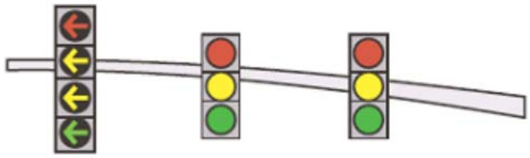
Dynamic Flashing Yellow Arrow (FYA)
A Study on Variable Left Turn Mode Operational and Safety Impacts - Phase III



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CONVERSION FACTORS

APPROXIMATE CONVERSIONS TO SI UNITS

SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
LENGTH				
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
AREA				
in^2	square inches	645.2	square millimeters	mm^2
ft^2	square feet	0.093	square meters	m^2
yd^2	square yard	0.836	square meters	m^2
ac	acres	0.405	hectares	ha
mi^2	square miles	2.59	square kilometers	km^2
VOLUME				
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liters	L
ft^3	cubic feet	0.028	cubic meters	m^3
yd^3	cubic yards	0.765	cubic meters	m^3
NOTE: volumes greater than 1000 L shall be shown in m^3				
MASS				
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	Mega grams (or "metric ton")	Mg (or "t")

*SI is the symbol for the International System of Units. Appropriate rounding should be made to comply with Section 4 of ASTM E380. (Revised March 2003)

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16. Abstract

The four-section head Flashing Yellow Arrow (FYA) provided an opportunity to advance the operation of the left turn mode at intersections. In phase III of the project, the UCF team further enhanced the decision support system (DSS) by developing an exclusive hardware platform. The hardware platform was developed for two main objectives: first, to provide a generic device compatible with the different controller types used by different jurisdictions within the FDOT Districts and, second, to automate selection of the FYA left-turn modes based on available gaps in the opposing traffic at intersections acquired in real time from existing sensors in the field. Phase III provided conclusive offline testing using a peer-to-peer logic environment as well as online and field testing of the DSS. Peer-to-peer-logic offers the advantage of acquiring and analyzing real-time traffic data coupled with video feed, with the benefit of a safe environment. The testing verified that the system was able to accurately acquire real-time traffic conditions and react by switching between red and FYA modes in a rational manner consistent with driver expectations and left-turning gap acceptance thresholds. It was also concluded that coordinated signals with very long cycle lengths, 3 minutes and longer, help in providing adequate gaps even in heavy traffic patterns since most of the vehicle arrivals are in platoons and at the beginning of the cycle. However, short cycle lengths eliminate sufficient gap times even with coordination. Two methods were used to calculate the minimum gap: discrete and average approach. Although the average method provides a more conservative approach, the discrete approach was more accurate. The developed platform is applicable at any four-section head configuration to alter the left turn restriction throughout the day to maximize safety and efficiency of the intersections.

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EXECUTIVE SUMMARY

The four-section head flashing yellow arrow (FYA) provided an opportunity to advance the operation of the left turn mode at intersections. In Phase III of the project, the UCF team further enhanced the decision support system (DSS) by developing an exclusive hardware platform. The hardware platform was developed for two main objectives. The first objective was to provide a generic device that would be compatible with the different controller types used by different jurisdictions within the FDOT districts. The DSS model testing through the pilot study conducted in Phase II as a proof of concept revealed several technical hitches related to the type of traffic signal controller utilized, such as Siemens controllers in Orange County versus Naztec in Seminole County. The second objective was to automate selection of the FYA left-turn modes based on available gaps in the opposing traffic at intersections acquired in real time from existing sensors in the field. The board used in the lab testing environment in Phase II was a one-way communication device. The decision of the algorithm was only displayed in a text box on the screen. An input/output (I/O) device was needed to complete the process and relay the decision back to the controller. The hardware platform receives volume data as well as signal phasing and timing (SPaT) inputs for a given cycle and returns recommendations to the controller.

A general wiring scheme capable of communicating with all TS-2 hardware layouts and controller models was achieved. Furthermore, a custom communication software with the new I/O board was developed using C# language. The software included various parameters required for a successful configuration of the hardware. The parameters included acquisition of signal timing, acquisition of mode, extracting arrival data from the input channels, and outputting data to the output channels. A user interface (UI) was also developed (1) to specify particular parameters pertinent to each intersection and also adjust parameters while the operation is in progress and (2) to visualize the input data and the output decision as they occur.

Offline testing was conducted using a peer-to-peer logic setup. Peer-to-peer logic offers the advantage of acquiring and analyzing real-time traffic data coupled with video feed with the benefit of a safe environment. Vehicle detection through loops or video detection is sensed in the field by the cabinet and the controller. Then, it is mapped in real-time mode from the intersection approach to the controller and cabinet in the lab. The algorithm analyzes the traffic data and makes a decision accordingly that is communicated back to the controller and generates a real-time log recording the events. Peer-to-peer logic was a crucial step to verify and validate the algorithm and the software prior to field testing.

Having proven the DSS in a virtual environment, the next step was to test it in the real world as part of the decision making at a traffic management center (TMC) with field intersections. The testing of the DSS and the hardware platform was conducted by connecting directly to various controller and cabinet types in an online mode while allowing for instant validation of the DSS. The DSS was tested at six different intersections located in Seminole, Orange, and Volusia counties. Field data were collected from the loop detectors in real-time mode on a second-by-second basis while monitoring traffic in each lane and detecting the status of the opposing green phase. Based on the intersection conditions and the gap threshold pertinent to the study intersection, the DSS sends the decision back to the controller in the field to apply it to the four-section head FYA.

Several issues and challenges were experienced in the field in the wiring setup and connections with certain controllers and cabinet types, especially with Siemens controllers and TS2 Type 2 Hybrid cabinets. In general, Siemens controllers don't have an output logic. In other words, it doesn't allow mapping an input as an output function as in the other controllers. Therefore, to overcome this issue, a peer-to-peer function on the controller itself was used to activate special functions to act as I/O logic. Furthermore, in the Temple Type 2 Hybrid cabinets, the I/O connections are wired differently from Type 1. The I/O connections are connected to the controller through pin connections (a, b, and c) and are broken out on the back panel and then connected to the load switches. However, they don't break out load switches; that's why a "Phase Check" function was used in lieu of the vehicle detector. Lastly, a relay was used to regulate the signal between the DSS I/O board and the controller.

Two approaches were tested to calculate the minimum gap: discrete and average approach. Overall, the DSS results using the discrete method, showed steady fluctuations between the red arrow and yellow arrow decisions throughout the testing periods, which is considered reasonable, especially for a driver's expectation. This also indicated that the thresholds were rational and practical. The decisions were also verified from the log file data, which showed the number of vehicles that arrived during the green phase along with the amount of green time in each cycle and the cycle length. However, the average method showed very conservative decisions. The average method was mainly used to verify saturated conditions and heavy traffic patterns assuming that the minimum gap is achieved between every two arriving vehicles every cycle in order to switch to a flashing yellow arrow. Although the average method provides a more conservative approach than the discrete one, the discrete approach is more accurate than the average approach.

It was also concluded that coordinated signals with very long cycle lengths, such as 3 minutes and longer, help in providing sufficient gaps even in heavy traffic patterns and during the peak hours because most of the vehicle arrivals are in platoons, due to coordination and at the beginning of the cycle. Therefore, in order to test the sensitivity of the algorithm to changes in the cycle length and also the difference between long and short cycles at coordinated signals, the intersection cycle length was reduced for a period of approximately 30 min. Although coordination helps in providing a more steady traffic flow with uniform arrivals of vehicles and eliminating the random arrivals, the DSS results showed that reducing the cycle length affects the traffic flow during the reduced green phase and eliminates sufficient gap times even with coordination.

The DSS testing confirmed the applicability and validity of the developed algorithm as well as the aforementioned procedure, criteria, and logic. The algorithm developed in this project will allow traffic signal controllers to be designed so that the appropriate left turn restriction can alter throughout the day to maximize safety and efficiency of the intersections. The value of the DSS in making real-time traffic decisions is crucial to improving the performance of the left turn and is applicable at any four-section head configuration.

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I. INTRODUCTION

1.1 Overview

Driven by the Decision Support System (DSS) and the interactive model developed in Phases I & II (BDK78 TWO 977-15, BDV24 TWO 977-10) for the selection of the flashing yellow arrow (FYA) left-turn phasing mode, changing based on current traffic conditions at intersections, the UCF research team is aiming at developing an exclusive hardware platform for the DSS for two main objectives. The first objective was to provide a generic device that would be compatible with the different controller types used by different jurisdictions within the FDOT districts. The DSS model testing, through the pilot study conducted in phase II as a proof of concept revealed several technical hitches related to the type of traffic signal controller utilized, such as Siemens controllers in Orange County versus Naztec in Seminole County. The second crucial objective was the automation of the decision process at the Traffic Management Center (TMC) as well as in the field. The board used in the field/lab testing environment in Phase II was a one-way communication device. The decision of the algorithm was only displayed in a text box on the screen. An input/output device is needed to complete the process and relay the decision back to the controller. The UCF research team developed a hardware platform, based on the DSS, which is connected to the controller in the field and automate the modification-selection process of the FYA mode on a cycle-by-cycle basis. The hardware platform receives volume data as well as signal phasing and timing (SPaT) inputs for a given cycle and returns recommendations back to the controller.

The proposed DSS is being developed with the goal of safely optimizing traffic operations. In the case of a red arrow signaled for a left turn, the opposing through traffic during the green phase is constantly analyzed in real time to determine whether it would be optimal to switch the red arrow to a flashing yellow arrow. The DSS would provide traffic engineers at the TMC with the tools to utilize the efficiency of the permissive left-turn phase at both peak and off-peak times and fine-tune time-of-day phasing to reduce the delay at approaches with low volumes. The result will be greater safety, higher throughput, and fewer delays at these intersections, producing greater convenience and efficiency for Florida drivers.

1.2 Objectives

The main project objectives are:

1- Select an appropriate I/O Data Logger Device
2- Develop a communication layer compatible with all FDOT controllers
3- Fine tune the DSS algorithm and criteria and its user interface
4- Offline testing and validation of the algorithm for safe operation
5- Online Field testing for different controller types

1.3 Summary of Phase III Project Tasks

Task 1: Hardware Procurement and Interface Design
Task 2: Software Development and Algorithm Fine Tuning
Task 3: Offline Testing
Task 4: Online Testing
Task 5: Draft and Final Report

II. HARDWARE PROCUREMENT AND INTERFACE DESIGN

2.1 Selection and Procurement of Digital Input/output Board

2.1.1 Examination of Boards in the Market

The first task in the project was to examine and study the available data logger hardware devices on the market. The goal is to procure a hardware board that is two-way communication and capable of connecting to the traffic controller on one side and to a computer on the other. The board used in the field/lab testing environment in phase II was a one-way communication device. The decision of the algorithm was only displayed in a text box on the screen. An input/output device is needed to complete the process and relay the decision back to the controller. The board is normally driven by a software interface that connects it to, and allows to be controlled by, the computer. This software is typically provided by the manufacturer to help developers interact with the hardware and build useful functionality into the system.

The project requirements for the hardware board are essentially the following:

i. Digital I/O board, i.e. capable of handling both digital input and output channels
ii. Has sufficient input and output channels to address multiple lanes and instructions
iii. Simple software interface compatible with Microsoft Visual Studio
iv. Portable

2.1.2 National Instruments

Our initial research choice led to National Instruments (www.ni.com). This is a company specializing in electronic test and measurement equipment. After consulting with their engineers, the following board and accessories were tentatively selected as shown in Figures 2-1 to 2-3.

Figure 2-1: NI-9375, PN: 785192-01

Figure 2-2: cDAQ-9171, PN: 781425-01

Figure 2-3: 782698-01 NI PS-10 power supply 24 VDC, 5A, 100-120/200-240 VAC

This board has the capability of handling 16 input and 16 output channels. It is compact and light weight which makes it ideal for the project. Unfortunately, after conducting significant research and effort with the company, it was found that the software provided was not easy to use, extremely bulky to install, and incapable of meeting the minimum requirements for our project. We had to look for another device.

2.1.3 CONTEC

We continued researching companies specializing in tests and measurements. A number of them were considered and our final choice was Contec (www.contec.com). Their subsidiary company is in Melbourne, FL (www.dtx.com). The software interface is relatively easy to install and use. The board is capable of handling 16 digital input and 16 digital output channels and it met the project requirements as shown in Figures 2-4 to 2-6.

Figure 2-4: Digital I/O board with 16 input and 16 output channels

Figure 2-5: External power supply necessary for the board operation

Figure 2-6: External larger power supply to provide power for the output channels

2.2 Wiring and Connection Testing

The UCF ITS laboratory is currently equipped with different traffic controllers and cabinets that were provided by Seminole and Orange County Traffic Engineering Staff to support the different controller types in the market such as Siemens and Naztec. Econolite controller will also be provided by Osceola County traffic engineering staff. Seminole County Traffic Engineering Staff were very helpful in setting up the testing environment as shown in Figure 2-7 and mapping the intersection loop detectors from the field to the cabinet in the lab through FDOT using a peer-to-peer logic. A workstation was also setup to monitor vehicle detection in real-time mode by CCTV cameras through the Bosch Video Management Software (BVMS). The intersection vehicle detection system through the loop occupancy and the CCTV cameras are connected to the I/O board and the communication software to receive data signaling the traffic flow on a second by second basis. Figures 2-8 to 2-10 show the inside of a Naztec controller cabinet and the different panels and modules needed for the wiring process.

Figure 2-7: Seminole county staff setting up the testing environment

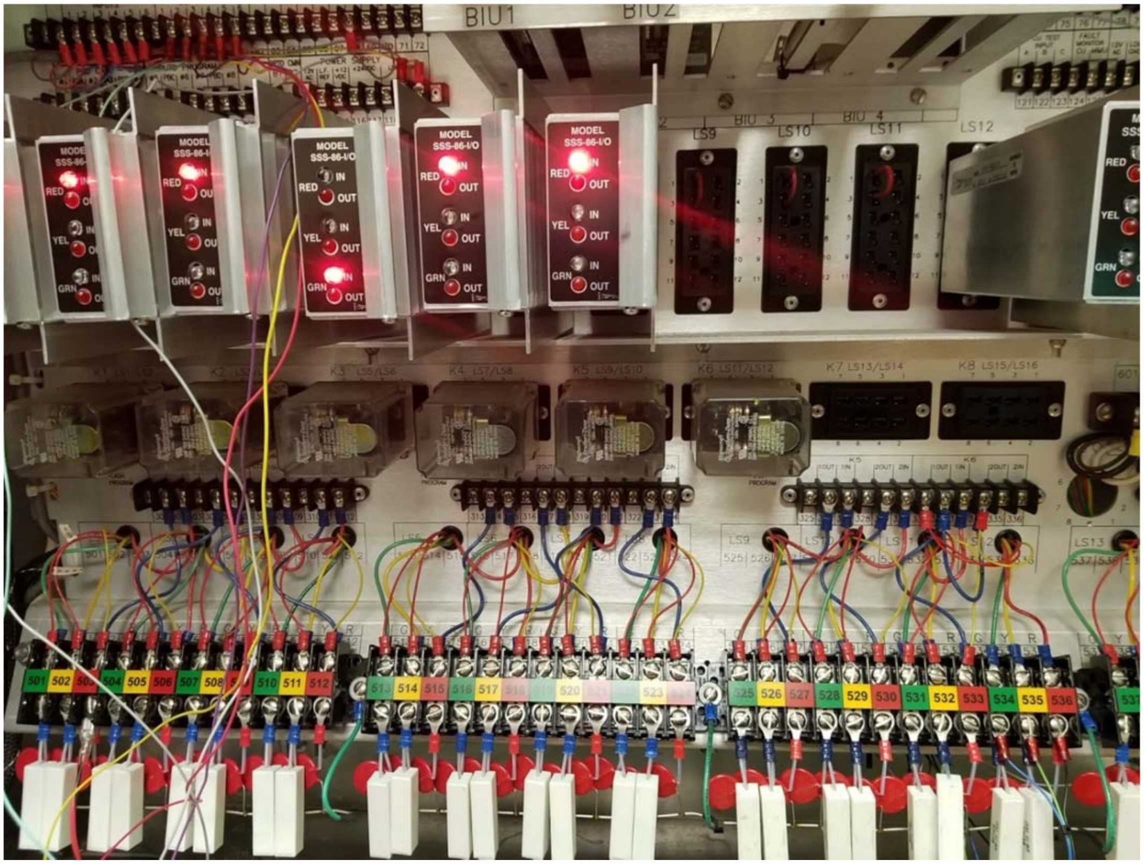


Figure 2-8: Load switch (LS) panel for signal heads (top) and load resistor panel (bottom)

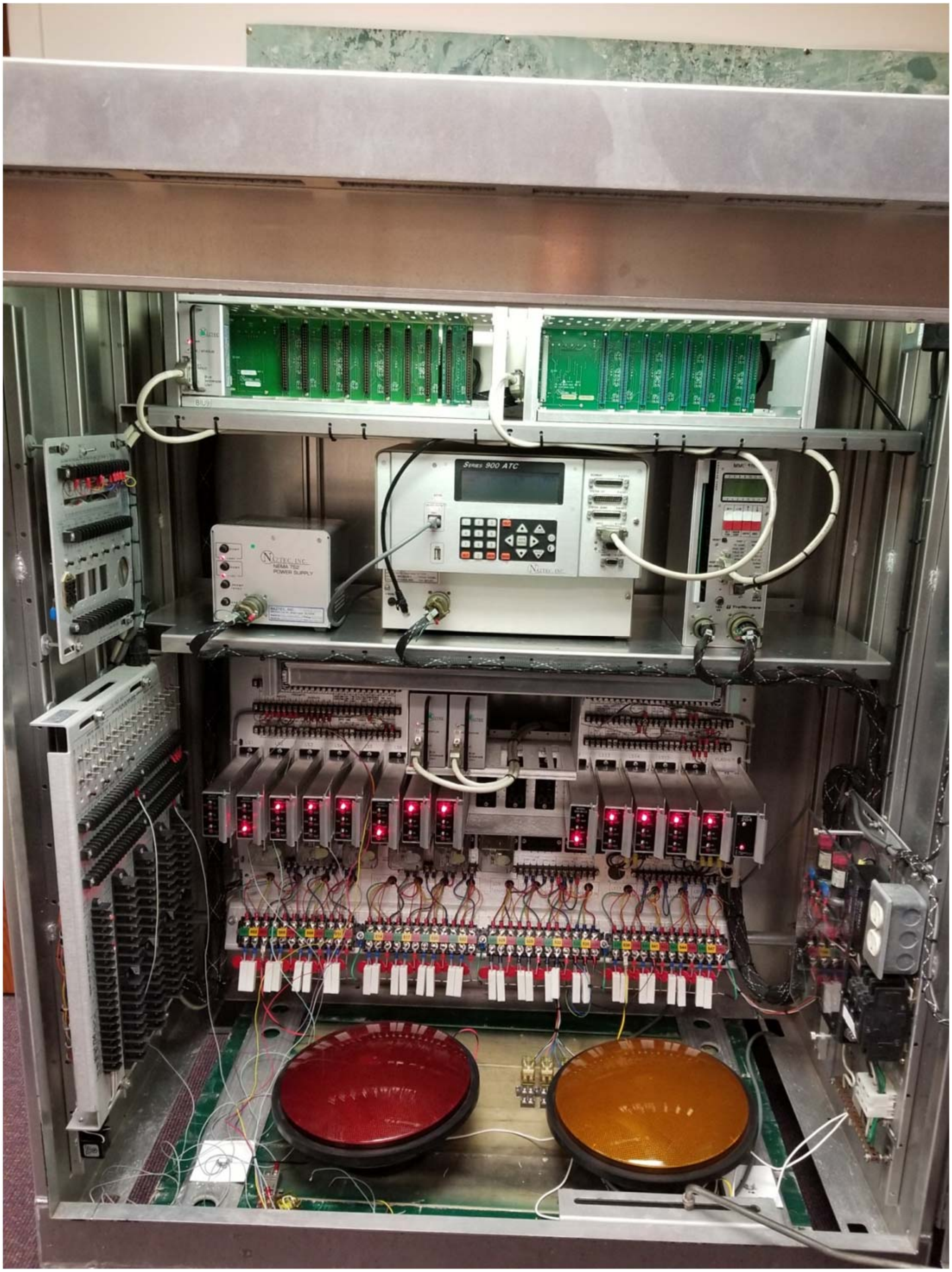


Figure 2-9: The inside of a Naztec controller cabinet showing various modules

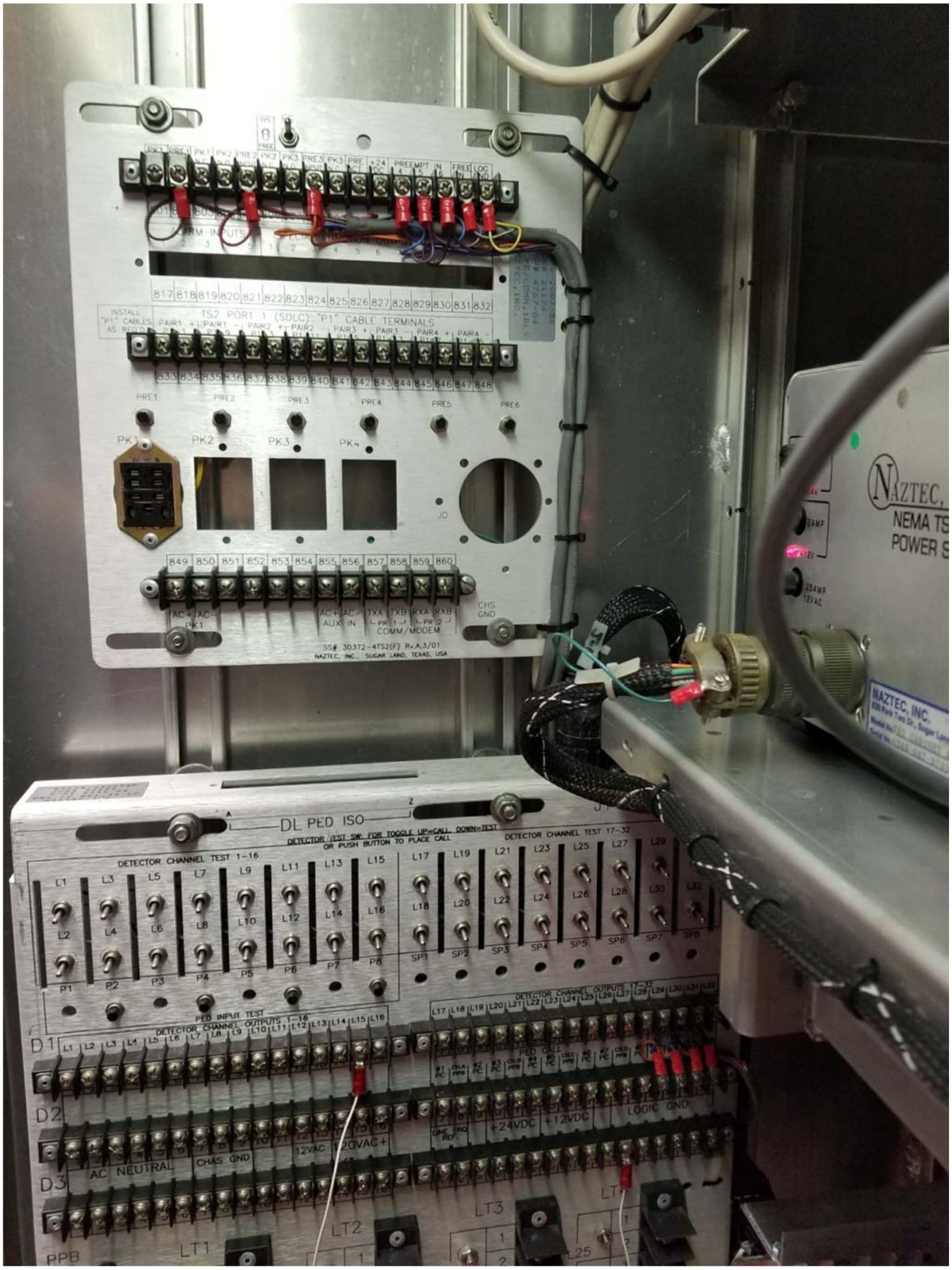


Figure 2-10: Detector channel outputs and bus interface unit (BIU)

2.2.1 Wiring Method from I/O Board to Controller

Traffic data received from, and the decision support system (DSS) logic instructions sent back to the controller are communicated through wiring connections to dedicated channels. Each traffic lane will use a separate input channel while other controller and/or traffic states will use one or more input channels. The logic instructions sent back to the controller will use one or more output channels. Additional wiring methods are used between the board and the controller to convert signals to and from the controller in order to accommodate various controller protocols. This task involves testing the wires and connections needed for the Siemens controllers in Orange County, Naztec controllers in Seminole County and Econolite controllers in Osceola/Volusia Counties to ensure compatibility. It should be noted that TS-2 controller cabinets are the only type approved by Traffic Engineering Research Lab (TERL) that supports the flashing yellow arrow (FYA) operation. TS-1 controllers are not capable of operating flashing yellow arrow signals. The following wiring technique is performed in the UCF ITS lab between the digital I/O board and a Naztec controller cabinet type TS-2 as an example for one of the intersection approaches and will be the standard for all other TS-2 controllers.

The digital I/O board was connected to the controller in a 2-way communication pattern; input and output as shown in Figures 2-11 and 2-12 showing the digital I/O board and its power supply.

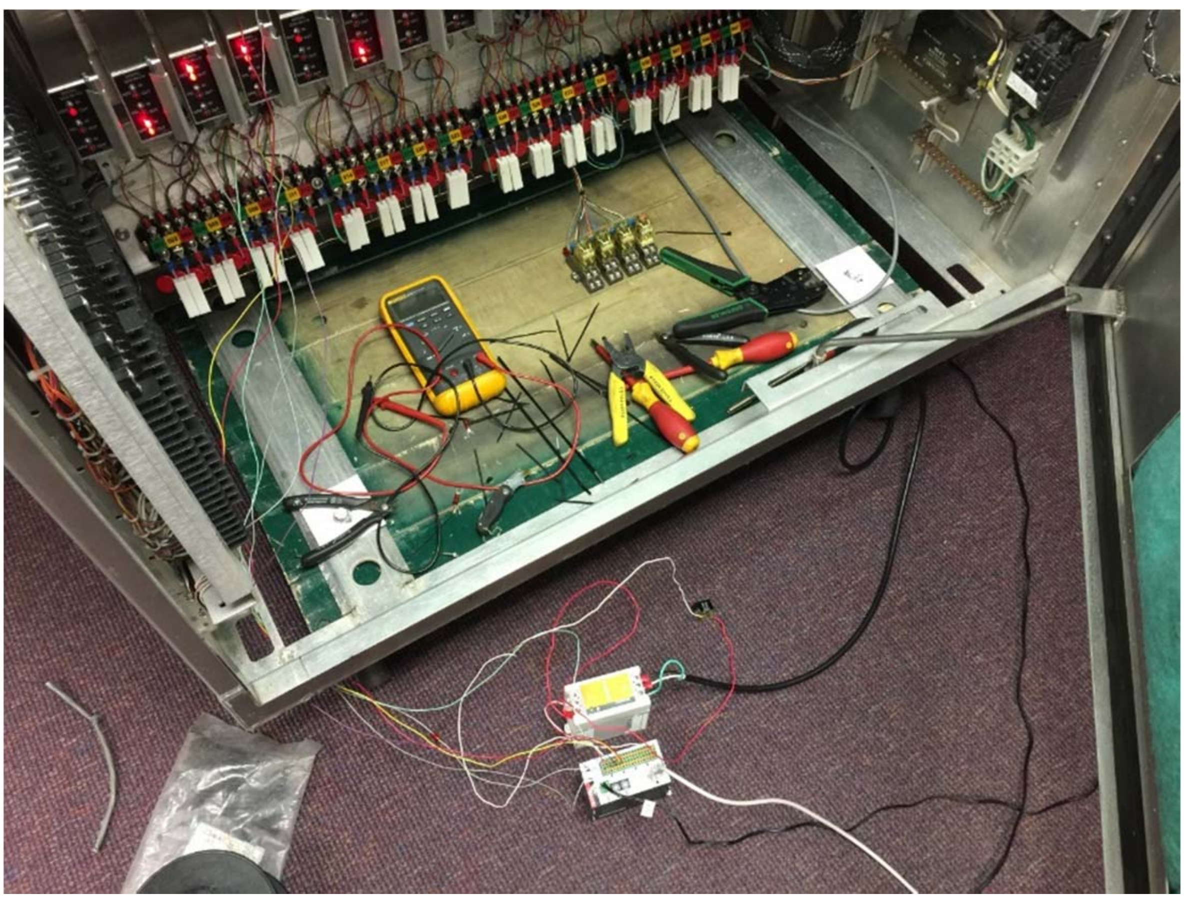


Figure 2-11: The digital I/O board and its wiring to the controller

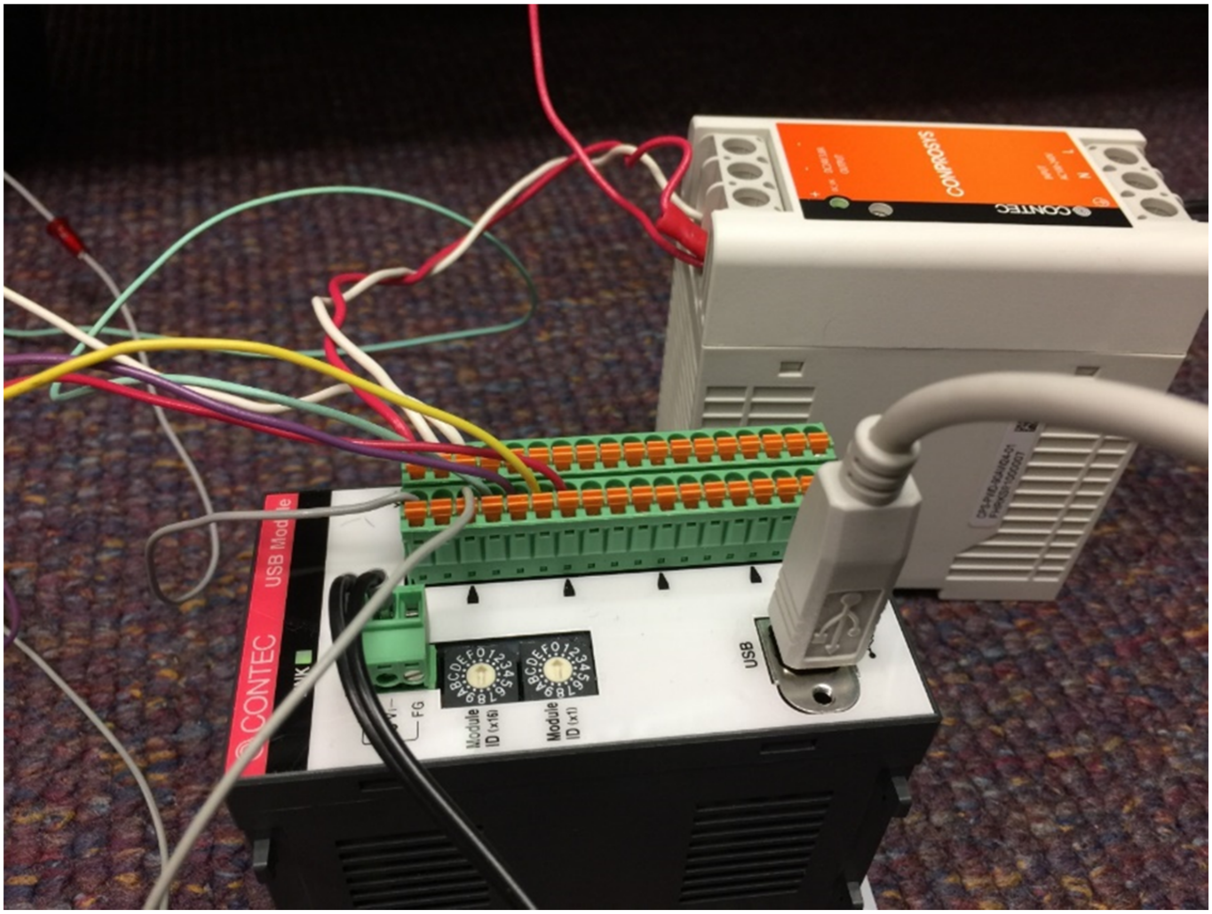


Figure 2-12: A close-up of the digital I/O board and its power supply

The wiring input needed to the board consist of 5 wires:

- **i)** The left lane detection (vehicle detection in the left lane)
- **ii)** The opposing through traffic lane detection (3 in this setting),
- **iii)** The opposing through green phase status (red or green)

The wires were connected to the I/O board channels using the pre-emption outputs from the cabinet as shown in Figure 2-13. The preemption outputs were remapped and converted into detector inputs to be able to detect the signal drop low which indicates vehicle presence in each lane. The controller’s input and output functions are hardwired to the Bus Interface Unit (BIU) which are communicated through the Synchronize Data Link Communication (SDLC) module. The detectors of the opposing through phases 2 and 6 will be used to activate the red arrow indication of the left turn (default mode) while phases 10 and 14 detectors will be utilized to activate the flashing yellow arrow indication.

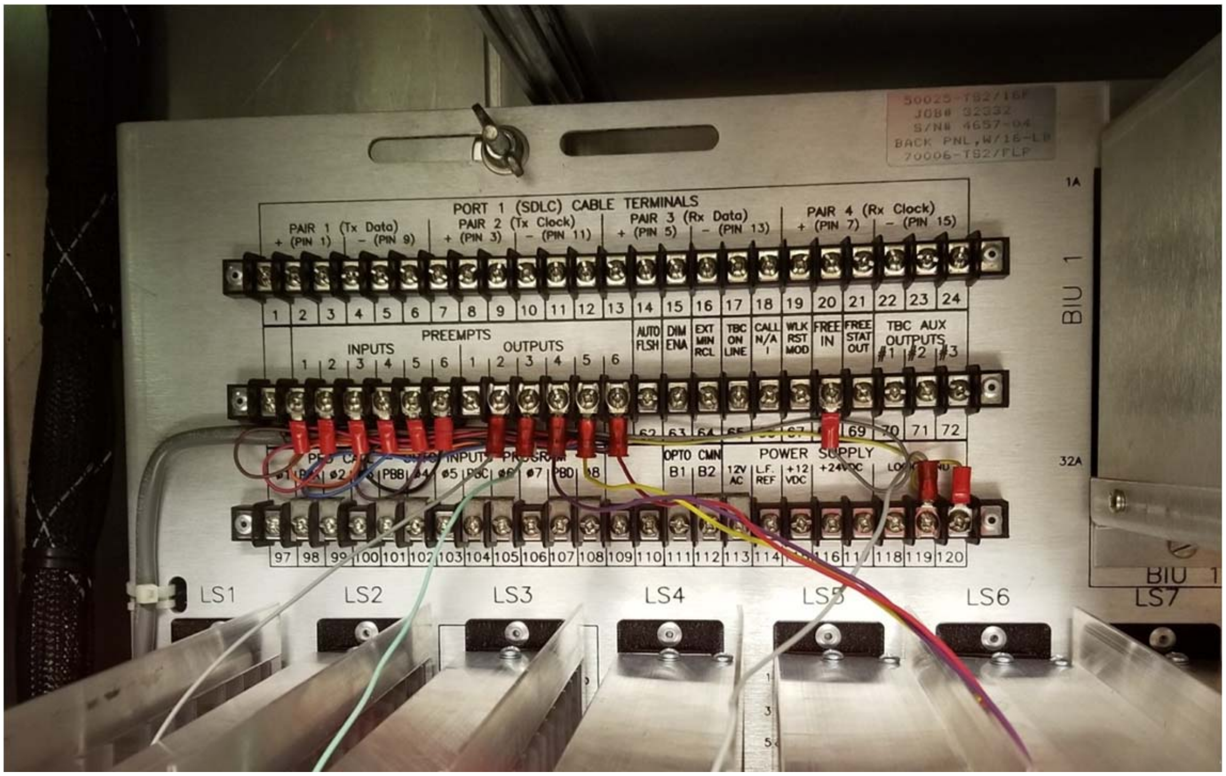


Figure 2-13: Wiring from five pre-emption outputs to I/O Board

During operation, the DSS algorithm is continuously receiving and analyzing traffic data from the field. Once the algorithm reaches a decision to safely switch from a red arrow to a flashing yellow arrow, the decision is communicated back to the traffic controller via the output protocol of the digital I/O board.

The output protocol needs two wires to send a signal back to the traffic controller that, when high, instructs it to switch to a flashing yellow arrow mode based on the DSS. The detector channel outputs were utilized and converted into detector inputs for this purpose as shown in Figure 2-14. The two wires are connected to the detector channel L15 and logic ground L27. The controller logic ground on L27 receives the signal from the I/O board and sends it to detector L15 to put in a call to activate phase 10 for a flashing yellow arrow mode and inhibits phase 2, which is protected-only mode.

It should be noted that, for safety purposes, at the beginning of each cycle, the default of the left turn mode will be a red arrow and, depending on the traffic conditions, the DSS will determine whether there are enough gaps to switch to a FYA mode or not.

The output from the digital I/O board to the controller is wired through a relay before being fed to the controller as shown in Figure 2-15. The relay is used as a test-bed integration to keep the power supply of the I/O board isolated from the cabinet power supply. The wiring setup also included the connection of actual red and yellow arrow LED light modules to indicate the status of the operation in real time as shown in Figures 2-16 and 2-17.

