container.name is one of response-plan-selection-service` and `Properties.FormattedMessage exists` | |  |  |
| 1 | Use the most recent event from DSS-2 or create a new Active SunGuide event at a location that is in the **Test Area**.  If creating a new event, adjust speed thresholds as necessary to trigger the proper response plans to be sent to and received back from simulation.  Note the SunGuide event ID. |  |  |  |
| 2 | Review the log message with template  Filtered response plan results InitialBenefitThreshold={initialBenefit} MaxSuggestedPlans={maxSuggestedPlans} FilteredPlans={filteredPlans} for event {eventId}, evaluation {evaluationId}, step {rpsStep} | The system used the configured threshold values to filter the list of response plans and scores prior to sending them to management for evaluation.  Note the initial benefit threshold  Note the maxSuggestedPlans  11/19/2020> set thresholds to -10 for the score for evals, and -20 for scores from re-evaluation. | Pass  Fail  **2020.12.09 Retesting>**  Pass  Fail | 5.1 17.1 |
| 3 | Log in to the R-ICMS website with user **RpsAdmin**.  Note the notification in the UI indicating **‘Response Plan Selection needed’** for the target event.  Review the log message with template  Response plans sent to ICM Manager for route selection for event {eventId}, evaluation {evaluationId}, step {rpsStep} | Notification with link is sent to ICM managers for selection of response plan for the next step of evaluation.  Note the evaluation ID in the log message | Pass  Fail | 5.1 5.1.3.10 17.1 17.1.1.1 |
| 4 | Click the link in the notification from the previous step.  Alternately, click on the Event List, select the target event and click the ‘Diversion Route Details’ button.  Select one of the rows in the list of available diversion routes.  Click ‘Poll For Approval’. | The data is retrieved for the event evaluation.  The UI displays the Response Plan details page for the selected evaluation of the target event.  The score information is displayed for the available diversion routes.  When selected, the device information is shown for the selected diversion route. | Pass  Fail | 10.1.1.1 10.1.1.2 17.1 17.1.1.1 |
| 5 | Use the following queries on the RPS database and note the SentForPlanSelection and ReceivedSelectedPlan columns:  SELECT ev.SourceId,ev.CenterId,eval.[Id],[Stage],SentForPlanSelection,ReceivedSelectedPlan FROM [Evaluations] eval JOIN [Events] ev on ev.Id = eval.RpsEventId ORDER BY Id DESC | The relevant timestamps are recorded for this stage of event evaluation.  This shows the manager has not selected a response plan. | Pass  Fail | 24.5.1.5 24.5.1.6 |

|  |  |
| --- | --- |
| Test End Date and Time | 11/18/2020 11:41, step 2 retesting completed 11/19/2020 12:  12/09/2020 11:46 retesting event |
| Test Result (Pass/Fail) | Step 2: Fail; Other steps passed  Step 2: Passed during 12/09/2020 11:46 retesting event |
| Tester | Adam Dylla |
| Approver | Tushar Patel |

## RICMS-DSS-4 Device Approval

Upon receiving the selected Response Plan from the ICM manager, the system will notify Device Owners as needed to allow approval of the device(s) to be included in the plan and automatically approve or reject devices for the selected plan based on the configured auto-approval profiles of the devices and device groups.

### Requirements Tested

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Text** |
| 1.2.5.6.3 | The R-ICMS shall provide an authorized user the capability to configure approval profiles to automatically approve a response plan request after a period of time defined by the user. |
| 1.2.5.6.4 | The R-ICMS shall provide an authorized user the capability to configure devices to automatically approve a response plan request during defined hours of the day after a period of time defined by the user. |
| 1.2.5.6.5 | The R-ICMS shall provide an authorized user the capability to configure approval profiles to automatically reject a response plan request during defined hours of the day after a period of time defined by the user. |
| 1.2.5.6.6 | The R-ICMS shall provide an authorized user the capability to configure devices to automatically reject a response plan request during defined hours of the day after a period of time defined by the user. |
| 1.2.5.7 | The R-ICMS shall provide the capability to assign devices to device groups. |
| 10.1.1.3 | The R-ICMS shall provide the selected proposed response plan elements to affected agencies. |
| 10.1.1.4 | The R-ICMS shall provide an interface to allow authorized users to approve proposed response plan elements. |
| 10.1.1.5 | The R-ICMS shall provide an interface to allow authorized users to reject proposed response plan elements. |
| 10.1.1.6 | The R-ICMS shall provide the ability for authorized users to track approval of proposed response plan elements. |
| 10.1.1.7 | The R-ICMS shall display attributes and status pertaining to the approval of response plan elements. |
| 24.5.1.7 | The R-ICMS shall store the timestamp when the IEN sends plan to affected agencies for approval |
| 24.5.1.8 | The R-ICMS shall store the timestamp when the last response plan approval is received |

### Test Script

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| --- | --- |
| Test Start Date and Time | 11/18/2020 11:43 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Step** | **Instruction** | **Expected Result** | **Pass/Fail** | **Req #** |
| 0 | **Definitions:**   1. Test Area – The test area for these tests will be along I-4 Westbound between 46A/H E Thomas Jr Pkwy and W Lake Mary Blvd.   **Preconditions:**   1. SunGuide version 7.2 (patched with hotfixes) is running and providing event data to the DFE.    1. Locations are configured to allow events locations to be set within the Test Area. 2. The Response Plan Selection Service is running. 3. The Response Plan Selection Service is running in Verbose mode. 4. Valid applicability settings are defined for the Test Area. 5. Kibana is configured to receive logs of the Response Plan Selection Service. 6. Requires user with access to and familiarity with Kibana. 7. The Response Plan Database is accessible via SQL Server Management studio to review database items.   **Related queries:**  Kibana filters: `kubernetes.container.name is one of response-plan-selection-service` and `Properties.FormattedMessage exists` | |  |  |
| 1 | Close the previous event to avoid conflicts.  Create a new Active SunGuide event at a location that is in the **Test Area**.  Adjust speed thresholds as necessary to ensure that the event gets to the ‘Awaiting Manager Selection’ stage.  Note the SunGuide event ID. |  |  |  |
| 2 | Find the event in the Event List and click Diversion Route Details.  Select a diversion route (other than the Do Nothing) row and review the Device List.  Note the Route Id (and signal pattern)  Note the first four device names (Signal names tend to end in #xxxx, for ease of reference). We will refer to these as **Device 1,2,3,4.** |  |  |  |
| 3 | Click on Admin/Device Groups on the navigation pane.  Click on Device Group 1.  Configure a single approval profile for the device group for the current day and the current time range (+/- 1 hour) and select to **Approve** and a delay of **4** minutes. Save.  Click on Device Group 2.  Configure a single approval profile for the device group for the current day and the current time range (+/- 1 hour) and select to **Reject** and a delay of **8** minutes. Save.  Configure Device 1 and 2 to be part of Device Group 1.  Configure Device 3 and 4 to be part of Device Group 2.  For Device 2, create a single approval profile to **Reject** after **6** minutes.  For Device 4, create a single approval profile to **Accept** after **10** minutes. | The devices now have approval profiles to approve or reject them after the configured delays.  The timeline will be as follows when a plan is ready to be polled for device approval:   * At 4 minutes, Device 1 becomes Approved * At 6 minutes, Device 2 becomes Rejected * At 8 minutes, Device 3 becomes Rejected * At 10 minutes, Device 4 becomes Approved. |  | 1.2.5.6.3 1.2.5.6.4 1.2.5.6.5 1.2.5.6.6 1.2.5.7 |
| 4 | Click the link in the notification from the notification for ‘**Response Plan Selection needed’**.  Alternately, click on the Event List, select the target event and click the ‘Diversion Route Details’ button.  Select the row of the Diversion Route selected in Step 2 in the list of available diversion routes.  Click ‘Poll For Approval’ and note the time. | The evaluation status changes to ‘Awaiting Device Approvals’ |  |  |
| 5 | Review the device list and wait for the 4, 6, 8, and 10 minute milestones. | At 4 minutes, Device 1 becomes Approved.  At 6 minutes, Device 2 becomes Rejected.  At 8 minutes, Device 3 becomes Rejected.  At 10 minutes, Device 4 becomes Approved. |  | 1.2.5.6.3 1.2.5.6.4 1.2.5.6.5 1.2.5.6.6 1.2.5.7 |
| 6 | Open a new browser in In-Private mode to allow logging in as a different user.  Log in as **Agency1.**  Click on the notification for **‘Device Approval needed’** for the target event. | The user is taken to the response plan details page. |  |  |
| 7 | Select the row that indicates ‘Device Approval needed’  Approve the devices that the user has permission to select.  Repeat step 6 and 7 for **Agency2**. | All devices will be marked as approved or rejected in the device status list.  The response plan will now be awaiting manager selection. | Pass  Fail | 10.1.1.3 10.1.1.4 10.1.1.5 10.1.1.6 10.1.1.7 |
| 8 | Use the following queries on the RPS database and note the ReceivedSelectedPlan. SentForDeviceApprovals and ReceivedAllDeviceApprovals columns:  SELECT ev.SourceId,ev.CenterId,eval.[Id],[Stage],ReceivedSelectedPlan, SentForDeviceApprovals,ReceivedAllDeviceApprovals FROM [Evaluations] eval JOIN [Events] ev on ev.Id = eval.RpsEventId ORDER BY Id DESC  Use the following queries on the RPS database and note the Approved and AgencyResponded columns:  SELECT ev.SourceId,ev.CenterId,eval.[Id] as EvaluationId,rp.[Id] as ResponsePlanId,rp.DiversionRouteId,devices.Id,devices.Discriminator,devices.Approved, devices.AgencyResponded FROM [ResponsePlans] rp JOIN [Evaluations] eval ON eval.Id = rp.EvaluationId JOIN [Events] ev on ev.Id = eval.RpsEventId LEFT JOIN [ResponsePlanDevices] devices on devices.ResponsePlanId = rp.Id ORDER BY eval.[Started] DESC | The relevant timestamps are recorded for this stage of event evaluation. | Pass  Fail | 24.5.1.7 24.5.1.8 |

