SunGuide® Software:

Device Integration Process

Prepared for:

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1 INTRODUCTION

SunGuide® Software is Florida's statewide advanced traffic management software that enables the Florida Department of Transportation's (FDOT's) Regional Traffic Management Centers (RTMCs) to carry out functions for the real-time, 24-hours a day, 7-days a week, operation of Florida's transportation system. SunGuide Software facilitates traffic and incident management; disseminates traveler information; exchanges critical information among agencies; and collects and reports traffic operations data. Since its inception in 2003 by FDOT, SunGuide Software has evolved to meet its users' needs and stay current with technological advancements, including the integration of new devices and systems.

SunGuide Software is based on an open architecture, and enables users to manage multiple subsystems. For example, operators can use the software to perform incident management tasks, obtain data from vehicle detection systems, display videos from roadside cameras, and inform motorists with messages on dynamic message signs, highway advisory radios, or by using the Florida 511 (FL511) advanced traveler information system. Devices and systems such as these must communicate with each other, and with SunGuide Software, to enable mission-critical functions of the FDOT RTMCs to be carried out. This document describes the process for integrating new devices, systems, and functionalities with SunGuide Software. A companion infographic, the SunGuide Device Integration Process Flowchart, can be found in the Appendix.

2 REFERENCES

The following documents and information sources, in conjunction with this document, serve as vital references for the SunGuide Software project:

- SunGuide Software website, http://sunguidesoftware.com
- Protocols Supported by SunGuide Software webpage, http://sunguidesoftware.com/about-hub/supported-protocols
- SunGuide Device Integration Process Flowchart
- Jira Software website, https://jira.datasys.swri.edu/jira/secure/Dashboard.jspa
- "SR-995-2.7.2-01 SunGuide Wrong Way Vehicle Detection System Supplemental Requirements", dated 07/16/2021, which can be downloaded at https://www.fdot.gov/traffic/traf-sys/product-specifications.shtm

3 CONTACTS

The following is a list of contacts for the SunGuide Software project:

- Derek Vollmer, FDOT Traffic Engineering Research Lab (TERL) Manager
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4 SUPPORTED DEVICE PROTOCOLS

Intelligent transportation systems (ITS) devices gather, analyze, and distribute real-time information to improve the safety, efficiency, mobility, security, and integration of transportation systems. SunGuide Software has functionality to interface with several types of ITS devices and systems. SunGuide Software can be used to configure, operate, and monitor these devices and systems, and currently supports protocols for:

- Dynamic Message Signs (DMS)
- Closed Circuit Television (CCTV) Cameras
- Connected Vehicles
- Video Switching: Internet Protocol (IP) Video
- Video Walls
- Safety Barriers
- Mobile Device Applications for Automatic Vehicle Location / Road Ranger (AVL/RR)
- Truck Parking
- Media Control Panel
- Traffic Detection (Point-based Detectors)
- Traffic Detection (Probe-based Detectors - Automatic Vehicle Identification [AVI])
- Traffic Detection (Probe-based Detectors - License Plate Reader [LPR])
- Highway Advisory Radios (HAR)
- Ramp Meters
- Road Weather Information Systems (RWIS)
- Incident Detection (Video Processing)
- Incident Detection (Wrong Way Driver)
- Incident Detection (Overheight Vehicle)
- Beacon Management
- Managed Lanes
- Traffic Signals

For up-to-date information on Protocols Supported by SunGuide Software, visit http://www.sunguidesoftware.com/about-hub/supported-protocols. New technologies, and new vendors for the technologies listed above, can be added to the suite of protocols supported by SunGuide Software. When new devices are proposed for integration with SunGuide Software, districts should determine if the device uses one of the currently supported protocols listed above. If the device's protocol is listed on the SunGuide Supported Protocols website for the appropriate functionality, then no further action is required.