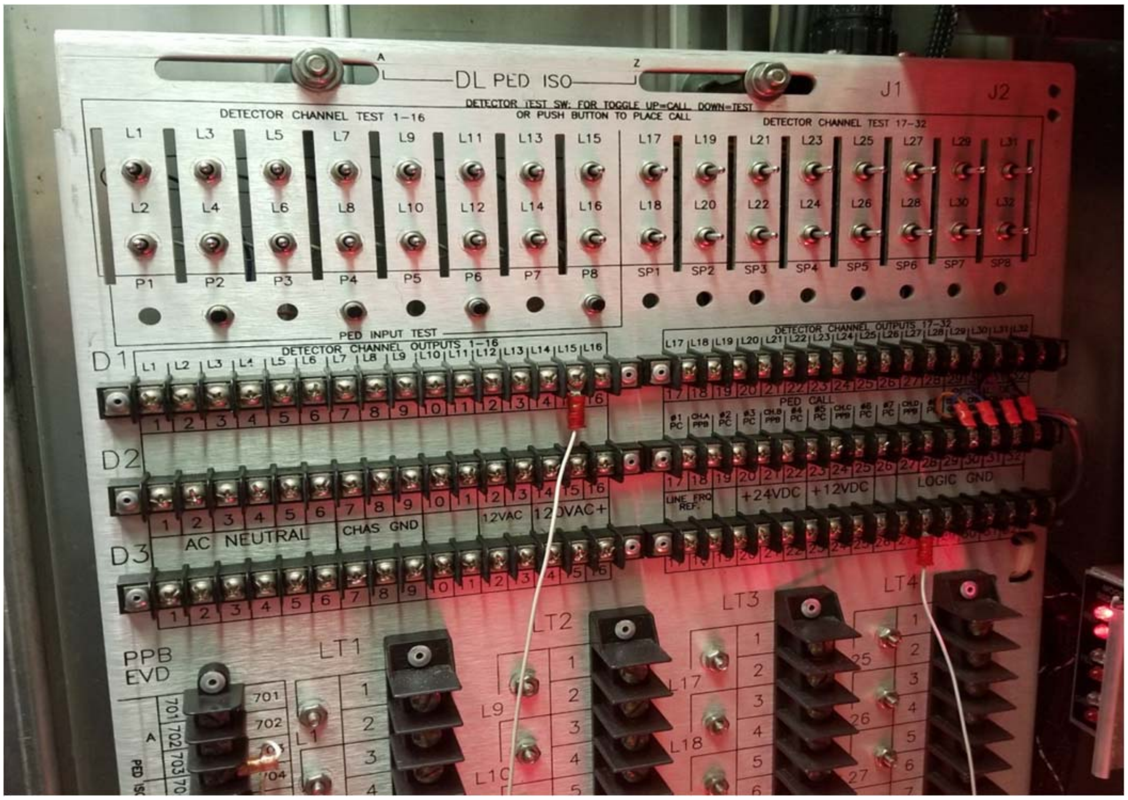


Figure 2-14: Connections to the detector channel (L15) and logic ground (L27)

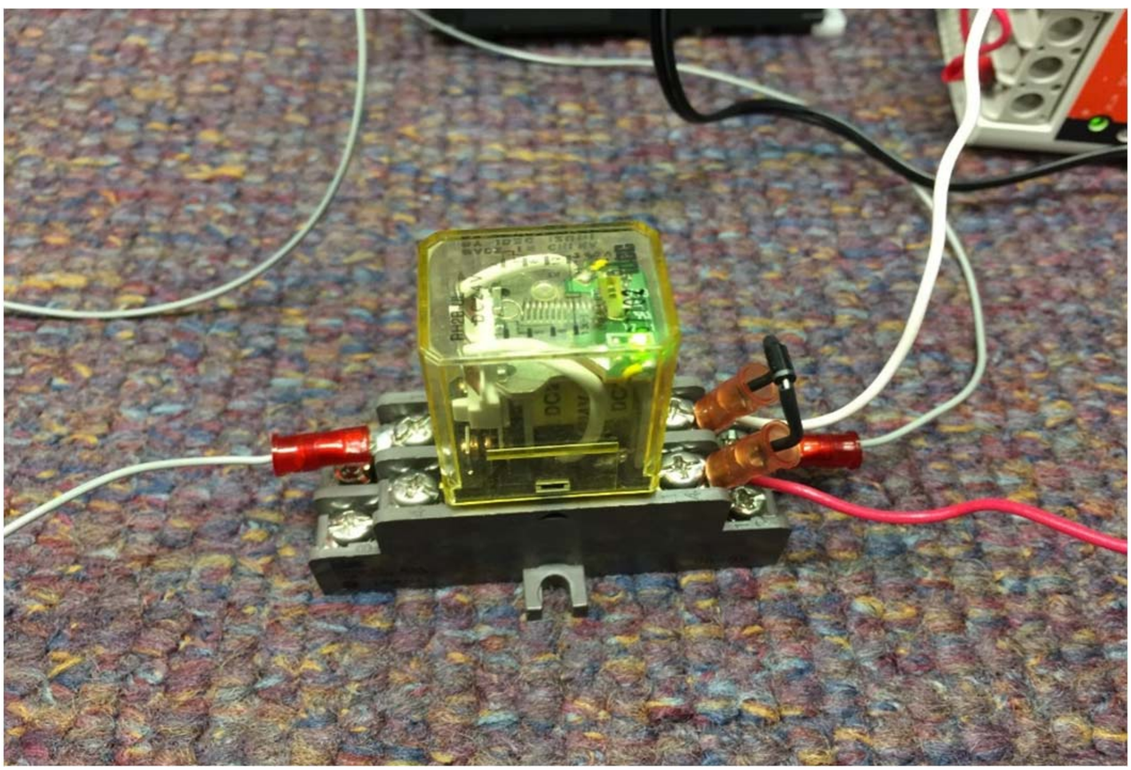


Figure 2-15: The output signal to the controller is wired through a relay.

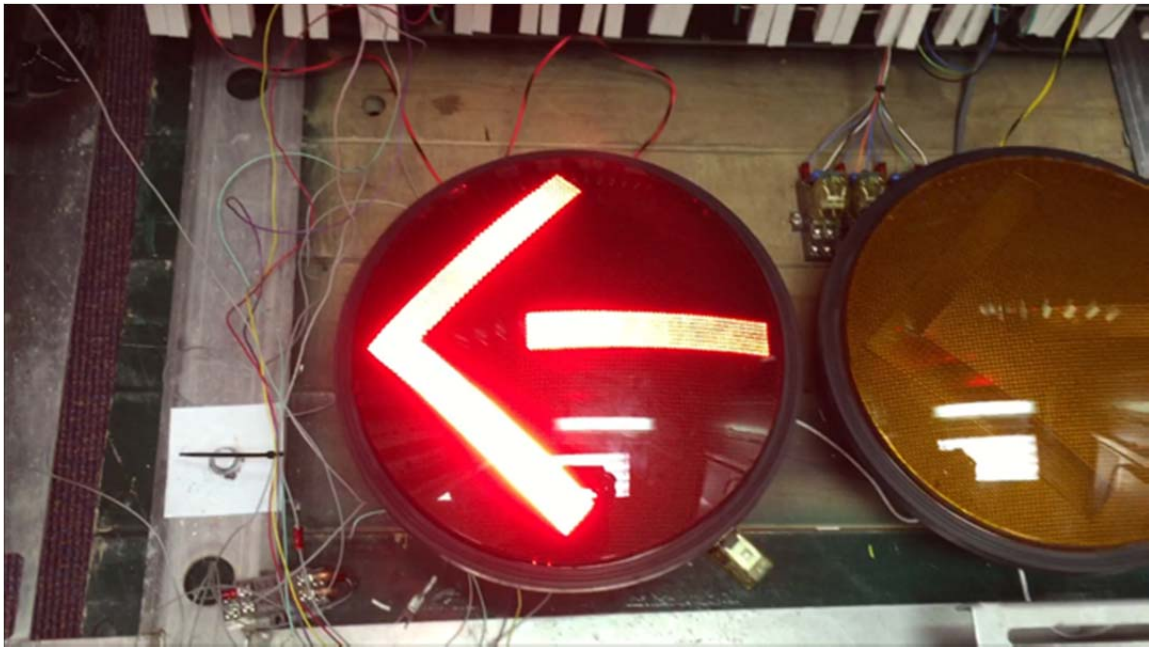


Figure 2-16: A red light arrow module is included in the wiring setup.

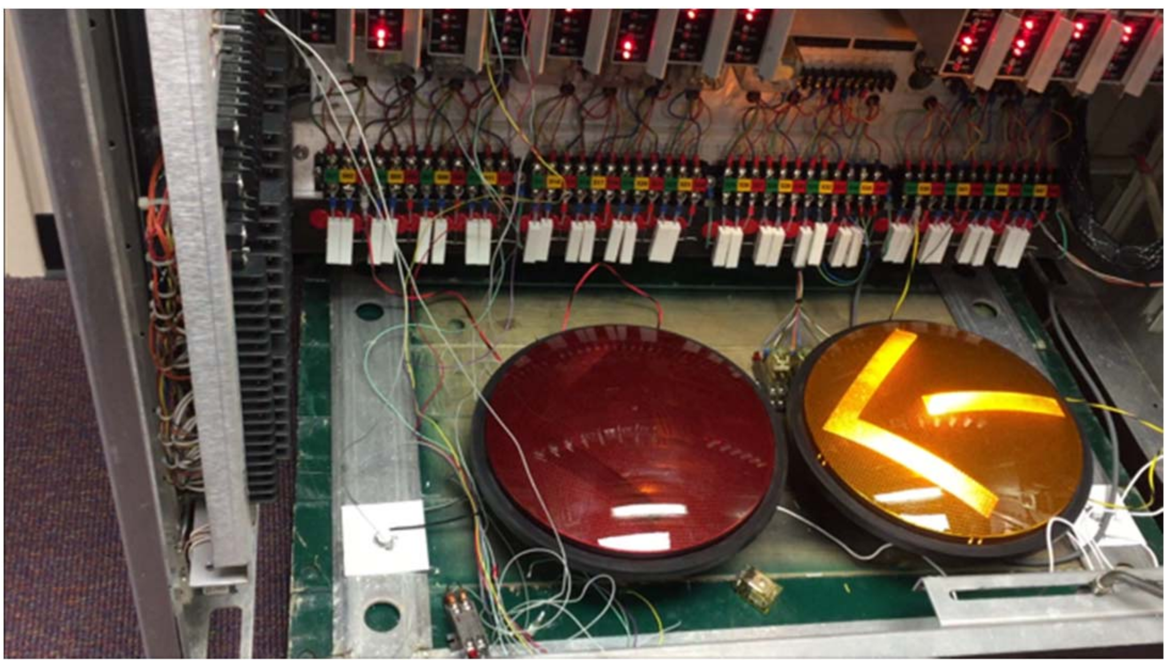


Figure 2-17: A flashing yellow arrow light module is included in the wiring setup.

2.3 General Wiring and Connection Interface

2.3.1 General Wiring

The general wiring and connections as well as the hardware described in the previous sections are selected and assembled in a manner that would facilitate the seamless communication with virtually any TS-2 traffic controller on the market which can accommodate different protocols & signal conversion. At a minimum, the Advanced Traffic Controller (ATC) should support the following requirements to be able to establish the above connections:

- 16 phases
- 4 rings
- 32 channel detection
- Input/output Logic
- Peer to Peer Logic

2.3.2 Connection Interface

The 2-way information to and from the computer communicating with the traffic controller is routed through the digital I/O board and driven by a software interface. Figure 2-18 shows an initial software interface version that was used to operate and test the wiring and connections. The interface has the responsibility of acting as a translator between the algorithm running on the computer side and the traffic controller present in the field.

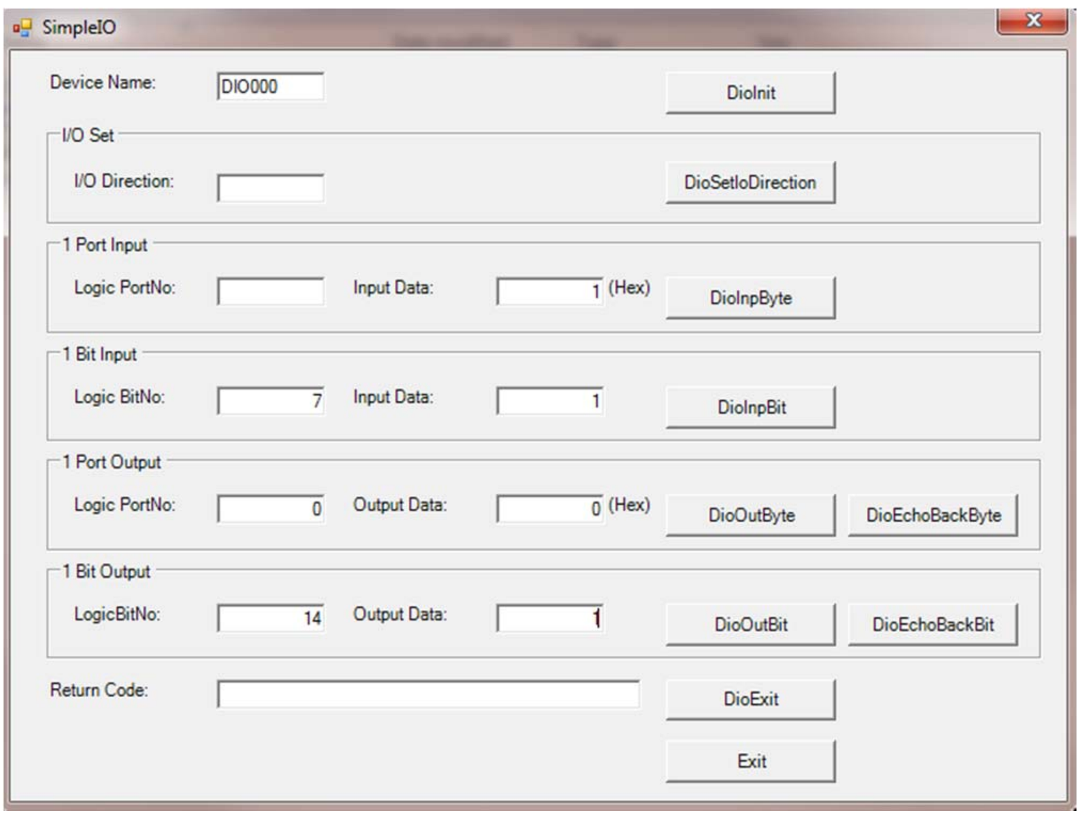


Figure 2-18: Software interface between the computer and the controller

2.3.3 Data Received and Analyzed in Real Time

The basic communications software that accompanied the I/O board was limited compared to what was required in this project. It essentially establishes connection with the board and receives the data through the input channels. However, the data is accessed manually. What was needed, however, was automatic real-time access to the channel data as it is received by the board so that the algorithm can analyze traffic information in real-time and make accurate decisions. No time lag or decision gaps are expected to occur during the operation of the algorithm or its decision based on the traffic status. That's why, a custom communication interface is needed on top of the basic software which has three main functions; control the hardware, display real-time status and execute the proposed FYA algorithm. In Task 2, the UCF research team will develop a specific code to retrieve instantaneous channel input data, synchronize opposing thru green phase, analyze traffic information, provide the algorithm decision, and generate a real-time log recording the events.

2.4 Task 1 Conclusion

What has been achieved is a general design capable of communicating with all TS-2 hardware layouts and controller models currently in operation. As mentioned earlier, Phase III aims at developing a common method to connect to any controller regardless of its make or model. The algorithm running on the computer side and the user do not need to know what hardware exists on the other side. This conversion is handled by the interface layer which is designed to seamlessly perform this operation.

III. SOFTWARE DEVELOPMENT

The software development task is conducted with two main goals; developing the communication layer and the user interface. These two sub-tasks are described in the next sections. The software is being developed in the C# language under the Microsoft Visual Studio environment. It employs custom methods and functions as well as general libraries provided by the hardware manufacturer. These software components have been streamlined in a manner to achieve the initial project requirements.

3.1 Development of the Communication Layer

3.1.1 Custom Communication Software

A custom communication software has been developed that is capable of communicating with the new I/O hardware board in a bi-directional manner. Bi-directional communication means that the software is capable of both receiving data from and sending instructions to the hardware. This is crucial in the decision making process as traffic related commands will eventually be initiated to the controller in real-time. The software has three main functions; control the hardware, display real-time status and execute the proposed FYA algorithm. The UCF research team developed a specific code to retrieve instantaneous channel input data, synchronize opposing thru green phase, analyze traffic information, provide the algorithm decision, and generate a real-time log recording the events.

The software is currently collecting traffic data at the rate of 20 readings per second for each channel. This rate is more than sufficient to guarantee complete data reception in real-time without the possibility of missing traffic activity. The communication layer reception has been tested offline then online using the traffic controller in the UCF lab. The controller is connected to live traffic but, for safety reasons, it is not sending instructions to the field. However, live algorithm decisions will be conducted in Task 4. Field cameras mounted at the analyzed intersections were also used to corroborate the accuracy of the data communication.

3.1.2 Parameter Setting for Hardware Configuration

The software sets the required parameters for hardware configuration. It sets the number of lanes monitored, the data acquisition rate, and the channel configuration for sending and receiving data. The software is flexible enough to modify these parameters for different intersection settings. This capability allows for the analysis of virtually any traffic configuration at different intersections.

3.2 Development of the User Interface

A user interface (UI) has been developed to operate the software and establish a layer of communication with the user. The role of the user interface is to take commands from, and display information back to, the user. Some of the user interface development challenges are intuitiveness and user-friendliness. These criteria have been essential during the UI development phase.

3.2.1 Intuitive User Interface

The user interface developed for this project allows for monitoring the traffic lanes under analysis in real-time conditions. The main user interface is shown in Figure 3-1.

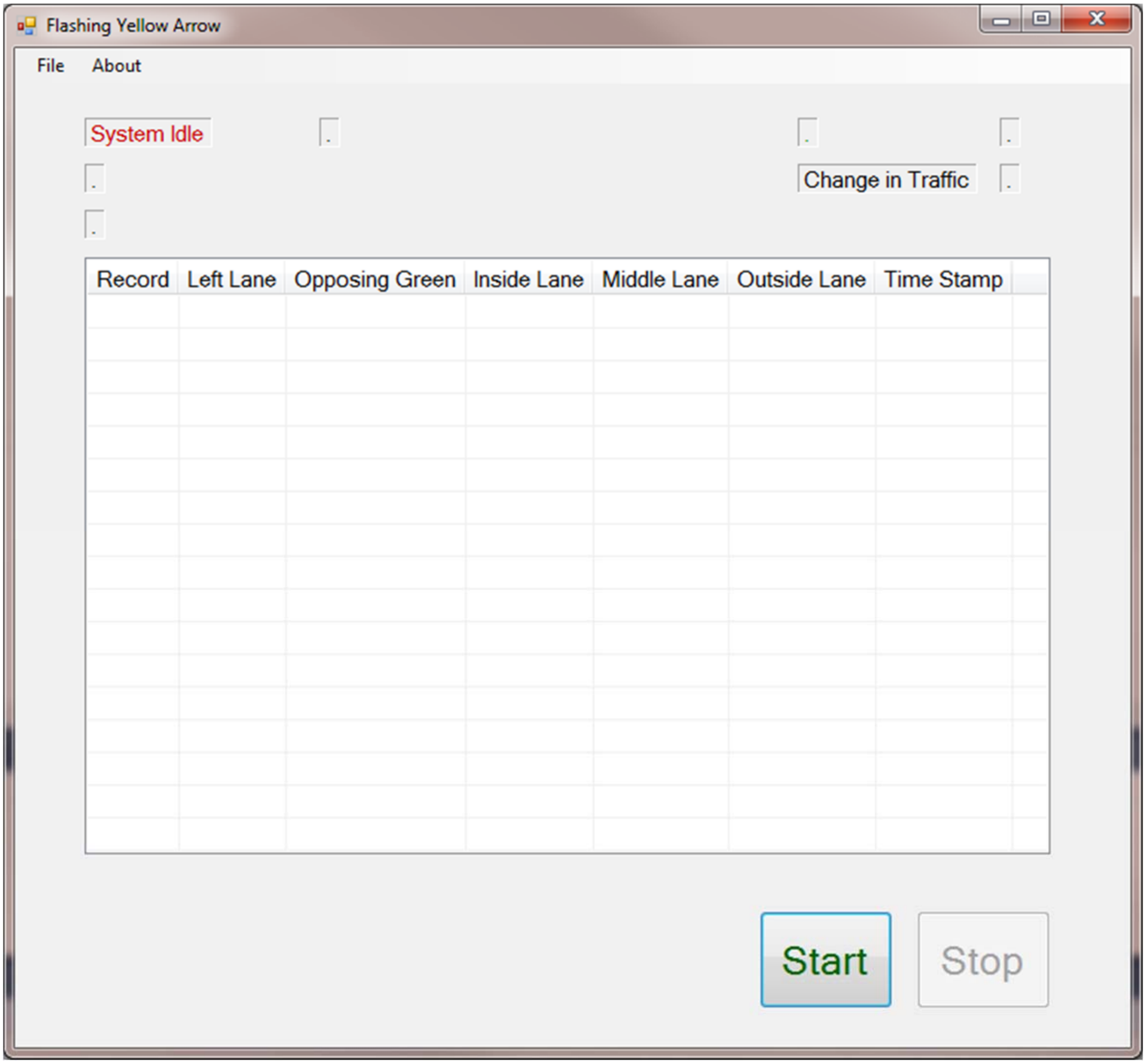
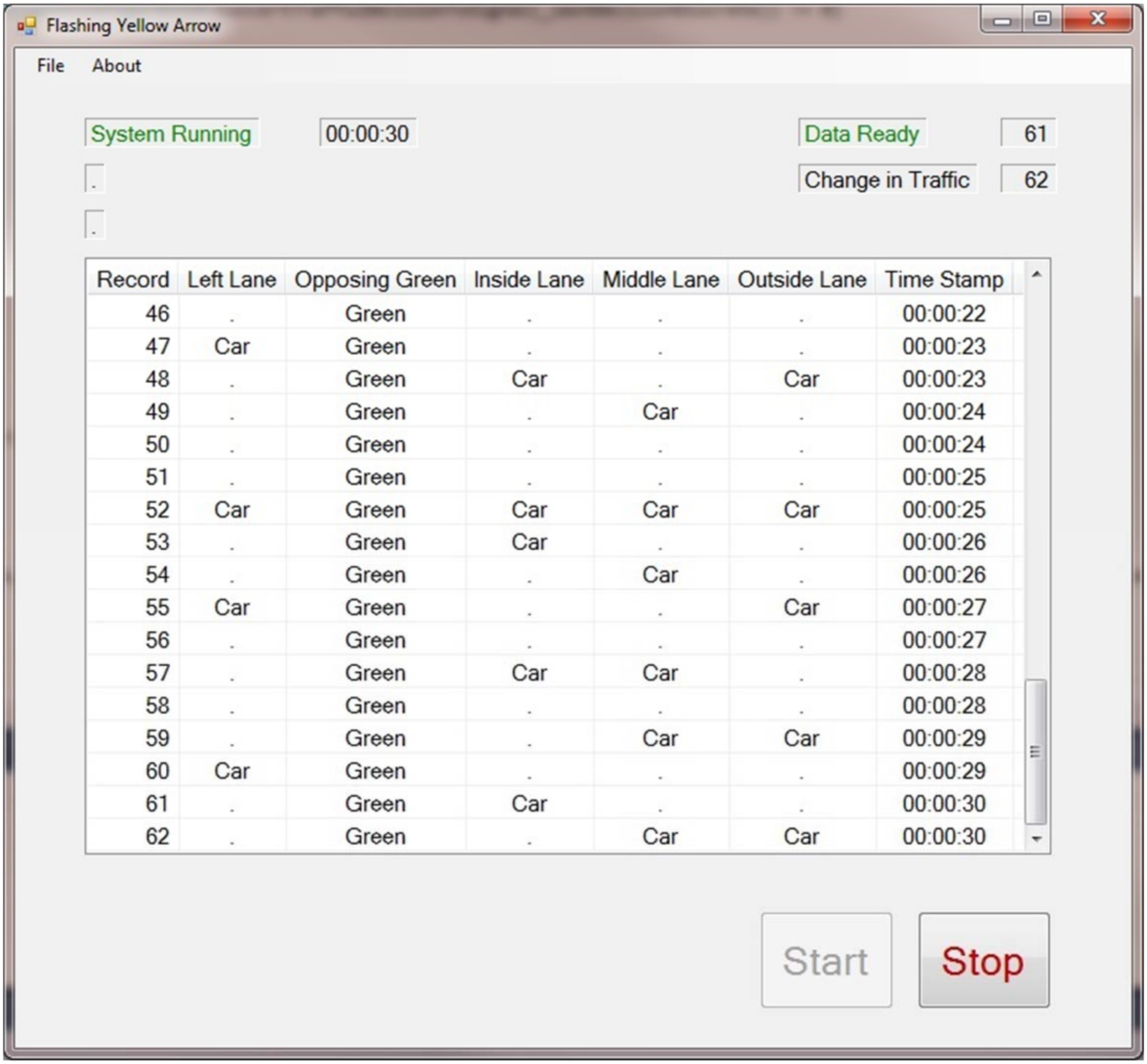


Figure 3-1: Main user interface

The interface is intuitive and very simple to operate. To start or stop the traffic monitoring process, the user presses the **Start** or **Stop** buttons, respectively. When the process is started, the real-time traffic activity is presented in a tabular scrolling list form where each traffic variable of interest is displayed. A time stamp and a record number are attached to each traffic activity which makes examining historical data straightforward. It should be noted that the sequential time stamp inside the log file is the incremental time starting from zero when the monitoring starts. However, the name of the file itself is the date and time of the analysis. The scrolling list allows the user to scroll back to previous records even when the system is running. Figure 3-2 shows a real time traffic display during the testing process. The interface was designed to be as user friendly as possible.



Record	Left Lane	Opposing Green	Inside Lane	Middle Lane	Outside Lane	Time Stamp
46	.	Green	.	.	.	00:00:22
47	Car	Green	.	.	.	00:00:23
48	.	Green	Car	.	Car	00:00:23
49	.	Green	.	Car	.	00:00:24
50	.	Green	.	.	.	00:00:24
51	.	Green	.	.	.	00:00:25
52	Car	Green	Car	Car	Car	00:00:25
53	.	Green	Car	.	.	00:00:26
54	.	Green	.	Car	.	00:00:26
55	Car	Green	.	.	Car	00:00:27
56	.	Green	.	.	.	00:00:27
57	.	Green	Car	Car	.	00:00:28
58	.	Green	.	.	.	00:00:28
59	.	Green	.	Car	Car	00:00:29
60	Car	Green	.	.	.	00:00:29
61	.	Green	Car	.	.	00:00:30
62	.	Green	.	Car	Car	00:00:30

Figure 3-2: Real-time traffic display

3.2.2 Specification of Initial Parameters

Specification of the initial parameters has been implemented with the goal of maximizing user awareness of the traffic activity. For example, the rate of information displayed is set at a reasonable value for a human to comprehend. This rate is slower than that of the data acquisition. The software also specifies the value for the number of cycles used for dynamic traffic analysis. The incoming traffic information is displayed on the screen in a tabulated fashion. The user has the ability to scroll back to historical data while the system is operating and acquiring data.

Traffic decisions that are made in real-time are displayed to the user clearly. The user can examine the decisions versus the corresponding historical data for further analysis.
While carrying out real-time data acquisition, the software outputs the time stamped traffic data continuously to a log file for later analysis as shown in Figure 3-3. Offline examination of the traffic events and the corresponding decisions will help better understand traffic patterns and improve the decision algorithm.

Monday, October 30, 2017 1.01.16 PM.txt - Notepad

File Edit Format View Help

Record	Left Lane	Opp Green	In Lane	Mid Lane	Out Lane	Time Stamp
1	.	Red	Car	.	Car	00:00:00
2	.	Red	Car	Car	Car	00:00:00
3	.	Green	Car	Car	Car	00:00:02
4	.	Green	Car	Car	.	00:00:09
5	.	Green	.	Car	.	00:00:10
6	Car	Green	Car	Car	Car	00:00:11
7	Car	Green	Car	Car	Car	00:00:11
8	Car	Green	Car	Car	Car	00:00:11
9	Car	Green	.	.	.	00:00:13
10	Car	Green	.	.	.	00:00:13
11	Car	Green	.	.	.	00:00:13
12	.	Green	Car	Car	Car	00:00:14
13	.	Green	Car	Car	Car	00:00:14
14	.	Green	Car	Car	Car	00:00:14
15	.	Green	Car	Car	Car	00:00:14
16	.	Green	.	.	Car	00:00:18
17	.	Green	.	.	Car	00:00:18
18	.	Green	Car	.	Car	00:00:19
19	.	Green	.	Car	.	00:00:20
20	.	Green	.	Car	.	00:00:20
21	.	Green	.	Car	.	00:00:20
22	.	Green	Car	Car	Car	00:00:21
23	.	Green	Car	Car	Car	00:00:21
24	.	Green	Car	Car	.	00:00:22
25	.	Green	Car	.	Car	00:00:23
26	.	Green	Car	.	Car	00:00:23
27	.	Green	.	Car	Car	00:00:24
28	.	Green	.	Car	Car	00:00:24

Figure 3-3: Log file during real-time data acquisition

3.2.3 Adaptation to Various Scenarios

The software allows for the adaptation of various scenarios and methods regarding various situations. For example, traffic data can be input in various logical formats based on the hardware. The software is flexible enough to allow for logical format variation in data logic signals. Currently, the software is configured to accommodate the following signal logic as shown in Table 3-1.

Table 3-1: Event signal logic

Event	Signal Logic
Car present	low
No Car	high
Opposing Green	low
Opposing Red	high

Also, different intersections have different lane configurations. The software has the capability to configure different lane numbers and assignments based on the scenario under analysis. Currently, the software is configured for the following channels:

1. Left Lane under study with FYA
2. Opposing thru Green Phase (red or green)
3. Three opposing thru lanes:
   [a] Inside Lane
   [b] Middle Lane
   [c] Outside Lane

Traffic data can follow many trends and have special cases. The software employs multiple approaches and techniques to examine the data and make a dynamic decision that best represents the real-time traffic.

3.3 Task 2 Conclusions

This task was mainly related to software development using C# language. The main goal of this task is to enable is the custom software to communicate with the new digital I/O board to allow the software to set various parameters required for a successful configuration of the hardware. The parameters included acquisition of signal timing, acquisition of mode, extracting arrival data from the input channels, and outputting data to the output channels.

A User Interface (UI) was also developed to specify particular parameters pertinent to each intersection and also adjust parameters while the operation is in progress, and to visualize the input data and the output decision as they occur.

IV. OFFLINE TESTING

4.1 Overview

The main goal of this task is to be able to communicate with various traffic controller types in an offline mode while allowing for the algorithm verification and enhancement using real-time traffic data. Offline testing provides this goal while maintaining a safe testing environment. It assists in developing the methods and techniques needed to examine the data and make a dynamic decision accordingly that best represents the real-time traffic.

The testing was conducted at UCF lab where actual intersection field data was obtained through loop detector mapping to the controller in the lab in real-time mode. This process is called peer-to-peer logic where an actual traffic controller is needed along with a controller interface device (CID) such as the digital input/output board. This setup is used in offline testing methodologies where an executable code such as algorithms or even an entire controller strategy, usually written for a particular system, is tested within a field environment that can help prove a concept or test a software. The testing environment required the following different components as shown in Figure 4-1:

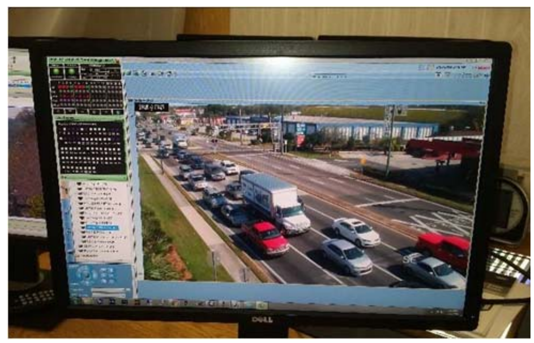
1- Traffic signal cabinet with different controller types (Siemens, Naztec, & Econolite)
2- Four-Section signal display (Flashing Yellow Arrow Signal)
3- CCTV camera feeds connected to a computer to monitor intersection traffic flow
4- Digital input/output data logger device
5- Communications software

Seminole County Traffic Engineering Staff were very helpful in setting up the testing environment and mapping the intersection loop detectors from the field to the cabinet in the lab. The CCTV cameras were also setup to monitor both the study approach as well as the traffic signal indication. The intersection vehicle detection system through the loop occupancy and the CCTV cameras were connected to the digital I/O board and the communication software to receive data signaling the traffic flow on a second by second basis. The permissive green times and the opposing through traffic were determined on a cycle-by-cycle basis from the field by the data logger software. The logic was based on modeling the inter-arrival time of vehicles and calculating the minimum headway and gap time per lane for the opposing traffic from the loop detectors data for the first two cycles before recommending a decision for the left turn signal head, either flashing or not, for the next cycle. This iterative process is repeated constantly on a cycle-by-cycle basis.


TS2 Cabinets, Different Controller Types & FYA Signal Head

Digital I/O Board

Naztec 900 ATC Controller


CCTV Camera Feeds

Siemens M60 Controller

Econolite Cobalt Controller

Figure 4-1: Testing environment components

4.2 Peer-to-Peer Logic for Data Communication

As mentioned earlier, Offline testing was conducted using a peer-to-peer logic setup as shown in Figure 4-2. It should be noted that all District 5 counties will eventually be connected to the Florida Department of Transportation's (FDOT) fiber optics network as part of the statewide effort of updating Florida's Statewide ITS Architecture (SITSA), which charts the current and future course of ITS deployment. SITSA provides an integrated framework to ensure that various transportation technologies can work together smoothly and effectively on Florida's highways. Currently, Seminole, Orange and Volusia Counties are connected to FDOT's network which facilitated the communication with the three (3) main traffic controller types in District 5; Siemens, Naztec and Econolite shown in Figure 4-1.

Vehicle detection through loops or video detection is sensed in the field by the cabinet and the controller. Then it is mapped in real-time mode from the intersection approach to the controller and cabinet in the lab through an FDOT switch located at the UCF lab which communicates between the 2 controllers. The digital I/O board retrieve instantaneous channel input data in each lane through the lab cabinet. The algorithm analyzes the traffic data and makes a decision accordingly that is communicated back to the controller, and generate a real-time log recording the events. Peer-to-peer-logic offers the benefit of acquiring and analyzing real-time traffic data coupled with video feed with the benefit of a safe environment. The decision to switch to a red or a flashing yellow arrow is demonstrated by an actual left-turn traffic light with 4-signal configuration installed in the lab. This makes the analysis intuitive and more realistic. Peer-to-peer-logic is a necessary step to verify and validate the algorithm and the software prior to field testing.

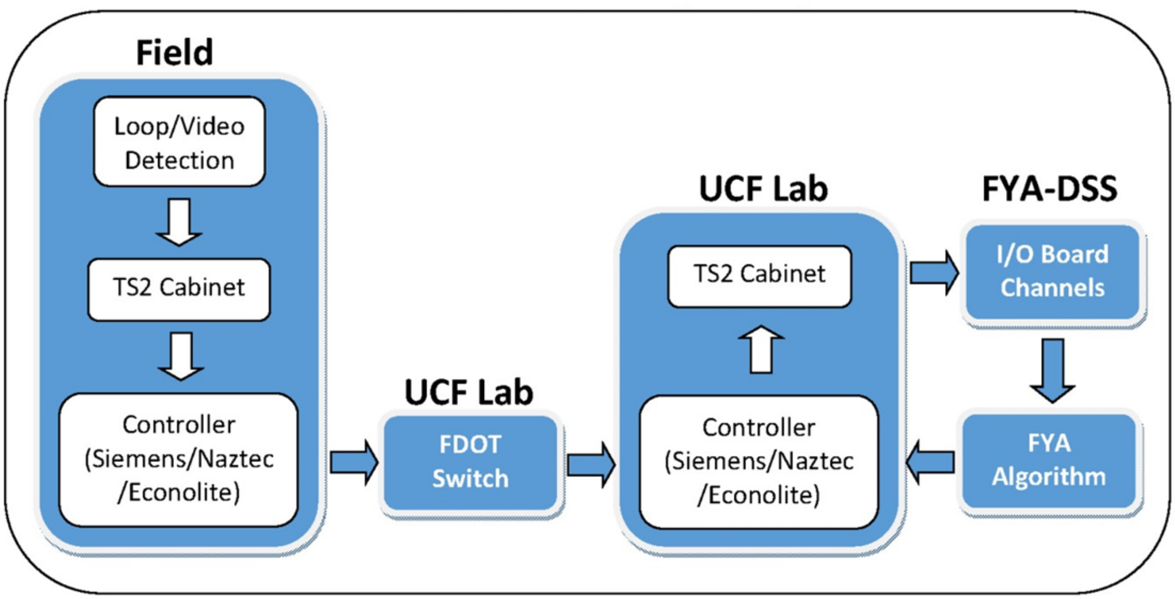


Figure 4-2: Peer-to-peer logic setup

4.3 Algorithm Logic

The original algorithm of the previous phase of the project helped achieve the proof of concept. It analyzed traffic data but without the ability to send back a decision to the controller. The decision reached after every analysis was only displayed to the user for verification. In this current phase, however, fine tuning and improving the algorithm and its accuracy are a natural progression in the development cycle. The algorithm decision is now communicated back to the controller for left turn mode adjustment. The decisions and the corresponding traffic data are stored in log files for further analysis and improvement.