|  |  |
| --- | --- |
| Test End Date and Time | 11/18/2020 12:28 |
| Test Result (Pass/Fail) | Pass |
| Tester | Adam Dylla |
| Approver | Tushar Patel |

## RICMS-DSS-5 Plan Approval and Activation

Upon receiving device manager approvals needed for the plan, the system will allow the ICM manager(s) to approve the plan for activation. When activated, performance timestamps will be calculated and saved for later reporting.

### Requirements Tested

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Text** |
| 5.1.1.1 | The R-ICMS shall receive agency status. |
| 5.1.1.2 | The R-ICMS shall provide agency status to authorized users. |
| 5.1.3.1 | The R-ICMS shall provide response plan lists for view and selection to authorized users. |
| 7.1.1 | The R-ICMS shall provide roadway event information through suggested response plans to SunGuide. |
| 10.1.1.10 | The R-ICMS shall send supported SunGuide response plan elements to SunGuide for activation. |
| 10.1.1.14 | The R-ICMS shall provide an interface to allow authorized users/systems to confirm enacted response plan elements. |
| 10.1.1.15 | The R-ICMS shall provide the ability for authorized users to track confirmation of enacted response plan elements. |
| 15.1 | The R-ICMS shall store history of enacted response plans. 15.1.1 The R-ICMS shall store the history of actions enacted during response plan implementation. |
| 16.1.1.2 | The R-ICMS shall store calculated performance measures. 24.5.1.9 The R-ICMS shall store the timestamp when an authorized user activates the response plan. |
| 24.5.1.10 | The R-ICMS shall store the timestamp when response plans are sent to SunGuide |
| 24.5.1.11 | The R-ICMS shall calculate and store delay. Delay is computed by summing the delays from 45.1 to 45.3, 45.4 to 45.5, 45.5 to 45.6, 45.10 to 45.11. |
| 24.5.1.12 | The R-ICMS shall provide a set of recommended response plans within 2 minutes of receiving a trigger to select alternative response plans from the modeling engine exclusive of time spent simulating the results of applying the response plans. |

### Test Script

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| --- | --- |
| Test Start Date and Time | 11/18/2020 11:38; retesting started 11/19/2020 11:05 |

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| --- | --- | --- | --- | --- |
| **Step** | **Instruction** | **Expected Result** | **Pass/Fail** | **Req #** |
| 0 | **Definitions:**   1. Test Area – The test area for these tests will be along I-4 Westbound between 46A/H E Thomas Jr Pkwy and W Lake Mary Blvd.   **Preconditions:**   1. SunGuide version 7.2 (patched with hotfixes) is running and providing event data to the DFE.    1. Locations are configured to allow events locations to be set within the Test Area. 2. The Response Plan Selection Service is running. 3. The Response Plan Selection Service is running in Verbose mode. 4. Valid applicability settings are defined for the Test Area. 5. Kibana is configured to receive logs of the Response Plan Selection Service. 6. Requires user with access to and familiarity with Kibana. 7. The Response Plan Database is accessible via SQL Server Management studio to review database items.   **Related queries:**  Kibana filters: `kubernetes.container.name is one of response-plan-selection-service` and `Properties.FormattedMessage exists` | |  |  |
| 1 | Use the event from DSS-4.  Note the SunGuide event ID. |  |  |  |
| 2 | Login as **RpsAdmin**.  Click on the notification for **‘All agency responses complete. Approval needed to activate Response Plan’** for the target event.  Alternately, click on the Event List, select the target event and click the ‘Diversion Route Details’ button.  Select the row of the Diversion Route that has a status of ‘**Awaiting Manager Review**’. | The evaluation stage is ‘Awaiting Manager Review’ | Pass  Fail ☐ | 5.1.1.1 5.1.1.2 5.1.3.1 |
| 3 | Ensure a user is logged into SunGuide and ensure that the user is logged in to EM, DMS, MAS, CVS, TCS and has the permission to be notified of response plans.  Click ‘Activate Response Plan’.  Note the status changed on the response plan details page to “Activated”  Note the notification for “Plan was activated”  Note the notification message in SunGuide | The system sent the request to SunGuide for activation.  SunGuide received a notification message that a response plan has been suggested. | Pass  Fail ☐ | 7.1.1 10.1.1.10 10.1.1.15 |
| 4 | Review the log message with the template  Plan was approved by manager Override={overridden} for event {eventId}, evaluation {evaluationId}, step {rpsStep}  Review the log message with the template  Rescheduling evaluation for event {eventId}, evaluation {evaluationId}: {reason}  Note the ‘reason’. | A notification is present that the plan has been activated.  Reason is be “Plan was activated” |  |  |
| 5 | Use the following queries on the RPS database and note the SentForActivationRequest ReceivedPlanToActivate, SentActivationRequestToSunGuide, and TotalDelay columns:  SELECT TOP(10) ev.SourceId,ev.CenterId,eval.[Id],[Stage],[Reason],[Started],SentToSimulationEngine,ReceivedAllSimulationScores,SentForPlanSelection,ReceivedSelectedPlan,SentForDeviceApprovals,ReceivedAllDeviceApprovals,SentForActivationRequest,ReceivedPlanToActivate,SentActivationRequestToSunGuide,TotalDelay FROM [Evaluations] eval JOIN [Events] ev on ev.Id = eval.RpsEventId ORDER BY Id DESC  SELECT Id, DATEDIFF(second, [Started], SentToSimulationEngine) PreScores,DATEDIFF(second, ReceivedAllSimulationScores, SentForPlanSelection) ScoresToSelection,DATEDIFF(second, ReceivedSelectedPlan, SentForDeviceApprovals) SelectionToDeviceApproval,DATEDIFF(second, ReceivedAllDeviceApprovals, SentForActivationRequest) DeviceApprovalToApproval,DATEDIFF(second, ReceivedPlanToActivate, SentActivationRequestToSunGuide) ApprovalToActivation FROM [Evaluations] ORDER BY Id DESC | The system calculated timestamps, total delay, and scheduled the event for re-evaluation at the configured interval. | Pass  Fail ☐ | 15.1 16.1.1.2 24.5.1.10 24.5.1.12 |

|  |  |
| --- | --- |
| Test End Date and Time | 11/18/2020 13:59; ended retesting on 11/19/2020 11:45 |
| Test Result (Pass/Fail) | Failed; will retest 11/28; Passed when retested on 11/19/2020 |
| Tester | Adam Dylla |
| Approver | Tushar Patel |

## RICMS-DSS-6 Plan Override

Instead of waiting on approval of devices, the ICM manager(s) are able to select a plan to activate.