If a new device's protocol is listed under one functional area, but is proposed for use in another, then the SunGuide device integration process must be followed for the proposed functionality. For example, if a traffic detector uses a protocol that is listed on the SunGuide Supported Protocols website under Traffic Detection, but the traffic detector is proposed for use as a Wrong Way Driver detection device and the protocol it uses is not listed under the Incident Detection (Wrong Way Driver) category, the SunGuide device integration process must be followed in its entirety.

If a protocol is not listed on the Protocols Supported by SunGuide Software webpage, but it is believed that the device or system in question is compatible with SunGuide Software, please contact the project's FDOT district representative for more details.

5 NTCIP DEVICES

Several ITS devices use National Transportation Communications for Intelligent Transportation System Protocol (NTCIP) to facilitate communications and interoperability between devices. NTCIP is a set of standards that allows equipment from different manufacturers to work together as a system, thereby reducing the reliance on specific equipment vendors and customized one-of-a-kind software.

If a new device or system is covered by an NTCIP standard, the process for integrating with SunGuide Software can be streamlined. The vendor will need to implement support for the NTCIP objects required for the proposed functionality. The vendor can consult with their FDOT district or the FDOT Central Office (CO) if there are any questions about which objects will be required. Once the necessary objects are implemented, the vendor should make the device or system available for testing at FDOT's TERL to follow the remainder of the integration process.

6 WRONG-WAY DRIVER DETECTION DEVICES

SunGuide Software includes functionality to detect wrong-way drivers (WWD) and provide alerts to the RTMC. To reduce the effort of integrating new WWD detection devices, FDOT created a generic application programming interface, or API, that vendors can implement to send alerts and images to the SunGuide Software without requiring changes to the software. The SunGuide Incident Detection System (IDS) WWD API was developed to open SunGuide Software's data and functionality to external third-party developers to allow WWD detection devices to communicate with SunGuide Software.

If the new device will be used for WWD detection, vendors should implement support for the SunGuide IDS WWD API, and make the device or system available for testing at the TERL to follow the remainder of the integration process.

7 OTHER DEVICES

If the new device or system is not covered by an NTCIP standard, and is not a WWD detection device, FDOT district representatives will work with the vendor and FDOT CO on the device integration process. The FDOT district will first create a ticket in Jira Software, the platform FDOT uses for issue collection and agile project management. The Jira issue ticket should request integration with SunGuide Software for the new device or system. This will begin the process for the SunGuide Software developer to work with the FDOT district making the request.

The vendor will be requested to provide their API for the device or system. If there are any other documents, such as specifications, Concept of Operations (ConOps), or other systems engineering documents relating to the device, system, or the project it will be deployed on, those should be provided as well. When all available information has been provided and reviewed, a determination will be made if the device or system can be integrated with SunGuide Software. If approved for integration, FDOT CO will implement SunGuide support for the Vendor API. The vendor will then make the device or system available for testing at the TERL to follow the remainder of the integration process.

8 INTEGRATION TESTING AND RELEASE

Once the development of enhancements for integration of new devices with SunGuide Software is completed, the candidate version of the SunGuide Software build will go through rigorous testing by the developer before being delivered to FDOT. FDOT will then conduct Independent Verification and Validation (IV&V) testing at the TERL using the device or system provided by the vendor. Immediately following the first execution of the IV&V testing, FDOT will supply results from verification steps and other general issues and observations to the SunGuide Software developer. The SunGuide Software developer will address any issues with system configuration, make software corrections, or recommend changes to test procedures or requirements. The vendor may need to be consulted during testing if problems or questions arise regarding the device or system. FDOT will retest all software corrections and repeat this process until all issues are resolved. FDOT will then produce a final test report of the test events. This report will conclude the IV&V testing.

The SunGuide Software developer will deliver the final software installation package and supporting documentation to the FDOT CO. The FDOT CO will then provide access to the software to SunGuide Software users for deployment.

Following the successful integration of the new device or system with SunGuide Software, the API will be added to the Protocols Supported by SunGuide Software webpage.