The idea was to devise a technique that would predict traffic behavior in the short term based on historical data of the past few minutes using a moving average window. The method examines the traffic for a user defined number of cycles to predict the behavior for the following cycle. A decision is then made and the analysis window is updated by dropping the older cycle in the window and adding the current one. The process is then repeated continuously.

The algorithm applies a two-cycle window of historical traffic data for analysis at every cycle. During analysis, the algorithm constantly searches for gaps across all lanes of the traffic flow in the prior two cycles. Any gap meeting or exceeding the minimum headway threshold, shown in Table 4-1, is taken into account as a **valid** gap and stored in an accumulator. The decision to switch to a flashing yellow arrow is made when the cumulative **valid** gap(s) in the analysis window meet or exceed 6 times the minimum threshold, which is an average of 3 times per analysis cycle. As a safety precaution, the default and fallback decision is a red arrow.

The decision is made based on a number of parameters. These parameters include the number of opposing through lanes, the number of crossing lanes, the minimum headway in seconds corresponding to the number of lanes to cross, and the number of cycles in the analysis window. Table 4-1 shows the minimum headway (gap) in seconds corresponding to the number of lanes to cross. The thresholds used for different crossing number of lanes were obtained from the database of 30,000 cycles collected from the field.

Table 4-1: FYA algorithm minimum headway criteria

No. of Opposing Lanes Crossed	Min acceptable Gap Time	Comments
1 Lane	3.0 s.	1 Thru lane
2 Lanes	3.5 s.	2 Thru lanes or 1 Thru + 1 RT
3 Lanes	4.0 s.	3 Thru lanes or 2 Thru + 1 RT
4 Lanes	4.5 s.	4 Thru lanes or 3 Thru + 1 RT

4.3.1 Discrete and Average Logic

Two approaches were tested to calculate the minimum gap; discrete and average approach. The discrete approach determines the time interval between the successive arrivals of vehicles for each lane independently and computes the lowest headway for each lane by cycle on a second by second basis. The algorithm then picks the minimum headway and compares it to the minimum acceptable gap shown in Table 4-1 needed for a vehicle to safely cross the given number of lanes. If the minimum headway for the corresponding number of lanes is achieved and repeated 3 times per cycle, the decision is made to switch to a flashing yellow mode. Otherwise, a red arrow is decided upon. The 3 time threshold was determined based on the statistical analysis of the cycle by cycle data collected from the field.

The average approach determines the heaviest lane of flow during the analysis period which is 2 cycles. It then determines the minimum gap duration by dividing the headway by the flow in the heaviest lane.

Gap per Lane = Headway / Flow (Eq. 1)

If the minimum headway for the corresponding number of lanes is achieved and repeated 6 times in the 2-cycles, the decision is made to switch to a flashing yellow mode. Otherwise, a red arrow is decided upon.

4.4 Offline Testing

The algorithm has been tested on a number of intersections in different counties (Seminole, Orange and Volusia) with different controller types, lane configurations and during different times of day using the peer-to-peer logic setup. The traffic data was streaming in real-time for the through lanes, the opposing green, and the left lane. Vehicle detection was in real-time mode and monitored by CCTV cameras through the Bosch Video Management Software (BVMS). Simultaneous video feed facilitated the visualization of the acquired data. The decision output by the algorithm only affected the controller in our lab and was inhibited from affecting the actual traffic. The following intersection and data provides an example of the testing procedure and results of the algorithm decision. The intersection is located in Seminole County at SR 436 (Semoran Blvd) and CR 427 (Ronald Reagan Blvd).

4.4.1 SR 436 and CR 427

One of the intersections used in testing the algorithm was the intersection of SR 436 and CR 427. The mainline SR 436 is a 6 lane divided arterial and CR 427 is a 2 lane road as shown in Figure 4-3. There is a gas station on one of the corners and a small office space on the other corner. There is a rail road crossing on the east side of the intersection. The traffic gets heavier in the afternoon as shown in Figure 4-4. Due to the trees location which blocked part of the intersection view, a dual view was needed as shown in Figure 4-4. The intersection was monitored in the afternoon between 3:00 and 6:00 pm on a Thursday. As can be seen, the intersection is considered busy especially during the peak period. The study approach was the westbound left turn lane and the opposing eastbound 3 thru lanes. The testing was conducted during peak and off-peak times and using both approaches (discrete and average) to assess the sensitivity of the algorithm to traffic conditions.

Figure 4-3: SR 436 and CR 427 Geometry

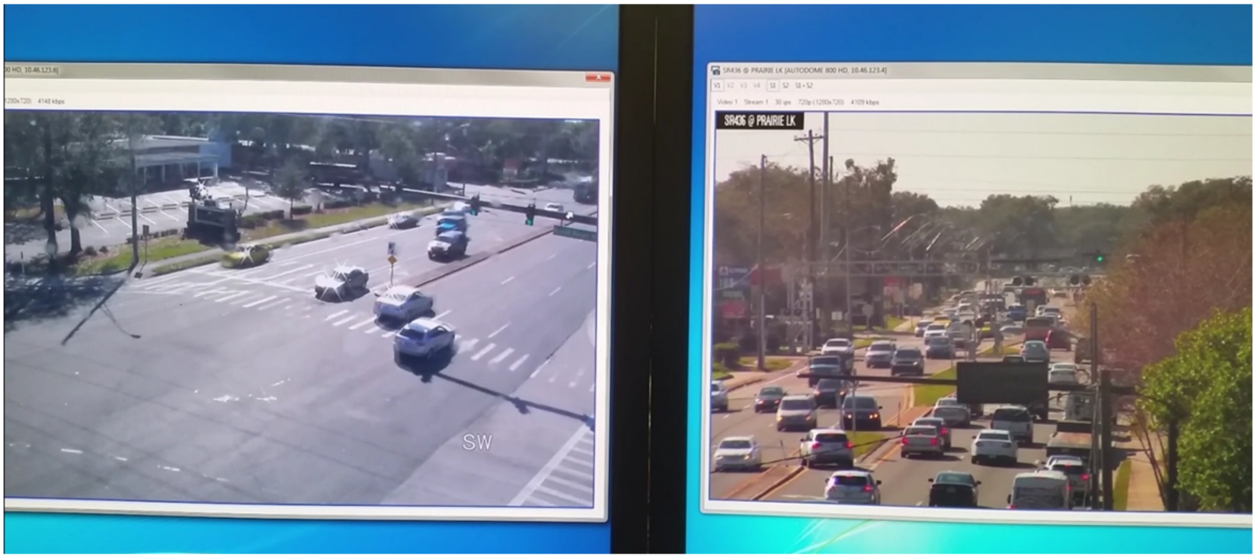


Figure 4-4: SR 436 at CR 427 CCTV Camera Feeds

4.4.2 Decision Assessment and Field Data Validation

Tables 4-2 and 4-3 display the DSS log file and outputs for the intersection of SR 436 and CR 427 on a second by second basis for part of a cycle. The study approach has 3 opposing lanes to be crossed which correspond to a minimum acceptable gap time of 4.0 seconds as defined in Table 4-1. However, this minimum gap needs to be repeated at least 6 times, as specified in the algorithm, before deciding on a Flashing Yellow Arrow mode. As mentioned previously, the algorithm receives data for the first 2 cycles to calculate the minimum acceptable gap. Then the decision is provided in the third cycle and each cycle afterwards. Table 4-2 shows a short gap of 1.7 seconds that did not meet the minimum threshold of 4.0 seconds for the analyzed approach and, therefore, was not taken into account. Table 4-3, on the other hand, shows a longer gap of 6.1 seconds that exceeded the minimum threshold of 4.0 seconds and was counted as a **valid** gap. It should be noted that the gap time accuracy is in fraction of a second. The cycle length was around 230 seconds. The algorithm decision was to switch to a FYA mode most of the time between 3 and 5:00 pm based on the discrete approach. The average approach was recommending a red arrow all the time except during the SunRail passing due to the big gap created between the train and the intersection approach. However, approaching 5 pm, the algorithm decision was fluctuating from red arrow to FYA mode based on the discrete approach.

Figure 4-5 shows a 4-minute gap profile between 5:56 pm and 6:00 pm and displays about 12 gaps. Only one gap exceeded the minimum threshold (6.1 sec) which is highlighted in green in Figure 4-6. It should be noted that the gap is determined only when there are no vehicles in any lane (Y-axis =0 veh). More detailed log file is provided in Appendix A.

4.4.3 Log File Review

The software has been designed with continuous improvement in mind. All traffic data from all sensors and the corresponding algorithm decision are stored in real-time in a log file timestamped with the date and time of the start of the operation. This not only allows for offline verification of the existing software based on the rules and parameters currently implemented, but also helps pinpoint areas of improvement in efficiency and time saving. Log files can virtually be any size in length and are a great tool that provides for a thorough analysis and verification.

The log file for the above intersection is included in Appendix A. The log file shows vehicle arrival in fraction of second in each lane and the 2 methodologies used to calculate the minimum gap and their decisions (discrete and average decision) along with the cycle length.

Table 4-2: Short gap that did not meet the minimum threshold

Record	Left Lane	Opposing Green	Inside Lane	Middle Lane	Outside Lane	Time	Vehicle Count	Gap (Seconds)
14330	Car	Green	Car	.	Car	05:57:32.2 PM	2	
14331	Car	Green	Car	.	Car	05:57:33.0 PM	2	
14332	Car	Green	.	.	.	05:57:33.3 PM	0	
14333	Car	Green	.	.	.	05:57:33.3 PM	0	
14334	Car	Green	.	.	.	05:57:34.0 PM	0	
14335	Car	Green	Car	.	Car	05:57:35.0 PM	2	00:01.7

Table 4-3: Long gap that exceeded the minimum threshold

Record	Left Lane	Opposing Green	Inside Lane	Middle Lane	Outside Lane	Time	Vehicle Count	Gap (seconds)
14481	Car	Green	.	Car	.	05:59:00.2 PM	1	
14482	Car	Green	.	.	.	05:59:01.2 PM	0	
14483	Car	Green	.	.	.	05:59:01.3 PM	0	
14484	Car	Green	.	.	.	05:59:02.2 PM	0	
14485	Car	Green	.	.	.	05:59:03.2 PM	0	
14486	Car	Green	.	.	.	05:59:04.2 PM	0	
14487	Car	Green	.	.	.	05:59:05.3 PM	0	
14488	Car	Green	.	.	.	05:59:06.3 PM	0	
14489	Car	Green	.	Car	.	05:59:07.3 PM	1	00:06.1

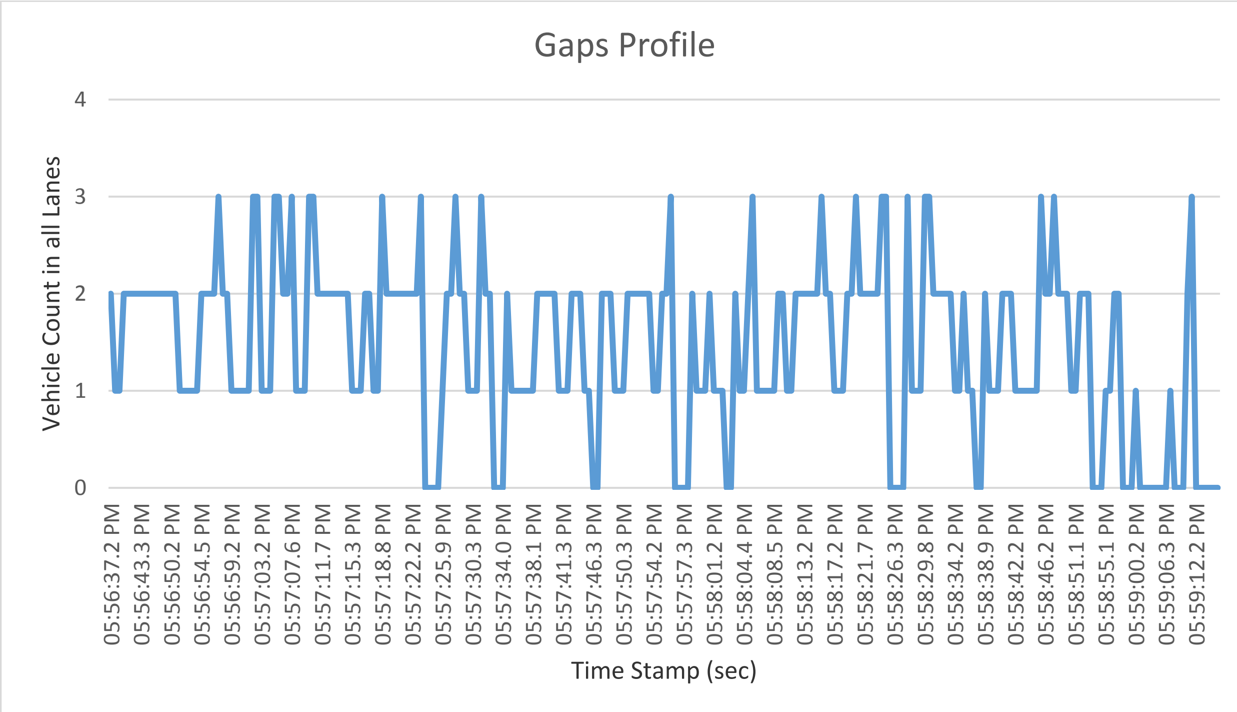


Figure 4-5: Four-minute gap profile for SR 436 and CR 427

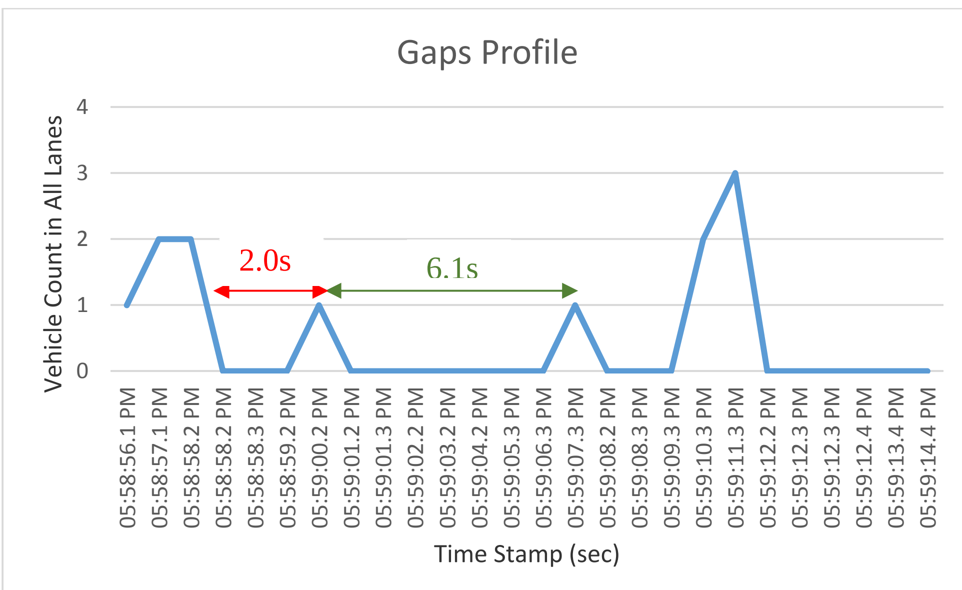


Figure 4-6: One-minute gap profile for SR 436 and CR 427

4.5 Task 3 Conclusions

The algorithm is implemented with the goal of safely optimizing traffic operations. The Decision Support System was tested at different intersections located in Seminole, Orange and Volusia Counties. Field data was collected in real time mode using peer-to-peer logic in order to map the field controller to the lab controller. Video data was collected at the same time period as the algorithm was tested in order to validate the algorithm decisions. The DSS testing confirmed the applicability and validity of the developed algorithm as well as the aforementioned procedure, criteria and logic. It is concluded that the average methodology provided a more conservative approach than the discrete one. However, the discrete approach is more accurate than the average approach.

4.5.1 Iterative Development Process

The software development lifecycle in general, and algorithm development in particular, follow an iterative development process. It starts with intersection requirements, moves to analysis and design, implementation, testing, evaluation, then cycles back to requirements as shown in Figure 4-7. Algorithm development lends itself to the iterative nature of development because it is a heuristic process where there is no known direct path to optimality.

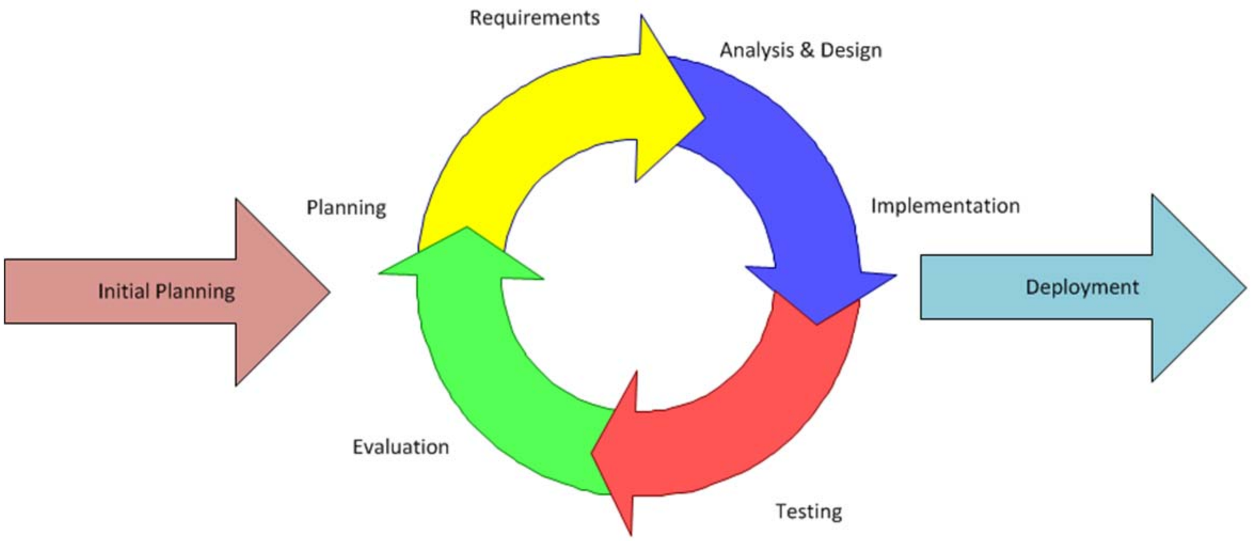


Figure 4-7: Iterative development process

V. ONLINE AND FIELD TESTING

5.1 Overview

The final task of this project involves field testing of the algorithm and the overall hardware platform developed throughout the project. The main goal was to connect directly to various controller and cabinet types in an online mode in the field while allowing for instant validation of the DSS. The system acquires and analyzes real-time traffic data, and the decisions are sent back to the controller, and at the same time, output is sent to the user's screen and saved to log files. The controller then applies the recommended decision to the four-section head display, whether in a flashing yellow arrow mode or red arrow, based on specific gap criteria reflecting intersection conditions. This task was performed on six intersections within the different counties in District 5 with the help of their traffic engineering staff. However, it is worth noting that Chad Dickson from Seminole County provided substantial help for Orange and Volusia County staff in the field wiring process and overcoming connection challenges. Field testing was executed at two intersections with Siemens controllers in Orange County, two intersections operated by Naztec controllers in Seminole County, and two intersections operated by Econolite controllers in Volusia County. The intersection photos are included in Appendix B, and the team photos are included in Appendix C. It should be noted that the intersection left turn approach required an actual four-section signal configuration instead of the five-section head display. The testing environment required the following components:

1- Traffic signal cabinet (TS2) with different controller types (Siemens, Naztec, & Econolite)
2- Four-Section signal display (flashing yellow arrow signal)
3- Vehicle detection
4- Digital input/output data logger device
5- Communications software

The following sections explain in greater detail the testing procedure and provide an illustrative representation of how the system was connected in the field and the results of the Decision Support System (DSS) at each location.

5.2 Testing Scope and Specifications

The first step in the testing procedure is to select an intersection with specific characteristics, including the number of approach lanes for the left and through movements, type of signal head display, type of vehicle detection, traffic signal cabinet type, and controller type. The number of approach lanes is an essential component in determining the minimum gap time needed for the left-turning vehicles to safely cross the opposing through lanes. Furthermore, a single left turn lane is required for the permissive mode operation. Dual left turn lanes operate in a protected mode only. Also, a 4-section configuration with the flashing yellow arrow (FYA) is needed instead of the 5-section display. As mentioned earlier, traffic signal cabinets TS2 are approved by the Traffic Engineering Research Lab (TERL) for the operation of the flashing yellow arrow. However, there exist TS2 type 1, type 2 and hybrid cabinets in the field which are acceptable but each one requires a different wiring setup as will be explained later. Vehicle detection through loop detectors or video detection is another requirement to determine the number of vehicles and inter-arrival times at the intersection approaches. Lastly, the three main controller types utilized in Florida; Siemens, Naztec and Econolite are also essential for the testing environment. The next sections describe the methods, techniques, issues and challenges faced during the field testing at each intersection in the different Counties.

The DSS communication software receives real-time data from the loop detectors signaling the traffic flow during the green phase on a second by second basis. The algorithm applies a two-cycle window of historical traffic data for analysis at every cycle. During analysis, the algorithm constantly searches for gaps across all lanes of the traffic flow in the prior two cycles. Any gap meeting or exceeding the minimum headway threshold which is defined at each intersection, is taken into account as a valid gap and stored in an accumulator. The decision to switch to a flashing yellow arrow is made when the cumulative valid gap(s) in the analysis window meet or exceed 6 times the minimum threshold, which is an average of 3 times per analysis cycle. As a safety precaution, the default and fallback decision is a red arrow. This iterative process is repeated constantly on a cycle by cycle basis and is defined as the “Discrete” method. An additional method was also used and defined as the “Average” method. The average method determines the heaviest lane of flow and determines the average gap duration by dividing the amount of green time in each cycle by the flow in the heaviest lane and compares it to the minimum gap time. This method is similar to the saturation headway and provides an average gap time assuming a uniform arrival of vehicles. It doesn’t take into account the stochastic nature of vehicle arrival or the actual arrival rate. However, it provides a more conservative approach by ensuring that the minimum gap is achieved between every two arriving vehicles every cycle in order to switch to a flashing yellow arrow.

In order to examine the sensitivity of the FYA DSS algorithm to the changes in traffic conditions during off peak and peak hours, the testing period was chosen from 2:00 to 5:00 pm which starts after the end of the mid-day peak hour and continues until the evening peak hour. Table 5-1 summarizes the list of intersections selected for testing in each County according to the above criteria as well as the cabinet type, controller type, study approaches, number of opposing lanes to cross, minimum acceptable gap time and the date when the site was visited.

Table 5-1: List of intersections and characteristics

County	Intersection	Cabinet Type	Controller Type	Study App	No of opp. Thru Lanes Crossed	Min acceptable Gap Time (Sec)	Date Site Visited
Seminole	CR427 @ Longwood Hills Rd	TS2-Type 1 Naztec Trafficware	Naztec Series ATC900 Trafficware	NBL & SBT	2 +1 RT	4.0	Sept 10, 2018
Seminole	Howell Branch Road @ Lake Howell Road	TS2-Type 1 Naztec Trafficware	Naztec Series ATC900 Trafficware	WBL & EBT	2	3.5	Sept 19, 2018
Volusia	Saxon Blvd @ Threadgill Place	TS2-Type 1 Econolite	Econolite ASC/3-2100	EBL & WBT	3	4.0	Oct 3, 2018
Volusia	Saxon Blvd @ Park & Ride/Deltona Memorial Funeral	TS2-Type 1 Econolite	Econolite ASC/3-2100	WBL & EBT	3	4.0	Nov 7, 2018
Orange	John Young Pkwy @ SR 408 EB Ramps	TS2-Type 1 Naztec Trafficware	Siemens M60	SBL & NBT	4	4.5	Nov 14, 2018
Orange	Orange Ave @ Office Ct	TS2-Type 2 Hybrid Temple	Siemens M60	NBL & SBT	2	3.5	Nov 26, 2018

5.3 Seminole County

5.3.1 Intersections Wiring and Challenges

Seminole County Traffic Engineering Staff (Chad Dickson and Jared Zabele) were extremely helpful in setting up the testing environment and wiring the connections to the cabinet and controller. The DSS I/O board requires specific input data from the cabinet and controller before sending a decision back to the controller. Input data include vehicle detection from each of the thru lanes as well as the left turn lane and status of the opposing thru phase. These data are needed as an output from the cabinet and the controller.

Seminole County utilizes Naztec Controllers and TS2 Type 1 Cabinets from Trafficware as shown in Figure 5-1. In a TS2 Type 1 cabinet, the Naztec controller's input and output (I/O) functions are hardwired to the Bus Interface Unit (BIU) and directly connected to the Load Switches (LS) which are communicated through the Synchronize Data Link Communication (SDLC) module. However, the back panel provides an additional I/O functions for testing purposes which were used to connect to the DSS I/O board. The preemption outputs shown in Figure 5-2 were remapped and converted into detector inputs to the DSS board to be able to detect the low signal which indicates vehicle presence in each lane and also to detect the status of the opposing thru phase.

On the other hand, the output protocol from the DSS needs special wiring to send a signal back to the traffic controller which instructs it to switch to a flashing yellow arrow mode based on the available gaps. The detector channel outputs were utilized and converted into detector inputs for this purpose as shown in Figure 5-3. Two (2) wires are connected to the detector channel L15 and logic ground L27. The controller logic ground on L27 receives the signal from the DSS board and sends it to detector L15 to put in a call to activate phase 10 for a flashing yellow arrow mode and inhibits phase 2 which is protected only mode.

It should be noted that, for safety purposes, at the beginning of each cycle the default of the left turn mode is a red arrow and depending on the traffic conditions, the DSS determines whether there are enough gaps to switch to a FYA mode or not. Therefore, the detectors of the opposing through phases 2 and 6 are used for the red arrow indication of the left turn (default mode) while phases 10 and 14 detectors are used to activate the flashing yellow arrow indication.

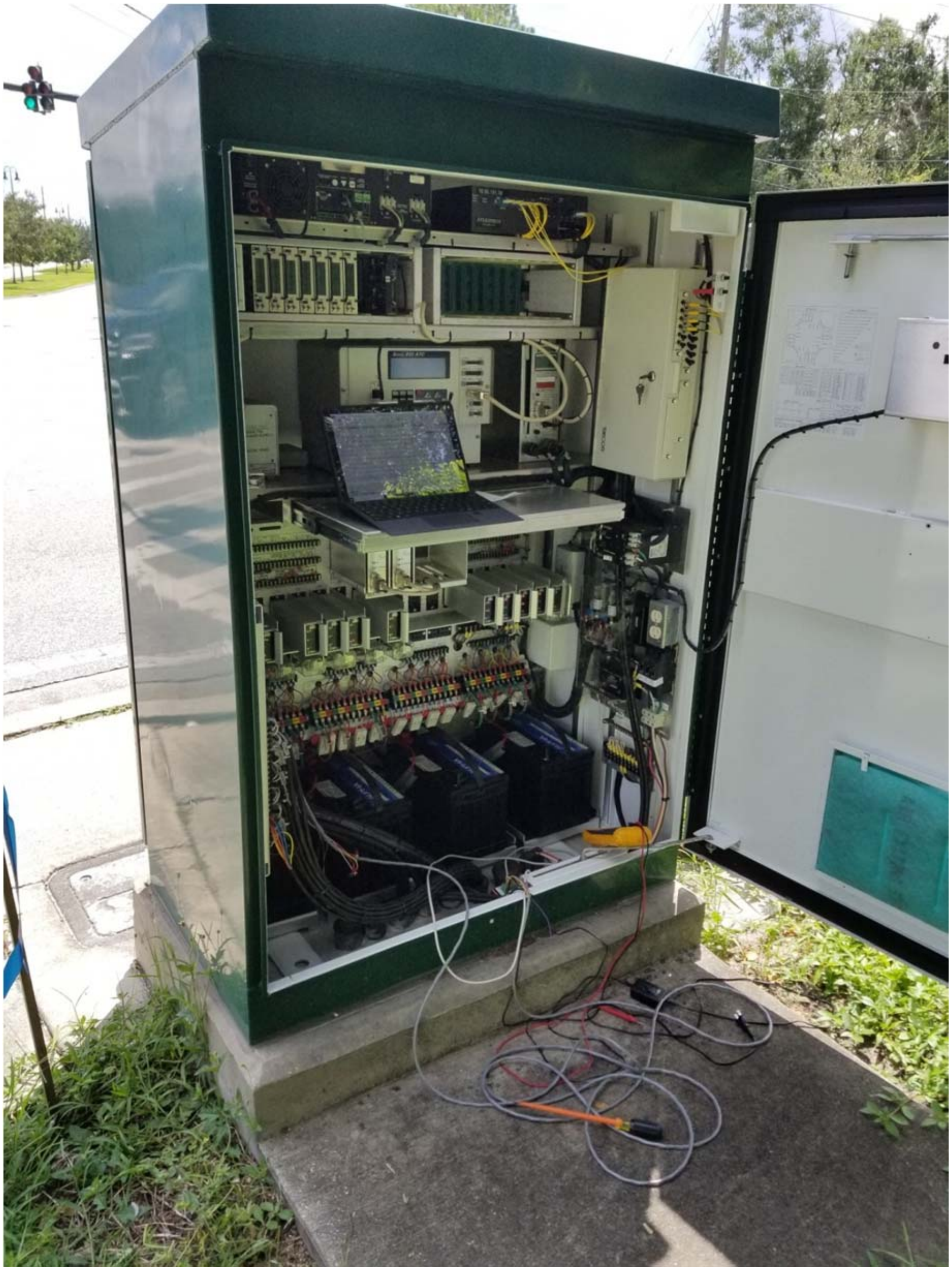


Figure 5-1: Naztec cabinet at CR 427 and Longwood Hills Road intersection

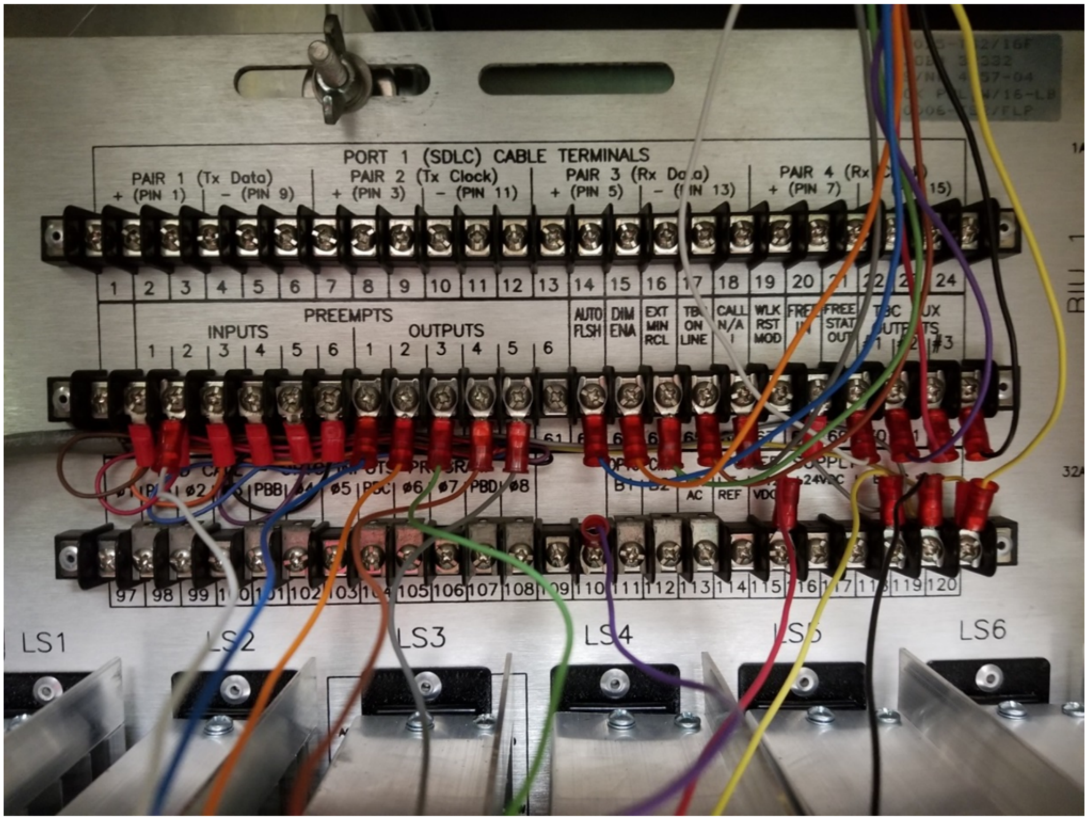


Figure 5-2: Naztec cabinet with preemption inputs and outputs connected to DSS

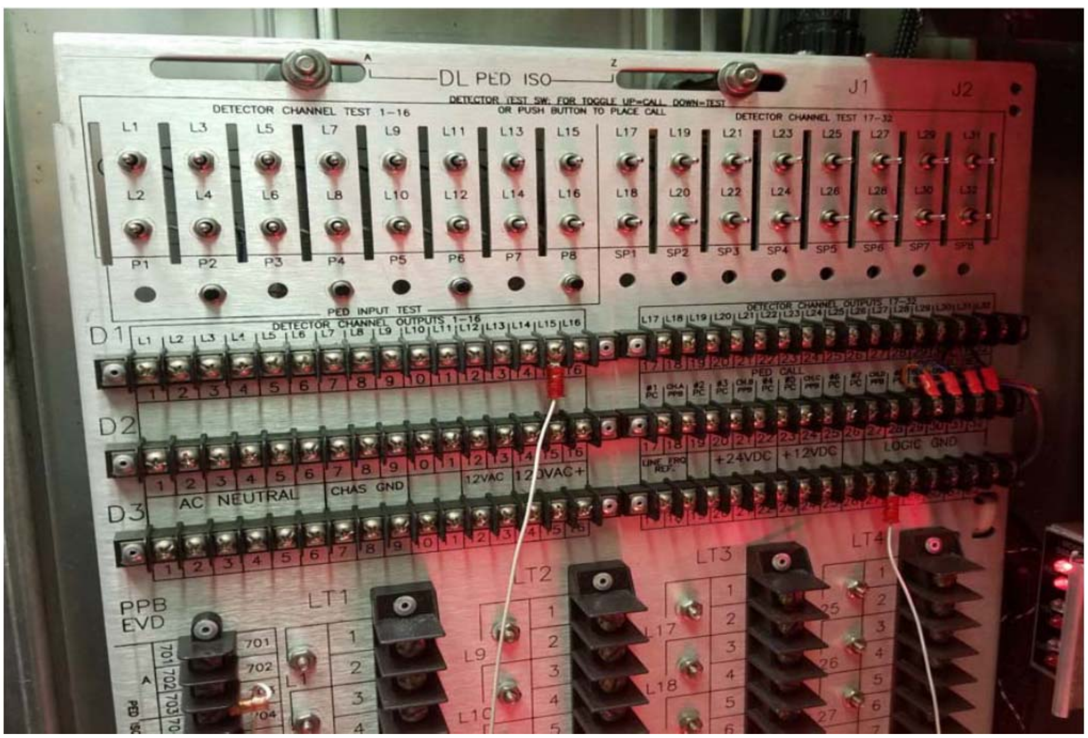


Figure 5-3: DSS connections to detector channel (L15) and logic ground (L27)

5.3.2 Intersections Testing and DSS Results

As mentioned earlier, the two intersections selected for testing in Seminole County were:

1- CR 427 (Ronald Reagan Blvd) at Longwood Hills Road
2- Howell Branch Road at Lake Howell Road.

1- CR427 and Longwood Hills Road Intersection

CR 427 (Ronald Reagan Blvd) is a four lane divided principle arterial in Seminole County running in the north-south direction with a posted speed limit of 45 mph. Longwood Hills Road is an east-west two lane two way collector with a posted speed limit of 30 mph. Residential land uses exist on the east side of the intersection while a power plant and a commercial building exist on the northwest and southwest quadrants respectively as shown in Figure 5-4. The intersection has an exclusive northbound (NB) and southbound (SB) left turn lanes. The NB and SB left turn lanes have a four-section head display which operate in a protected permissive mode throughout the day. However, the side streets on Longwood Hills Rd/Shomate Drive have split phase operation. The traffic gets heavier in the southbound direction during the PM peak hour.

The study approaches were the northbound left turn (NBL) and southbound opposing thru (SBT). The southbound has 2 through lanes with loop detectors and an exclusive right turn lane without a loop detector as shown in Figure 5-3. Therefore, the DSS was setup to receive data from 2 lanes while the minimum gap time was set to cross 3 lanes. The intersection was running in a free mode and not coordinated. The cycle length varied according to the demand but was fluctuating between 80 and 130 seconds during the testing period.