### Requirements Tested

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Text** |
| 10.1.1.8 | The R-ICMS shall allow authorized users to activate a response plan regardless of agency approval status. |

### Test Script

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| --- | --- |
| Test Start Date and Time | 11:48 AM |

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| --- | --- | --- | --- | --- |
| **Step** | **Instruction** | **Expected Result** | **Pass/Fail** | **Req #** |
| 0 | **Definitions:**   1. Test Area – The test area for these tests will be along I-4 Westbound between 46A/H E Thomas Jr Pkwy and W Lake Mary Blvd.   **Preconditions:**   1. SunGuide version 7.2 (patched with hotfixes) is running and providing event data to the DFE.    1. Locations are configured to allow events locations to be set within the Test Area. 2. The Response Plan Selection Service is running. 3. The Response Plan Selection Service is running in Verbose mode. 4. Valid applicability settings are defined for the Test Area. 5. Kibana is configured to receive logs of the Response Plan Selection Service. 6. Requires user with access to and familiarity with Kibana. 7. The Response Plan Database is accessible via SQL Server Management studio to review database items.   **Related queries:**  Kibana filters: `kubernetes.container.name is one of response-plan-selection-service` and `Properties.FormattedMessage exists` | |  |  |
| 1 | Close the previous event to avoid conflicts.  Create a new Active SunGuide event at a location that is in the **Test Area**.  Adjust speed thresholds as necessary to ensure that the event gets to the ‘Awaiting Manager Selection’ stage.  Note the SunGuide event ID. |  |  |  |
| 2 | Click the link in the notification from the notification for ‘**Response Plan Selection needed’**.  Alternately, click on the Event List, select the target event and click the ‘Diversion Route Details’ button.  Click ‘Poll For Approval’. | The response plan moves to the ‘Awaiting Device Approval’ stage. |  |  |
| 3 | Without waiting for Device owners to approve or reject the devices,  Click ‘Activate Response Plan’.  Note the confirmation dialog.  Click ‘Override and Activate’ | It is possible to activate a response plan regardless of agency approval status. | Pass  Fail ☐ | 10.1.1.8 |

|  |  |
| --- | --- |
| Test End Date and Time | 11/19/2020 11:57 |
| Test Result (Pass/Fail) | Pass |
| Tester | Adam Dylla |
| Approver | Tushar Patel |

## RICMS-DSS-7 Limiting frequency of signal timing changes

After activating a response plan, a new event evaluation will not recommend a plan that has signals in common with the active response plan if the plan has been activated within the last 15 minutes

### Requirements Tested

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Text** |
| 24.6 | The R-ICMS shall not recommend a change to a currently activated response plan containing a signal that has changed within the last 15 minutes |

### Test Script

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| --- | --- |
| Test Start Date and Time | 11/19/2020 12:00 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Step** | **Instruction** | **Expected Result** | **Pass/Fail** | **Req #** |
| 1 | DO NOT close the previous event.  HOWEVER, do ensure that it has been **de-activated**.  Create a new Active SunGuide event at a location that is in the **Test Area**.  Adjust speed thresholds as necessary to ensure that the event gets to the ‘Awaiting Simulation Results’ stage.  Note the SunGuide event ID. |  |  |  |
| 2 | Review the log message with the template  "{recentlyChangedCount} signal(s) have a signal plan that has changed too recently for route {routeId}, event {eventId}"  Review the log message with the template  Filtered response plans {filteredResponsePlans} for event {eventId}, evaluation {evaluationId}, step {rpsStep} | No routes that have a recently changed signal are present in the list of filtered response plans. | Pass  Fail  **2020.12.09 Retesting>**  Pass  Fail | 24.6 |

|  |  |
| --- | --- |
| Test End Date and Time | 11/19/2020 12:11 |
| Test Result (Pass/Fail) | Fail  **2020.12.09 Retesting> passed** |
| Tester | Adam Dylla |
| Approver | Tushar Patel |

## RICMS-DSS-8 Re-evaluation of Active Plan

Enacted plans are re-evaluated on a configurable interval and a return-to-normal plan is considered by the system.

### Requirements Tested

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Text** |
| 16.1.1.1 | The R-ICMS shall reevaluate the performance of response plans on a configurable interval. |
| 16.1.1.3 | The R-ICMS shall evaluate the impact on the transportation network of returning to normal operations. |
| 16.1.1.4 | The R-ICMS shall receive predicted data from the External Modeling Engine for the return to normal operations scenario. |
| 17.1.1.2 | The R-ICMS shall include the updated alternate response plans and the return to normal operations scenario in the response plan list |

### Test Script

|  |  |
| --- | --- |
| Test Start Date and Time | 11/19/2020 12:12 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Step** | **Instruction** | **Expected Result** | **Pass/Fail** | **Req #** |
| 0 | **Definitions:**   1. Test Area – The test area for these tests will be along I-4 Westbound between 46A/H E Thomas Jr Pkwy and W Lake Mary Blvd.   **Preconditions:**   1. SunGuide version 7.2 (patched with hotfixes) is running and providing event data to the DFE.    1. Locations are configured to allow events locations to be set within the Test Area. 2. The Response Plan Selection Service is running. 3. The Response Plan Selection Service is running in Verbose mode. 4. Valid applicability settings are defined for the Test Area. 5. Kibana is configured to receive logs of the Response Plan Selection Service. 6. Requires user with access to and familiarity with Kibana. 7. The Response Plan Database is accessible via SQL Server Management studio to review database items.   **Related queries:**  Kibana filters: `kubernetes.container.name is one of response-plan-selection-service` and `Properties.FormattedMessage exists` | |  |  |
| 1 | Close all previous events in the **Test Area** to avoid conflicts.  Create a new Active SunGuide event at a location that is in the **Test Area**.  Adjust speed thresholds as necessary to ensure that the event gets to the ‘Awaiting Manager Selection’ stage.  Note the SunGuide event ID.  On the RPS Settings page, note the rescheduled delay in the RPS settings for Activated Plans. |  |  |  |
| 2 | Select the plan to `Poll For Approval`  Select `Activate Response Plan` without waiting for device approvals. |  |  |  |
| 3 | Wait for the evaluation to be run again after the configured delay.  Note the De-Activate Response Plan button is present now that the plan has been activated. | There is a button to De-Activate an Active plan | Pass  Fail | 16.1.1.1 |
| 4 | Once the plan is now ‘Awaiting Manager Review’ again, review the list of Diversion Routes.  Note the Do-Nothing information.  Note the Return-To-Normal information. | The Do-Nothing row shows information related to taking no action.  The Return-To-Normal row shows information related if the response plan would be deactivated. | Pass  Fail  2020.12.09> updated GUI shows do nothing and return to normal with relevant information from simulation | 16.1.1.3  16.1.1.4  17.1.1.2 |

|  |  |
| --- | --- |
| Test End Date and Time | 11/19/2020 12:35 |
| Test Result (Pass/Fail) | Pass; except for step 4 which needs design review  2020.12.09retesting after redesign – step 4 passes |
| Tester | Adam Dylla |
| Approver | Tushar Patel |

## RICMS-SOT-0: Demonstrate signal corridor measures of effectiveness

The system will demonstrate the detailed results of full signal corridor optimization and simulation that was generated before ATP

### Requirements Tested

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Text** |
| 19.1.1.2 | The R-ICMS shall provide the capability to load intersection data necessary to calculate capacity of intersection movements |
| 19.1.3.2 | The R-ICMS shall display measures of effectiveness from the SOT tool (HCS7 Streets) for proposed sets of signal timing plans for an intersection |
| 19.1.3.3 | The R-ICMS shall display The "score" calculated from the modelling engine and the SOT tool for proposed sets of signal timing plans for an intersection |
| 19.1.3.4 | The R-ICMS shall display MOEs from the modelling engine for proposed sets of signal timing plans for an intersection |
| 19.1.6.4 | The R-ICMS shall display measures of effectiveness for sets of signal timing plans and proposed offsets for corridors |
| 19.1.3.5 | The R-ICMS shall allow authorized users to modify signal timing plans within the proposed sets of signal timing plans for an intersection |