9 APPENDIX

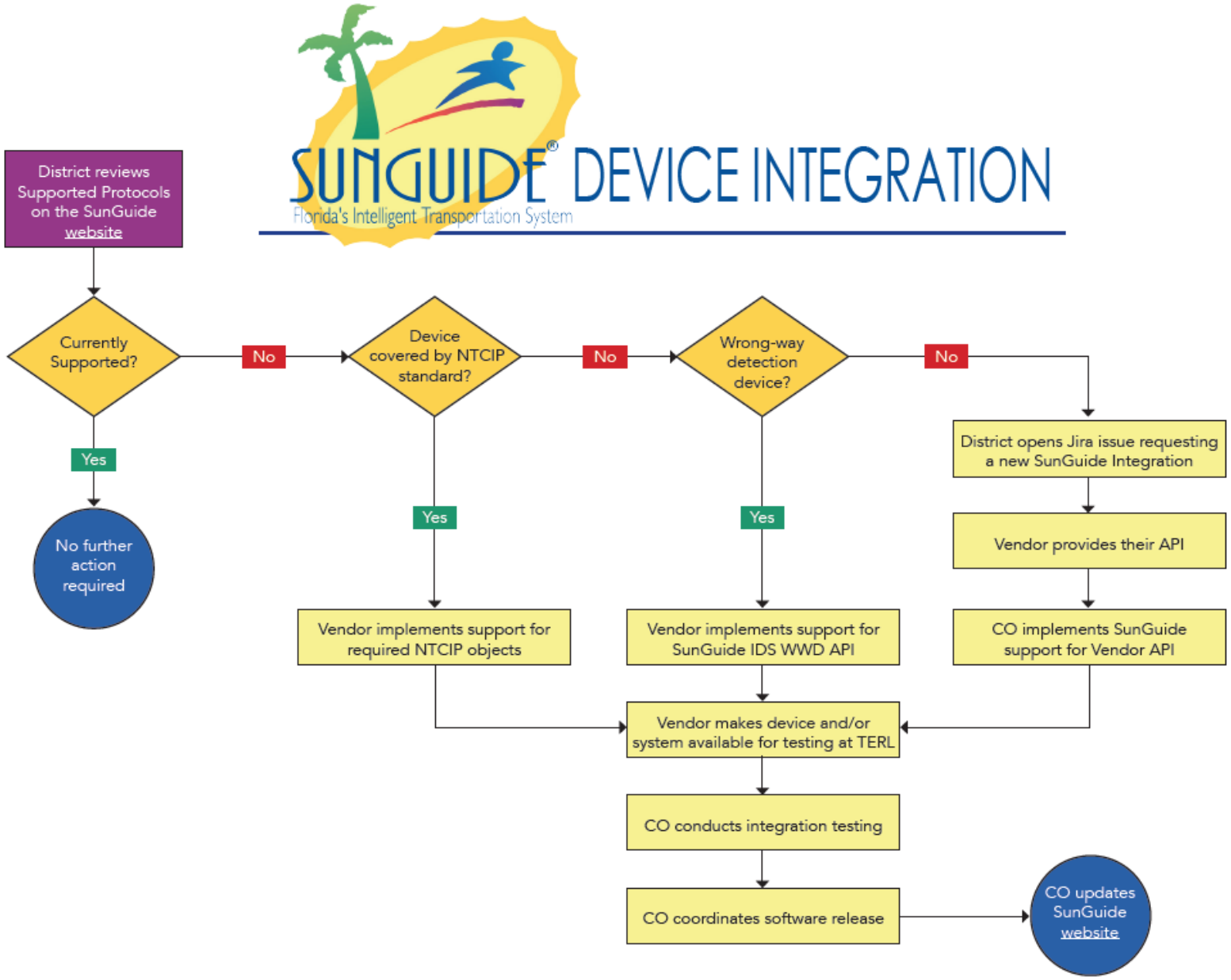

Figure 9-1 SunGuide Device Integration Process Flowchart