Figure 5-4: CR 427 and Longwood Hills Rd intersection

Decision Results and Assessment

Table 5-2 provides a summary of the log file and the DSS decisions in each cycle during the testing period for the NBL at CR 427. The study approach has 3 opposing lanes to be crossed which correspond to a minimum threshold of 24 second before deciding on a Flashing Yellow Arrow mode based on the discrete method. The 2-hour testing period resulted in 75 cycles with a majority of red arrow decisions (47 cycles) which shows a heavy traffic pattern even before the peak hour which started around 4:00 pm. Approaching the peak hour around 4 pm, the algorithm decision was red arrow for 29 cycles except for 5 cycles. The results also show steady fluctuations between the red arrow and yellow arrow decisions which are considered reasonable especially for driver's expectation. This also indicates that the threshold is rational and practical. Figure 5-5 shows a graphical representation of the gaps and the threshold. As can be seen on Figure 5-5, the max total gaps achieved were almost 50 seconds and the minimum gap was 0 seconds. The decisions can also be verified from the rest of the data which shows the number of vehicles that arrived during the green phase along with the amount of green time in each cycle and the cycle length. For example, at 4:06 pm, the decision was to inhibit FYA due to absence of gaps which can be verified by the 54 vehicles, in the heaviest lane, that arrived during 47 seconds of green phase. The average method calculates the saturation headway and proves that the approach was operating at capacity. As mentioned earlier, the average method is more conservative and is looking for the minimum gap to be achieved between every two arriving vehicles. It is important to note that the discrete method is more accurate and reflects actual traffic conditions on a second-by-second basis.

Table 5-2: DSS results by cycle for CR 427 NBL

Cycle No	Time Stamp	Discrete Gap (sec)	Discrete Decision	Average Gap (sec)	Average Decision	No of Veh/Green		Green Phase (sec)	Cycle Length (sec)
						Lane 1	Lane 2		
1	02:50:36.41 PM	27.1	Yellow Arrow	2.5	Red Arrow	17	15	40.4	124.3
2	02:52:10.81 PM	18.2	Red Arrow	1.9	Red Arrow	22	10	40.5	94.4
3	02:53:38.12 PM	29.5	Yellow Arrow	3.4	Red Arrow	13	12	40.6	87.3
4	02:55:10.14 PM	38.5	Yellow Arrow	2	Red Arrow	14	21	40.4	92
5	02:56:45.29 PM	44.1	Yellow Arrow	5	Yellow Arrow	9	4	40.2	95.2
6	02:58:27.13 PM	42.8	Yellow Arrow	2.7	Red Arrow	16	8	40.6	101.8
7	03:00:06.67 PM	38.6	Yellow Arrow	3.3	Red Arrow	13	10	39.9	99.5
8	03:01:56.09 PM	43.8	Yellow Arrow	1.9	Red Arrow	25	24	45.8	109.4
9	03:03:28.97 PM	41.9	Yellow Arrow	2.5	Red Arrow	16	19	45.4	92.9
10	03:04:50.06 PM	30.6	Yellow Arrow	1.8	Red Arrow	24	13	40.3	81.1
11	03:06:07.83 PM	15.9	Red Arrow	1.4	Red Arrow	29	9	40	77.8
12	03:07:38.59 PM	17.1	Red Arrow	3.1	Red Arrow	14	12	40.5	90.8
13	03:09:04.53 PM	29.8	Yellow Arrow	2	Red Arrow	9	21	40.2	85.9
14	03:10:48.53 PM	38.9	Yellow Arrow	2.3	Red Arrow	19	16	40.8	104
15	03:12:16.70 PM	17.5	Red Arrow	1	Red Arrow	42	19	40.7	88.2
16	03:13:48.12 PM	10.2	Red Arrow	1.7	Red Arrow	25	21	39.9	91.4
17	03:15:13.42 PM	29.6	Yellow Arrow	4	Yellow Arrow	11	10	40	85.3
18	03:16:33.64 PM	19.4	Red Arrow	1.2	Red Arrow	36	29	41.2	80.2
19	03:18:07.24 PM	10.9	Red Arrow	2.1	Red Arrow	20	6	40.4	93.6
20	03:19:34.57 PM	19.7	Red Arrow	1.7	Red Arrow	25	18	40.6	87.3
21	03:20:57.64 PM	8.8	Red Arrow	1.7	Red Arrow	25	15	40.5	83.1
22	03:22:27.48 PM	6	Red Arrow	1.7	Red Arrow	25	12	40.1	89.8
23	03:24:17.55 PM	18.9	Red Arrow	1.8	Red Arrow	26	22	45.7	110.1
24	03:25:40.31 PM	32.3	Yellow Arrow	1.6	Red Arrow	29	18	45.3	82.8
25	03:27:07.37 PM	47.1	Yellow Arrow	3.8	Red Arrow	6	13	45.2	87.1
26	03:28:34.30 PM	41.8	Yellow Arrow	1.6	Red Arrow	19	29	44.9	86.9
27	03:30:20.92 PM	35.3	Yellow Arrow	2.3	Red Arrow	21	9	45.1	106.6
28	03:31:51.32 PM	25.5	Yellow Arrow	1.6	Red Arrow	30	22	45.2	90.4
29	03:33:26.12 PM	16.6	Red Arrow	2.3	Red Arrow	19	21	45.8	94.8
30	03:35:07.95 PM	12.1	Red Arrow	1.6	Red Arrow	30	17	45.1	101.8
31	03:36:56.04 PM	13.3	Red Arrow	1.7	Red Arrow	28	4	45.7	108.1
32	03:38:30.54 PM	18.4	Red Arrow	1.6	Red Arrow	29	23	45.6	94.5
33	03:40:04.33 PM	15.8	Red Arrow	1.3	Red Arrow	31	37	45.4	93.8
34	03:41:38.62 PM	31.7	Yellow Arrow	1.7	Red Arrow	23	27	45.4	94.3
35	03:43:05.95 PM	21	Red Arrow	1	Red Arrow	32	46	45.5	87.3
36	03:44:56.64 PM	22	Red Arrow	2.2	Red Arrow	23	9	47.7	110.7
37	03:46:21.40 PM	49.1	Yellow Arrow	3.6	Red Arrow	14	14	47.3	84.8
38	03:48:03.24 PM	48.3	Yellow Arrow	2.5	Red Arrow	19	7	45.7	101.8
39	03:49:34.54 PM	43.8	Yellow Arrow	2.2	Red Arrow	11	22	45.8	91.3
40	03:51:02.82 PM	35.7	Yellow Arrow	2.1	Red Arrow	23	20	45.8	88.3
41	03:52:36.86 PM	28.3	Yellow Arrow	1.8	Red Arrow	27	8	45.5	94
42	03:54:18.64 PM	20.5	Red Arrow	1.2	Red Arrow	40	35	44.9	101.8
43	03:55:47.07 PM	15.1	Red Arrow	1.6	Red Arrow	29	12	45.1	88.4
44	03:57:22.53 PM	13.8	Red Arrow	2	Red Arrow	25	25	47.3	95.5
45	03:59:10.53 PM	4.1	Red Arrow	1.5	Red Arrow	32	28	45.8	108
46	04:00:52.21 PM	14.1	Red Arrow	2.5	Red Arrow	20	17	47.1	101.7
47	04:02:32.86 PM	28.8	Yellow Arrow	2.3	Red Arrow	21	6	45.3	100.7
48	04:04:12.87 PM	14.6	Red Arrow	1	Red Arrow	26	48	44.9	100
49	04:06:03.65 PM	0	Red Arrow	0.9	Red Arrow	54	42	47.3	110.8
50	04:07:51.54 PM	10.3	Red Arrow	2	Red Arrow	25	25	47.6	107.9
51	04:09:57.45 PM	10.3	Red Arrow	1.3	Red Arrow	39	21	47.8	125.9
52	04:11:56.21 PM	0	Red Arrow	1.6	Red Arrow	30	16	46.9	118.8
53	04:13:52.15 PM	8.5	Red Arrow	1	Red Arrow	48	35	47.3	115.9
54	04:15:49.65 PM	32.5	Yellow Arrow	2.2	Red Arrow	22	18	47.1	117.5
55	04:17:38.55 PM	24	Red Arrow	1.4	Red Arrow	33	14	45.5	108.9
56	04:18:54.49 PM	10.6	Red Arrow	2.5	Red Arrow	19	15	45.4	75.9
57	04:20:27.52 PM	20.1	Red Arrow	1.4	Red Arrow	29	33	45.1	93
58	04:22:08.59 PM	18.7	Red Arrow	2.2	Red Arrow	22	16	45.8	101.1
59	04:23:40.61 PM	28.1	Yellow Arrow	2.7	Red Arrow	18	10	45.6	92
60	04:25:07.12 PM	18.9	Red Arrow	1.3	Red Arrow	36	12	44.9	86.5
61	04:26:46.07 PM	40.6	Yellow Arrow	11.9	Yellow Arrow	4	5	47.5	99
62	04:28:14.60 PM	40.6	Yellow Arrow	1.1	Red Arrow	26	42	45.8	88.5
63	04:30:04.11 PM	14.5	Red Arrow	1.4	Red Arrow	33	16	45.8	109.5
64	04:32:08.94 PM	14.5	Red Arrow	1.2	Red Arrow	37	38	45.1	124.8
65	04:34:20.70 PM	0	Red Arrow	1.2	Red Arrow	41	38	46.8	131.8
66	04:36:13.75 PM	0	Red Arrow	1.2	Red Arrow	37	41	47.3	113.1
67	04:38:02.00 PM	4.7	Red Arrow	1.5	Red Arrow	34	20	51.1	108.3
68	04:40:04.82 PM	10.9	Red Arrow	1.8	Red Arrow	29	22	51.3	122.8
69	04:41:54.13 PM	15.9	Red Arrow	1.1	Red Arrow	46	17	51	109.3
70	04:43:56.89 PM	9.7	Red Arrow	0.9	Red Arrow	42	57	51.1	122.8
71	04:46:02.33 PM	0	Red Arrow	0.9	Red Arrow	58	62	54.9	125.4
72	04:47:50.32 PM	13.2	Red Arrow	1.8	Red Arrow	25	31	55.4	108
73	04:49:47.15 PM	13.2	Red Arrow	1.8	Red Arrow	26	20	45.4	116.8
74	04:51:42.75 PM	5.9	Red Arrow	1.1	Red Arrow	42	40	45.6	115.6
75	04:53:31.50 PM	19.2	Red Arrow	2.4	Red Arrow	24	20	54.8	108.8

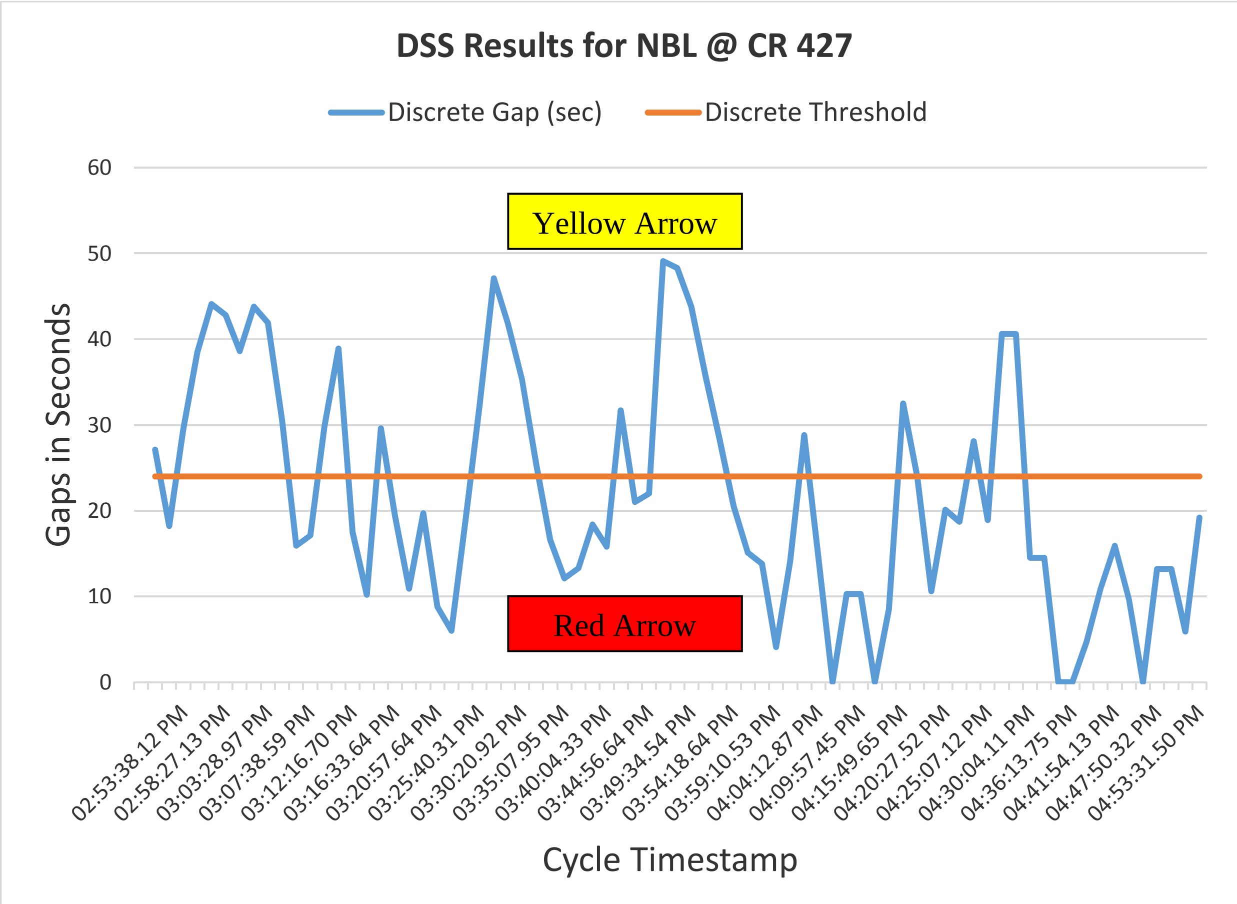


Figure 5-5: DSS results by cycle for CR 427 NBL

2- Howell Branch and Lake Howell Road Intersection

At the vicinity of the intersection, Howell Branch is a four-lane divided arterial running east-west with a posted speed limit of 45 mph, connecting Goldenrod Road and US 17-92. Lake Howell Road is a two-lane road running north-south, connecting between SR 436 in the north to the County Line in the south with posted speed limit of 35 mph. Commercial land uses exist on all quadrants of the intersection as shown in Figure 5-6. The intersection has exclusive eastbound (EB) and westbound (WB) left turn lanes. The EB and WB left turn lanes have a four-section head display, which operates in a protected permissive mode throughout the day. The side streets on Lake Howell Rd also have exclusive left turn lanes with four-section head display. The traffic gets heavier in the eastbound direction during the PM peak hour.

The study approaches were the westbound left turn lane (WBL) and eastbound through lane (EBT). The eastbound has two through lanes with loop detectors. Therefore, the DSS was set up to receive data from two lanes, and the minimum gap time was set to cross two lanes as well. The intersection was running in a coordinated mode. The cycle length was almost steady throughout the testing period and was around 170 seconds.

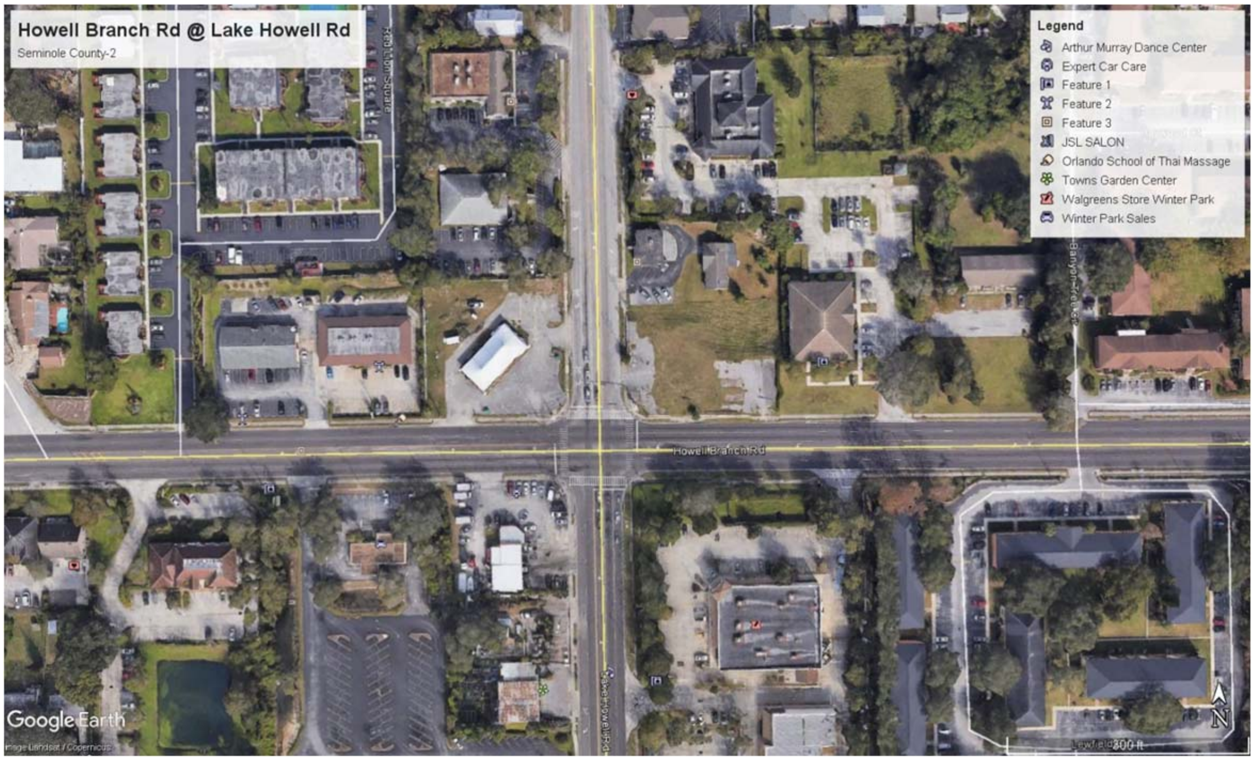


Figure 5-6: Howell Branch Road and Lake Howell Road intersection

Decision Results and Assessment

Table 5-3 provides a summary of the log file and the DSS decisions in each cycle during the testing period for the WBL along Howell Branch Road. The study approach has 2 opposing lanes to be crossed which correspond to a minimum threshold of 21 second before deciding on a Flashing Yellow Arrow mode based on the discrete method. The 2.5 hours testing period resulted in 49 cycles with a majority of yellow arrow decisions (31 cycles) which shows a light to moderate traffic pattern from 3:00 to 4:30 pm before the peak hour which started after 4:30 pm. Approaching the peak hour around 4:40 pm, the algorithm decision was red arrow for 11 cycles except for 3 cycles. The results also show steady fluctuations between the red arrow and yellow arrow decisions which are considered reasonable and indicate that the threshold is rational and practical. Figure 5-6 shows a graphical representation of the gaps and the threshold. As can be seen on Figure 5-7, the max total gaps reached 112 seconds and the minimum gap was 0 seconds at 5:15 pm. The decisions was also verified from the rest of the data which shows the number of vehicles that arrived during the green phase along with the amount of green time in each cycle and the cycle length. For example, at 4:06 pm, the decision was to inhibit FYA due to absence of gaps which can be verified by the 88 vehicles, in the heaviest lane, that arrived during 88 seconds of green phase. The average method calculates the saturation headway and proves that the approach was operating at capacity.

Table 5-3: DSS results by cycle for Howell Branch Rd WBL

Cycle No	Time Stamp	Discrete Gap (sec)	Discrete Decision	Average Gap (sec)	Average Decision	No of Veh/Green Lane 1	No of Veh/Green Lane 2	Green Phase	Cycle Length
1	02:53:37.88 PM	93.9	Yellow Arrow	2.7	Red Arrow	37	37	95.4	169.8
2	02:56:27.92 PM	62.6	Yellow Arrow	1.7	Red Arrow	53	42	87	170
3	02:59:18.51 PM	60.4	Yellow Arrow	2.5	Red Arrow	36	32	88.3	170.6
4	03:02:08.08 PM	95.7	Yellow Arrow	2.5	Red Arrow	41	31	99.7	169.6
5	03:04:58.52 PM	92.7	Yellow Arrow	2	Red Arrow	47	47	92.7	170.4
6	03:07:48.56 PM	86.5	Yellow Arrow	2.7	Red Arrow	30	34	90.3	170
7	03:10:38.28 PM	90.1	Yellow Arrow	2.4	Red Arrow	37	39	92.7	169.7
8	03:13:28.61 PM	101.2	Yellow Arrow	3.7	Yellow Arrow	27	29	102.9	170.3
9	03:16:18.70 PM	112.2	Yellow Arrow	3.4	Red Arrow	31	31	100.6	170.1
10	03:19:08.74 PM	99.4	Yellow Arrow	2.5	Red Arrow	38	21	92.1	170
11	03:21:58.16 PM	74.6	Yellow Arrow	2.5	Red Arrow	35	22	84.1	169.4
12	03:24:48.00 PM	52.9	Yellow Arrow	2	Red Arrow	44	40	84.6	169.8
13	03:27:37.83 PM	56.3	Yellow Arrow	2.4	Red Arrow	35	37	85.1	169.8
14	03:30:27.76 PM	57.5	Yellow Arrow	1.8	Red Arrow	50	38	88.7	169.9
15	03:33:17.84 PM	67	Yellow Arrow	2.1	Red Arrow	48	45	99.6	170.1
16	03:36:08.08 PM	61.2	Yellow Arrow	1.6	Red Arrow	53	45	84.3	170.2
17	03:38:58.17 PM	62	Yellow Arrow	3.2	Red Arrow	27	27	83	170.1
18	03:41:47.78 PM	66.9	Yellow Arrow	2.1	Red Arrow	39	40	80.2	169.6
19	03:44:37.78 PM	62	Yellow Arrow	1.9	Red Arrow	56	58	109.3	170
20	03:47:28.32 PM	40	Yellow Arrow	1.4	Red Arrow	54	53	74	170.5
21	03:50:18.39 PM	19.9	Red Arrow	1.8	Red Arrow	33	42	73.7	170.1
22	03:52:28.13 PM	31.2	Yellow Arrow	1.7	Red Arrow	22	31	50.3	129.7
23	03:54:17.40 PM	22.2	Yellow Arrow	1.6	Red Arrow	25	28	44	109.3
24	03:55:50.01 PM	13.1	Red Arrow	2.2	Red Arrow	17	16	35.2	92.6
25	03:57:47.11 PM	16.5	Red Arrow	1.4	Red Arrow	26	33	43.8	117.1
26	03:59:53.02 PM	14.5	Red Arrow	1.3	Red Arrow	26	36	47	125.9
27	04:01:52.48 PM	18.7	Red Arrow	1.6	Red Arrow	22	32	49.9	119.5
28	04:04:16.83 PM	14.5	Red Arrow	1.4	Red Arrow	34	30	46.2	144.4
29	04:06:43.66 PM	21	Yellow Arrow	1.6	Red Arrow	32	20	50	146.8
30	04:08:45.51 PM	32.5	Yellow Arrow	1.5	Red Arrow	21	30	43.1	121.9
31	04:11:36.09 PM	43	Yellow Arrow	2.5	Red Arrow	23	34	81.9	170.6
32	04:15:40.00 PM	92.3	Yellow Arrow	2.1	Red Arrow	61	60	125	243.9
33	04:32:47.90 PM	15.7	Red Arrow	1	Red Arrow	77	89	88.1	169.9
34	04:35:37.99 PM	21.9	Yellow Arrow	1.7	Red Arrow	52	39	87.9	170.1
35	04:38:27.97 PM	21.9	Yellow Arrow	1.1	Red Arrow	81	81	87.5	170
36	04:41:17.90 PM	20.6	Red Arrow	1.7	Red Arrow	47	54	88.1	169.9
37	04:44:08.08 PM	20.6	Red Arrow	1.1	Red Arrow	75	84	87.9	170.2
38	04:46:58.01 PM	4	Red Arrow	1	Red Arrow	78	85	87.5	169.9
39	04:49:48.10 PM	4	Red Arrow	1.2	Red Arrow	61	74	87.4	170.1
40	04:52:37.78 PM	12.2	Red Arrow	1.1	Red Arrow	54	81	88.6	169.7
41	04:55:27.76 PM	26	Yellow Arrow	1.3	Red Arrow	52	66	87.2	170
42	04:58:17.74 PM	13.9	Red Arrow	0.9	Red Arrow	83	97	87.8	170
43	05:01:07.78 PM	21.6	Yellow Arrow	1.4	Red Arrow	62	58	88	170
44	05:03:57.83 PM	25.6	Yellow Arrow	1.1	Red Arrow	61	78	88.2	170.1
45	05:06:47.89 PM	4	Red Arrow	1	Red Arrow	84	91	87.9	170.1
46	05:09:37.77 PM	7.9	Red Arrow	1.1	Red Arrow	65	82	92.5	169.9
47	05:12:27.70 PM	7.9	Red Arrow	1.1	Red Arrow	83	71	88	169.9
48	05:15:17.79 PM	0	Red Arrow	1	Red Arrow	67	88	87.8	170.1
49	05:18:08.78 PM	0	Red Arrow	1.1	Red Arrow	77	82	88.4	171

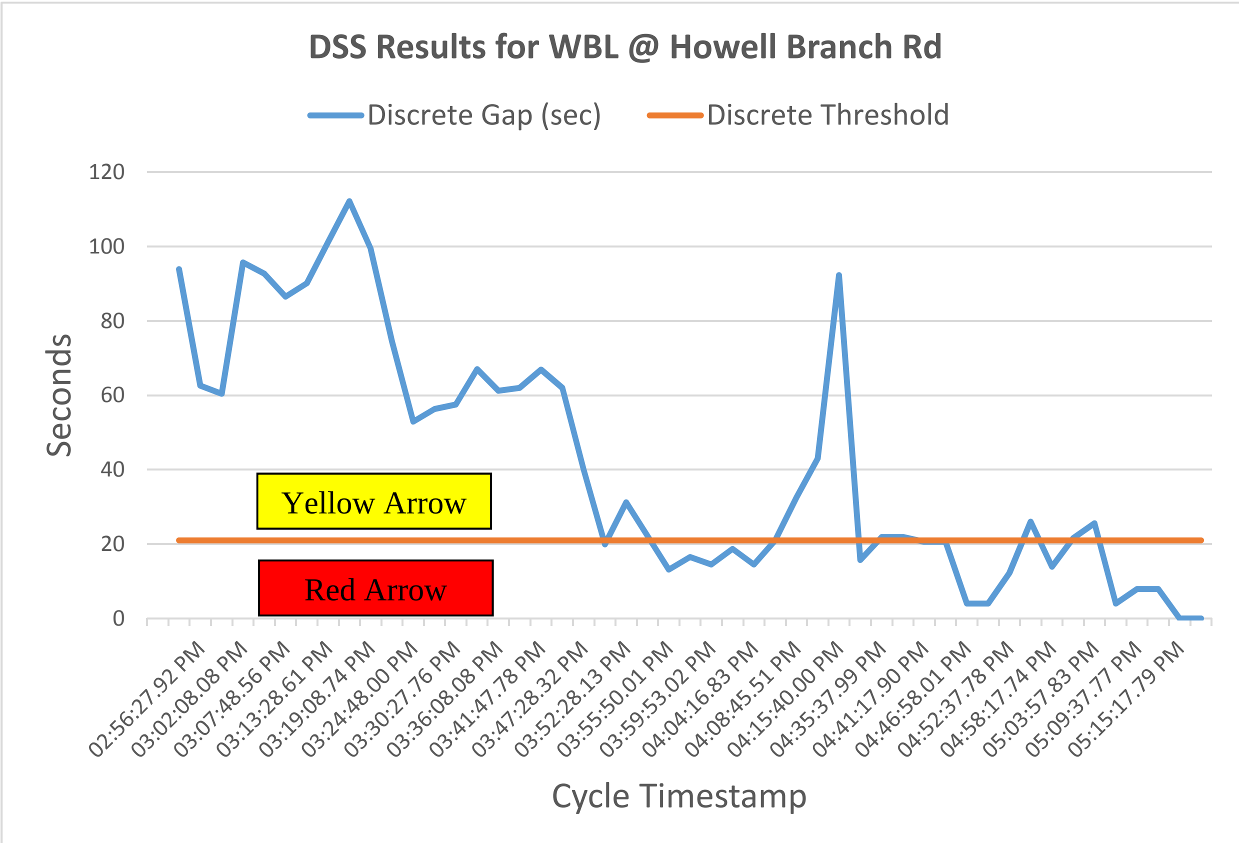


Figure 5-7: DSS results by cycle for Howell Branch WBL

5.4 Volusia County

5.4.1 Intersections Wiring and Challenges

Volusia County Traffic Engineering Staff (Bobby Maddox and Karl Ewald) were very helpful in selecting the intersections and conducting the testing. It should be noted that Chad Dickson and Jared Zabele from Seminole County were also available for setting up the wiring and connections to the cabinet and controller. The same input and output data was needed.

Volusia County study intersections utilized Econolite Controllers ASC/3-2100 and TS2 Type 1 Cabinets from Econolite as shown in Figure 5-8. As mentioned earlier, the controller's input and output (I/O) functions in TS2 Type 1 cabinets are hardwired to the Bus Interface Unit (BIU) and directly connected to the Load Switches (LS) which are communicated through the Synchronize Data Link Communication (SDLC) module. However, the Econolite cabinet didn't breakout the detectors or load switch drivers on a back panel such as Naztec Cabinets. Therefore, to overcome this issue, vehicle detection from the inductive loops for the left turn (Phase 1) and the opposing thru (Phase 2) as well as the green status of the opposing thru (Phase 2) were interfaced through spare (empty) Load Switch sockets (24v side) in the cabinet and remapped with the Controller's I/O logic processor as shown in Figure 5-9. It is worth mentioning that Econolite controllers were the easiest of all controllers to setup a logic statement. The control wire for the DSS to determine a protected or FYA operation was input through Ped call 1 on the back panel of the cabinet to allow or omit FYA overlap using I/O Logic statements within the controller as in Figure 5-10.

Figure 5-8: Econolite cabinet at Saxon Blvd and Threadgill Place intersection

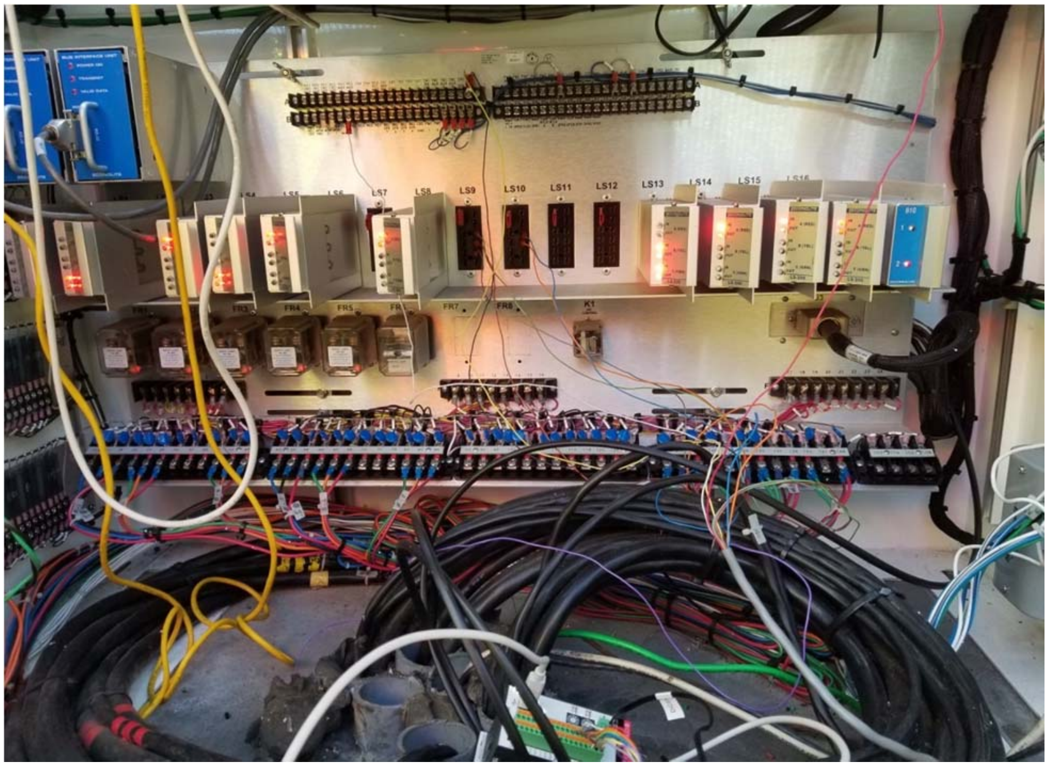


Figure 5-9: Econolite cabinet with load switch sockets connected to DSS

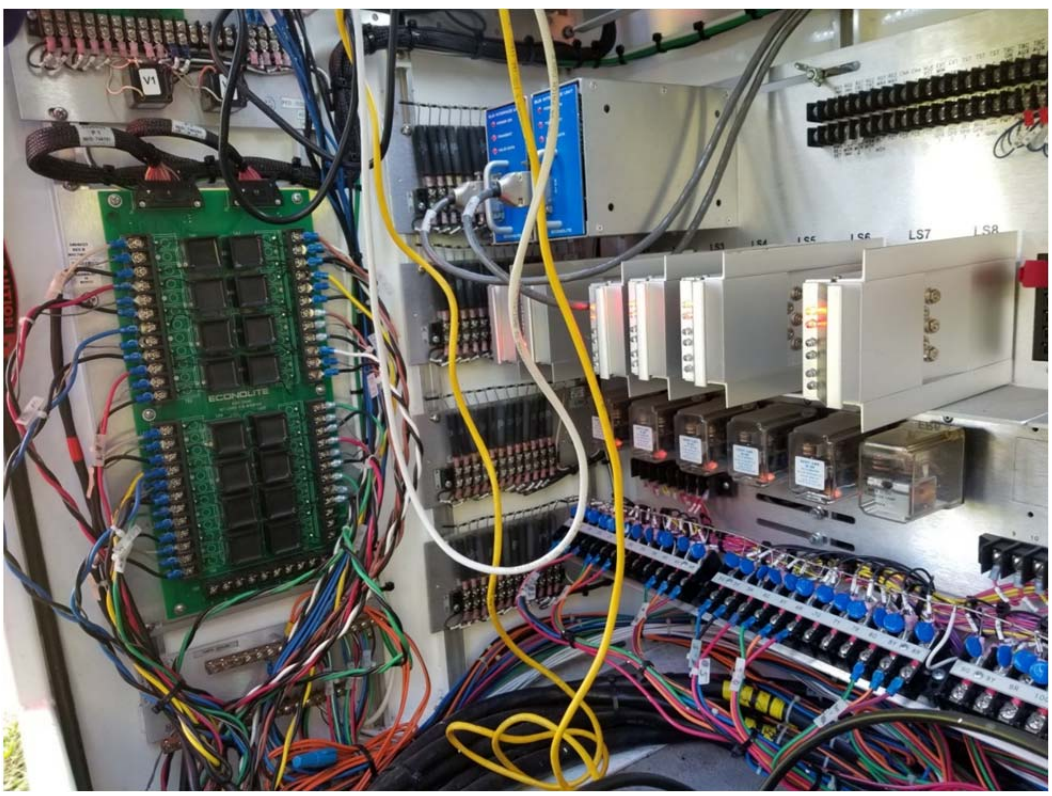


Figure 5-10: DSS connected to Econolite back panel for ped call

5.4.2 Intersections Testing and DSS Results

As mentioned earlier, the two intersections selected for testing in Volusia County were:

3- Saxon Blvd at Threadgill Place
4- Saxon Blvd at Park and Ride Pl

3- Saxon Blvd and Threadgill Place Intersection

Saxon Blvd is a six-lane divided principle arterial in Volusia County running in the east-west direction with a posted speed limit of 45 mph. Threadgill Place is a minor local road running in the northbound direction. The area is predominantly commercial land uses and offices such as Lowe’s, Five Guys and Jena Medical and Daytona Heart group as shown in Figure 5-11. The intersection has an exclusive eastbound (EB) and westbound (WB) left turn lanes. The EB and WB left turn lanes have a four-section head display which operate in a protected permissive mode throughout the day. The side street also on Threadgill Place has exclusive left turn lanes but with three section head display which operates in a permissive mode. It was expected that the traffic gets heavier in the westbound direction during the PM peak hour for drivers coming off of I-4. However, the traffic pattern stayed light to moderate throughout the testing period 3-5 pm.

The study approaches were the eastbound left turn (EBL) and westbound opposing thru (WBT). The westbound has 3 through lanes with loop detectors. Therefore, the DSS was setup to receive data from 3 lanes and the minimum gap time was set to cross 3 lanes as well. The intersection was running in a free mode and was not coordinated. The cycle length was fluctuating based on the demand throughout the testing period.