### Test Script

|  |  |
| --- | --- |
| **Test Start Date and Time** | 11/17/2020 14:19 |

| **Step** | **Instruction** | **Expected Result** | **Pass/Fail** | **Req #** |
| --- | --- | --- | --- | --- |
| 0 | Preconditions:   1. Active Directory (AD) users created: SotAdmin, SotUser 2. AD groups created for devices: agency1\_deviceGroup, agency2\_deviceGroup, agency3\_deviceGroup 3. SotAdmin has AD group memberships: icms\_user, signal\_operator, signal\_approver, signal\_signer, agency1\_deviceGroup, agency2\_deviceGroup, agency3\_deviceGroup 4. SotUser has AD group memberships: ricms\_user, signal\_operator, signal\_approver, agency1\_deviceGroup 5. R-ICMS roles created: SotUser, SotApprover, SotSigner 6. RICMS role SotUser is granted permission UseSot 7. RICMS role SotApprover is granted permission ApproveSotDevices 8. RICMS role SotSigner is granted permission AddSotSignatures 9. agency1\_deviceGroup has devices assigned: Orange Ave & 02-West Town Pkwy #23421 (Type: Traffic Signal, Center: SEM) 10. agency3\_deviceGroup has devices assigned: SR 434 & 05-Orange Ave #4342 (Type: Traffic Signal, Center: SEM), SR 434 & 03-Trailwood #2375 (Type: Traffic Signal, Center: SEM) 11. SotAdmin has created a corridor for signals 1200, 1205, and 1210 on SR-434 and ran a full optimization and simulation. The corridor active period should include multiple days of week from 7am to 12pm, using historical data from the week prior to ATP. |  |  |  |
| 1 | Log in to the R-ICMS user interface as SotAdmin | User is logged into the test environment and the map page is displayed. |  |  |
| 2 | Select SOT from the left side menu | The SOT list is displayed. Note, items are listed in reverse order by last modified date. |  |  |
| 3 | Select corridor 29 and double click to view details. | The corridor details are displayed, showing step 1: signals. |  |  |
| 4 | Click on step 2: Schedule | The corridor schedule is displayed. |  |  |
| 5 | Click on step 3: Intersections | The corridor intersection details are displayed, showing the first signal in the corridor by default. |  |  |
| 6 | Click the lane-diagram | A popup dialog is shown with lane configuration details and measures that were loaded from the SIIA API and used by the HCS7 optimization. | Pass  Fail ☐ | 19.1.1.2 |
| 7 | Select the tab for the second signal, then select the subtab for the second cluster, then click the “Traffic Volume” button. | A popup dialog is shown with the traffic volumes fetched from ITSIQA API and aggregated for the signal and time-cluster to be used by the HCS7 optimization. |  |  |
| 8 | Click on step 4: Results | The corridor results are displayed, with the default view showing the “All Clusters” tab with “Simulation Region & Corridor” selected. Data tables display the aggregate simulation statistics for existing versus new timing plans for overall scores, region statistics, and sub-path statistics. | Pass  Fail ☐ | 19.1.3.2  19.1.3.3  19.1.3.4  19.1.6.4 |
| 9 | Change the dropdown selection to “Simulation Signals” | Data tables display the aggregate simulation section statistics for new timing plans for delay, flow, flow capacity, queue length, and travel time. | Pass  Fail ☐ | 19.1.3.2  19.1.3.4  19.1.6.4 |
| 10 | Change the dropdown selection to “Simulation Delay % Improvement” | Heatmaps show the percent change in through-movement delay between existing and new timing plans over the full corridor active period. | Pass  Fail ☐ | 19.1.3.2  19.1.3.4  19.1.6.4 |
| 11 | Mouse over a cell in any displayed heatmap. | A tooltip shows detailed information, including the day of week, time of day, cluster assignment, and percent change in delay. | Pass  Fail ☐ | 19.1.3.2  19.1.3.4  19.1.6.4 |
| 12 | Click on the first non-free cluster tab. | The cluster results are displayed, with the default view showing the “HCS7 Segments & Signals”.  Data tables display the optimization result statistics for roadway segments and signals.  Cluster time periods and optimization settings summary are shown. | Pass  Fail ☐ | 19.1.3.2  19.1.6.4 |
| 13 | Change the dropdown selection to “Simulation Region & Corridor” | Data tables display the aggregate simulation statistics for existing versus new timing plans for overall scores, region statistics, and sub-path statistics. | Pass  Fail ☐ | 19.1.3.2  19.1.3.4  19.1.6.4 |
| 14 | Change the dropdown selection to “Simulation Signals” | Data tables display the aggregate simulation section statistics for new timing plans for delay, flow, flow capacity, queue length, and travel time. | Pass  Fail ☐ | 19.1.3.2  19.1.3.4  19.1.6.4 |
| 15 | Change the dropdown selection to “Simulation Delay % Improvement” | Heatmaps show the percent change in through-movement delay between existing and new timing plans over the full corridor active period. | Pass  Fail ☐ | 19.1.3.2  19.1.3.4  19.1.6.4 |
| 16 | Change the dropdown selection to “Signal Offsets” | Time space diagrams for forward and reverse progression are shown. A table of editable offset values per signal is shown. | Pass  Fail ☐ | 19.1.3.2  19.1.6.4 |
| 17 | Click and hold the up-arrow key for the offset for any signal. | The diagrams will redraw to match the new offset values. | Pass  Fail ☐ | 19.1.3.5 |
| 18 | Change the dropdown selection to “Signal Splits” | A phase split diagram and table with editable splits is shown. A dropdown box allows selection of each signal in the corridor. | Pass  Fail ☐ | 19.1.3.2  19.1.6.4 |
| 19 | Modify the cycle length or split values for the shown signal.   * Add 50 to cycle length (verify splits reallocated proportionally in both rings) * Subtract 50 from cycle length (verify splits reallocated proportionally in both rings) * Subtract 50 from ring barrier (verify splits reallocated proportionally in both rings) * Add 50 to ring barrier (verify splits reallocated proportionally in both rings) * Add 5 to phase 1 (phase 2 should subtract) | The diagram will redraw to reflect the changes. Note: green time is automatically calculated for phase 2 and 6, and the ring barrier is set accordingly. | Pass  Fail ☐ | 19.1.3.5 |
| 20 | Click the Undo Changes button, and accept the confirmation to overwrite any unsaved changes | Original values for splits and offsets will be restored, and the user is redirected back to step 1. |  |  |

|  |  |
| --- | --- |
| **Test End Date and Time** | 11/18/2020 14:58 |
| **Test Result (Pass/Fail)** | Pass |
| **Tester** | Angela Bos |
| **Approver** | Tushar Patel |

## RICMS-SOT-1: Demonstrate multiple intersection signal corridor optimization

The system will demonstrate a multiple signal corridor configuration, optimization, review, modification, re-evaluation, and deployment. The system will demonstrate map integration, exports of timing reports and data, and imports of signed reports.

### Requirements Tested

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Text** |
| 1.1.1.6.1 | The R-ICMS shall allow clicking on a traffic signal icon to display a menu option allowing the user to view SOT Optimization list filtered to the selected traffic signal. |
| 19.1.1.2 | The R-ICMS shall provide the capability to load intersection data necessary to calculate capacity of intersection movements |
| 19.1.1.3 | The R-ICMS shall provide the capability to load Intersection geometry data necessary to calculate capacity of intersection movements |
| 19.1.1.6 | The R-ICMS shall allow authorized users to specify which parameters should be optimized for an intersection during specific periods |
| 19.1.1.7 | The R-ICMS shall allow authorized users to specify whether phase sequencing should be optimized for an intersection for specific periods. |
| 19.1.1.8 | The R-ICMS shall allow authorized users to specify that phasing timing (splits) can be optimized while optimizing an intersection for specific periods. |
| 19.1.1.9 | The R-ICMS shall allow authorized users to specify whether Dallas phasing is valid for optimizing an intersection for specific periods. |
| 19.1.1.10 | The R-ICMS shall allow authorized users to specify whether cycle length should be optimized for an intersection for specific periods. |
| 19.1.1.11 | If the user has elected to allow the optimization of the cycle time, the R-ICMS shall allow authorized users to specify a maximum cycle length for an intersection for specific periods. |
| 19.1.1.12 | If the user has elected to allow the optimization of the cycle time, the R-ICMS shall allow authorized users to specify a minimum cycle length for an intersection for specific periods. |
| 19.1.1.13 | The R-ICMS shall allow authorized users to specify which parameters should not be optimized. |
| 19.1.1.14 | The R-ICMS shall load default values for parameters to be optimized for an intersection during specific periods. |
| 19.1.2.1 | The R-ICMS shall allow authorized users to define corridors consisting of one or more adjacent connected signalized intersections with the same annotated direction |
| 19.1.2.2 | The R-ICMS shall allow authorized users to define a common cycle time for a corridor (a single cycle time for the intersections in a corridor) during specific time periods. |
| 19.1.2.3 | The R-ICMS shall provide the capability to load intersection connection data |
| 19.1.2.4 | The R-ICMS shall allow authorized users to configure the times for which corridors are active. |
| 19.1.2.6 | The R-ICMS shall provide the coordination schedule for an intersection, including corridor membership |
| 19.1.2.8 | The R-ICMS shall allow authorized users to select the master intersection for a corridor during a specific time period. |
| 19.1.3.2 | The R-ICMS shall display measures of effectiveness from the SOT tool (HCS7 Streets) for proposed sets of signal timing plans for an intersection |
| 19.1.3.3 | The R-ICMS shall display The "score" calculated from the modelling engine and the SOT tool for proposed sets of signal timing plans for an intersection |
| 19.1.3.4 | The R-ICMS shall display MOEs from the modelling engine for proposed sets of signal timing plans for an intersection |
| 19.1.3.5 | The R-ICMS shall allow authorized users to modify signal timing plans within the proposed sets of signal timing plans for an intersection |
| 19.1.3.6 | The R-ICMS shall allow authorized users to request the generation of measures of effectiveness for modified signal timing plans for an intersection |
| 19.1.3.7 | The R-ICMS shall allow authorized users to attach a comment to a signal timing plan |
| 19.1.3.8 | The R-ICMS shall allow users to approve signal timing plan sets. |
| 19.1.3.9 | The R-ICMS shall allow users to download a corridor report that will facilitate digital signing by a licensed PE. |
| 19.1.4.1 | The R-ICMS shall allow authorized users to initiate optimization of a pre-defined corridor |
| 19.1.4.2 | The R-ICMS shall allow authorized users to select the pre-defined corridor to be evaluated |
| 19.1.4.3 | The R-ICMS shall allow authorized users to select the temporal pattern from which data will be used to evaluate the corridor |
| 19.1.4.4 | The R-ICMS shall allow authorized users to determine whether special days will be included in data used to evaluate the corridor |
| 19.1.4.5 | The R-ICMS shall allow authorized users to determine which days of the week equivalent to the corridor activation period will be included in data used to evaluate the corridor |
| 19.1.4.6 | The R-ICMS shall allow authorized users to define special days |
| 19.1.4.7 | The R-ICMS shall allow authorized users to select a contiguous date range relative to the optimization run time from which data will be used to evaluate the corridor |
| 19.1.4.8 | The R-ICMS shall use the contiguous time period equivalent to the corridor activation period from which data will be used to evaluate the corridor. |
| 19.1.4.9 | The R-ICMS shall allow authorized users to select the parameters to be optimized for a corridor. |
| 19.1.4.10 | The R-ICMS shall allow authorized users to configure the optimization parameters. |
| 19.1.6.3 | The R-ICMS shall allow authorized users to select a recommended corridor signal timing plan set to evaluate |
| 19.1.6.4 | The R-ICMS shall display measures of effectiveness for sets of signal timing plans and proposed offsets for corridors |
| 19.1.6.5 | The R-ICMS shall allow authorized users to modify the offsets for intersections within a corridor |
| 19.1.6.6 | The R-ICMS shall allow authorized users to request that modified corridor optimizations be simulated to produce updated measures of effectiveness |
| 19.1.6.7 | The R-ICMS shall allow authorized users to attach a comment to a signal timing plan set |
| 19.1.7.1 | The R-ICMS shall be capable of displaying a map highlighting corridors with recommended signal timing plan sets |
| 19.1.7.2 | The R-ICMS shall be capable of displaying a map with a selected corridor highlighted |
| 19.1.8.1 | The R-ICMS shall notify selected users that a signal timing plan set is available for review |
| 19.1.8.2 | The R-ICMS shall notify logged on users that a signal timing plan set is available for review via the R-ICMS alerting capability. |
| 19.1.8.3 | The R-ICMS shall notify selected users that a signal timing plan set is available for review via email. |
| 19.1.8.4 | The R-ICMS shall allow authorized users to navigate from a signal timing plan set alert to the signal timing plan recommendation. |
| 19.1.8.5 | The R-ICMS shall allow authorized users to reject a recommended signal timing plan set |
| 19.1.9.1 | The R-ICMS shall allow authorized users to generate a summary report of the signal timing plans for a corridor |
| 19.1.9.2 | The R-IMCS shall allow authorized users to generate output files. |
| 19.1.9.3 | The R-IMCS shall allow authorized users to generate signal timing plan output files. |
| 19.1.9.4 | The R-ICMS shall provide the capability to generate output files in a format which will facilitate the generation of comparable signal timing plan sets in Synchro. |
| 19.1.9.5 | The R-ICMS shall provide the capability to generate output files in a format which will facilitate the generation of comparable signal timing plan sets in TruTraffic. |
| 19.3.1.10 | The R-ICMS shall allow users to upload a signed corridor report to an optimization. |

### Test Script

|  |  |
| --- | --- |
| **Test Start Date and Time** | 11/18/2020 15:01 |

| **Step** | **Instruction** | **Expected Result** | **Pass/Fail** | **Req #** |
| --- | --- | --- | --- | --- |
|  | Preconditions:   1. Set the SOT notification threshold to -16.0 2. Restart the sot-business-service 3. Requested users and groups are created in FDOT active directory, including SotAdmin and SotUser, and SotUser has an email address configured as [ricms.test@gmail.com](mailto:ricms.test@gmail.com) 4. Tester should have a valid D5-ITS user login with access to Power BI reports 5. Tested should have login info for the [ricms.test@gmail.com](mailto:ricms.test@gmail.com) email account. | Note: lowering the notification threshold ensures that that popup and email notifications will be sent for this test case, regardless of the simulation result scores, which are highly dependent on input data. |  |  |
|  | Log in to the R-ICMS user interface as SotAdmin | User is logged into the test environment and the map page is displayed. |  |  |
|  | Select SOT from the left side menu | The SOT list is displayed. Note, items are listed in reverse order by last modified date. |  |  |
|  | Click the Add New button | “Corridor: New“ configuration screen is displayed on step 1: Corridor. |  |  |
|  | Open the Corridor Roadway dropdown and select roadway SR-434 | Traffic signals along SR-434 (from the SIIA API) are displayed in order by milepost. | Pass  Fail ☐ | 19.1.2.3 |
|  | Click on signal 1200: TRAILWOOD DR, then click on signal 1210: ORANGE AVE | All signals between 1200 and 1210 are selected, including signal 1205: WEST TOWN PKWY  Note: when the signal selection changes, the SIIA API is used to fetch signal details for the new selection. | Pass  Fail ☐ | 19.1.2.1 |
|  | Click on step 2: Schedule | The default corridor schedule is displayed. |  |  |
|  | Set the Corridor Active Period values to the following:  Start Time, 07:00  End Time, 12:00  Days of week, Tuesday and Wednesday |  | Pass  Fail ☐ | 19.1.2.4  19.1.4.5  19.1.4.8 |
|  | Set the Historical Traffic Period values to the following:  Start Date, Nov-09-2020  End Date, Nov-13-2020 | Error message: “History range (minus excluded dates and holidays) must include each selected day of week” | Pass  Fail ☐ | 19.1.4.3  19.1.4.7 |
|  | Click the Exclude Dates button | A popup dialog shows the user and holiday exclusion dates to be applied to the historical traffic period, including Veteran’s Day Nov-11. | Pass  Fail ☐ | 19.1.4.4 |
|  | Close the exclusion dates dialog, and disable the Exclude Holidays setting. | The error message is removed. |  |  |
|  | Click the Exclude Dates button, and click on Friday Nov-13 in the calendar widget. | Friday Nov-13 is shown User Exclusion Dates. | Pass  Fail ☐ | 19.1.4.4  19.1.4.6 |
|  | Close the exclusion dates dialog | The Exclude special option has been automatically enabled.  Error message: “History range (minus excluded dates and holidays) must include each selected day of week” |  |  |
|  | Set the Historical Traffic Period values to the following:  Start Date, Nov-06-2020 | The error message is removed. |  |  |
|  | In the Time of Day Schedule section, click the Existing tab. | A subset of tabs is shown for each signal, showing the existing coordination day-plans. | Pass  Fail ☐ | 19.1.2.6 |
|  | Select the Existing subtab for signal 1200, then click the Use This Schedule button | The view automatically switches to the For Optimization day-plan, and a copy of the existing day-plan for signal 1200 is populated.  Note: this day-plan includes 5 time-clusters, where cluster 1 operates in free mode, and other clusters will have HCS7 optimizations. |  |  |
|  | Click on the gear icon for cluster 1 | The Optimization Settings: Cluster 1 popup dialog is displayed. |  |  |
|  | Change the master signal to 1205 |  | Pass  Fail ☐ | 19.1.2.8 |
|  | Repeat for cluster 1 – 2:  Click on the gear icon for cluster, deselect the Cycle Length option, set Maximum Number of Generations to 20, and click OK | Note: disabling the cycle length allows the user preferred Initial Cycle Length to be preserved, and only splits and offset will be optimized by HCS7.  Note: setting the generations to a low number allows the optimization to complete in a short amount of time, for testing only. | Pass  Fail ☐ | 19.1.1.6  19.1.1.7  19.1.1.8  19.1.1.9  19.1.1.10  19.1.1.11  19.1.1.12  19.1.1.13  19.1.1.14  19.1.2.2  19.1.4.9  19.1.4.10 |
|  | Click on step 3: Intersections | A loading spinner and status messages are displayed while SunGuide-TCS (TMDD) signal timing parameters and ITSIQA turn movement counts are fetched.  After data is fetched, a set of tabs on the top of the screen shows the phase-movement assignments, lane diagram, and basic timing settings for each signal.  A set of subtabs for each signal shows the times of day, phase splits and offsets for time cluster. |  |  |
|  | Select the signal tab 1200 and click the lane diagram | A popup dialog shows lane configuration details for signal 1200. | Pass  Fail ☐ | 19.1.1.2  19.1.1.3 |
|  | Click OK to close the lane configuration dialog |  |  |  |
|  | Select the signal tab 1205 and the subtab for cluster 1, then click the Traffic Volume button | A popup dialog shows the traffic volume dialog, which includes the following saturation flow rates for movement types:   * Left turn: 1700 * Through: 1900 * Right turn: 1500 * U-turn: 1500 | Pass  Fail ☐ | 19.1.1.2 |
|  | Click OK to close the traffic volume dialog |  |  |  |
|  | Select the signal tab 1205 and the subtab for cluster 1, then set the offset to 95 | The user is able to enter an offset for signal 1205 cluster 1 | Pass  Fail ☐ | 19.1.2.8 |
|  | Click on step 4: Results | The corridor results are displayed, with the default view showing the “All Clusters” tab. Detailed statistics are not available yet. |  |  |
|  | Click the Optimize button | The corridor configuration is saved, and the user is redirected to the sot-list, where the new optimization is listed at the top (ordered by lastModifyDate descending) with a status of Optimizing.  Note: the optimization will automatically trigger a set of simulations when it completes. These processes may take a long time to complete.  Note: the estimated runtime for this test case is 2 minutes for optimization, 15-30 minutes for simulation. | Pass  Fail  **Note: Seems failure was due to an off-by-one error from the entered date range of the historical data**  **2020.12.09 Retesting>**  Pass  Fail | 19.1.4.1  19.1.4.2 |
|  | When both the optimization and simulation completed, the logged-in user should see a popup notification indicating successful completion. | A notification popup is displayed indicating the simulation completed successfully. | Pass  Fail ☐ | 19.1.8.1  19.1.8.2 |
|  | Click the results link in the notification. | The view is redirected to the corridor details. | Pass  Fail ☐ | 19.1.8.4 |
|  | Click on steps 3: Intersections | The step 3 details are show, which may show errors if the truncated optimization resulted in invalid splits. |  |  |
|  | Click on step 4: Results | The corridor results are displayed, with the default view showing the “All Clusters” tab with “Simulation Region & Corridor” selected. Data tables display the aggregate simulation statistics for existing versus new timing plans for overall scores, region statistics, and sub-path statistics. | Pass  Fail ☐ | 19.1.3.2  19.1.3.3  19.1.3.4  19.1.6.4 |
|  | Change the dropdown selection to “Simulation Signals” | Data tables display the aggregate simulation section statistics for new timing plans for delay, flow, flow capacity, queue length, and travel time. | Pass  Fail ☐ | 19.1.3.2  19.1.3.4  19.1.6.4 |
|  | Change the dropdown selection to “Simulation Delay % Improvement” | Heatmaps show the percent change in through-movement delay between existing and new timing plans over the full corridor active period. | Pass  Fail ☐ | 19.1.3.2  19.1.3.4  19.1.6.4 |
|  | Mouse over a cell in any displayed heatmap. | A tooltip shows detailed information, including the day of week, time of day, cluster assignment, and percent change in delay. | Pass  Fail ☐ | 19.1.3.2  19.1.3.4  19.1.6.4 |
|  | Click on the first non-free cluster tab. | The cluster results are displayed, with the default view showing the “HCS7 Segments & Signals”.  Data tables display the optimization result statistics for roadway segments and signals.  Cluster time periods and optimization settings summary are shown. | Pass  Fail ☐ | 19.1.3.2  19.1.6.4 |