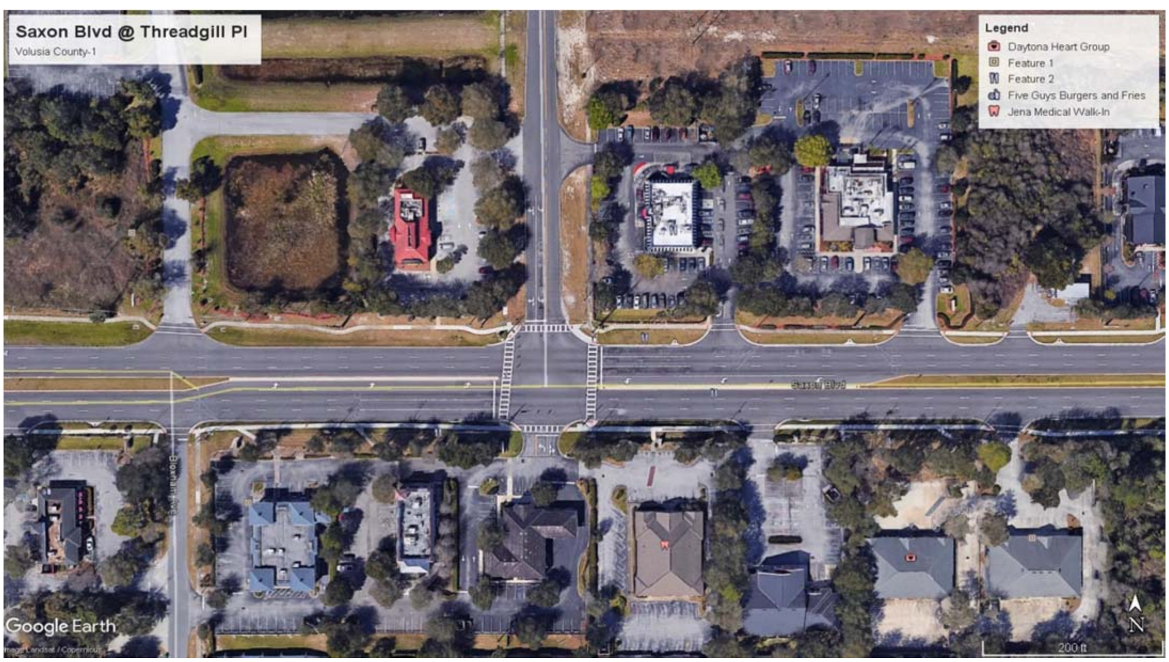


Figure 5-11: Saxon Blvd and Threadgill Place intersection

Decision Results and Assessment

Table 5-4 provides a summary of the DSS decisions in each cycle during the testing period for the EBL along Saxon Blvd. The study approach has 3 opposing lanes to be crossed which correspond to a minimum threshold of 24 seconds before deciding on a Flashing Yellow Arrow mode based on the discrete method. The testing period lasted for 1.5 hours only due to the time taken for the wiring setup and connections. A total of 60 cycles with a majority of yellow arrow decisions (49 cycles) were observed which show a very light traffic pattern even during the peak hour until 5 pm. What was more interesting is the average method decisions which included a lot of yellow arrows. As mentioned before, the average method is a very conservative approach which requires that the minimum gap be available between every arriving vehicle. It assumes a uniform distribution of the vehicle's arrival without taking into account actual arrival patterns. Results also show steady fluctuations between the red arrow and yellow arrow decisions which are considered reasonable and indicate that the threshold is rational and practical. Figure 5-12 shows a graphical representation of the gaps and the threshold. As can be seen on Figure 5-12, the max total gaps reached 145 seconds and the minimum gap was 0 seconds at 4:30 pm. The decisions was also verified from the rest of the data which shows the number of vehicles that arrived during the green phase along with the amount of green time in each cycle and the cycle length. For example, at 4:30 pm, the decision was to inhibit FYA due to absence of gaps which can be verified by the 75 vehicles, in the heaviest lane, that arrived during 55 seconds of green phase.

Table 5-4: DSS results by cycle for Saxon Blvd EBL

Cycle No	Time Stamp	Discrete Gap (sec)	Discrete Decision	Average Gap (sec)	Average Decision	No of Veh/Green			Green Phase	Cycle Length
						Lane 1	Lane 2	Lane 3		
1	03:27:10.87 PM	0	Red Arrow	0.6	Red Arrow	86	20	20	54.2	80.1
2	03:29:07.02 PM	6.4	Red Arrow	1.3	Red Arrow	48	46	48	61.9	116.2
3	03:31:10.02 PM	25.8	Yellow Arrow	2.6	Red Arrow	13	13	22	54.1	123
4	03:32:48.62 PM	36.9	Yellow Arrow	2.3	Red Arrow	15	15	18	39.1	98.6
5	03:35:39.15 PM	118.9	Yellow Arrow	7.8	Yellow Arrow	11	11	17	125.5	170.5
6	03:37:11.07 PM	134.8	Yellow Arrow	4.1	Yellow Arrow	15	15	7	57.2	91.9
7	03:38:37.73 PM	80.6	Yellow Arrow	10.1	Yellow Arrow	3	3	7	60.7	86.7
8	03:40:33.98 PM	86.4	Yellow Arrow	9	Yellow Arrow	4	4	7	54.2	116.3
9	03:42:12.92 PM	76.9	Yellow Arrow	19.8	Yellow Arrow	3	3	3	39.6	98.9
10	03:43:58.23 PM	52.4	Yellow Arrow	1.6	Red Arrow	29	29	36	57.7	105.3
11	03:46:01.25 PM	14.6	Red Arrow	1	Red Arrow	56	56	58	55	123
12	03:48:04.26 PM	0	Red Arrow	1	Red Arrow	55	55	55	54.3	123
13	03:50:07.33 PM	12.7	Red Arrow	1.5	Red Arrow	33	33	38	54.7	123.1
14	03:51:55.78 PM	34.9	Yellow Arrow	2.2	Red Arrow	6	6	25	52.6	108.5
15	03:53:17.28 PM	48.9	Yellow Arrow	2.2	Red Arrow	26	26	12	55	81.5
16	03:54:59.61 PM	61.4	Yellow Arrow	9.2	Yellow Arrow	3	3	6	45.8	102.3
17	03:56:22.43 PM	68	Yellow Arrow	12.8	Yellow Arrow	3	3	4	38.4	82.8
18	03:57:56.17 PM	49.2	Yellow Arrow	3.1	Red Arrow	15	15	12	42.9	93.7
19	03:58:43.61 PM	25.5	Yellow Arrow	7.1	Yellow Arrow	2	2	3	14.3	47.4
20	04:00:35.68 PM	52.8	Yellow Arrow	4.7	Yellow Arrow	17	17	13	75.9	112.1
21	04:02:33.29 PM	85.4	Yellow Arrow	6.8	Yellow Arrow	10	10	6	61.4	117.6
22	04:04:16.39 PM	106.7	Yellow Arrow	11	Yellow Arrow	7	7	1	66.2	103.1
23	04:06:12.11 PM	114.7	Yellow Arrow	3.7	Red Arrow	10	10	22	77.4	115.7
24	04:08:06.93 PM	73.4	Yellow Arrow	2.2	Red Arrow	17	17	26	54.3	114.8
25	04:09:57.81 PM	46.1	Yellow Arrow	3.4	Red Arrow	15	15	17	54.7	110.9
26	04:11:47.39 PM	86.9	Yellow Arrow	23.7	Yellow Arrow	4	4	3	71	109.6
27	04:13:21.31 PM	96.2	Yellow Arrow	3.1	Red Arrow	15	15	20	58.4	93.9
28	04:15:25.09 PM	97.4	Yellow Arrow	7.2	Yellow Arrow	8	8	13	86.9	123.8
29	04:16:13.12 PM	79.5	Yellow Arrow	14.3	Yellow Arrow	1	1	1	14.3	48
30	04:17:52.77 PM	27.2	Yellow Arrow	3.1	Red Arrow	8	8	17	50.1	99.7
31	04:19:35.71 PM	77.1	Yellow Arrow	9.2	Yellow Arrow	5	5	9	73.9	102.9
32	04:20:42.50 PM	75.4	Yellow Arrow	2.6	Red Arrow	11	11	9	26.1	66.8
33	04:22:42.27 PM	18.1	Red Arrow	1.6	Red Arrow	14	14	38	58.7	119.8
34	04:24:39.32 PM	16	Red Arrow	1.2	Red Arrow	46	46	45	55	117.1
35	04:26:42.39 PM	9.1	Red Arrow	0.9	Red Arrow	59	59	2	54.4	123.1
36	04:28:45.40 PM	0	Red Arrow	0.8	Red Arrow	66	66	19	54.7	123
37	04:30:34.10 PM	0	Red Arrow	0.7	Red Arrow	75	75	23	54.9	108.7
38	04:32:24.72 PM	0	Red Arrow	0.7	Red Arrow	75	75	13	55	110.6
39	04:34:42.76 PM	53.9	Yellow Arrow	7	Yellow Arrow	11	11	13	84.6	138
40	04:36:30.92 PM	93.6	Yellow Arrow	11	Yellow Arrow	6	6	4	54.8	108.2
41	04:38:21.99 PM	75.5	Yellow Arrow	2.1	Red Arrow	10	10	25	51.3	111.1
42	04:40:20.85 PM	92.4	Yellow Arrow	3.3	Red Arrow	8	8	26	82.4	118.9
43	04:41:41.75 PM	88.2	Yellow Arrow	7.9	Yellow Arrow	6	6	7	47.2	80.9
44	04:43:33.29 PM	80	Yellow Arrow	19.5	Yellow Arrow	4	4	4	58.4	111.5
45	04:45:08.23 PM	91.7	Yellow Arrow	3.7	Red Arrow	9	9	19	67.2	94.9
46	04:47:00.97 PM	77.9	Yellow Arrow	6.8	Yellow Arrow	9	9	9	54.2	112.7
47	04:47:51.84 PM	52.9	Yellow Arrow	18.8	Yellow Arrow	1	1	1	18.8	50.9
48	04:49:30.44 PM	68.3	Yellow Arrow	8.1	Yellow Arrow	10	10	6	72.8	98.6
49	04:51:13.88 PM	102.9	Yellow Arrow	8.2	Yellow Arrow	10	9	8	73.9	103.4
50	04:52:58.29 PM	115	Yellow Arrow	11.5	Yellow Arrow	5	5	7	69.1	104.4
51	04:54:02.14 PM	96.5	Yellow Arrow	35.3	Yellow Arrow	1	1	2	35.3	63.9
52	04:55:40.81 PM	64.4	Yellow Arrow	4.9	Yellow Arrow	15	15	11	68	98.7
53	04:57:25.81 PM	60.4	Yellow Arrow	6.2	Yellow Arrow	9	9	10	55.4	105
54	04:59:00.81 PM	73	Yellow Arrow	4.5	Yellow Arrow	3	3	13	54.1	95
55	05:00:09.17 PM	55.7	Yellow Arrow	2.4	Red Arrow	8	8	15	34.2	68.4
56	05:01:50.58 PM	76.8	Yellow Arrow	33.3	Yellow Arrow	2	2	3	66.7	101.4
57	05:03:38.63 PM	82.9	Yellow Arrow	3.1	Red Arrow	5	5	15	43.9	108.1
58	05:05:29.16 PM	57.8	Yellow Arrow	2.6	Red Arrow	19	19	30	75.3	110.5
59	05:06:56.67 PM	54.1	Yellow Arrow	3.6	Red Arrow	11	11	8	36.1	87.5
60	05:08:37.85 PM	83	Yellow Arrow	10.3	Yellow Arrow	3	3	8	72.4	101.2

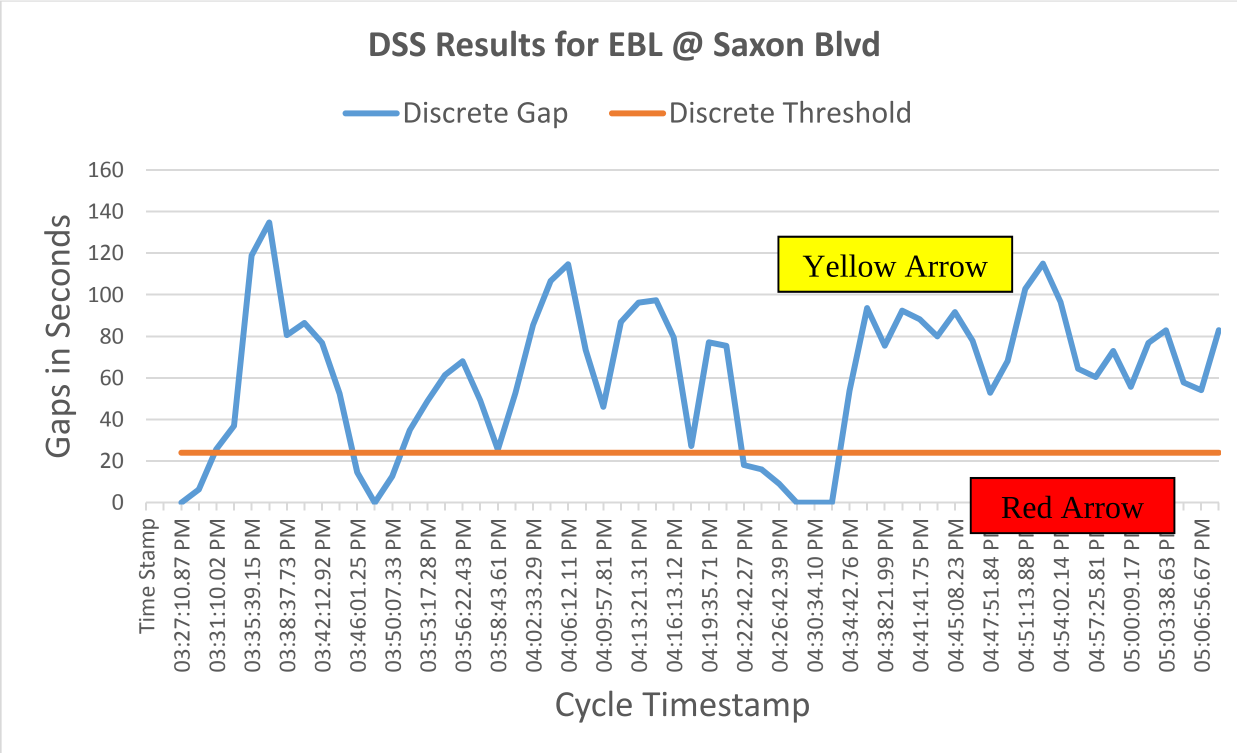


Figure 5-12: DSS results by cycle for Saxon Blvd EBL

4- Saxon Blvd and Park and Ride Intersection

Saxon Blvd is a six lane divided principle arterial in Volusia County running in the east-west direction with a posted speed limit of 45 mph. Park and Ride is just west of I-4 interchange ramps. The Park and Ride lot offers a central location where commuters can park their cars and make the transfer to a carpool or transit. The Saxon Boulevard Park and Ride is serviced by Votran via the SunRail Connector service. This location was selected due to its close proximity to I-4 interchange ramps and the fact that the previous intersection along Saxon Blvd didn't experience any congestion even during the peak hour. The main purpose was to test the DSS algorithm on a heavily congested six lane roadway and to capture any traffic heading towards I-4 during the peak hour. The area is predominantly service land uses such as Deltona Memorial Funeral Home, Race Track gas station and Park and Ride as shown in Figure 5-13. The intersection has an exclusive eastbound (EB) and westbound (WB) left turn lanes. The EB and WB left turn lanes have a four-section head display which operate in a protected permissive mode throughout the day. The side street also on Park and Ride has exclusive left turn lanes but with three section head display which operates in a permissive mode.

The study approaches were the westbound left turn (WBL) and eastbound opposing thru (EBT). The eastbound direction has 3 through lanes with loop detectors. Therefore, the DSS was setup to receive data from 3 lanes and the minimum gap time was set to cross 3 lanes as well. The intersection was running in a coordinated mode which was recently modified from running in a free mode. The cycle length was 150 seconds.

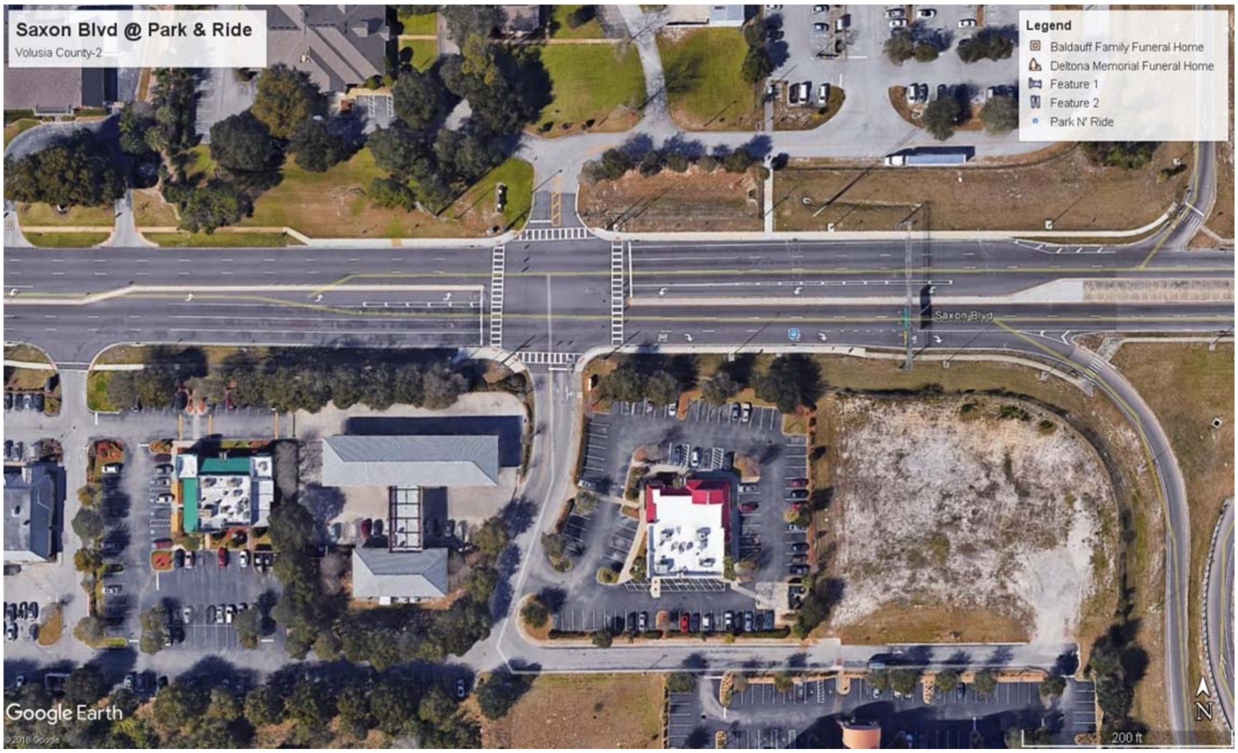


Figure 5-13: Saxon Blvd and Park and Ride intersection

Decision Results and Assessment

Table 5-5 provides a summary of the DSS decisions in each cycle during the testing period for the WBL along Saxon Blvd. The study approach has three opposing lanes to be crossed, which corresponds to a minimum threshold of 24 seconds before deciding on a flashing yellow arrow mode based on the discrete method. The testing period lasted for 1.5 hours only due to the time taken for the wiring setup and connections, especially to map the loop detectors. A total of 42 cycles display a majority of yellow arrow decisions (26 cycles), suggesting a light to moderate traffic pattern, even during the peak hour. The average method also included several yellow arrow decisions. It was expected that the traffic would get heavier in the eastbound direction during the PM peak hour for drivers heading towards I-4. However, the traffic pattern stayed light to moderate throughout the testing period. In order to test the sensitivity of the algorithm to changes in the cycle length and also the difference between coordinated and uncoordinated signals, the intersection cycle length was reduced for a period of approximately 30 min between 3:40 and 4:10 pm as shown on Table 5-5. Although coordination helps in providing a more steady traffic flow with uniform arrivals of vehicles and eliminating the random arrivals, the DSS results showed that reducing the cycle length affects the traffic flow during the reduced green time and eliminates sufficient gap times even with coordination.

Table 5-5: DSS results by cycle for Saxon Blvd WBL

Cycle No	Time Stamp	Discrete Gap (sec)	Discrete Decision	Average Gap (sec)	Average Decision	No of Veh/Green			Green Phase	Cycle Length
						Lane 1	Lane 2	Lane 3		
1	03:13:01.88 PM	84.6	Yellow Arrow	9	Yellow Arrow	13	10	5	108.3	150.1
2	03:15:31.89 PM	118.9	Yellow Arrow	2.7	Red Arrow	43	23	48	125.4	150
3	03:18:01.90 PM	107.1	Yellow Arrow	3.1	Red Arrow	35	15	13	104.1	150
4	03:20:31.91 PM	130.5	Yellow Arrow	4.9	Yellow Arrow	23	9	22	107.1	150
5	03:23:01.87 PM	124.9	Yellow Arrow	4.4	Yellow Arrow	26	11	10	109	150
6	03:25:31.88 PM	140.5	Yellow Arrow	5.2	Yellow Arrow	24	6	15	119	150
7	03:28:01.89 PM	147.2	Yellow Arrow	5	Yellow Arrow	24	15	9	113.9	150
8	03:30:31.85 PM	117.3	Yellow Arrow	2.3	Red Arrow	55	28	10	122.7	150
9	03:33:01.86 PM	108.9	Yellow Arrow	5.9	Yellow Arrow	17	11	18	99.5	150
10	03:35:31.83 PM	101.9	Yellow Arrow	1.8	Red Arrow	70	51	14	124.8	150
11	03:37:49.40 PM	50.3	Yellow Arrow	1.6	Red Arrow	51	32	54	86.9	137.6
12	03:39:51.60 PM	11.7	Red Arrow	1.2	Red Arrow	62	42	46	71.2	122.2
13	03:40:43.58 PM	6.3	Red Arrow	1.9	Red Arrow	13	6	1	22.8	52
14	03:42:11.25 PM	20.5	Red Arrow	3.1	Red Arrow	21	19	8	61.8	87.7
15	03:45:07.45 PM	69.7	Yellow Arrow	3.1	Red Arrow	36	33	8	109.2	176.2
16	03:46:55.14 PM	75.4	Yellow Arrow	1.7	Red Arrow	51	16	27	83.1	107.7
17	03:48:15.54 PM	37.5	Yellow Arrow	1.7	Red Arrow	33	29	12	55	80.4
18	03:49:54.52 PM	17.5	Red Arrow	1.4	Red Arrow	36	31	9	48.5	99
19	03:51:31.03 PM	6.1	Red Arrow	1.3	Red Arrow	18	23	12	29.4	96.5
20	03:53:12.63 PM	0	Red Arrow	0.9	Red Arrow	55	50	50	50.9	101.6
21	03:54:49.15 PM	0	Red Arrow	0.9	Red Arrow	51	49	43	46	96.5
22	03:56:29.30 PM	0	Red Arrow	1	Red Arrow	36	32	25	33.6	100.2
23	03:57:49.79 PM	0	Red Arrow	1.1	Red Arrow	28	27	18	30	80.5
24	03:59:26.92 PM	0	Red Arrow	1	Red Arrow	47	38	12	46	97.1
25	04:01:09.26 PM	0	Red Arrow	1.1	Red Arrow	35	34	18	35.7	102.3
26	04:02:50.48 PM	0	Red Arrow	0.9	Red Arrow	55	46	21	49.8	101.2
27	04:04:38.72 PM	0	Red Arrow	1	Red Arrow	38	36	36	36.3	108.2
28	04:06:00.52 PM	0	Red Arrow	1.1	Red Arrow	37	32	30	40	81.8
29	04:08:20.53 PM	8.9	Red Arrow	2.2	Red Arrow	42	37	28	90.8	140
30	04:09:44.35 PM	8.9	Red Arrow	1.3	Red Arrow	39	22	36	47.9	83.8
31	04:12:39.85 PM	51.7	Yellow Arrow	2.3	Red Arrow	67	19	18	150.4	175.5
32	04:15:31.50 PM	87.4	Yellow Arrow	1.8	Red Arrow	75	56	49	135.5	171.7
33	04:18:01.51 PM	46.5	Yellow Arrow	1.5	Red Arrow	56	42	23	80.6	150
34	04:20:33.77 PM	38.7	Yellow Arrow	1.6	Red Arrow	66	47	8	101.1	152.3
35	04:23:01.55 PM	61.8	Yellow Arrow	2.1	Red Arrow	47	38	29	98.8	147.8
36	04:25:31.60 PM	69	Yellow Arrow	2.5	Red Arrow	40	24	11	98.8	150.1
37	04:28:01.61 PM	61.8	Yellow Arrow	2	Red Arrow	51	21	23	98.7	150
38	04:30:31.62 PM	46	Yellow Arrow	1.6	Red Arrow	53	37	45	83.4	150
39	04:33:01.63 PM	70.2	Yellow Arrow	4.6	Yellow Arrow	19	13	12	83.4	150
40	04:35:31.70 PM	65.1	Yellow Arrow	1.5	Red Arrow	53	37	18	80.3	150.1
41	04:38:01.67 PM	66.8	Yellow Arrow	3.6	Red Arrow	29	17	4	99.5	150
42	04:40:31.61 PM	77.7	Yellow Arrow	2.4	Red Arrow	31	23	35	81.1	149.9

On the other hand, providing very long cycle lengths due to coordination increases available gaps in the traffic stream. The results also showed steady fluctuations between the red arrow and yellow arrow decisions which are considered reasonable and indicates that the threshold is rational and practical. Figure 5-14 shows a graphical representation of the gaps and the threshold. As can be seen on Figure 5-14, the max total gaps reached 147 seconds with the 150 coordinated cycle length. However, after reducing the cycle length, the minimum gap reached 0 seconds continuously for almost 9 cycles. The decisions was also verified from the rest of the data which shows the number of vehicles that arrived during the green phase along with the amount of green time in each cycle and the cycle length. For example, at 3:59 pm, the decision was to inhibit FYA due to absence of gaps which can be verified by the 47 vehicles, in the heaviest lane, that arrived during 46 seconds of green phase.

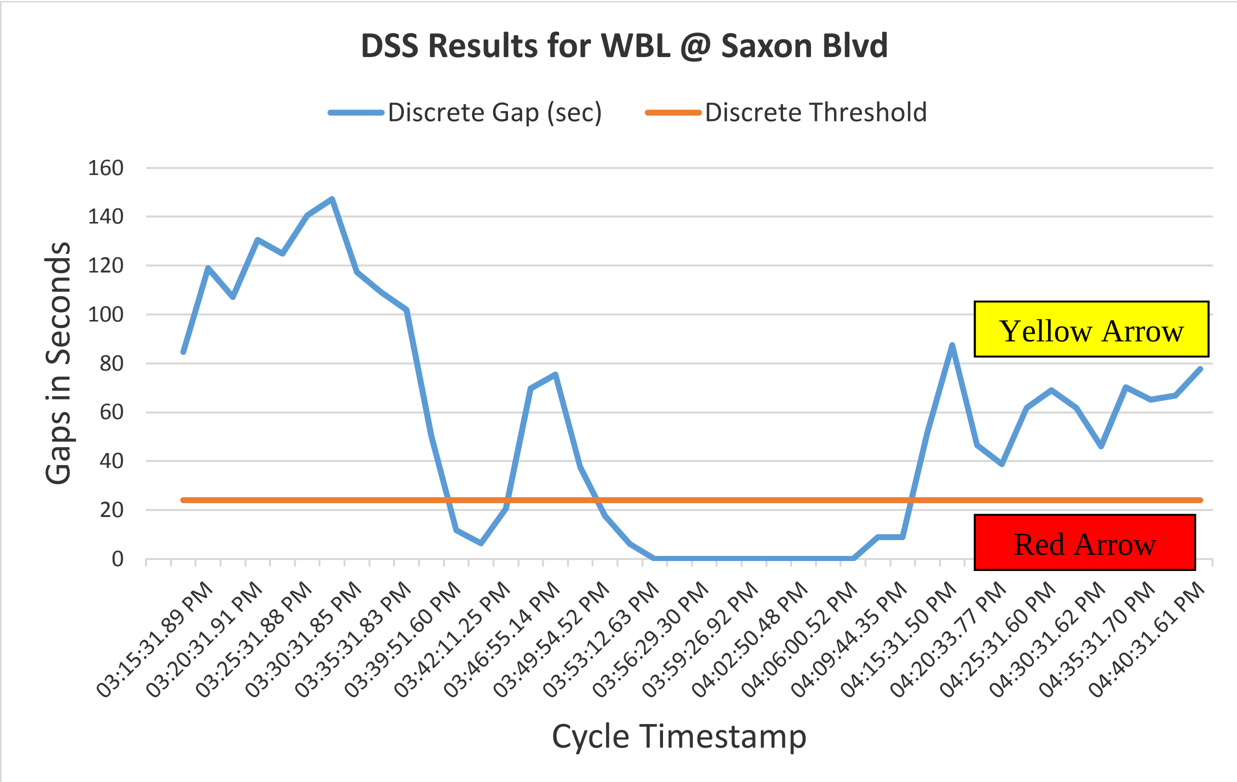


Figure 5-14: DSS results by cycle for Saxon Blvd WBL

5.5 Orange County

5.5.1 Intersections Wiring and Challenges

Orange County Traffic Engineering Staff (Roger Smith and Michael Colon Rodriguez) were very helpful in selecting the intersections, setting up the connections and conducting the testing. It should be noted that Chad Dickson and Jared Zabele from Seminole County were also available for setting up the wiring and connections to the cabinet and controller. The same input and output data from the controller and cabinet was needed for the DSS. Orange County study intersections utilized Siemens Controllers M60 which is the latest version from Siemens to accommodate FYA and peer to peer logic. However, the two intersections selected for testing had different cabinet types. The intersection at John Young Parkway had a Naztec cabinet TS2 Type 1 as shown previously in Figure 5-1. The intersection at Orange Avenue had a TS2 Type 2 Hybrid Temple Cabinet as shown in Figure 5-15. Both locations experienced several challenges in the wiring setup. First, Siemens controllers don't have an output logic. In other words, it doesn't allow mapping an input as an output function such as in the other controllers. Therefore, to overcome this issue, we used peer-to-peer functions on the controller itself to activate special functions to act as I/O logic. Second, in the Temple Type 2 Hybrid cabinets, the I/O connections are wired differently from Type 1. They are connected to the controller through pin connections (a, b & c). Then they are broken out on the back panel and then connected to the load switches. However, they don't break out call switches that's why we had to use "Phase Check" function in lieu of vehicle detector. Third, a relay was used to regulate the signal between the DSS I/O board and the controller. The following is a summary of the connections at each location.

- **<u>John Young Pkwy @ SR408 EB Ramps:</u>** The Cabinet was Trafficware (Naztec) TS2 Type 1 but the intersection operating with Siemens M60 controller. Phases 1&6 utilize video detection while Phase 2 had inductive loop detectors. Vehicle detection was interfaced through loop panel output terminals. A relay was used for Phase 1 (FYA Phase) due to issues with Video detection holding a call while the interface unit was installed as shown in Figure 5-16. Using the controller's Peer to Peer functions to act as I/O logic, green status of opposing thru (phase 2) was mapped to Special function 2. The control wire to determine protected or FYA operation was input through Loop Panel detector 16 and remapped within controller Peer to Peer to call Special Function 1.
- **<u>Orange Ave @ Office Court:</u>** The Cabinet was Temple brand TS2 type 2 hybrid. Intersection operating with Siemens M60 controller. Vehicle detection was through inductive loops for all directions which was interfaced through back panel "Phase Check" terminal for Phase 1 for the left turn demand (FYA Phase) and Special Functions 2 & 3 were remapped within controller's Peer to Peer I/O Logic for Phase 2 (opposing thru) as shown in Figure 5-17. Green status of opposing thru (Phase 2) is interfaced directly on back panel phase 2 green terminal. The control wire to determine protected or FYA operation was input through a relay into Ped call 1 and remapped within controller Peer to Peer to call Special Function 1 as shown in Figure 5-18.

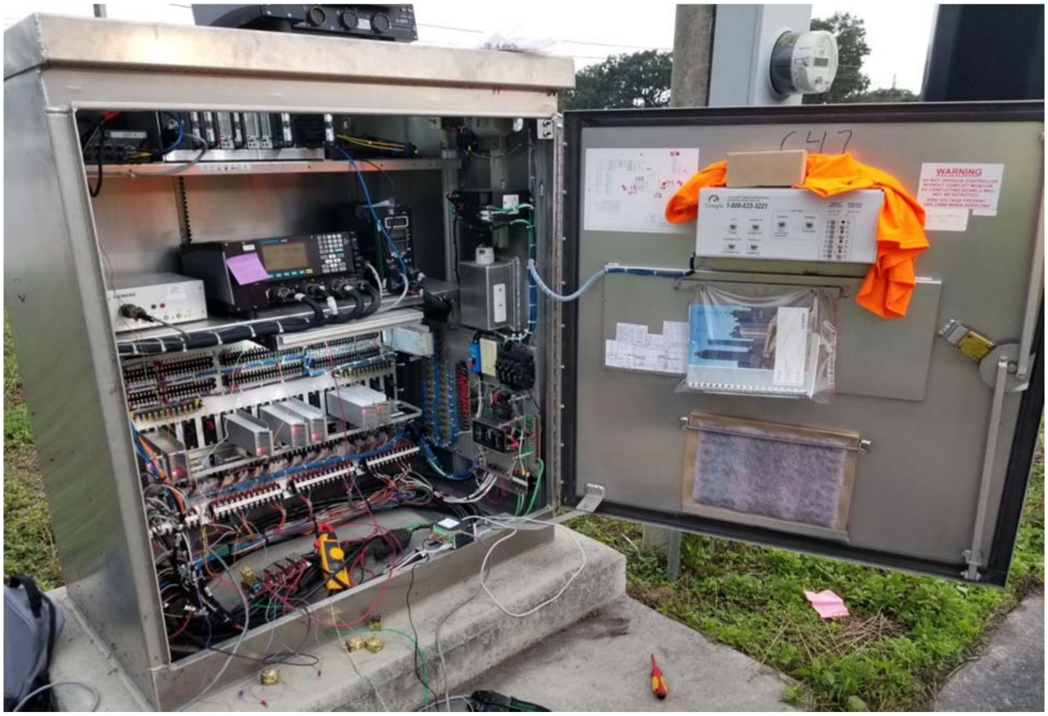


Figure 5-15: Temple cabinet at Orange Avenue and Office Court intersection

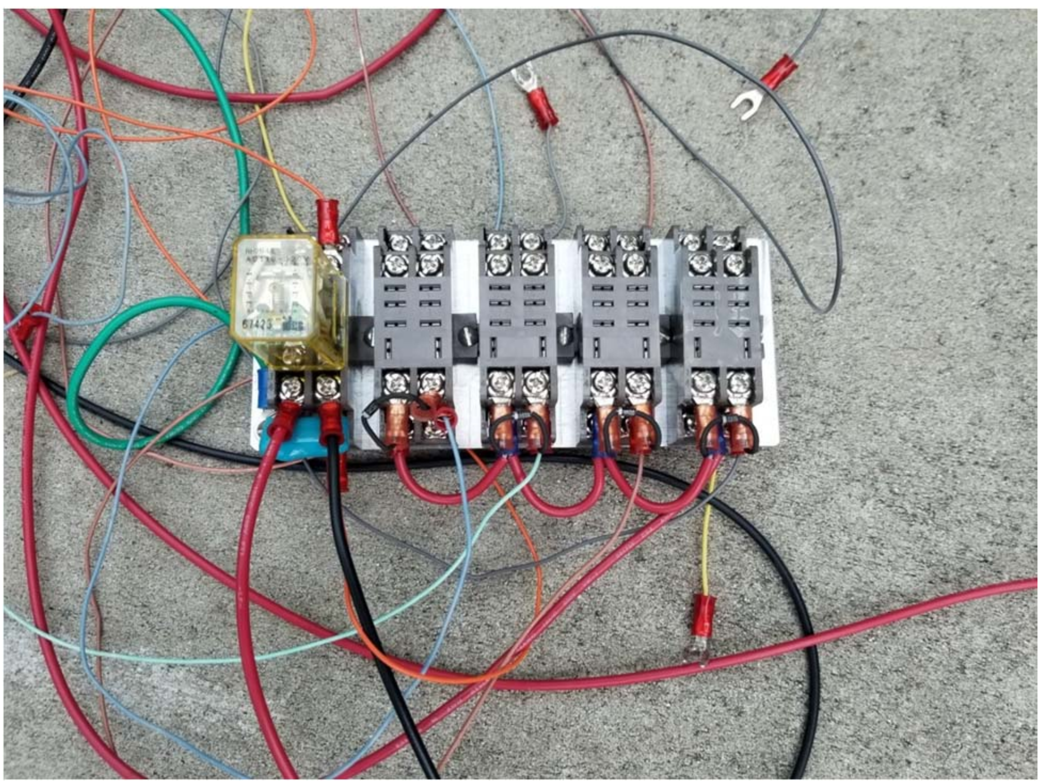


Figure 5-16: Relays to regulate the signal between the DSS I/O board and the controller

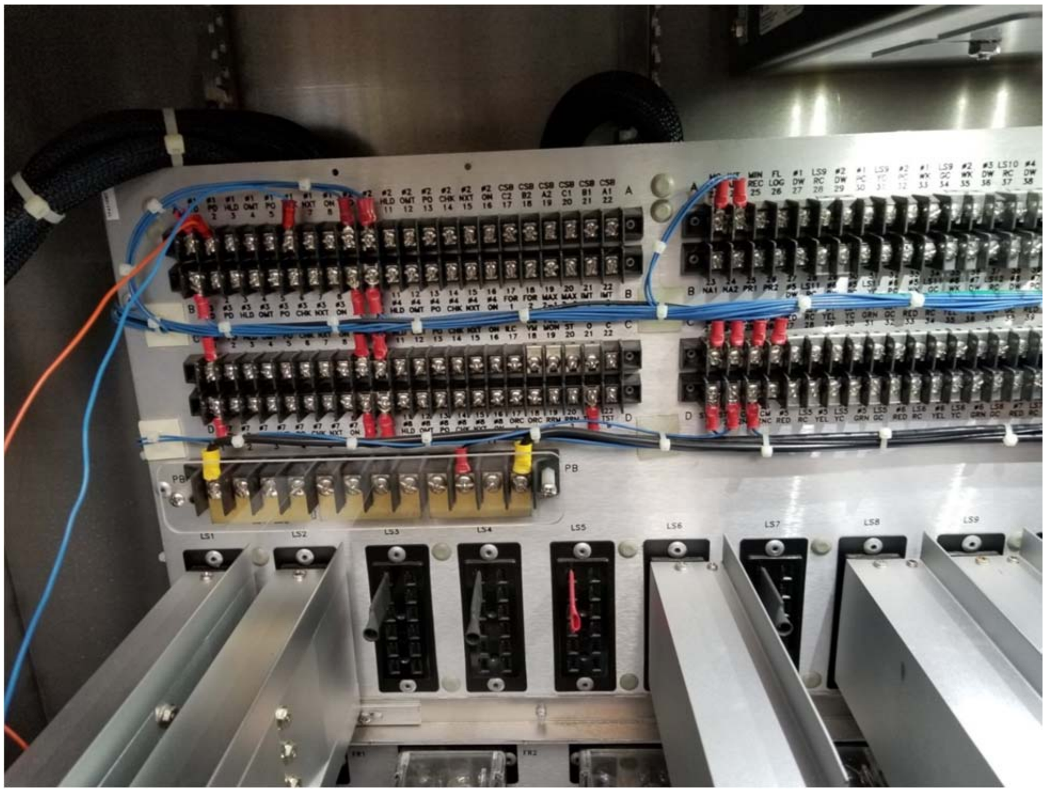


Figure 5-17: Temple cabinet with phase check terminal connected to DSS

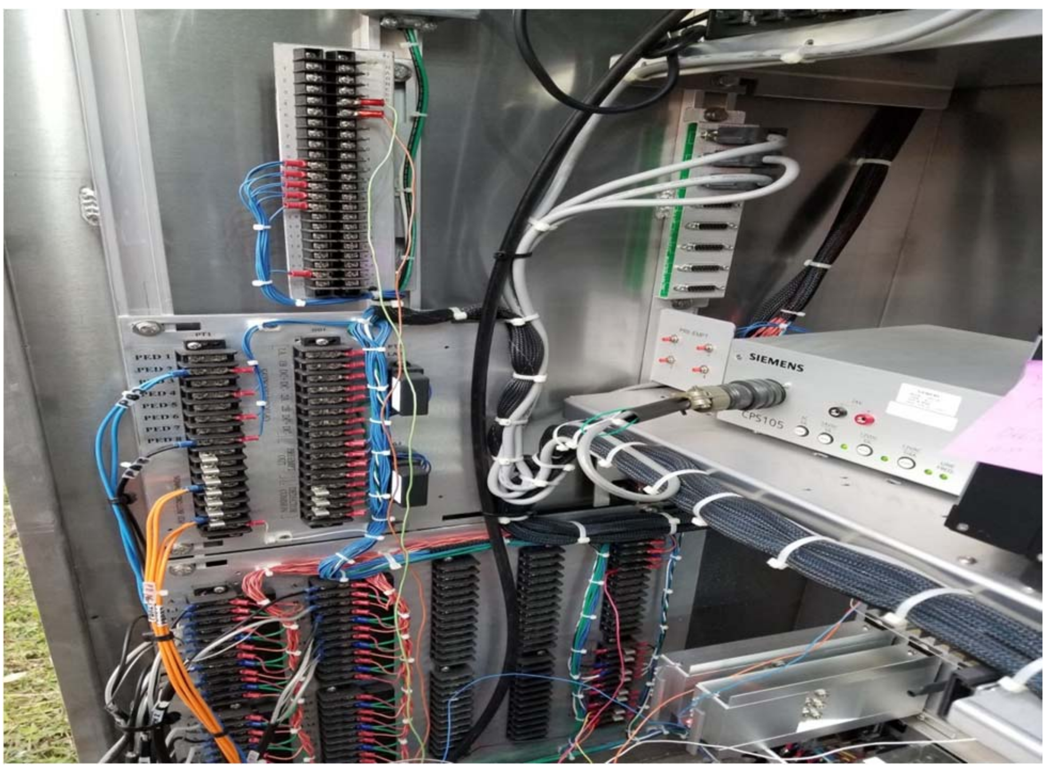


Figure 5-18: DSS connected to temple back panel for ped call

5.5.2 Intersections Testing and DSS Results

As mentioned earlier, the two intersections selected for testing in Orange County were:

5- John Young Parkway at SR 408 EB Ramps
6- Orange Avenue at Office Court

5- John Young Parkway and SR 408 EB Ramps Intersection

John Young Parkway (JYP) is a north-south six lane divided principle arterial in Orange County with a posted speed limit of 45 mph. Within the vicinity of the intersection and between the SR 408 ramps, JYP has 8 lanes. The additional lane is used as an auxiliary lane for the westbound on ramp. SR 408 is an east-west expressway with 8 lanes and posted speed limit of 60 mph. JYP intersects with the eastbound off ramp and on ramp which is considered as T intersection. The area is predominantly residential on the west side and commercial land uses are on the east side as shown in Figure 5-19. The intersection has an exclusive southbound (SB) left turn lane. The EB approach has dual left turn lanes and single right turn lane. The SB left turn lane has a four-section head display which operates in a protected permissive mode throughout the day. This was considered a key location to test the DSS while crossing 4 lanes of traffic. The testing period lasted for 2 hours from 3:00 to 5:00 pm. It should be noted that due to the wiring issues and challenges mentioned above, we had to visit the site couple of times.