|  | Change the dropdown selection to “Simulation Region & Corridor” | Data tables display the aggregate simulation statistics for existing versus new timing plans for overall scores, region statistics, and sub-path statistics. | Pass  Fail ☐ | 19.1.3.2  19.1.3.4  19.1.6.4 |
|  | Change the dropdown selection to “Simulation Signals” | Data tables display the aggregate simulation section statistics for new timing plans for delay, flow, flow capacity, queue length, and travel time. | Pass  Fail ☐ | 19.1.3.2  19.1.3.4  19.1.6.4 |
|  | Change the dropdown selection to “Simulation Delay % Improvement” | Heatmaps show the percent change in through-movement delay between existing and new timing plans over the full corridor active period. | Pass  Fail ☐ | 19.1.3.2  19.1.3.4  19.1.6.4 |
|  | Select the Cluster 1 tab, and select Signal Offsets in the dropdown | Verify that signal 1205 has offset of 95 | Pass  Fail ☐ | 19.1.2.8 |
|  | Clear the signal 1205 offset, then enter a value of 100 | The diagrams will redraw to match the new offset values. | Pass  Fail ☐ | 19.1.3.5  19.1.6.5 |
|  | Change the dropdown selection to Signal Splits, then set the split for signal 1205 as follows:  phase 5, NBL, 20 | The phase split diagram is updated to reflect the changes, and phase 6 is recalculated. | Pass  Fail ☐ | 19.1.3.5 |
|  | View the corridor status label near the top of the screen, then click the Save button | The corridor status label changes to “Modifying” | Pass  Fail ☐ | 19.1.3.6 |
|  | Select the All Clusters tab, then click the Simulate button | The corridor configuration is saved, and the user is redirected to the sot-list, where the modified corridor is listed first with a status of Preparing Simulation.  Note: the simulation is estimated to run in 15-30 minutes for this test case | Pass  Fail ☐ | 19.1.6.6 |
|  | When both the optimization and simulation completed, the logged-in user should see a popup notification indicating successful completion. | Note: we will not wait for this to complete. The rest of this test case will use s previously completed simulation. |  |  |
|  | Go to the SOT list from the left side menu, and select a simulation with status “Simulation Success” for SR-434: TRAILWOOD DR to ORANGE AVE, double click to open the corridor details view | The corridor details are displayed starting on step 1: Corridor |  |  |
|  | Click through to step 4: Results, then click the Review button the All Clusters tab | The approval status dialog is displayed. |  |  |
|  | Click inside the Corridor Plan Comments text area, and enter the text “This is a test comment”, then click the Add button | The comment is displayed in a table below the Corridor Plan Comments text area.  Note: corridor comments are add-only, they cannot be edited. | Pass  Fail ☐ | 19.1.6.7 |
|  | Click the Request Approval button | Buttons are enabled to allow users to approve/deny individual signal timing plans, approve all, deny all, and clear all. All signal approval statuses are set to Await Approval, and the corridor approval status is set to Awaiting Approval.  SotAdmin should be able to approve/deny all three signals. | Pass  Fail | 19.1.3.8  19.1.6.3 |
|  | Log the SotAdmin user out of the R-ICMS user interface |  |  |  |
|  | Show the email account inbox for SotUser | The user received a notification that corridor approval was requested. | Pass ☐  Fail ☐  Clay – Note>  Not Testable. FDOT will look into proving a shared FDOT mailbox for use. Will need to whitelist R-ICMS IPs. | 19.1.8.3 |
|  | Click the link from the SotUser email | The RICMS user interface is loaded in a browser, and the user is presented at the login screen. |  |  |
|  | Login as SotUser | The corridor details page is loaded |  |  |
|  | As SotUser, click through to step 4: Results, then click the Review button the All Clusters tab | The approval status dialog is displayed.  SotUser should be able to approve/deny only signal 1205. |  |  |
|  | Click on the comment dropdown associated with signal 1205, click the edit button, then enter the text “this signal has two NBL phases”, and click Save | The signal comment was modified.  Note: signal comments are editable | Pass  Fail | 19.1.3.7 |
|  | Click on the deny button (the X icon) for signal 1205 | The signal 1205 status is set to denied, and the corridor approval status is also set to denied. | Pass  Fail | 19.1.8.5 |
|  | Log the SotUser out of the UI, and login as SotAdmin user |  |  |  |
|  | Open the same corridor details, and click through to the step 4: Results screen, then click “Review” button to open the approval status dialog for the corridor. | The approval status dialog is displayed and shows that signal 1205 status is set to denied, and the corridor approval status is also set to denied. |  |  |
|  | Click the Cancel Request button | All signal statuses are set to Not Requested, and the corridor approval status is set to Not Requested. |  |  |
|  | Click the Request Approval button | Buttons are enabled to allow users to approve/deny individual signal timing plans, approve all, deny all, and clear all. All signal approval statuses are set to Await Approval, and the corridor approval status is set to Awaiting Approval. |  |  |
|  | Click the Approve All button | All signal approval statuses are set to Approved, and the corridor approval status is set to Approved. | Pass  Fail | 19.1.3.8 |
|  | Close the approval status dialog |  |  |  |
|  | Click on the Timing Report tab, then enter a valid Power BI username and password if needed (tester should have a valid D5-ITS user login with Power BI access). | The tab content shows an input field for an Optimization ID. |  |  |
|  | Enter the ID for the corridor (which is shown in the corridor title), then click the View Report button | The timing report for the corridor is generated and displayed in the tab content pane. |  |  |
|  | Click the Save icon button within the report tab, then select PDF, then save the file to the testing workstation. | The pdf file is stored on the test workstation. | Pass  Fail ☐ | 19.1.9.2  19.1.9.3  19.1.3.9  19.1.9.1 |
|  | Click on the All Clusters tab, then click the Timing Plans button | The Timing Plans dialog is loaded |  |  |
|  | Click the Upload R-ICMS Signed Plan button, accept the confirmation dialog message | A Windows file selection dialog is opened |  |  |
|  | Browse to the saved timing report, and click Open | The uploaded file is shown in the Timing Plans dialog, with an auto-generated filename and upload date. | Pass  Fail | 19.3.1.10 |
|  | Close the Timing Plan dialog |  |  |  |
|  | Click on the Data button | A loading spinner will be displayed (briefly) while csv files are generated and zipped, then the user will be able to download the zip file to the local workstation. Depending on the browser settings, the file download may happen automatically, or a dialog may open to select a file save location. |  |  |
|  | Double click the zip file to browse its contents. Then open a csv file to view its contents. |  | Pass  Fail ☐ | 19.1.9.2  19.1.9.4  19.1.9.5  (SSP.06) |
|  | Click the Deploy button | A confirmation dialog shows “Successfully deployed corridor”. The corridor status is set to Deployed.  Note: deploying a corridor prevents configuration of signals in different corridors at the same time of day. Validating conflicts is in another test case, for which this step is required in preparation. |  |  |
|  | Click the Map item from the left menu |  |  |  |
|  | When the map loads, click the sot-list icon in the top right button panel | The sot list opens in a split-pane view integrated with the map |  |  |
|  | Select the corridor from this test case in the sot list on the map | The map zooms to a view of the corridor showing both signals and roadway segments. | Pass  Fail ☐ | 19.1.7.1 |
|  | Click on a roadway segment for the corridor shown on the map | All corridor roadway segments are highlighted, and a info popup on the map shows corridor info | Pass  Fail ☐ | 19.1.7.2 |
|  | Click the link to View SOT corridors | The sot list is displayed and pre-filtered for corridors that include the selected signal. | Pass  Fail ☐ | 19.1.2.6  1.1.1.6.1 |
|  | Postcondition:   1. Set the SOT notification threshold to 8.0 2. Restart the sot-business-service | Note: 8.0 is the default value |  |  |

|  |  |
| --- | --- |
| **Test End Date and Time** | 11/19/2020 09:48 |
| **Test Result (Pass/Fail)** | Pass except 50 which FDOT has action to provide email shared mailbox |
| **Tester** | Angela Bos |
| **Approver** | Tushar Patel |