The study approaches were the southbound left turn (SBL) and northbound opposing thru (NBT). The northbound has 4 through lanes with loop detectors. Therefore, the DSS was setup to receive data from 4 lanes and the minimum gap time was set to cross 4 lanes as well. The intersection was running in a coordinated mode with Cycle length of 180 seconds.

Figure 5-19: JYP and SR 408 EB ramps intersection

Decision Results and Assessment

Table 5-6 provides a summary of the DSS decisions in each cycle during the testing period for the SBL along JYP. The study approach has 4 opposing lanes to be crossed which corresponds to a minimum threshold of 27 seconds before deciding on a Flashing Yellow Arrow mode based on the discrete method. The testing period lasted for 2 hours only due to the time taken for the wiring setup and connections especially to use the relays and special functions. A total of 38 cycles with a majority of yellow arrow decisions (28 cycles) was observed, although there was heavy traffic pattern especially during the peak hour. The traffic pattern stayed moderate to heavy throughout the testing period. However, as mentioned earlier, coordinated signals with very long cycle lengths such as the 3 minute cycle help in providing sufficient gaps especially when most of the vehicle arrivals are in platoons due to coordination. The average method showed only one yellow arrow decision which shows that there was heavy traffic patterns.

On the other hand, the results showed steady fluctuations between the red arrow and yellow arrow decisions which are considered reasonable and indicates that the threshold is rational and practical. Figure 5-20 shows a graphical representation of the gaps and the threshold. As can be seen on Figure 5-20, the max total gaps reached 125 seconds and the minimum gap was 0 seconds at 4:25 pm. The decisions was also verified from the rest of the data which shows the number of vehicles that arrived during the green phase along with the amount of green time in each cycle and the cycle length. For example, at 4:25 pm, the decision was to inhibit FYA due to absence of gaps which can be verified by the 108 vehicles, in the heaviest lane, that arrived during 108 seconds of green phase. Excerpts from the log file for the above intersection is included in Appendix D.

Table 5-6: DSS results by cycle for JYP SBL

Cycle No	Time Stamp	Discrete Gap (sec)	Discrete Decision	Average Gap (sec)	Average Decision	No of Veh/Green				Green Phase	Cycle Length
						Lane 1	Lane 2	Lane 3	Lane 4		
1	03:21:45.33 PM	66.3	Yellow Arrow	3.9	Red Arrow	29	26	25	5	110.2	180
2	03:23:54.35 PM	64.1	Yellow Arrow	5.4	Yellow Arrow	11	8	1	1	53.7	129
3	03:23:57.33 PM	33.1	Yellow Arrow	1.9	Red Arrow	2	1	1	1	1.9	3
4	03:24:45.32 PM	8.1	Red Arrow	2.2	Red Arrow	18	22	4	1	46.9	48
5	03:27:45.36 PM	20.3	Red Arrow	2.9	Red Arrow	31	34	11	4	96.1	180
6	03:30:45.36 PM	35.8	Yellow Arrow	3.1	Red Arrow	33	29	29	2	97.6	180
7	03:33:45.35 PM	46.3	Yellow Arrow	2.7	Red Arrow	36	32	19	5	94.1	180
8	03:36:45.34 PM	69.3	Yellow Arrow	3.1	Red Arrow	38	43	20	4	132.1	180
9	03:39:45.33 PM	102.4	Yellow Arrow	2.9	Red Arrow	42	36	19	5	120.5	180
10	03:42:45.39 PM	112.4	Yellow Arrow	2.9	Red Arrow	54	40	33	11	152.5	180.1
11	03:45:45.37 PM	100.3	Yellow Arrow	2.1	Red Arrow	51	53	38	17	107.4	180
12	03:48:45.37 PM	57.6	Yellow Arrow	1.9	Red Arrow	55	51	26	7	100.8	180
13	03:51:45.36 PM	22.1	Red Arrow	1.5	Red Arrow	56	58	23	4	87.1	180
14	03:54:45.36 PM	50.1	Yellow Arrow	2	Red Arrow	48	64	44	4	127.2	180
15	03:57:45.40 PM	114.3	Yellow Arrow	2.6	Red Arrow	60	55	11	11	153.1	180
16	04:00:45.40 PM	98.6	Yellow Arrow	1.8	Red Arrow	74	73	54	11	132.3	180
17	04:03:45.39 PM	54.4	Yellow Arrow	1.6	Red Arrow	53	66	44	7	101.4	180
18	04:06:45.38 PM	41.8	Yellow Arrow	1.3	Red Arrow	93	93	49	7	124.2	180
19	04:09:45.38 PM	61.2	Yellow Arrow	1.8	Red Arrow	63	73	53	11	129.8	180
20	04:12:45.42 PM	47.5	Yellow Arrow	1.3	Red Arrow	89	77	47	13	113.1	180
21	04:15:45.37 PM	15.2	Red Arrow	1.3	Red Arrow	77	74	83	12	109.5	180
22	04:18:45.41 PM	15.2	Red Arrow	1	Red Arrow	98	120	61	20	117.2	180
23	04:21:45.44 PM	0	Red Arrow	0.9	Red Arrow	88	102	78	11	93.4	180
24	04:24:45.39 PM	0	Red Arrow	1	Red Arrow	99	108	66	4	108.1	180
25	04:27:45.43 PM	9.2	Red Arrow	1.4	Red Arrow	86	83	59	7	121.8	180
26	04:30:45.43 PM	44.4	Yellow Arrow	1.8	Red Arrow	65	66	26	17	115.2	180
27	04:33:45.43 PM	53.4	Yellow Arrow	2	Red Arrow	44	51	32	22	98.5	180
28	04:36:45.42 PM	45	Yellow Arrow	1.8	Red Arrow	53	64	48	33	110.5	180
29	04:39:45.41 PM	86.2	Yellow Arrow	2.3	Red Arrow	51	38	33	6	113.7	180
30	04:42:45.46 PM	125.6	Yellow Arrow	4.2	Red Arrow	32	28	22	18	129.5	180.1
31	04:45:45.45 PM	117.7	Yellow Arrow	2.5	Red Arrow	47	55	39	21	136.1	180
32	04:48:45.45 PM	80.9	Yellow Arrow	1.9	Red Arrow	57	43	35	12	107.2	180
33	04:51:45.44 PM	59.3	Yellow Arrow	1.8	Red Arrow	70	61	45	14	122.9	180
34	04:54:45.44 PM	50.5	Yellow Arrow	2	Red Arrow	58	60	42	14	119.4	180
35	04:57:45.48 PM	41.8	Yellow Arrow	2.1	Red Arrow	61	59	52	7	125	180
36	05:00:45.47 PM	26.5	Red Arrow	1.5	Red Arrow	62	72	32	18	109.3	180
37	05:03:45.47 PM	18.9	Red Arrow	1.7	Red Arrow	65	64	40	13	109.8	180
38	05:06:45.46 PM	58.6	Yellow Arrow	2.2	Red Arrow	40	55	47	10	117.4	180

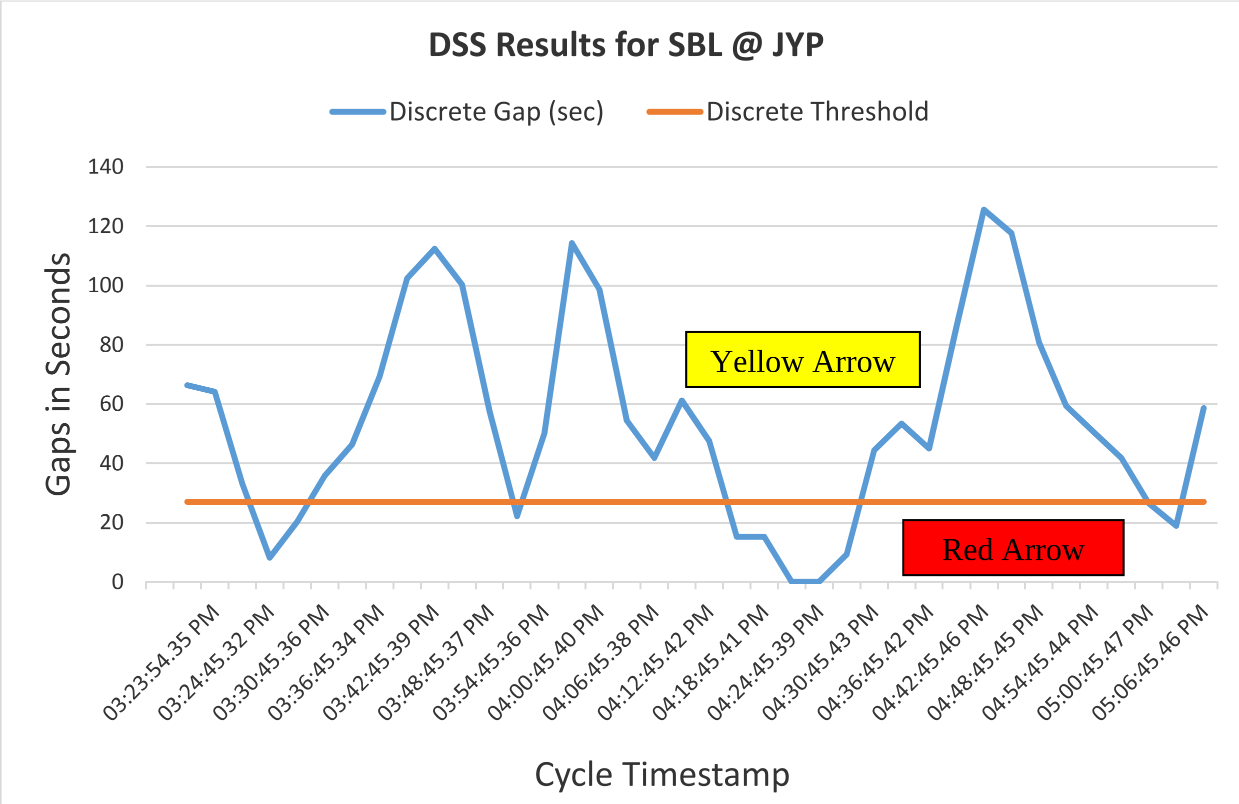


Figure 5-20: DSS results by cycle for JYP SBL

6- Orange Avenue and Office Court Intersection

Orange Avenue is a five lane major arterial in Orange County running in the north-south direction with a posted speed limit of 45 mph. Office Court is a local road for the offices surrounding the site. The area is predominantly offices on the west side and there is a US post office on the east side as shown in Figure 5-21. This is a T intersection with an exclusive northbound (NB) left turn lane. The EB approach has single lane. The NB left turn lane has a four-section head display which operates in a protected permissive mode throughout the day. The testing period lasted for 2 hours from 3:00 to 5:00 pm.

The study approaches were the northbound left turn (NBL) and southbound opposing thru (SBT). The southbound has 2 through lanes with loop detectors. Therefore, the DSS was setup to receive data from 2 lanes and the minimum gap time was set to cross 2 lanes as well. The intersection was running in a coordinated mode with Cycle length of 150 seconds and sometimes reaching 300 seconds when there was no calls from the side street.

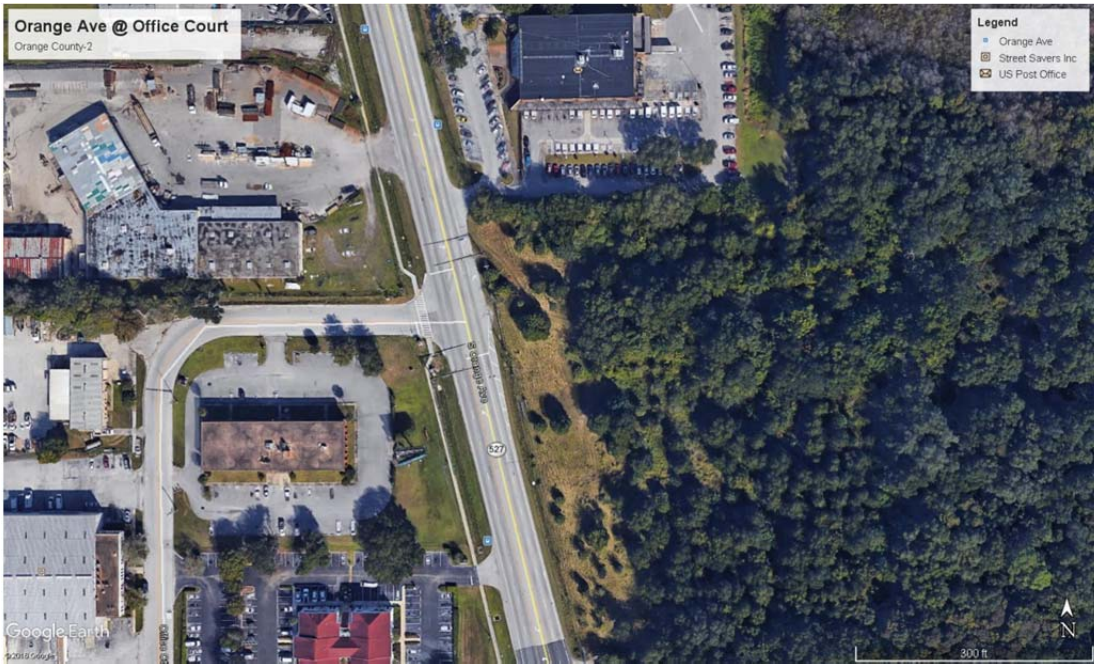


Figure 5-21: Orange Ave and Office Court intersection

Decision Results and Assessment

Table 5-7 provides a summary of the DSS decisions in each cycle during the testing period for the NBL along Orange Avenue. The study approach has two opposing lanes to be crossed, which corresponds to a minimum threshold of 21 seconds before deciding on a flashing yellow arrow mode based on the discrete method. The testing period lasted for 2 hours due to the connection wiring to use the relays and special functions as explained earlier. A total of 43 cycles display a majority of yellow arrow decisions (27 cycles), despite a heavy traffic pattern, especially during the peak hour, which could be inferred from the decreasing gap, as shown in Figure 5-22. The traffic pattern stayed moderate to heavy throughout the testing period. However, as mentioned earlier, coordinated signals with very long cycle lengths, such as the 5-minute cycle, help in providing sufficient gaps, especially when most of the vehicle arrivals are in platoons due to coordination. The average method showed only two yellow arrow decisions, which shows that there was a heavy traffic pattern. A majority of the congestion was due to shockwaves from the downstream signal at Sand Lake Road, which brought the intersection to a halt. On the other hand, the results showed steady fluctuations between the red arrow and yellow arrow decisions, which was considered reasonable and indicated that the threshold was rational and practical. Figure 5-22 shows a graphical representation of the gap and the threshold. As can be seen on Figure 5-22, the maximum total gap reached 165 seconds and the minimum gap reached 0 seconds three times (Fig. 4-22). Figure 5-22 also shows a decreasing trend in the gaps when approaching the peak hour. The decisions were also verified from the rest of the data, which showed the number of vehicles that arrived during the green phase along with the amount of green time in each cycle and the cycle length. At 4:48 pm, the decision was to inhibit FYA due to absence of gaps, which was verified by the 116 vehicles, in the heaviest lane, that arrived during 149 seconds of green phase. Furthermore, the 0 gap was also due to the backups and queues from the downstream intersection which affected the traffic flow at the study intersection.

Table 5-7: DSS results by cycle for Orange Ave NBL

Cycle No	Time Stamp	Discrete Gap (sec)	Discrete Decision	Average Gap (sec)	Average Decision	No of Veh/Green		Green Phase	Cycle Length
						Lane 1	Lane 2		
1	02:58:04.72 PM	114.4	Yellow Arrow	2.4	Red Arrow	117	66	281.2	299.9
2	03:00:35.60 PM	165.8	Yellow Arrow	4.8	Yellow Arrow	22	22	100.5	150.9
3	03:03:04.69 PM	118.2	Yellow Arrow	3.4	Red Arrow	24	35	116.8	149.1
4	03:05:54.72 PM	90.9	Yellow Arrow	2	Red Arrow	37	66	129.6	170
5	03:08:24.74 PM	74.1	Yellow Arrow	2.5	Red Arrow	53	43	130.6	150
6	03:10:54.75 PM	69.7	Yellow Arrow	1.9	Red Arrow	70	33	130.5	150
7	03:13:24.71 PM	51.3	Yellow Arrow	1.7	Red Arrow	79	40	130.4	150
8	03:15:54.72 PM	73.6	Yellow Arrow	2.6	Red Arrow	51	23	130.4	150
9	03:18:04.71 PM	112.8	Yellow Arrow	4	Yellow Arrow	29	13	111.3	130
10	03:20:54.74 PM	119.1	Yellow Arrow	2.9	Red Arrow	48	20	135.3	170
11	03:23:04.73 PM	94.2	Yellow Arrow	2.5	Red Arrow	45	25	111.2	130
12	03:25:34.74 PM	82.2	Yellow Arrow	2.6	Red Arrow	45	24	114.1	150
13	03:28:04.86 PM	76.9	Yellow Arrow	2.1	Red Arrow	63	19	128.4	150.1
14	03:30:34.87 PM	61.9	Yellow Arrow	2	Red Arrow	64	33	125.3	150
15	03:33:04.82 PM	25	Yellow Arrow	1.2	Red Arrow	109	64	131.2	150
16	03:40:36.78 PM	33.3	Yellow Arrow	1.3	Red Arrow	329	173	425	452
17	03:45:36.75 PM	49.1	Yellow Arrow	1.5	Red Arrow	188	159	279.8	300
18	03:48:07.68 PM	29.4	Yellow Arrow	1.5	Red Arrow	75	58	112.4	150.9
19	03:50:36.77 PM	17.9	Red Arrow	1.5	Red Arrow	74	60	111.4	149.1
20	03:53:26.76 PM	26.6	Yellow Arrow	1.5	Red Arrow	93	35	137.4	170
21	03:55:36.80 PM	37.5	Yellow Arrow	1.4	Red Arrow	80	19	111.3	130
22	03:58:06.86 PM	68.4	Yellow Arrow	2.4	Red Arrow	57	12	132.5	150.1
23	04:00:36.87 PM	98.2	Yellow Arrow	2.6	Red Arrow	52	18	130.5	150
24	04:03:06.88 PM	45	Yellow Arrow	0.8	Red Arrow	170	29	132.4	150
25	04:05:36.79 PM	0	Red Arrow	0.8	Red Arrow	137	44	106.9	149.9
26	04:08:06.80 PM	3.5	Red Arrow	1	Red Arrow	123	48	116	150
27	04:10:36.82 PM	22.3	Yellow Arrow	1.5	Red Arrow	71	55	106.8	150
28	04:13:06.78 PM	32.7	Yellow Arrow	1.3	Red Arrow	96	75	118.9	150
29	04:15:36.79 PM	13.9	Red Arrow	1.3	Red Arrow	85	53	112.7	150
30	04:18:06.81 PM	3.9	Red Arrow	1.1	Red Arrow	109	59	118.7	150
31	04:20:36.80 PM	3.9	Red Arrow	1.5	Red Arrow	73	67	110.5	150
32	04:23:06.82 PM	0	Red Arrow	1.3	Red Arrow	95	69	118.6	150
33	04:25:36.83 PM	12.4	Red Arrow	1.5	Red Arrow	61	80	118.5	150
34	04:28:06.80 PM	31.9	Yellow Arrow	1.3	Red Arrow	93	74	120.5	150
35	04:30:36.81 PM	25.1	Yellow Arrow	1.2	Red Arrow	95	67	113.3	150
36	04:33:06.92 PM	9.6	Red Arrow	1.1	Red Arrow	126	78	132.6	150.1
37	04:35:36.83 PM	7.9	Red Arrow	1.2	Red Arrow	88	58	107.1	149.9
38	04:38:07.75 PM	7.6	Red Arrow	1.2	Red Arrow	83	48	99.8	150.9
39	04:40:36.85 PM	11.3	Red Arrow	1.3	Red Arrow	90	59	114.1	149.1
40	04:43:06.82 PM	14.5	Red Arrow	1.3	Red Arrow	89	92	115	150
41	04:45:37.73 PM	6.9	Red Arrow	1.1	Red Arrow	94	70	99.6	150.9
42	04:48:06.84 PM	0	Red Arrow	1.1	Red Arrow	109	80	115.9	149.1
43	04:50:36.84 PM	19.1	Red Arrow	1.4	Red Arrow	79	61	110.7	150

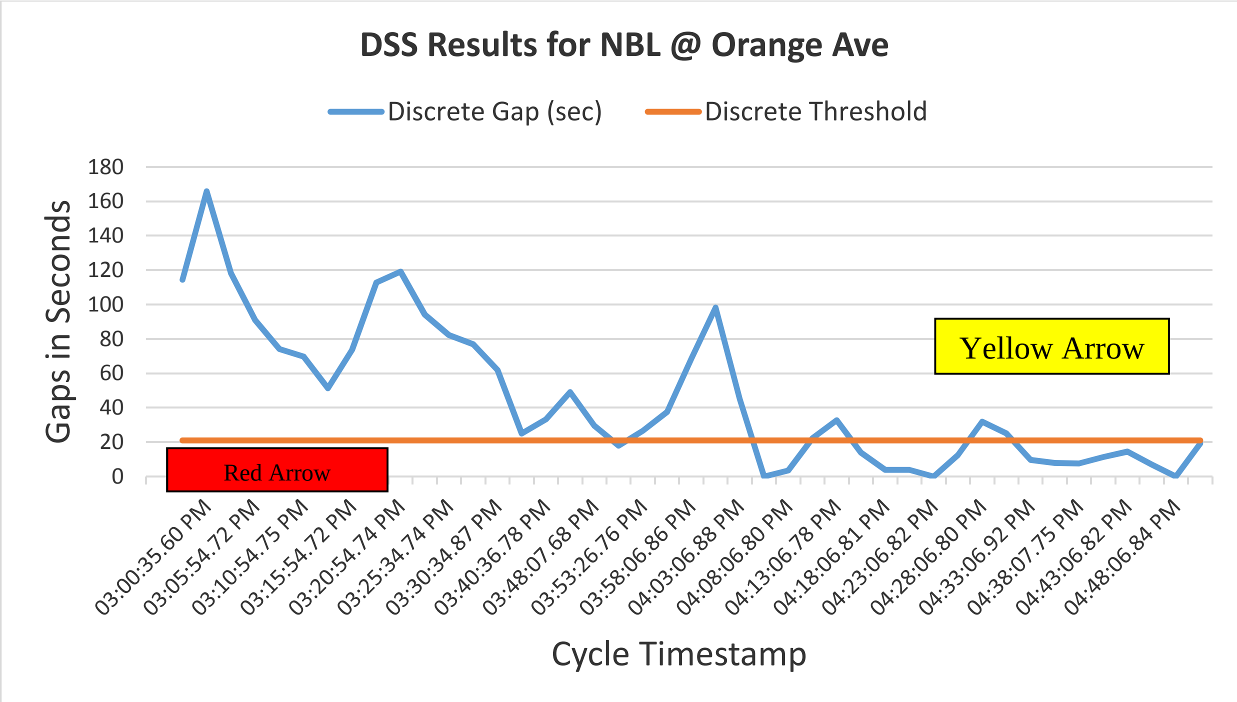


Figure 5-22: DSS results by cycle for Orange Ave NBL

VI. CONCLUSIONS

The four section head flashing yellow arrow (FYA) provided an opportunity to advance the operation of the left turn mode at intersections. In phase 3 of the project, the UCF team further enhanced the decision support system (DSS) by developing an exclusive hardware platform. The hardware platform was developed for two main objectives. First, to provide a generic device that would be compatible with the different controller types used by different jurisdictions within the FDOT Districts. The second objective is to automate selection of the FYA left-turn modes based on available gaps in the opposing traffic at intersections acquired in real time from existing sensors in the field.

A general wiring scheme capable of communicating with all TS-2 hardware layouts and controller models was achieved. Furthermore, a custom communication software with the new I/O board was developed using C# language. The software includes various parameters required for a successful configuration of the hardware. The parameters included acquisition of signal timing, acquisition of mode, extracting arrival data from the input channels, and outputting data to the output channels. A User Interface (UI) was also developed to specify particular parameters pertinent to each intersection and also adjust parameters while the operation is in progress, and to visualize the input data and the output decision as they occur.

Offline testing was conducted using a peer-to-peer logic setup. Peer-to-peer-logic offers the advantage of acquiring and analyzing real-time traffic data coupled with video feed with the benefit of a safe environment. Vehicle detection through loops or video detection is sensed in the field by the cabinet and the controller. Then it is mapped in real-time mode from the intersection approach to the controller and cabinet in the lab. The algorithm analyzes the traffic data and makes a decision accordingly that is communicated back to the controller, and generate a real-time log recording the events. Peer-to-peer-logic was a crucial step to verify and validate the algorithm and the software prior to field testing.

The final step of this research was to test the DSS and the hardware platform in the field by connecting directly to various controller and cabinet types in an online mode while allowing for instant validation of the DSS. The DSS was tested at 6 different intersections located in Seminole, Orange and Volusia Counties. Field data was collected from the loop detectors in real time mode on a second by second basis while monitoring traffic in each lane and detecting the status of the opposing green phase. Based on the intersection conditions and the gap threshold, the DSS sends the decision back to the controller in the field to apply it to the four section head FYA. Several issues and challenges were experienced in the field in the wiring setup and connections with certain controllers and cabinet types especially with Siemens controllers and TS2 Type 2 Hybrid cabinets. In general, Siemens controllers don’t have an output logic. In other words, it doesn’t allow mapping an input as an output function as in the other controllers. Therefore, to overcome this issue, a peer-to-peer function on the controller itself was used to activate special functions to act as I/O logic. Furthermore, in the Temple Type 2 Hybrid cabinets, the I/O connections are wired differently from Type 1. They are connected to the controller through pin connections (a, b & c). They are broken out on the back panel and then connected to the load switches. However, they don't break out load switches, that's why a "Phase Check" function was used in lieu of the vehicle detector. Lastly, a relay was used to regulate the signal between the DSS I/O board and the controller.

Overall, the DSS results through the discrete method, showed steady fluctuations between the red arrow and yellow arrow decisions throughout the testing periods which are considered reasonable especially for driver's expectation. This also indicated that the thresholds were rational and practical. The decisions were also verified from the log file data which showed the number of vehicles that arrived during the green phase along with the amount of green time in each cycle and the cycle length. However, the average method showed very conservative decisions. The average method was mainly used to verify saturated conditions and heavy traffic patterns assuming that the minimum gap is achieved between every two arriving vehicles every cycle in order to switch to a flashing yellow arrow. Although the average method provides a more conservative approach than the discrete one, the discrete approach is more accurate than the average approach.

It was also concluded that coordinated signals with very long cycle lengths such as 3 minutes and longer help in providing sufficient gaps even in heavy traffic patterns and during the peak hours since most of the vehicle arrivals are in platoons due to coordination and at the beginning of the cycle. Therefore, in order to test the sensitivity of the algorithm to changes in the cycle length and also the difference between long and short cycles at coordinated signals, the intersection cycle length was reduced for a period of approximately 30 min. Although coordination helps in providing a more steady traffic flow with uniform arrivals of vehicles and eliminating the random arrivals, the DSS results showed that reducing the cycle length affects the traffic flow during the reduced green phase and eliminates sufficient gap times even with coordination.

The DSS testing confirmed the applicability and validity of the developed algorithm as well as the aforementioned procedure, criteria and logic. The algorithm developed in this project will allow traffic signal controllers to be designed so that the appropriate left turn restriction can alter throughout the day to maximize safety and efficiency of the intersections. The value of the DSS in making real-time traffic decisions is crucial to improving the performance of the left turn and is applicable at any four section head configuration.

APPENDIX A - Log File Excerpts for SR 436 at CR 427 (Offline Testing)

RecorV	Left LaVe	OpposV GreeV	s de LaVe	MVddle LaVe	OutsV e LaVe	T me Stamp	ehicle Count	Gap	D screte Dec s oV	AveraVe Dec s oV	#of eh	AveraVe HeaVway	Cycle LeV th
13329	Car	R		Car	Car	:44: 1 PM							
1333	Car	R		Car	Car	:44: 2 PM							
13331	Car	R		Car	Car	:44: 3 PM							
13332	Car	R		Car	Car	:44: 4 PM							
13333	Car	R		Car	Car	:44: PM							
13334	Car	R		Car	Car	:44: 6 PM							
1333	Car	R		Car	Car	:44: 7 6 PM							
13336	Car	R		Car	Car	:44: 8 6 PM							
13337	Car	R		Car	Car	:44: 9 6 PM							
13338	Car	R		Car	Car	:4 : 6 PM							
13339	Car	R		Car	Car	:4 : 1 6 PM							
1334	Car	R		Car	Car	:4 : 2 6 PM							
13341	Car	R		Car	Car	:4 : 3 6 PM							
13342		R		Car	Car	:4 : 4 3 PM							
13343		R		Car	Car	:4 : 4 6 PM							
13344	Car	R		Car	Car	:4 : 7 PM							
1334		R		Car	Car	:4 : 6 3 PM							
13346		R		Car	Car	:4 : 6 7 PM							
13347		R		Car	Car	:4 : 7 7 PM							
13348	Car	R		Car	Car	:4 : 8 7 PM							
13349	Car	R		Car	Car	:4 : 9 7 PM							
133	Car	R		Car	Car	:4 :1 7 PM							
133 1	Car	R		Car	Car	:4 :11 7 PM							
133 2		R		Car	Car	:4 :12 2 PM							
133 3		R		Car	Car	:4 :12 8 PM							
133 4		R		Car	Car	:4 :13 8 PM							
133	Car	R		Car	Car	:4 :14 8 PM							
133 6		R		Car	Car	:4 :1 3 PM							
133 7		R		Car	Car	:4 :1 8 PM							
133 8		R		Car	Car	:4 :16 8 PM							
133 9	Car	R		Car	Car	:4 :17 8 PM							
1336		R		Car	Car	:4 :18 3 PM							
13361		R		Car	Car	:4 :18 8 PM							
13362	Car	R		Car	Car	:4 :19 9 PM							
13363		R		Car	Car	:4 :2 3 PM							
13364		R		Car	Car	:4 :2 9 PM							
1336		R		Car	Car	:4 :21 9 PM							
13366		R		Car	Car	:4 :22 9 PM							
13367	Car	R		Car	Car	:4 :23 9 PM							
13368	Car	R		Car	Car	:4 :24 9 PM							
13369	Car	R		Car	Car	:4 :2 9 PM							
1337		R		Car	Car	:4 :26 3 PM							
13371		R		Car	Car	:4 :27 PM							
13372	Car	R		Car	Car	:4 :28 PM							
13373	Car	R		Car	Car	:4 :29 PM							
13374	Car	R		Car	Car	:4 :3 PM							
1337	Car	R		Car	Car	:4 :31 PM							
13376		R		Car	Car	:4 :31 3 PM							
13377		R		Car	Car	:4 :32 PM							
13378	Car	R		Car	Car	:4 :33 PM							
13379		R		Car	Car	:4 :33 3 PM							
1338		R		Car	Car	:4 :34 1 PM							
13381		R		Car	Car	:4 :3 1 PM							
13382	Car	R		Car	Car	:4 :36 1 PM							
13383	Car	R		Car	Car	:4 :37 1 PM							
13384		R		Car	Car	:4 :37 3 PM							
1338		R		Car	Car	:4 :38 1 PM							
13386	Car	R		Car	Car	:4 :39 1 PM							
13387		R		Car	Car	:4 :39 3 PM							
13388		R		Car	Car	:4 :4 1 PM							
13389	Car	R		Car	Car	:4 :41 2 PM							
1339		R		Car	Car	:4 :41 3 PM							
13391		R		Car	Car	:4 :42 2 PM							
13392		R		Car	Car	:4 :43 2 PM							
13393		R		Car	Car	:4 :44 2 PM							
13394		R		Car	Car	:4 :4 2 PM							
1339		R		Car	Car	:4 :46 2 PM							
13396	Car	R		Car	Car	:4 :47 2 PM							
13397		R		Car	Car	:4 :47 3 PM							
13398		R		Car	Car	:4 :48 2 PM							
13399		R		Car	Car	:4 :49 3 PM							
134		R		Car	Car	:4 : 3 PM							
134 1		R		Car	Car	:4 : 1 3 PM							
134 2		R		Car	Car	:4 : 2 3 PM							
134 3		Gr n		Car	Car	:4 : 3 3 PM	2						
134 4		Gr n		Car	Car	:4 : 4 3 PM	2						
134		Gr n		Car	Car	:4 : 3 PM	2						
134 6		Gr n		Car	Car	:4 : 6 4 PM	2						
134 7		Gr n		Car	Car	:4 : 7 4 PM	2						

RecorV	Left LaVe	OpposV GreeV	sV e LaVe	MVddle LaVe	OutsV e LaVe	T me Stamp	ehicle Count	Gap	D screte Dec s oV	AveraVe Dec s oV	#of eh	AveraVe HeaVway	Cycle LeV th
134 8		Gr n		Car	Car	:4 : 8 4 PM	2						
134 9		Gr n		Car	Car	:4 : 9 4 PM	2						
1341	Car	Gr n		Car	Car	:46: 4 PM	2						
13411	Car	Gr n		Car	Car	:46: 1 4 PM	2						
13412	Car	Gr n	Car	Car	Car	:46: 2 4 PM	3						
13413	Car	Gr n	Car		Car	:46: 3 3 PM	2						
13414	Car	Gr n	Car		Car	:46: 3 PM	2						
1341	Car	Gr n	Car	Car	Car	:46: 4 PM	3						
13416	Car	Gr n		Car	Car	:46: 3 PM	2						
13417	Car	Gr n		Car	Car	:46: PM	2						
13418	Car	Gr n		Car	Car	:46: 6 PM	2						
13419	Car	Gr n	Car		Car	:46: 7 3 PM	2						
1342	Car	Gr n	Car		Car	:46: 7 PM	2						
13421	Car	Gr n	Car			:46: 8 3 PM	1						
13422	Car	Gr n	Car			:46: 8 PM	1						
13423	Car	Gr n			Car	:46: 9 3 PM	1						
13424	Car	Gr n			Car	:46: 9 PM	1						
1342	Car	Gr n		Car	Car	:46:1 6 PM	2						
13426	Car	Gr n	Car	Car		:46:11 3 PM	2						
13427	Car	Gr n	Car	Car		:46:11 6 PM	2						
13428	Car	Gr n				:46:12 3 PM							
13429	Car	Gr n				:46:12 3 PM							
1343	Car	Gr n				:46:12 6 PM							
13431	Car	Gr n	Car		Car	:46:13 6 PM	2	: 1 3					
13432	Car	Gr n	Car		Car	:46:14 6 PM	2						
13433	Car	Gr n	Car	Car		:46:1 3 PM	2						
13434	Car	Gr n	Car	Car		:46:1 6 PM	2						
1343	Car	Gr n	Car			:46:16 3 PM	1						
13436	Car	Gr n	Car			:46:16 6 PM	1						
13437	Car	Gr n	Car		Car	:46:17 7 PM	2						
13438	Car	Gr n	Car		Car	:46:18 7 PM	2						
13439	Car	Gr n		Car		:46:19 3 PM	1						
1344	Car	Gr n		Car		:46:19 4 PM	1						
13441	Car	Gr n		Car		:46:19 7 PM	1						
13442	Car	Gr n	Car		Car	:46:2 3 PM	2						
13443	Car	Gr n	Car		Car	:46:2 7 PM	2						
13444	Car	Gr n		Car	Car	:46:21 3 PM	2						
1344	Car	Gr n		Car	Car	:46:21 7 PM	2						
13446	Car	Gr n			Car	:46:22 3 PM	1						
13447	Car	Gr n			Car	:46:22 7 PM	1						
13448	Car	Gr n		Car		:46:23 3 PM	1						
13449	Car	Gr n		Car		:46:23 7 PM	1						
134	Car	Gr n		Car		:46:24 8 PM	1						
134 1	Car	Gr n		Car		:46:2 8 PM	1						
134 2	Car	Gr n		Car		:46:26 8 PM	1						
134 3	Car	Gr n	Car		Car	:46:27 3 PM	2						
134 4	Car	Gr n	Car		Car	:46:27 8 PM	2						
134	Car	Gr n	Car	Car		:46:28 3 PM	2						
134 6	Car	Gr n	Car	Car		:46:28 8 PM	2						
134 7	Car	Gr n	Car	Car	Car	:46:29 8 PM	3						
134 8	Car	Gr n	Car		Car	:46:3 3 PM	2						
134 9	Car	Gr n	Car		Car	:46:3 8 PM	2						
1346	Car	Gr n				:46:31 3 PM							
13461	Car	Gr n				:46:31 3 PM							
13462	Car	Gr n				:46:31 9 PM							
13463	Car	Gr n		Car		:46:32 9 PM	1	: 1 6					
13464	Car	Gr n			Car	:46:33 3 PM	1						
1346	Car	Gr n			Car	:46:33 9 PM	1						
13466	Car	Gr n		Car	Car	:46:34 9 PM	2						
13467	Car	Gr n				:46:3 3 PM							
13468	Car	Gr n				:46:3 3 PM							
13469	Car	Gr n				:46:3 9 PM							
1347	Car	Gr n		Car	Car	:46:36 9 PM	2	: 1 6					
13471	Car	Gr n		Car	Car	:46:37 9 PM	2						
13472	Car	Gr n		Car		:46:38 3 PM	1						
13473	Car	Gr n		Car		:46:39 PM	1						
13474	Car	Gr n				:46:39 3 PM							
1347	Car	Gr n				:46:4 PM							
13476	Car	Gr n				:46:41 PM							
13477	Car	Gr n				:46:42 PM							
13478	Car	Gr n	Car			:46:43 PM	1	: 3 7					
13479	Car	Gr n		Car	Car	:46:43 3 PM	2						
1348	Car	Gr n		Car	Car	:46:44 PM	2						
13481	Car	Gr n		Car		:46:44 3 PM	1						
13482	Car	Gr n		Car		:46:4 PM	1						
13483	Car	Gr n	Car		Car	:46:4 3 PM	2						
13484	Car	Gr n	Car		Car	:46:46 PM	2						
1348	Car	Gr n	Car		Car	:46:47 1 PM	2						
13486	Car	Gr n	Car		Car	:46:48 1 PM	2						

RecorV	Left LaVe	OpposV GreeV	sV e LaVe	MVddle LaVe	OutsV e LaVe	T me Stamp	ehicle Count	Gap	D screte Dec s oV	AveraVe Dec s oV	#of eh	AveraVe HeaVway	Cycle LeV th
13487	Car	Gr n		Car	Car	:46:48 3 PM	2						
13488	Car	Gr n		Car	Car	:46:49 1 PM	2						
13489	Car	Gr n		Car		:46:49 3 PM	1						
1349	Car	Gr n		Car		:46: 1 PM	1						
13491	Car	Gr n		Car	Car	:46: 1 1 PM	2						
13492	Car	Gr n	Car		Car	:46: 1 2 PM	2						
13493	Car	Gr n	Car		Car	:46: 2 1 PM	2						
13494	Car	Gr n	Car	Car		:46: 2 3 PM	2						
1349	Car	Gr n	Car	Car		:46: 3 1 PM	2						
13496	Car	Gr n	Car			:46: 3 3 PM	1						
13497	Car	Gr n	Car			:46: 4 2 PM	1						
13498	Car	Gr n	Car			:46: 2 PM	1						
13499	Car	Gr n	Car	Car	Car	:46: 6 2 PM	3						
13	Car	Gr n				:46: 6 3 PM							
13 1	Car	Gr n				:46: 6 3 PM							
13 2	Car	Gr n				:46: 6 3 PM							
13 3	Car	Gr n				:46: 7 2 PM							
13 4	Car	Gr n	Car	Car	Car	:46: 8 2 PM	3	: 1 9					
13	Car	Gr n			Car	:46: 8 3 PM	1						
13 6	Car	Gr n			Car	:46: 8 3 PM	1						
13 7	Car	Gr n			Car	:46: 9 2 PM	1						
13 8	Car	Gr n		Car	Car	:47: 2 PM	2						
13 9	Car	Gr n		Car	Car	:47: 3 PM	2						
13 1	Car	Gr n	Car			:47: 1 3 PM	1						
13 11	Car	Gr n	Car			:47: 1 3 PM	1						
13 12	Car	Gr n	Car			:47: 1 3 PM	1						
13 13	Car	Gr n			Car	:47: 2 3 PM	1						
13 14	Car	Gr n			Car	:47: 2 3 PM	1						
13 1	Car	Gr n	Car	Car		:47: 3 3 PM	2						
13 16	Car	Gr n	Car	Car		:47: 3 3 PM	2						
13 17	Car	Gr n	Car	Car	Car	:47: 4 3 PM	3						
13 18	Car	Gr n	Car	Car	Car	:47: 3 PM	3						
13 19	Car	Gr n				:47: 6 3 PM							
13 2	Car	Gr n				:47: 6 3 PM							
13 21	Car	Gr n				:47: 6 4 PM							
13 22	Car	Gr n				:47: 6 4 PM							
13 23	Car	Gr n			Car	:47: 7 3 PM	1	: 1					
13 24	Car	Gr n				:47: 8 3 PM							
13 2	Car	Gr n				:47: 8 4 PM							
13 26	Car	Gr n				:47: 9 4 PM							
13 27	Car	Gr n	Car		Car	:47:1 4 PM	2	: 2 1					
13 28	Car	Gr n			Car	:47:11 3 PM	1						
13 29	Car	Gr n			Car	:47:11 4 PM	1						
13 3	Car	Gr n				:47:12 3 PM							
13 31	Car	Gr n				:47:12 4 PM							
13 32	Car	Gr n		Car		:47:13 4 PM	1						
13 33	Car	Gr n				:47:14 2 PM							
13 34	Car	Gr n				:47:14 4 PM							
13 3	Car	Gr n		Car		:47:1 PM	1						
13 36	Car	Gr n			Car	:47:16 3 PM	1						
13 37	Car	Gr n			Car	:47:16 PM	1						
13 38	Car	Gr n	Car			:47:17 3 PM	1						
13 39	Car	Gr n	Car			:47:17 PM	1						
13 4	Car	Gr n				:47:18 2 PM							
13 41	Car	Gr n				:47:18 PM							
13 42	Car	Gr n		Car		:47:19 PM	1						
13 43	Car	Gr n		Car		:47:2 PM	1						
13 44	Car	Gr n		Car		:47:21 PM	1						
13 4	Car	Gr n		Car		:47:22 6 PM	1						
13 46	Car	Gr n		Car		:47:23 6 PM	1						
13 47	Car	Gr n				:47:24 3 PM							
13 48	Car	Gr n				:47:24 6 PM							
13 49	Car	Gr n				:47:2 6 PM							
13	Car	Gr n			Car	:47:26 6 PM	1	: 2 3					
13 1	Car	Gr n		Car	Car	:47:27 6 PM	2						
13 2	Car	Gr n		Car		:47:28 3 PM	1						
13 3	Car	Gr n		Car		:47:28 6 PM	1						
13 4	Car	Gr n	Car			:47:29 3 PM	1						
13	Car	Gr n	Car			:47:29 7 PM	1						
13 6	Car	Gr n				:47:3 3 PM							
13 7	Car	Gr n				:47:3 7 PM							
13 8	Car	Gr n			Car	:47:31 7 PM	1						
13 9	Car	Gr n				:47:32 3 PM							
13 6	Car	Gr n				:47:32 7 PM							
13 61	Car	Gr n				:47:33 7 PM							
13 62	Car	Gr n				:47:34 7 PM							
13 63	Car	Gr n	Car			:47:3 7 PM	1	: 3 4					
13 64	Car	Gr n	Car			:47:36 8 PM	1						
13 6	Car	Gr n			Car	:47:37 3 PM	1						

RecorV	Left LaVe	OpposV GreeV	s de LaVe	MVddle LaVe	OutsV e LaVe	T me Stamp	ehicle Count	Gap	D screte Dec s oV	AveraVe Dec s oV	#of eh	AveraVe HeaVway	Cycle LeV th
13 66	Car	Gr n			Car	:47:37 8 PM	1						
13 67	Car	Gr n		Car		:47:38 3 PM	1						
13 68	Car	Gr n		Car		:47:38 8 PM	1						
13 69	Car	Gr n		Car		:47:39 8 PM	1						
13 7	Car	Gr n	Car	Car	Car	:47:4 8 PM	3						
13 71	Car	Gr n	Car		Car	:47:41 3 PM	2						
13 72	Car	Gr n	Car		Car	:47:41 8 PM	2						
13 73	Car	Gr n				:47:42 3 PM							
13 74	Car	Gr n				:47:42 3 PM							
13 7	Car	Gr n				:47:42 8 PM							
13 76	Car	Gr n				:47:43 8 PM							
13 77	Car	R				:47:44 3 PM		: 2	R Arrow	R Arrow	1,2	3	231
13 78	Car	R				:47:44 9 PM							
13 79	Car	R				:47:4 9 PM							
13 8	Car	R				:47:46 9 PM							
13 81	Car	R				:47:47 9 PM							
13 82	Car	R	Car	Car		:47:48 9 PM							
13 83	Car	R		Car		:47:49 3 PM							
13 84	Car	R		Car		:47:49 9 PM							
13 8	Car	R				:47: 2 PM							
13 86	Car	R				:47: 9 PM							
13 87	Car	R				:47: 2 PM							
13 88	Car	R				:47: 3 PM							
13 89	Car	R				:47: 4 PM							
13 9	Car	R				:47: PM							
13 91	Car	R				:47: 6 PM							
13 92	Car	R				:47: 7 PM							
13 93	Car	R				:47: 8 PM							
13 94	Car	R				:47: 9 1 PM							
13 9	Car	R				:48: 1 PM							
13 96	Car	R				:48: 1 1 PM							
13 97	Car	R				:48: 2 1 PM							
13 98	Car	R				:48: 3 1 PM							
13 99	Car	R				:48: 4 1 PM							
136	Car	R				:48: 1 PM							
136 1	Car	R				:48: 6 2 PM							
136 2	Car	R				:48: 7 2 PM							
136 3	Car	R				:48: 8 2 PM							
136 4	Car	R				:48: 9 2 PM							
136	Car	R				:48:1 2 PM							
136 6	Car	R				:48:11 2 PM							
136 7	Car	R				:48:12 2 PM							
136 8	Car	R				:48:13 3 PM							
136 9	Car	R				:48:14 3 PM							
1361	Car	R				:48:1 3 PM							
13611	Car	R				:48:16 3 PM							
13612	Car	R				:48:17 3 PM							
13613	Car	R				:48:18 3 PM							
13614	Car	R				:48:19 3 PM							
1361	Car	R				:48:2 4 PM							
13616	Car	R				:48:21 4 PM							
13617	Car	R				:48:22 4 PM							
13618	Car	R				:48:23 4 PM							
13619	Car	R				:48:24 4 PM							
1362	Car	R				:48:2 4 PM							
13621	Car	R				:48:26 4 PM							
13622	Car	R				:48:27 4 PM							
13623	Car	R				:48:28 PM							
13624	Car	R				:48:29 PM							
1362	Car	R				:48:3 PM							
13626	Car	R				:48:31 PM							
13627	Car	R				:48:32 PM							
13628	Car	R				:48:33 PM							
13629		R				:48:34 3 PM							
1363		R				:48:34 PM							
13631	Car	R				:48:3 6 PM							
13632	Car	R				:48:36 6 PM							
13633		R				:48:37 3 PM							
13634		R				:48:37 6 PM							
1363	Car	R				:48:38 6 PM							
13636	Car	R				:48:39 6 PM							
13637	Car	R				:48:4 6 PM							
13638		R				:48:41 3 PM							
13639		R				:48:41 6 PM							
1364	Car	R				:48:42 7 PM							
13641		R				:48:43 3 PM							
13642		R				:48:43 7 PM							
13643	Car	R				:48:44 7 PM							
13644		R				:48:4 3 PM							

RecorV	Left LaVe	OpposV GreeV	sV e LaVe	MVddle LaVe	OutsV e LaVe	T me Stamp	ehicle Count	Gap	D screte Dec s oV	AveraVe Dec s oV	#of eh	AveraVe HeaVway	Cycle LeV th
1364		R				:48:4 7 PM							
13646	Car	R				:48:46 7 PM							
13647		R				:48:47 3 PM							
13648		R				:48:47 7 PM							
13649		R				:48:48 7 PM							
136	Car	R				:48:49 8 PM							
136 1	Car	R				:48: 8 PM							
136 2		R				:48: 1 3 PM							
136 3		R				:48: 1 8 PM							
136 4		R				:48: 2 8 PM							
136	Car	R				:48: 3 8 PM							
136 6		R				:48: 4 3 PM							
136 7		R				:48: 4 8 PM							
136 8		R				:48: 8 PM							
136 9		R				:48: 6 9 PM							
1366	Car	R				:48: 7 9 PM							
13661		R				:48: 8 2 PM							
13662		R				:48: 8 9 PM							
13663	Car	R				:48: 9 9 PM							
13664	Car	R				:49: 9 PM							
1366	Car	R				:49: 1 9 PM							
13666	Car	R				:49: 2 9 PM							
13667	Car	R				:49: 4 PM							
13668		R				:49: 4 3 PM							
13669		R				:49: PM							
1367	Car	R				:49: 6 PM							
13671	Car	R				:49: 7 PM							
13672		R				:49: 7 2 PM							
13673		R				:49: 8 PM							
13674	Car	R				:49: 9 PM							
1367	Car	R				:49:1 PM							
13676		R				:49:1 3 PM							
13677		R				:49:11 1 PM							
13678	Car	R				:49:12 1 PM							
13679		R				:49:12 3 PM							
1368		R				:49:13 1 PM							
13681	Car	R				:49:14 1 PM							
13682		R				:49:14 3 PM							
13683		R				:49:1 1 PM							
13684		R				:49:16 1 PM							
1368	Car	R	Car			:49:17 1 PM							
13686	Car	R				:49:17 3 PM							
13687	Car	R				:49:18 1 PM							
13688	Car	R			Car	:49:19 2 PM							
13689		R				:49:19 3 PM							
1369		R				:49:19 3 PM							
13691		R				:49:2 2 PM							
13692	Car	R				:49:21 2 PM							
13693		R				:49:21 3 PM							
13694		R				:49:22 2 PM							
1369	Car	R		Car		:49:23 2 PM							
13696		R		Car	Car	:49:23 3 PM							
13697		R	Car		Car	:49:24 2 PM							
13698		R	Car		Car	:49:24 3 PM							
13699		R			Car	:49:2 3 PM							
137		R			Car	:49:2 3 PM							
137 1		R				:49:26 3 PM							
137 2		R				:49:26 3 PM							
137 3		R				:49:27 3 PM							
137 4		R				:49:28 3 PM							
137		R				:49:29 3 PM							
137 6		R				:49:3 3 PM							
137 7		R				:49:31 3 PM							
137 8		R				:49:32 3 PM							
137 9		R				:49:33 4 PM							
1371		Gr n				:49:34 4 PM							
13711		Gr n				:49:3 4 PM							
13712		Gr n				:49:36 4 PM							
13713		Gr n				:49:37 4 PM							
13714		Gr n				:49:38 4 PM							
1371		Gr n	Car			:49:39 4 PM	1	:					
13716		Gr n	Car			:49:4 PM	1						
13717		Gr n	Car			:49:41 PM	1						
13718		Gr n	Car			:49:42 PM	1						
13719		Gr n			Car	:49:43 2 PM	1						
1372		Gr n			Car	:49:43 PM	1						
13721		Gr n			Car	:49:44 PM	1						
13722		Gr n				:49:4 3 PM							
13723		Gr n				:49:4 PM							

RecorV	Left LaVe	OpposV GreeV	sV e LaVe	MVddle LaVe	OutsV e LaVe	T me Stamp	ehicle Count	Gap	D screte Dec s oV	AveraVe Dec s oV	#of eh	AveraVe HeaVway	Cycle LeV th
13724		Gr n				:49:46 PM							
1372		Gr n				:49:47 6 PM							
13726		Gr n				:49:48 6 PM							
13727		Gr n				:49:49 6 PM							
13728		Gr n			Car	:49: 6 PM	1	: 3					
13729		Gr n				:49: 1 2 PM							
1373		Gr n				:49: 1 6 PM							
13731		Gr n				:49: 2 6 PM							
13732		Gr n				:49: 3 6 PM							
13733		Gr n	Car	Car		:49: 4 7 PM	2	: 3					
13734		Gr n		Car		:49: 2 PM	1						
1373		Gr n		Car		:49: 7 PM	1						
13736		Gr n				:49: 6 2 PM							
13737		Gr n				:49: 6 7 PM							
13738		Gr n				:49: 7 7 PM							
13739		Gr n				:49: 8 7 PM							
1374		Gr n				:49: 9 7 PM							
13741		Gr n				: : 7 PM							
13742		Gr n				: : 1 8 PM							
13743		Gr n	Car	Car		: : 2 8 PM	2	: 6 6					
13744		Gr n	Car		Car	: : 3 3 PM	2						
1374		Gr n	Car		Car	: : 3 8 PM	2						
13746		Gr n	Car	Car		: : 4 2 PM	2						
13747		Gr n	Car	Car		: : 4 8 PM	2						
13748	Car	Gr n		Car		: : 2 PM	1						
13749	Car	Gr n		Car		: : 8 PM	1						
137	Car	Gr n		Car		: : 6 8 PM	1						
137 1	Car	Gr n	Car			: : 7 3 PM	1						
137 2	Car	Gr n	Car			: : 7 8 PM	1						
137 3	Car	Gr n	Car			: : 8 9 PM	1						
137 4	Car	Gr n		Car		: : 9 2 PM	1						
137	Car	Gr n		Car		: : 9 9 PM	1						
137 6	Car	Gr n				: :1 2 PM							
137 7	Car	Gr n				: :1 9 PM							
137 8	Car	Gr n	Car		Car	: :11 9 PM	2	: 1 7					
137 9	Car	Gr n		Car	Car	: :12 3 PM	2						
1376	Car	Gr n		Car	Car	: :12 9 PM	2						
13761	Car	Gr n	Car			: :13 2 PM	1						
13762	Car	Gr n	Car			: :13 3 PM	1						
13763	Car	Gr n	Car			: :13 9 PM	1						
13764	Car	Gr n	Car			: :14 9 PM	1						
1376	Car	Gr n	Car			: :1 9 PM	1						
13766	Car	Gr n		Car		: :16 3 PM	1						
13767	Car	Gr n		Car		: :17 PM	1						
13768	Car	Gr n	Car	Car	Car	: :18 PM	3						
13769	Car	Gr n	Car			: :18 2 PM	1						
1377	Car	Gr n	Car			: :18 3 PM	1						
13771	Car	Gr n	Car			: :19 PM	1						
13772	Car	Gr n	Car	Car	Car	: :2 PM	3						
13773	Car	Gr n	Car		Car	: :2 3 PM	2						
13774	Car	Gr n	Car		Car	: :21 PM	2						
1377	Car	Gr n	Car	Car	Car	: :22 PM	3						
13776	Car	Gr n	Car			: :22 2 PM	1						
13777	Car	Gr n	Car			: :22 3 PM	1						
13778	Car	Gr n	Car			: :23 PM	1						
13779	Car	Gr n	Car	Car		: :24 1 PM	2						
1378	Car	Gr n		Car	Car	: :24 3 PM	2						
13781	Car	Gr n		Car	Car	: :2 1 PM	2						
13782	Car	Gr n	Car			: :2 3 PM	1						
13783	Car	Gr n	Car			: :2 3 PM	1						
13784	Car	Gr n	Car			: :26 1 PM	1						
1378	Car	Gr n		Car		: :26 3 PM	1						
13786	Car	Gr n		Car		: :27 1 PM	1						
13787	Car	Gr n		Car		: :28 1 PM	1						
13788	Car	Gr n				: :28 2 PM							
13789	Car	Gr n				: :29 1 PM							
1379	Car	Gr n	Car			: :3 1 PM	1	: 1 9					
13791	Car	Gr n	Car	Car	Car	: :31 2 PM	3						
13792	Car	Gr n	Car			: :31 2 PM	1						
13793	Car	Gr n	Car			: :31 3 PM	1						
13794	Car	Gr n	Car			: :32 2 PM	1						
1379	Car	Gr n	Car	Car		: :33 2 PM	2						
13796	Car	Gr n		Car	Car	: :33 3 PM	2						
13797	Car	Gr n		Car	Car	: :34 2 PM	2						
13798	Car	Gr n		Car	Car	: :3 2 PM	2						
13799	Car	Gr n		Car	Car	: :36 2 PM	2						
138	Car	Gr n		Car	Car	: :37 2 PM	2						
138 1	Car	Gr n		Car	Car	: :38 3 PM	2						
138 2	Car	Gr n		Car		: :39 3 PM	1						

RecorV	Left LaVe	OpposV GreeV	sV e LaVe	MVddle LaVe	OutsV e LaVe	T me Stamp	ehicle Count	Gap	D screte Dec s oV	AveraVe Dec s oV	#of eh	AveraVe HeaVway	Cycle LeV th
138 3	Car	Gr n		Car		: :39 3 PM	1						
138 4	Car	Gr n	Car		Car	: :4 2 PM	2						
138	Car	Gr n	Car		Car	: :4 3 PM	2						
138 6	Car	Gr n	Car	Car		: :41 2 PM	2						
138 7	Car	Gr n	Car	Car		: :41 3 PM	2						
138 8	Car	Gr n	Car		Car	: :42 3 PM	2						
138 9	Car	Gr n	Car		Car	: :42 3 PM	2						
1381	Car	Gr n			Car	: :43 3 PM	1						
13811	Car	Gr n			Car	: :43 3 PM	1						
13812	Car	Gr n	Car		Car	: :44 3 PM	2						
13813	Car	Gr n		Car	Car	: :4 2 PM	2						
13814	Car	Gr n		Car	Car	: :4 4 PM	2						
1381	Car	Gr n	Car	Car	Car	: :46 4 PM	3						
13816	Car	Gr n		Car	Car	: :47 3 PM	2						
13817	Car	Gr n		Car	Car	: :47 4 PM	2						
13818	Car	Gr n			Car	: :48 3 PM	1						
13819	Car	Gr n			Car	: :48 4 PM	1						
1382	Car	Gr n			Car	: :49 4 PM	1						
13821	Car	Gr n	Car	Car		: : 2 PM	2						
13822	Car	Gr n	Car	Car		: : 4 PM	2						
13823	Car	Gr n	Car	Car		: : 1 4 PM	2						
13824	Car	Gr n	Car	Car		: : 2 PM	2						
1382	Car	Gr n	Car		Car	: : 3 3 PM	2						
13826	Car	Gr n	Car		Car	: : 3 PM	2						
13827	Car	Gr n		Car		: : 4 2 PM	1						
13828	Car	Gr n		Car		: : 4 3 PM	1						
13829	Car	Gr n		Car		: : 4 PM	1						
1383	Car	Gr n				: : 2 PM							
13831	Car	Gr n				: : PM							
13832	Car	Gr n	Car	Car		: : 6 PM	2	: 1 3					
13833	Car	Gr n	Car	Car	Car	: : 7 PM	3						
13834	Car	Gr n	Car	Car		: : 8 2 PM	2						
1383	Car	Gr n	Car	Car		: : 8 PM	2						
13836	Car	Gr n		Car		: : 9 2 PM	1						
13837	Car	Gr n		Car		: : 9 6 PM	1						
13838	Car	Gr n			Car	: 1: 3 PM	1						
13839	Car	Gr n			Car	: 1: 6 PM	1						
1384	Car	Gr n	Car		Car	: 1: 1 6 PM	2						
13841	Car	Gr n	Car	Car	Car	: 1: 2 6 PM	3						
13842	Car	Gr n	Car	Car		: 1: 3 2 PM	2						
13843	Car	Gr n	Car	Car		: 1: 3 6 PM	2						
13844	Car	Gr n	Car	Car	Car	: 1: 4 6 PM	3						
1384	Car	Gr n	Car	Car	Car	: 1: 6 PM	3						
13846	Car	Gr n	Car		Car	: 1: 6 3 PM	2						
13847	Car	Gr n	Car		Car	: 1: 6 6 PM	2						
13848	Car	Gr n	Car			: 1: 7 3 PM	1						
13849	Car	Gr n	Car			: 1: 7 7 PM	1						
138	Car	Gr n	Car	Car		: 1: 8 7 PM	2						
138 1	Car	Gr n	Car			: 1: 9 3 PM	1						
138 2	Car	Gr n	Car			: 1: 9 7 PM	1						
138 3	Car	Gr n				: 1:1 3 PM							
138 4	Car	Gr n				: 1:1 7 PM							
138	Car	Gr n		Car		: 1:11 7 PM	1	: 1 4					
138 6	Car	Gr n			Car	: 1:12 2 PM	1						
138 7	Car	Gr n			Car	: 1:12 7 PM	1						
138 8	Car	Gr n		Car		: 1:13 2 PM	1						
138 9	Car	Gr n		Car		: 1:13 7 PM	1						
1386	Car	Gr n		Car	Car	: 1:14 8 PM	2						
13861	Car	Gr n		Car	Car	: 1:1 8 PM	2						
13862	Car	Gr n			Car	: 1:16 3 PM	1						
13863	Car	Gr n			Car	: 1:16 8 PM	1						
13864	Car	Gr n	Car	Car		: 1:17 2 PM	2						
1386	Car	Gr n	Car	Car		: 1:17 8 PM	2						
13866	Car	Gr n	Car	Car	Car	: 1:18 8 PM	3						
13867	Car	Gr n		Car	Car	: 1:19 3 PM	2						
13868	Car	Gr n		Car	Car	: 1:19 8 PM	2						
13869	Car	Gr n		Car	Car	: 1:2 8 PM	2						
1387	Car	Gr n				: 1:21 2 PM							
13871	Car	Gr n				: 1:21 3 PM							
13872	Car	Gr n				: 1:21 9 PM							
13873	Car	Gr n			Car	: 1:22 9 PM	1	: 1 7					
13874	Car	Gr n				: 1:23 3 PM							
1387	Car	Gr n				: 1:23 9 PM							
13876	Car	Gr n			Car	: 1:24 9 PM	1						
13877	Car	Gr n			Car	: 1:2 9 PM	1						
13878	Car	Gr n		Car		: 1:26 2 PM	1						
13879	Car	Gr n		Car		: 1:26 9 PM	1						
1388	Car	Gr n				: 1:27 3 PM							
13881	Car	Gr n				: 1:27 9 PM							

RecorV	Left LaVe	OpposV GreeV	s de LaVe	MVddle LaVe	OutsV e LaVe	T me Stamp	ehicle Count	Gap	D screte Dec s oV	AveraVe Dec s oV	#of eh	AveraVe HeaVway	Cycle LeV th
13882	Car	Gr n				: 1:29 PM							
13883	Car	Gr n				: 1:3 PM							
13884	Car	Gr n				: 1:31 PM							
1388	Car	Gr n				: 1:32 PM							
13886	Car	Gr n				: 1:33 PM							
13887	Car	R				: 1:33 3 PM		: 6	Y llow Arrow	R Arrow	1,163	3 1	229
13888	Car	R				: 1:34 PM							
13889	Car	R				: 1:3 PM							
1389	Car	R				: 1:36 1 PM							
13891	Car	R				: 1:37 1 PM							
13892	Car	R				: 1:38 1 PM							
13893	Car	R		Car		: 1:39 1 PM							
13894	Car	R		Car		: 1:4 1 PM							
1389	Car	R				: 1:4 2 PM							
13896	Car	R				: 1:41 1 PM							
13897	Car	R				: 1:42 1 PM							
13898	Car	R				: 1:43 2 PM							
13899	Car	R				: 1:44 2 PM							
139	Car	R				: 1:4 2 PM							
139 1	Car	R			Car	: 1:46 2 PM							
139 2	Car	R			Car	: 1:47 2 PM							
139 3	Car	R				: 1:47 3 PM							
139 4	Car	R				: 1:48 2 PM							
139	Car	R				: 1:49 2 PM							
139 6	Car	R				: 1: 3 PM							
139 7	Car	R				: 1: 1 3 PM							
139 8	Car	R				: 1: 2 3 PM							
139 9	Car	R				: 1: 3 3 PM							
1391	Car	R				: 1: 4 3 PM							
13911	Car	R				: 1: 3 PM							
13912	Car	R				: 1: 6 3 PM							
13913	Car	R				: 1: 7 3 PM							
13914	Car	R				: 1: 8 4 PM							
1391	Car	R				: 1: 9 4 PM							
13916	Car	R				: 2: 4 PM							
13917	Car	R				: 2: 1 4 PM							
13918	Car	R				: 2: 2 4 PM							
13919	Car	R				: 2: 3 4 PM							
1392	Car	R				: 2: 4 4 PM							
13921	Car	R				: 2: PM							
13922	Car	R				: 2: 6 PM							
13923	Car	R				: 2: 7 PM							
13924	Car	R				: 2: 8 PM							
1392	Car	R				: 2: 9 PM							
13926	Car	R				: 2:1 PM							
13927	Car	R				: 2:11 PM							
13928	Car	R				: 2:12 6 PM							
13929	Car	R				: 2:13 6 PM							
1393	Car	R				: 2:14 6 PM							
13931	Car	R				: 2:1 6 PM							
13932	Car	R				: 2:16 6 PM							
13933	Car	R				: 2:17 6 PM							
13934	Car	R				: 2:18 6 PM							
1393	Car	R				: 2:19 7 PM							
13936	Car	R				: 2:2 7 PM							
13937	Car	R				: 2:21 7 PM							
13938	Car	R			Car	: 2:22 7 PM							
13939	Car	R			Car	: 2:23 7 PM							
1394	Car	R				: 2:24 2 PM							
13941	Car	R				: 2:24 7 PM							
13942	Car	R				: 2:2 7 PM							
13943	Car	R				: 2:26 8 PM							
13944	Car	R				: 2:27 8 PM							
1394	Car	R				: 2:28 8 PM							
13946	Car	R				: 2:29 8 PM							
13947	Car	R				: 2:3 8 PM							
13948	Car	R				: 2:31 8 PM							
13949	Car	R				: 2:32 8 PM							
139	Car	R				: 2:33 9 PM							
139 1	Car	R				: 2:34 9 PM							
139 2	Car	R				: 2:3 9 PM							
139 3		R	Car		Car	: 2:36 3 PM							
139 4		R	Car		Car	: 2:36 9 PM							
139	Car	R	Car			: 2:37 3 PM							
139 6	Car	R	Car			: 2:37 9 PM							
139 7	Car	R				: 2:38 2 PM							
139 8	Car	R				: 2:38 9 PM							
139 9		R				: 2:39 2 PM							
1396		R				: 2:39 9 PM							

RecorV	Left LaVe	OpposV GreeV	s de LaVe	MVddle LaVe	OutsV e LaVe	T me Stamp	ehicle Count	Gap	D screte Dec s oV	AveraVe Dec s oV	#of eh	AveraVe HeaVway	Cycle LeV th
13961	Car	R				: 2:41 PM							
13962	Car	R				: 2:42 PM							
13963		R				: 2:42 2 PM							
13964		R				: 2:43 PM							
1396	Car	R				: 2:44 PM							
13966		R				: 2:44 3 PM							
13967		R				: 2:4 PM							
13968		R				: 2:46 PM							
13969	Car	R				: 2:47 PM							
1397		R				: 2:47 2 PM							
13971		R				: 2:48 1 PM							
13972		R			Car	: 2:49 1 PM							
13973	Car	R	Car			: 2:49 3 PM							
13974	Car	R	Car			: 2: 1 PM							
1397		R	Car		Car	: 2: 3 PM							
13976		R	Car		Car	: 2: 1 1 PM							
13977		R		Car	Car	: 2: 1 2 PM							
13978		R		Car	Car	: 2: 2 1 PM							
13979	Car	R		Car		: 2: 2 2 PM							
1398	Car	R		Car		: 2: 3 1 PM							
13981		R	Car			: 2: 3 3 PM							
13982		R	Car			: 2: 3 3 PM							
13983		R	Car			: 2: 4 1 PM							
13984	Car	R		Car		: 2: 4 3 PM							
1398	Car	R		Car		: 2: 1 PM							
13986	Car	R	Car	Car		: 2: 6 2 PM							
13987		R	Car		Car	: 2: 6 2 PM							
13988		R	Car		Car	: 2: 6 3 PM							
13989		R	Car		Car	: 2: 7 2 PM							
1399	Car	R			Car	: 2: 7 2 PM							
13991	Car	R			Car	: 2: 8 2 PM							
13992		R				: 2: 8 3 PM							
13993		R				: 2: 8 3 PM							
13994		R				: 2: 9 2 PM							
1399		R		Car		: 3: 2 PM							
13996		R		Car		: 3: 3 PM							
13997	Car	R				: 3: 1 2 PM							
13998	Car	R				: 3: 1 3 PM							
13999		R				: 3: 2 2 PM							
14		R				: 3: 2 3 PM							
14 1	Car	R	Car			: 3: 3 3 PM							
14 2		R	Car			: 3: 4 2 PM							
14 3		R	Car			: 3: 4 3 PM							
14 4	Car	R				: 3: 2 PM							
14	Car	R				: 3: 3 PM							
14 6		R			Car	: 3: 6 2 PM							
14 7		R			Car	: 3: 6 3 PM							
14 8	Car	R	Car		Car	: 3: 7 3 PM							
14 9		R			Car	: 3: 8 3 PM							
14 1		R			Car	: 3: 8 3 PM							
14 11		R			Car	: 3: 8 4 PM							
14 12	Car	R			Car	: 3: 9 3 PM							
14 13		R	Car		Car	: 3:1 2 PM							
14 14		R	Car		Car	: 3:1 4 PM							
14 1		R	Car		Car	: 3:11 4 PM							
14 16		R			Car	: 3:12 3 PM							
14 17		R			Car	: 3:12 4 PM							
14 18		R	Car		Car	: 3:13 4 PM							
14 19		R			Car	: 3:14 2 PM							
14 2		R			Car	: 3:14 4 PM							
14 21		R			Car	: 3:1 4 PM							
14 22		R			Car	: 3:16 4 PM							
14 23		R			Car	: 3:17 PM							
14 24		R			Car	: 3:18 PM							
14 2		R		Car	Car	: 3:19 PM							
14 26		R		Car	Car	: 3:2 PM							
14 27		R			Car	: 3:21 3 PM							
14 28		R			Car	: 3:21 PM							
14 29		Gr n			Car	: 3:22 PM	1						
14 3		Gr n			Car	: 3:23 PM	1						
14 31		Gr n			Car	: 3:24 6 PM	1						
14 32		Gr n			Car	: 3:2 6 PM	1						
14 33		Gr n			Car	: 3:26 6 PM	1						
14 34		Gr n			Car	: 3:27 6 PM	1						
14 3		Gr n			Car	: 3:28 6 PM	1						
14 36		Gr n		Car	Car	: 3:29 6 PM	2						
14 37		Gr n		Car		: 3:3 3 PM	1						
14 38		Gr n		Car		: 3:3 6 PM	1						
14 39		Gr n				: 3:31 2 PM							