## RICMS-SOT-2: Demonstrate single intersection signal corridor optimization

The system will demonstrate a single signal corridor configuration with automatic day-plan generation, optimization, and review.

### Requirements Tested

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Text** |
| 19.1.3.1 | The R-ICMS shall provide the capability to optimize Signal Timing Plans for individual intersections |
| 19.1.6.2 | The R-ICMS shall display a list of corridors with recommended signal timing plan sets |

### Test Script

|  |  |
| --- | --- |
| **Test Start Date and Time** | 11/18/2020 16:11 |

| **Step** | **Instruction** | **Expected Result** | **Pass/Fail** | **Req #** |
| --- | --- | --- | --- | --- |
| * 1. 1 | Log in to the R-ICMS user interface as SotAdmin | User is logged into the test environment and the map page is displayed. |  |  |
|  | Select SOT from the left side menu, then set the status column filter to show only corridors with status Deployed or Simulation Success | The SOT list is displayed. Note, items are listed in reverse order by last modified date. The deployed corridor from the previous test case is shown. | Pass  Fail | 19.1.6.2 |
|  | Click the Add New button | “Corridor: New“ configuration screen is displayed on step 1: Corridor. |  |  |
|  | Open the Corridor Roadway dropdown and select roadway SR-434 | Traffic signals along SR-434 (from the SIIA API) are displayed in order by milepost. |  |  |
|  | Click on signal 1250: SANLANDO OFFICE PARK | Note: when the signal selection changes, the SIIA API is used to fetch signal details for the new selection. |  |  |
|  | Click on step 2: Schedule | The default corridor schedule is displayed. |  |  |
|  | Set the Corridor Active Period values to the following:  Start Time, 00:00  End Time, 24:00  Days of week, M-F (weekdays)  De-select the “Exclude holidays” option  And the historical date range to:  Start Date, Nov-9-2020  End Date, Nov-13-2020 |  |  |  |
|  | In the Time of Day Schedule section, click the Auto-calculate button, and accept the confirmation dialog to overwrite any existing day-plans. | A loading spinner and status message will display “Clustering turn counts”. When complete, the day-plan For Optimization will be automatically populated with the clustering results, and a plot icon button will be shown.  Note: the day-plan clustering results are meant as a starting point, which may require additional user edits for viability. |  |  |
|  | Click the plot icon button | A plot shows the results of turn count clustering. |  |  |
|  | Select the Existing subtab for signal 1250, then click the Use This Schedule button | The view automatically switches to the For Optimization day-plan, and a copy of the existing day-plan for signal 1250 is populated.  Note: this day-plan includes 5 time-clusters, where cluster 1 operates in free mode, and other clusters will have HCS7 optimizations. |  |  |
|  | Repeat for cluster 2 – 5:  Click on the gear icon for cluster, set Maximum Number of Generations to 20, and click OK | Note: offset optimization is disabled for single intersection, and the default objective is set to Balanced Delay  Note: setting the generations to a low number allows the optimization to complete in a short amount of time, for testing only. |  |  |
|  | Click on step 3: Intersections | A loading spinner and status messages are displayed while SunGuide-TCS (TMDD) signal timing parameters and ITSIQA turn movement counts are fetched.  After data is fetched, a set of tabs on the top of the screen shows the phase-movement assignments, lane diagram, and basic timing settings for each signal.  A set of subtabs for each signal shows the times of day, phase splits and offsets for time cluster. |  |  |
|  | Click on step 4: Results | The corridor results are displayed, with the default view showing the “All Clusters” tab. Detailed statistics are not available yet.  The Simulate button is disabled with a message indicating that “Simulation is not available for corridors with fewer than two intersections” |  |  |
|  | Click the Optimize button | The corridor configuration is saved, and the user is redirected to the sot-list, where the new optimization is listed first with a status of Optimizing.  Note: the optimization will NOT trigger any simulations, and the processes should easily complete within a few minutes. | Pass  Fail | 19.1.3.1 |
|  | When the optimizations are completed, the logged-in user should see a popup notification indicating successful completion. | A notification popup is displayed indicating the simulation completed successfully. |  |  |
|  | Click the notification link to open the corridor details | The corridor details are shown |  |  |
|  | Go to step 3: Intersections, then click on the subtab for Time Cluster 2.  Note that phase 2 and 6 are locked and auto-calculated.  Then enter 35 in the exclusive pedestrian time input field. | Phase 2 and 6 are unlocked for edits and no longer auto calculated.  Note: this input validation behavior mocks the HCS7 Streets user interface, so we ensure we are sending valid optimization requests. |  |  |
|  | Go to step 4: Results | The Optimize button is disabled, and step 2 indicates there are configuration errors. |  |  |
|  | Go to step 2: Schedule | Note that the Time of Day Schedule shows an error for cluster 2 |  |  |
|  | Repeat for cluster 2 – 5:  Click the gear icon  De-select Cycle Length optimization  Click OK | There is an error prohibiting Cycle Length optimization for uncoordinated intersections, which is cleared when the option is deselected.  HCS7 can only perform uncoordinated optimization for signals designated to have exclusive pedestrian time, and cycle length optimization is disallowed. |  |  |
|  | Go to step 4: Results, and click the Optimize button, accept confirmation to overwrite the previous results | The corridor configuration is saved, and the user is redirected to the sot-list, where the new optimization is listed first with a status of Preparing Optimization. Note: Preparing Optimization happens quickly, so the corridor may already be in Optimizing status by the time the sot-list is shown.  Note: the optimization will NOT trigger any simulations, and the processes should easily complete within a few minutes. |  |  |

|  |  |
| --- | --- |
| **Test End Date and Time** | 11/18/2020 16:30 |
| **Test Result (Pass/Fail)** | Pass |
| **Tester** | Angela Bos |
| **Approver** | Tushar Patel |

## RICMS-SOT-3: Demonstrate recurring signal corridor optimization with deployment conflicts

The system will demonstrate a recurring signal corridor configuration, optimization, review, and deployment with conflicts that must be resolved

### Requirements Tested

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Text** |
| 19.1.2.5 | The R-ICMS shall provide capabilities to ensure that no intersection is a part of two deployed corridors at the same time. |
| 19.1.5.1 | The R-ICMS shall conduct periodic optimization of selected pre-configured corridors. |
| 19.1.5.2 | The R-ICMS shall allow authorized users to configure the temporal pattern with a relative date range at which a pre-defined corridor will be evaluated. |

### Test Script

|  |  |
| --- | --- |
| **Test Start Date and Time** |  |

| **Step** | **Instruction** | **Expected Result** | **Pass/Fail** | **Req #** |
| --- | --- | --- | --- | --- |
| 1 | Log in to the R-ICMS user interface as SotAdmin | User is logged into the test environment and the map page is displayed. |  |  |
| 2 | Select SOT from the left side menu | The SOT list is displayed. Note, items are listed in reverse order by last modified date. |  |  |
| 3 | Select the corridor 29, and double click it to view details  When details are loaded, click the Clone button, and accept the warning about unsaved changes. | The view is changed to a new corridor configuration, with initial data populated from the cloned corridor. |  |  |
| 4 | Go to step 2: Schedule, set the Recurrence setting to weekly | The view shows additional options for weekly Recurrence settings and Historical Traffic Period |  |  |
| 5 | In the Recurrence section  Set the Days to Wednesday (or whatever day of week on which this test step is performed).  Set the Time to 23:00 | A label shows: Next Run: 11/18/20, 11:00 PM  Depending on the date this test case is run, the next run dates may vary. It should match the run-date of the test case, with a time of 11pm.  Note: this test case requires a follow-up steps on the day following this step |  |  |
| 6 | In the Historical Traffic Period section  Select 1 week of data  From 1 week ago | A label shows:  Historical Dates: 11/11/20 to 11/17/20  Depending on the date the test case is run, the start/end dates in this label may vary. They should match the week of data staring one week before the run date. | Pass  Fail ☐ | 19.1.5.2 |
| 7 | Click the Save button |  |  |  |
| 8 | Click the SOT item in the left menu pane | The view redirects to the sot list showing the newly configured corridor on top of the list with a status of Recurring |  |  |
| 9 | Record the highest numbered corridor ID for use later when this test case is resumed. | #40 |  |  |
| **This remaining steps in this test case are to be completed on the following day of testing** | | | | |
| 10 | Log in to the R-ICMS user interface as SotAdmin | User is logged into the test environment and the map page is displayed. |  |  |
| 11 | Select SOT from the left side menu | The SOT list is displayed showing a new corridor with the same configuration as the recurring one from this test case in Simulation Success status.  The new corridor ID should be one greater than the corridor ID recorded from step 9 on the previous day. | Pass  Fail ☐ | 19.1.5.1 |
| 12 | Double click on the new corridor to view details, go to step 4: Results, then click the Deploy button | The Deploy Corridor popup dialog shows conflicts from the corridor created and deployed in test case 1, which must be resolved. | Pass  Fail ☐ | 19.1.2.5 |
| 13 | Select SOT from the left side menu, double click on the corridor created in test case 1, then go to step 4: Results, then click the Retire button | The corridor status changes to Retired |  |  |
| 14 | Select SOT from the left side menu, double click on the new corridor verified by this test cases, then go to step 4: Results, then click the Deploy button | The Deploy Corridor popup dialog shows the corridor is successfully deployed |  |  |
| 15 | Select SOT from the left side menu, double click on the corridor that was retired in this test case, then go to step 4: Results, then click the Archive button | The corridor status changes to Archived |  |  |
| 16 | Select SOT from the left side menu | Archived corridors are filtered out of the sot list view by default |  |  |

|  |  |
| --- | --- |
| **Test End Date and Time** | 11/19/2020 10:06 |
| **Test Result (Pass/Fail)** | Pass |
| **Tester** | Angela Bos |
| **Approver** | Tushar Patel |

## RICMS-SOT-4: Demonstrate signal corridor restrictions per day of week and time of day

The system will demonstrate signal corridor configurations with respect to the following restrictions set in the SIIA system:

1. Can’t Lag Left
2. Can’t Run Concurrent Lefts
3. Exclusive phases for pedestrians
4. Split phase side street

### Requirements Tested

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Text** |
| N/A |  |

### Test Script

|  |  |
| --- | --- |
| **Test Start Date and Time** | 11/19/2020 10:06 |

| **Step** | **Instruction** | **Expected Result** | **Pass/Fail** | **Req #** |
| --- | --- | --- | --- | --- |
|  | Preconditions: run the mongo queries below to temporarily set restrictions in the R-ICMS DFE  db.intersection\_current.find(  { "summary.atspmid": "1220" },  { "summary.atspmid": 1, "detail.approaches.direction": 1, "detail.approaches.lanes.laneType": 1, "detail.approaches.lanes.movementRestrictions": 1 }  );  db.intersection\_current.updateOne(  { "summary.atspmid": "1220" },  { $push: { "detail.approaches.0.lanes.0.movementRestrictions":  {  "type" : "Can't Run Concurrent Lefts",  "startTime" : "7:30:00 AM",  "endTime" : "8:30:00 AM",  "dayOfWeek" : "All Days"  }  }}  );  db.intersection\_current.updateOne(  { "summary.atspmid": "1220" },  { $push: { "detail.approaches.2.lanes.1.movementRestrictions":  {  "type" : "Can't Lag Left",  "startTime" : "1:30:00 PM",  "endTime" : "2:30:00 PM",  "dayOfWeek" : "All Days"  }  }}  ); |  |  |  |
|  | Log in to the R-ICMS user interface as SotAdmin | User is logged into the test environment and the map page is displayed. |  |  |
|  | Select SOT from the left side menu | The SOT list is displayed. Note, items are listed in reverse order by last modified date. |  |  |
|  | Click the Add New button | “Corridor: New“ configuration screen is displayed on step 1: Corridor. |  |  |
|  | Open the Corridor Roadway dropdown and select roadway SR-434 | Traffic signals along SR-434 (from the SIIA API) are displayed in order by milepost. |  |  |
|  | Click on signal 1220 SAND LAKE RD |  |  |  |
|  | Click on step 2: Schedule | The default corridor schedule is displayed. |  |  |
|  | Set the Corridor Active Period to all days of week and disable exclude holidays |  |  |  |
|  | Set the Historical Traffic Period  Start: Nov-08-2020  End: Nov-14-2020 |  |  |  |
|  | In the Time of Day Schedule, click the Existing tag, and click the Use This Schedule button |  |  |  |
|  | Click on step 3: Intersections |  |  |  |
|  | Click the Restrictions button | The following signal restrictions should be displayed:   * EBT, All Days, 00:00 to 24:00, Split phase side street * WBT, All Days, 07:30 to 08:30, Can’t Run Concurrent Lefts * SBT, All Days, 13:30 to 14:30, Can’t Lag Left   Note: additional restrictions or copies for different approach lanes may also be included. |  |  |
|  | Close the Restrictions dialog |  |  |  |
|  | Validate that split-phasing is enabled and locked for editing |  | Pass  Fail ☐ |  |
|  | Click on the Time Cluster 2 tab, and note that phase 5 is lagged, but phase 1 is not lagged |  |  |  |
|  | Disable lag for phase 1 and 5 (SBL, NBL) | Error message is displayed: Concurrent lefts disallowed for phase 1/5 signal 1220 cluster 2 | Pass  Fail ☐ |  |
|  | Enable lag for phase 1 and 5 (SBL, NBL) | Error message is displayed: Concurrent lefts disallowed for phase 1/5 signal 1220 cluster 2 | Pass  Fail ☐ |  |
|  | Go to step 4: Results | The buttons to Optimize and Simulate are disabled, and a message is shown below: Invalid/Missing Data. Step 3 shows invalid intersection settings should be addressed. |  |  |
|  | Go to step 3: Intersections, select the Time Cluster 2 tab, and disable lag for phase 1 (SBL) | The error message is cleared from view |  |  |
|  | Select Time Cluster 3 tab | SBL lag phase option is disabled, and edits are locked  Note: this is because the time periods for cluster 3 include Monday 10:00 to 14:00, and the Can’t Lag Left restriction applies during that time. | Pass  Fail |  |
|  | Disable lag for phase 5 (NBL) | Error message is displayed: Concurrent lefts disallowed for phase 1/5 signal 1220 cluster 3 | Pass  Fail |  |
|  | Enable lag for phase 5 (NBL) | The error message is cleared from view |  |  |
|  | Repeat for Time Cluster tabs 4 and 5 | SBL lag phase option is disabled, and edits are locked | Pass  Fail |  |
|  | Select Time Cluster 6 tab | SBL lag phase option is NOT locked for edits, because the time periods do not overlap with the restriction.  Both SBL and NBL are not lagged, and the concurrent left error is not shown, because the time periods do not overlap with the restriction. | Pass  Fail |  |
|  | Go to step 1: Corridor, change the roadway selection to W LAKE MARY BLVD, and select signal 2055: COUNTRY CLUB RD |  |  |  |
|  | Go to step 2: Schedule, click the Existing tab, and click Use this Schedule |  |  |  |
|  | Go to step 3: Intersections | The error message is shown: 2055 SIIA restrictions require exclusive pedestrian time | Pass  Fail |  |
|  | Click on the Restrictions button | The following signal restrictions should be displayed:   * SBR, All Days, 00:00 to 24:00, Exclusive phases for pedestrians   Note: additional restrictions or copies for different approach lanes may also be included. |  |  |
|  | Close the Restrictions dialog |  |  |  |
|  | Enter a value of 20 in the Exclusive Pedestrian Time (s) input field | The error message is cleared  A new error messages may be displayed: Invalid splits or non-integer offset for signal 2055 cluster 4 | Pass  Fail |  |
|  | If needed, fix the invalid split on Time Cluster 4 tab by entering a value of 30 for the SBT phase 8 split | The error message is cleared |  |  |
|  | Go to step 4: Results | The buttons to Optimize and Simulate are disabled, and a message is shown below: Invalid/Missing Data. Step 2 shows invalid schedule settings should be addressed. |  |  |
|  | Postconditions: set the extract date for MongoDB SIIA current data “01-01-2000” to trigger a reload. It is recommended to put the driver into verbose log mode temporarily to monitor the refresh. The reload should take 10 to 20 minutes. |  |  |  |

|  |  |
| --- | --- |
| **Test End Date and Time** | 11/19/2020 10:31 |
| **Test Result (Pass/Fail)** | Pass |
| **Tester** | Angela Bos |
| **Approver** | Tushar Patel |