RecorV	Left LaVe	OpposV GreeV	sV e LaVe	MVddle LaVe	OutsV e LaVe	T me Stamp	ehicle Count	Gap	D screte Dec s oV	AveraVe Dec s oV	#of eh	AveraVe HeaVway	Cycle LeV th
14 4		Gr n				: 3:31 7 PM							
14 41		Gr n				: 3:32 7 PM							
14 42		Gr n				: 3:33 7 PM							
14 43		Gr n				: 3:34 7 PM							
14 44		Gr n			Car	: 3:3 7 PM	1	: 4					
14 4		Gr n			Car	: 3:36 7 PM	1						
14 46		Gr n				: 3:37 2 PM							
14 47		Gr n				: 3:37 7 PM							
14 48		Gr n			Car	: 3:38 7 PM	1						
14 49		Gr n			Car	: 3:39 8 PM	1						
14		Gr n				: 3:4 2 PM							
14 1		Gr n				: 3:4 8 PM							
14 2	Car	Gr n				: 3:41 8 PM							
14 3		Gr n				: 3:42 2 PM							
14 4		Gr n				: 3:42 8 PM							
14		Gr n				: 3:43 8 PM							
14 6		Gr n		Car		: 3:44 8 PM	1	: 4 6					
14 7		Gr n				: 3:4 2 PM							
14 8		Gr n				: 3:4 8 PM							
14 9		Gr n				: 3:46 9 PM							
14 6		Gr n		Car		: 3:47 9 PM	1						
14 61		Gr n				: 3:48 3 PM							
14 62		Gr n				: 3:48 9 PM							
14 63		Gr n				: 3:49 9 PM							
14 64		Gr n				: 3: 9 PM							
14 6		Gr n				: 3: 1 9 PM							
14 66		Gr n				: 3: 2 9 PM							
14 67		Gr n				: 3: 4 PM							
14 68		Gr n				: 3: PM							
14 69		Gr n				: 3: 6 PM							
14 7		Gr n				: 3: 7 PM							
14 71		Gr n				: 3: 8 PM							
14 72		Gr n				: 3: 9 PM							
14 73		Gr n				: 4: PM							
14 74		Gr n				: 4: 1 1 PM							
14 7		Gr n				: 4: 2 1 PM							
14 76		Gr n				: 4: 3 1 PM							
14 77		Gr n				: 4: 4 1 PM							
14 78		Gr n				: 4: 1 PM							
14 79		Gr n				: 4: 6 1 PM							
14 8		Gr n				: 4: 7 1 PM							
14 81		Gr n				: 4: 8 2 PM							
14 82		Gr n				: 4: 9 2 PM							
14 83		Gr n				: 4:1 2 PM							
14 84		Gr n				: 4:11 2 PM							
14 8		Gr n				: 4:12 2 PM							
14 86		R				: 4:13 2 PM		:24 9	Y llow Arrow	Y llow Arrow	27	13 3	16
14 87		R				: 4:13 3 PM							
14 88		R				: 4:14 2 PM							
14 89		R				: 4:1 3 PM							
14 9		R				: 4:16 3 PM							
14 91		R				: 4:17 3 PM							
14 92		R				: 4:18 3 PM							
14 93		R				: 4:19 3 PM							
14 94	Car	R				: 4:2 3 PM							
14 9	Car	R				: 4:21 3 PM							
14 96	Car	R				: 4:22 4 PM							
14 97	Car	R				: 4:23 4 PM							
14 98	Car	R				: 4:24 4 PM							
14 99	Car	R				: 4:2 4 PM							
141	Car	R				: 4:26 4 PM							
141 1	Car	R				: 4:27 4 PM							
141 2	Car	R				: 4:28 4 PM							
141 3	Car	R				: 4:29 PM							
141 4	Car	R				: 4:3 PM							
141	Car	R				: 4:31 PM							
141 6	Car	R				: 4:32 PM							
141 7	Car	R				: 4:33 PM							
141 8	Car	R				: 4:34 PM							
141 9	Car	R				: 4:3 PM							
1411	Car	R				: 4:36 PM							
14111	Car	R				: 4:37 6 PM							
14112	Car	R				: 4:38 6 PM							
14113	Car	R				: 4:39 6 PM							
14114	Car	R				: 4:4 6 PM							
1411	Car	R				: 4:41 6 PM							
14116	Car	R				: 4:42 6 PM							
14117	Car	R				: 4:43 6 PM							
14118	Car	R				: 4:44 7 PM							

RecorV	Left LaVe	OpposV GreeV	s de LaVe	MVddle LaVe	OutsV e LaVe	T me Stamp	ehicle Count	Gap	D screte Dec s oV	AveraVe Dec s oV	#of eh	AveraVe HeaVway	Cycle LeV th
14119	Car	R				: 4:4 7 PM							
1412	Car	R				: 4:46 7 PM							
14121	Car	R				: 4:47 7 PM							
14122	Car	R				: 4:48 7 PM							
14123		R				: 4:49 2 PM							
14124		R				: 4:49 7 PM							
1412		R				: 4: 7 PM							
14126	Car	R				: 4: 1 8 PM							
14127		R				: 4: 2 2 PM							
14128		R				: 4: 2 8 PM							
14129	Car	R				: 4: 3 8 PM							
1413		R				: 4: 4 2 PM							
14131		R				: 4: 4 8 PM							
14132		R				: 4: 8 PM							
14133		R				: 4: 6 8 PM							
14134		R				: 4: 7 8 PM							
1413		R				: 4: 8 9 PM							
14136		R				: 4: 9 9 PM							
14137		R				: : 9 PM							
14138		R				: : 1 9 PM							
14139		R				: : 2 9 PM							
1414		R				: : 3 9 PM							
14141		R				: : 4 9 PM							
14142		R				: : 6 PM							
14143		R				: : 7 PM							
14144		R				: : 8 PM							
1414		R				: : 9 PM							
14146		R				: :1 PM							
14147		R				: :11 PM							
14148		R				: :12 PM							
14149		R				: :13 1 PM							
141		R				: :14 1 PM							
141 1		R				: :1 1 PM							
141 2		R				: :16 1 PM							
141 3		R				: :17 1 PM							
141 4		R				: :18 1 PM							
141		R				: :19 1 PM							
141 6		R				: :2 2 PM							
141 7		R				: :21 2 PM							
141 8		R				: :22 2 PM							
141 9		R				: :23 2 PM							
1416		R				: :24 2 PM							
14161		R				: :2 2 PM							
14162		R				: :26 2 PM							
14163		R				: :27 2 PM							
14164		R				: :28 3 PM							
1416		R				: :29 3 PM							
14166		R				: :3 3 PM							
14167		R				: :31 3 PM							
14168		R				: :32 3 PM							
14169		R				: :33 3 PM							
1417		R				: :34 3 PM							
14171		R				: :3 4 PM							
14172		R				: :36 4 PM							
14173		R				: :37 4 PM							
14174		R				: :38 4 PM							
1417		R				: :39 4 PM							
14176		R				: :4 4 PM							
14177		R				: :41 4 PM							
14178		R				: :42 PM							
14179		R				: :43 PM							
1418		R				: :44 PM							
14181		R				: :4 PM							
14182		R				: :46 PM							
14183		R				: :47 PM							
14184		R				: :48 PM							
1418		R				: :49 6 PM							
14186		R				: : 6 PM							
14187		R				: : 1 6 PM							
14188		R				: : 2 6 PM							
14189		R				: : 3 6 PM							
1419		R				: : 4 6 PM							
14191		R				: : 6 PM							
14192		R				: : 6 7 PM							
14193		R				: : 7 7 PM							
14194		R				: : 8 7 PM							
1419		R				: : 9 7 PM							
14196		R				: 6: 7 PM							
14197		R				: 6: 1 7 PM							

RecorV	Left LaVe	OpposV GreeV	sV e LaVe	MVddle LaVe	OutsV e LaVe	T me Stamp	ehicle Count	Gap	D screte Dec s oV	AveraVe Dec s oV	#of eh	AveraVe HeaVway	Cycle LeV th
14198		R				: 6: 2 7 PM							
14199		R				: 6: 3 8 PM							
142		R				: 6: 4 8 PM							
142 1		R				: 6: 8 PM							
142 2		R				: 6: 6 8 PM							
142 3		R	Car	Car	Car	: 6: 7 8 PM							
142 4		R	Car	Car	Car	: 6: 8 8 PM							
142		R		Car	Car	: 6: 9 2 PM							
142 6		R		Car	Car	: 6: 9 8 PM							
142 7		R	Car		Car	: 6:1 2 PM							
142 8		R	Car		Car	: 6:1 9 PM							
142 9		R			Car	: 6:11 2 PM							
1421		R			Car	: 6:11 9 PM							
14211		R		Car		: 6:12 3 PM							
14212		R		Car		: 6:12 9 PM							
14213		R	Car	Car	Car	: 6:13 9 PM							
14214		R	Car		Car	: 6:14 2 PM							
1421		R	Car		Car	: 6:14 9 PM							
14216		R				: 6:1 2 PM							
14217		R				: 6:1 3 PM							
14218		R				: 6:1 9 PM							
14219		R		Car	Car	: 6:16 9 PM							
1422		R	Car	Car	Car	: 6:17 9 PM							
14221		R	Car	Car		: 6:18 2 PM							
14222		R	Car	Car		: 6:19 PM							
14223		R	Car	Car		: 6:2 PM							
14224		R	Car	Car		: 6:21 PM							
1422		R	Car	Car	Car	: 6:22 PM							
14226		R		Car	Car	: 6:22 3 PM							
14227		R		Car	Car	: 6:23 PM							
14228		R			Car	: 6:23 2 PM							
14229		R			Car	: 6:24 PM							
1423		R	Car	Car	Car	: 6:2 PM							
14231		R	Car	Car	Car	: 6:26 1 PM							
14232		R	Car	Car	Car	: 6:27 1 PM							
14233		R	Car	Car	Car	: 6:28 1 PM							
14234		R	Car	Car	Car	: 6:29 1 PM							
1423		R	Car	Car		: 6:29 2 PM							
14236		R	Car	Car		: 6:3 1 PM							
14237		R	Car	Car		: 6:31 1 PM							
14238		R	Car	Car		: 6:32 1 PM							
14239		R	Car	Car		: 6:33 2 PM							
1424		R	Car	Car		: 6:34 2 PM							
14241		R	Car	Car		: 6:3 2 PM							
14242		R	Car	Car		: 6:36 2 PM							
14243		Gr n	Car	Car		: 6:37 2 PM	2						
14244		Gr n		Car		: 6:38 2 PM	1						
1424		Gr n		Car		: 6:38 3 PM	1						
14246		Gr n	Car	Car		: 6:39 2 PM	2						
14247		Gr n	Car	Car		: 6:4 3 PM	2						
14248		Gr n	Car	Car		: 6:41 3 PM	2						
14249		Gr n	Car	Car		: 6:42 3 PM	2						
142		Gr n	Car	Car		: 6:43 3 PM	2						
142 1		Gr n	Car	Car		: 6:44 3 PM	2						
142 2		Gr n	Car	Car		: 6:4 3 PM	2						
142 3		Gr n	Car	Car		: 6:46 3 PM	2						
142 4		Gr n	Car	Car		: 6:47 4 PM	2						
142		Gr n	Car	Car		: 6:48 4 PM	2						
142 6		Gr n	Car	Car		: 6:49 4 PM	2						
142 7		Gr n		Car	Car	: 6: 2 PM	2						
142 8		Gr n		Car	Car	: 6: 4 PM	2						
142 9		Gr n			Car	: 6: 1 2 PM	1						
1426		Gr n			Car	: 6: 1 4 PM	1						
14261		Gr n			Car	: 6: 2 4 PM	1						
14262		Gr n	Car			: 6: 3 3 PM	1						
14263		Gr n	Car			: 6: 3 4 PM	1						
14264		Gr n	Car		Car	: 6: 4 PM	2						
1426		Gr n		Car	Car	: 6: 2 PM	2						
14266		Gr n		Car	Car	: 6: PM	2						
14267		Gr n		Car	Car	: 6: 6 PM	2						
14268		Gr n	Car	Car	Car	: 6: 7 PM	3						
14269		Gr n	Car	Car		: 6: 8 2 PM	2						
1427		Gr n	Car	Car		: 6: 8 PM	2						
14271		Gr n			Car	: 6: 9 2 PM	1						
14272		Gr n			Car	: 6: 9 3 PM	1						
14273		Gr n			Car	: 6: 9 PM	1						
14274		Gr n		Car		: 7: 2 PM	1						
1427		Gr n		Car		: 7: PM	1						
14276		Gr n	Car	Car	Car	: 7: 1 6 PM	3						

RecorV	Left LaVe	OpposV GreeV	sV e LaVe	MVddle LaVe	OutsV e LaVe	T me Stamp	ehicle Count	Gap	D screte Dec s oV	AveraVe Dec s oV	#of eh	AveraVe HeaVway	Cycle LeV th
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14278		Gr n			Car	: 7: 3 2 PM	1						
14279		Gr n			Car	: 7: 3 3 PM	1						
1428		Gr n			Car	: 7: 3 6 PM	1						
14281		Gr n	Car	Car	Car	: 7: 4 6 PM	3						
14282		Gr n	Car	Car	Car	: 7: 6 PM	3						
14283		Gr n		Car	Car	: 7: 6 3 PM	2						
14284		Gr n		Car	Car	: 7: 6 6 PM	2						
1428	Car	Gr n	Car	Car	Car	: 7: 7 6 PM	3						
14286	Car	Gr n			Car	: 7: 8 2 PM	1						
14287	Car	Gr n			Car	: 7: 8 3 PM	1						
14288	Car	Gr n			Car	: 7: 8 6 PM	1						
14289	Car	Gr n	Car	Car	Car	: 7: 9 7 PM	3						
1429	Car	Gr n	Car	Car	Car	: 7:1 7 PM	3						
14291	Car	Gr n	Car	Car		: 7:11 3 PM	2						
14292	Car	Gr n	Car	Car		: 7:11 7 PM	2						
14293	Car	Gr n	Car		Car	: 7:12 2 PM	2						
14294	Car	Gr n	Car		Car	: 7:12 7 PM	2						
1429	Car	Gr n	Car	Car		: 7:13 2 PM	2						
14296	Car	Gr n	Car	Car		: 7:13 7 PM	2						
14297	Car	Gr n		Car	Car	: 7:14 2 PM	2						
14298	Car	Gr n		Car	Car	: 7:14 7 PM	2						
14299	Car	Gr n	Car			: 7:1 3 PM	1						
143	Car	Gr n	Car			: 7:1 3 PM	1						
143 1	Car	Gr n	Car			: 7:1 7 PM	1						
143 2	Car	Gr n		Car	Car	: 7:16 2 PM	2						
143 3	Car	Gr n		Car	Car	: 7:16 8 PM	2						
143 4	Car	Gr n			Car	: 7:17 2 PM	1						
143	Car	Gr n			Car	: 7:17 8 PM	1						
143 6	Car	Gr n	Car	Car	Car	: 7:18 8 PM	3						
143 7	Car	Gr n	Car	Car		: 7:19 3 PM	2						
143 8	Car	Gr n	Car	Car		: 7:19 8 PM	2						
143 9	Car	Gr n	Car		Car	: 7:2 3 PM	2						
1431	Car	Gr n	Car		Car	: 7:2 8 PM	2						
14311	Car	Gr n	Car	Car		: 7:21 2 PM	2						
14312	Car	Gr n	Car	Car		: 7:21 8 PM	2						
14313	Car	Gr n		Car	Car	: 7:22 2 PM	2						
14314	Car	Gr n		Car	Car	: 7:22 8 PM	2						
1431	Car	Gr n	Car	Car	Car	: 7:23 9 PM	3						
14316	Car	Gr n				: 7:24 3 PM							
14317	Car	Gr n				: 7:24 3 PM							
14318	Car	Gr n				: 7:24 4 PM							
14319	Car	Gr n				: 7:24 9 PM							
1432	Car	Gr n			Car	: 7:2 9 PM	1	: 1 6					
14321	Car	Gr n	Car		Car	: 7:26 9 PM	2						
14322	Car	Gr n	Car		Car	: 7:27 9 PM	2						
14323	Car	Gr n	Car	Car	Car	: 7:28 9 PM	3						
14324	Car	Gr n		Car	Car	: 7:29 3 PM	2						
1432	Car	Gr n		Car	Car	: 7:29 9 PM	2						
14326	Car	Gr n	Car			: 7:3 2 PM	1						
14327	Car	Gr n	Car			: 7:3 3 PM	1						
14328	Car	Gr n	Car			: 7:31 PM	1						
14329	Car	Gr n	Car	Car	Car	: 7:32 PM	3						
1433	Car	Gr n	Car		Car	: 7:32 2 PM	2						
14331	Car	Gr n	Car		Car	: 7:33 PM	2						
14332	Car	Gr n				: 7:33 3 PM							
14333	Car	Gr n				: 7:33 3 PM							
14334	Car	Gr n				: 7:34 PM							
1433	Car	Gr n	Car		Car	: 7:3 PM	2	: 1 7					
14336	Car	Gr n	Car			: 7:3 2 PM	1						
14337	Car	Gr n	Car			: 7:36 PM	1						
14338	Car	Gr n		Car		: 7:36 2 PM	1						
14339	Car	Gr n		Car		: 7:37 PM	1						
1434	Car	Gr n	Car			: 7:37 3 PM	1						
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14343	Car	Gr n	Car	Car		: 7:39 2 PM	2						
14344	Car	Gr n	Car	Car		: 7:4 1 PM	2						
1434	Car	Gr n	Car		Car	: 7:4 2 PM	2						
14346	Car	Gr n	Car		Car	: 7:41 1 PM	2						
14347	Car	Gr n		Car		: 7:41 2 PM	1						
14348	Car	Gr n		Car		: 7:41 3 PM	1						
14349	Car	Gr n		Car		: 7:42 1 PM	1						
143	Car	Gr n	Car	Car		: 7:43 1 PM	2						
143 1	Car	Gr n	Car	Car		: 7:44 1 PM	2						
143 2	Car	Gr n	Car	Car		: 7:4 2 PM	2						
143 3	Car	Gr n	Car			: 7:4 2 PM	1						
143 4	Car	Gr n	Car			: 7:46 2 PM	1						
143	Car	Gr n				: 7:46 3 PM							

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143 6	Car	Gr n				: 7:47 2 PM							
143 7	Car	Gr n	Car	Car		: 7:48 2 PM	2	: 1 9					
143 8	Car	Gr n	Car	Car		: 7:49 2 PM	2						
143 9	Car	Gr n	Car	Car		: 7:49 3 PM	2						
1436	Car	Gr n			Car	: 7: 2 PM	1						
14361	Car	Gr n			Car	: 7: 3 PM	1						
14362	Car	Gr n			Car	: 7: 3 PM	1						
14363	Car	Gr n	Car	Car		: 7: 1 2 PM	2						
14364	Car	Gr n	Car	Car		: 7: 1 3 PM	2						
1436	Car	Gr n		Car	Car	: 7: 2 2 PM	2						
14366	Car	Gr n		Car	Car	: 7: 2 3 PM	2						
14367	Car	Gr n	Car	Car		: 7: 3 2 PM	2						
14368	Car	Gr n	Car	Car		: 7: 3 3 PM	2						
14369	Car	Gr n		Car		: 7: 4 2 PM	1						
1437	Car	Gr n		Car		: 7: 4 3 PM	1						
14371	Car	Gr n	Car		Car	: 7: 2 PM	2						
14372	Car	Gr n	Car		Car	: 7: 3 PM	2						
14373	Car	Gr n	Car	Car	Car	: 7: 6 3 PM	3						
14374	Car	Gr n				: 7: 7 2 PM							
1437	Car	Gr n				: 7: 7 3 PM							
14376	Car	Gr n				: 7: 7 3 PM							
14377	Car	Gr n				: 7: 7 4 PM							
14378	Car	Gr n	Car		Car	: 7: 8 3 PM	2	: 1 1					
14379	Car	Gr n		Car		: 7: 9 2 PM	1						
1438	Car	Gr n		Car		: 7: 9 3 PM	1						
14381	Car	Gr n		Car		: 7: 9 4 PM	1						
14382	Car	Gr n		Car	Car	: 8: 4 PM	2						
14383	Car	Gr n	Car			: 8: 1 2 PM	1						
14384	Car	Gr n	Car			: 8: 1 3 PM	1						
1438	Car	Gr n	Car			: 8: 1 4 PM	1						
14386	Car	Gr n				: 8: 2 2 PM							
14387	Car	Gr n				: 8: 2 4 PM							
14388	Car	Gr n	Car		Car	: 8: 3 4 PM	2	: 1 2					
14389	Car	Gr n			Car	: 8: 4 2 PM	1						
1439	Car	Gr n			Car	: 8: 4 4 PM	1						
14391	Car	Gr n		Car	Car	: 8: 4 PM	2						
14392	Car	Gr n	Car	Car	Car	: 8: 6 4 PM	3						
14393	Car	Gr n			Car	: 8: 7 2 PM	1						
14394	Car	Gr n			Car	: 8: 7 3 PM	1						
1439	Car	Gr n			Car	: 8: 7 PM	1						
14396	Car	Gr n		Car		: 8: 8 2 PM	1						
14397	Car	Gr n		Car		: 8: 8 PM	1						
14398	Car	Gr n		Car	Car	: 8: 9 PM	2						
14399	Car	Gr n		Car	Car	: 8:1 PM	2						
144	Car	Gr n		Car		: 8:11 2 PM	1						
144 1	Car	Gr n		Car		: 8:11 PM	1						
144 2	Car	Gr n	Car		Car	: 8:12 2 PM	2						
144 3	Car	Gr n	Car		Car	: 8:12 PM	2						
144 4	Car	Gr n	Car	Car		: 8:13 2 PM	2						
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144 7	Car	Gr n	Car		Car	: 8:14 6 PM	2						
144 8	Car	Gr n	Car	Car	Car	: 8:1 6 PM	3						
144 9	Car	Gr n		Car	Car	: 8:16 2 PM	2						
1441	Car	Gr n		Car	Car	: 8:16 6 PM	2						
14411	Car	Gr n	Car			: 8:17 2 PM	1						
14412	Car	Gr n	Car			: 8:17 3 PM	1						
14413	Car	Gr n	Car			: 8:17 6 PM	1						
14414	Car	Gr n	Car	Car		: 8:18 6 PM	2						
1441	Car	Gr n	Car	Car		: 8:19 6 PM	2						
14416	Car	Gr n	Car	Car	Car	: 8:2 6 PM	3						
14417	Car	Gr n	Car		Car	: 8:21 2 PM	2						
14418	Car	Gr n	Car		Car	: 8:21 7 PM	2						
14419	Car	Gr n	Car		Car	: 8:22 7 PM	2						
1442	Car	Gr n		Car	Car	: 8:23 2 PM	2						
14421	Car	Gr n		Car	Car	: 8:23 7 PM	2						
14422	Car	Gr n	Car	Car	Car	: 8:24 7 PM	3						
14423	Car	Gr n	Car	Car	Car	: 8:2 7 PM	3						
14424	Car	Gr n				: 8:26 2 PM							
1442	Car	Gr n				: 8:26 3 PM							

RecorV	Left LaVe	OpposV GreeV	sV e LaVe	MVddle LaVe	OutsV e LaVe	T me Stamp	ehicle Count	Gap	D screte Dec s oV	AveraVe Dec s oV	#of eh	AveraVe HeaVway	Cycle LeV th
14426	Car	Gr n				: 8:26 4 PM							
14427	Car	Gr n				: 8:26 7 PM							
14428	Car	Gr n	Car	Car	Car	: 8:27 7 PM	3	: 1					
14429	Car	Gr n			Car	: 8:28 2 PM	1						
1443	Car	Gr n			Car	: 8:28 3 PM	1						
14431	Car	Gr n			Car	: 8:28 8 PM	1						
14432	Car	Gr n	Car	Car	Car	: 8:29 8 PM	3						
14433	Car	Gr n	Car	Car	Car	: 8:3 8 PM	3						
14434	Car	Gr n		Car	Car	: 8:31 2 PM	2						
1443	Car	Gr n		Car	Car	: 8:31 8 PM	2						
14436	Car	Gr n	Car	Car		: 8:32 2 PM	2						
14437	Car	Gr n	Car	Car		: 8:32 8 PM	2						
14438	Car	Gr n	Car	Car		: 8:33 8 PM	2						
14439	Car	Gr n		Car		: 8:34 2 PM	1						
1444	Car	Gr n		Car		: 8:34 8 PM	1						
14441	Car	Gr n	Car	Car		: 8:3 9 PM	2						
14442	Car	Gr n	Car			: 8:36 3 PM	1						
14443	Car	Gr n	Car			: 8:36 9 PM	1						
14444	Car	Gr n				: 8:37 2 PM							
1444	Car	Gr n				: 8:37 9 PM							
14446	Car	Gr n	Car	Car		: 8:38 9 PM	2	: 1 7					
14447	Car	Gr n			Car	: 8:39 2 PM	1						
14448	Car	Gr n			Car	: 8:39 3 PM	1						
14449	Car	Gr n			Car	: 8:39 9 PM	1						
144	Car	Gr n	Car		Car	: 8:4 9 PM	2						
144 1	Car	Gr n		Car	Car	: 8:41 2 PM	2						
144 2	Car	Gr n		Car	Car	: 8:41 9 PM	2						
144 3	Car	Gr n		Car		: 8:42 2 PM	1						
144 4	Car	Gr n		Car		: 8:43 PM	1						
144	Car	Gr n			Car	: 8:43 2 PM	1						
144 6	Car	Gr n			Car	: 8:44 PM	1						
144 7	Car	Gr n	Car			: 8:44 2 PM	1						
144 8	Car	Gr n	Car			: 8:4 PM	1						
144 9	Car	Gr n	Car	Car	Car	: 8:46 PM	3						
1446	Car	Gr n	Car	Car		: 8:46 2 PM	2						
14461	Car	Gr n	Car	Car		: 8:47 PM	2						
14462	Car	Gr n	Car	Car	Car	: 8:48 PM	3						
14463	Car	Gr n	Car	Car		: 8:48 2 PM	2						
14464	Car	Gr n	Car	Car		: 8:49 PM	2						
1446	Car	Gr n	Car	Car		: 8: 1 PM	2						
14466	Car	Gr n		Car		: 8: 2 PM	1						
14467	Car	Gr n		Car		: 8: 1 1 PM	1						
14468	Car	Gr n	Car		Car	: 8: 1 2 PM	2						
14469	Car	Gr n	Car		Car	: 8: 2 1 PM	2						
1447	Car	Gr n	Car		Car	: 8: 3 1 PM	2						
14471	Car	Gr n				: 8: 3 2 PM							
14472	Car	Gr n				: 8: 3 3 PM							
14473	Car	Gr n				: 8: 4 1 PM							
14474	Car	Gr n	Car			: 8: 1 PM	1	: 1 9					
1447	Car	Gr n	Car			: 8: 6 1 PM	1						
14476	Car	Gr n	Car	Car		: 8: 7 1 PM	2						
14477	Car	Gr n	Car	Car		: 8: 8 2 PM	2						
14478	Car	Gr n				: 8: 8 2 PM							
14479	Car	Gr n				: 8: 8 3 PM							
1448	Car	Gr n				: 8: 9 2 PM							
14481	Car	Gr n		Car		: 9: 2 PM	1	: 2					
14482	Car	Gr n				: 9: 1 2 PM							
14483	Car	Gr n				: 9: 1 3 PM							
14484	Car	Gr n				: 9: 2 2 PM							
1448	Car	Gr n				: 9: 3 2 PM							
14486	Car	Gr n				: 9: 4 2 PM							
14487	Car	Gr n				: 9: 3 PM							
14488	Car	Gr n				: 9: 6 3 PM							
14489	Car	Gr n		Car		: 9: 7 3 PM	1	: 6 1					
1449	Car	Gr n				: 9: 8 2 PM							
14491	Car	Gr n				: 9: 8 3 PM							
14492	Car	Gr n				: 9: 9 3 PM							
14493	Car	Gr n	Car	Car		: 9:1 3 PM	2	: 2 1					
14494	Car	Gr n	Car	Car	Car	: 9:11 3 PM	3						
1449	Car	Gr n				: 9:12 2 PM							
14496	Car	Gr n				: 9:12 3 PM							
14497	Car	Gr n				: 9:12 3 PM							
14498	Car	Gr n				: 9:12 4 PM							
14499	Car	Gr n				: 9:13 4 PM							
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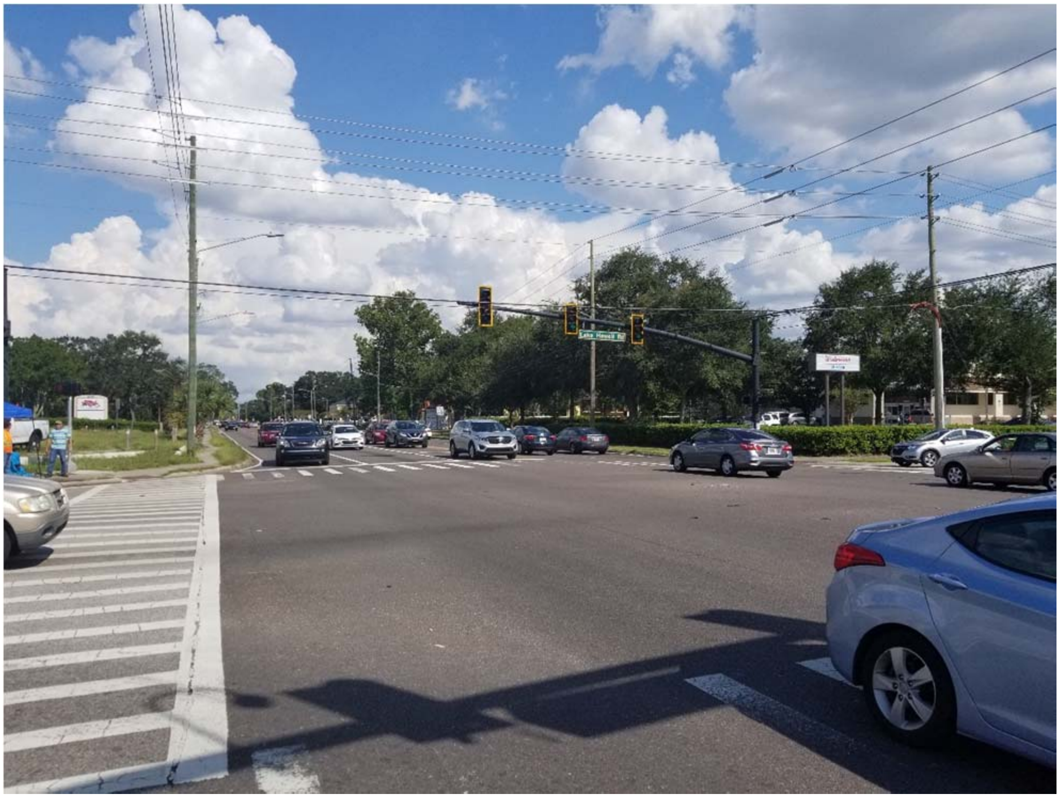
14 1	Car	R				: 9:1 2 PM		: 3	Y llow Arrow	R Arrow	1,	2 3	3 2
14 2	Car	R				: 9:1 4 PM							

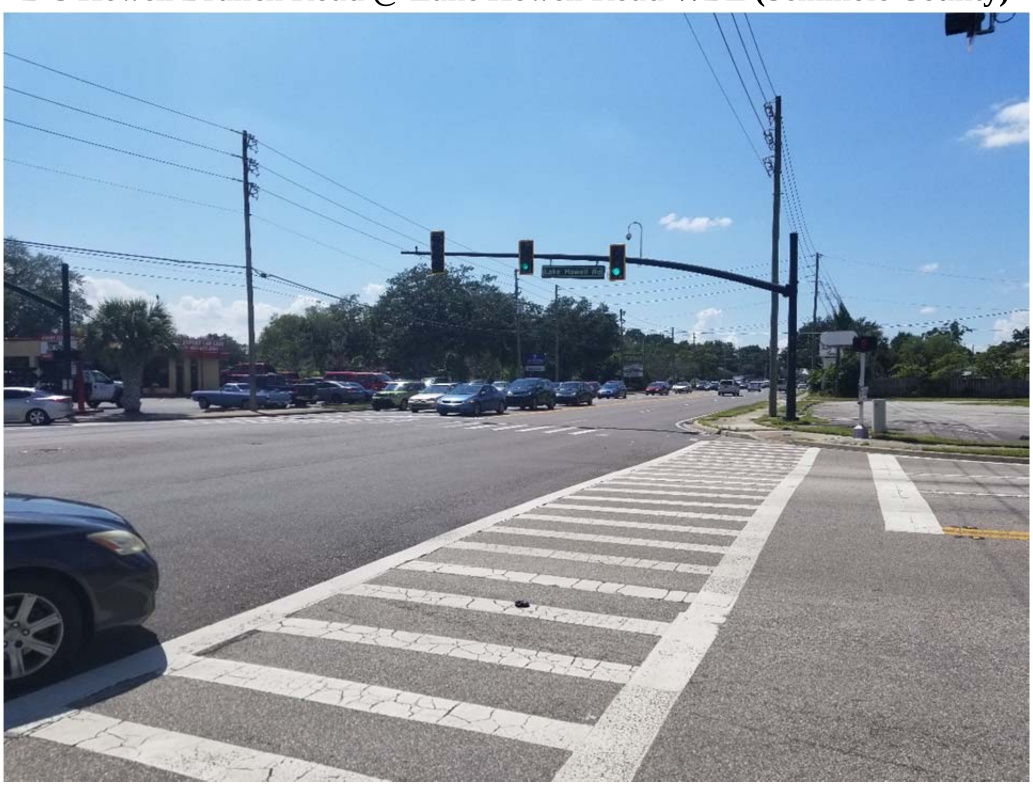
APPENDIX B - INTERSECTION PHOTOS

B-1 CR 427 @ Longwood Hills Road NBL (Seminole County)

B-2 CR 427 @ Longwood Hills Road SBT (Seminole County)



B-3 Howell Branch Road @ Lake Howell Road WBL (Seminole County)



B-4 Howell Branch Road @ Lake Howell Road EBT (Seminole County)

B-5 Saxon Blvd @ Threadgill Place EBL (Volusia County)

B-6 Saxon Blvd @ Threadgill Place WBT (Volusia County)

B-7 Saxon Blvd @ Park & Ride WBL (Volusia County)

B-8 Saxon Blvd @ Park & Ride EBT (Volusia County)

B-9 JYP @ SR 408 EB Ramps SBL (Orange County)

B-10 JYP @ SR 408 EB Ramps NBT (Orange County)

B-11 Orange Ave @ Office Court NBL (Orange County)

B-12 Orange Ave @ Office Court SBT (Orange County)

APPENDIX C - Team Photos

C-1 @ JYP & SR 408 EB Ramps Intersection - Left to right:

Roger Smith (Orange County)
Jim Stroz (FDOT)
Hatem Abou-Senna (UCF)
Chad Dickson (Seminole County)
Jared Zabele (Seminole County)

C-2 @ Orange Avenue and Office Court Intersection – Left to right

Michael Colon Rodriguez (Orange County)
Jared Zabele (Seminole County)
Chad Dickson (Seminole County)
Hesham Eldeeb (UCF)

C-3 @ Orange Avenue and Office Court Intersection – Left to right

Michael Colon Rodriguez (Orange County)
Jared Zabele (Seminole County)
Chad Dickson (Seminole County)
Hatem Abou-Senna (UCF)

C-4 @ Saxon Blvd & Park and Ride Intersection – Left to right

Bobby Maddox (Volusia County)
Chad Dickson (Seminole County)
Ray Marlin (FDOT)
Jared Zabele (Seminole County)
Hesham Eldeeb (UCF)

C-5 @ Saxon Blvd & Threadgill Place Intersection – Left to right

Bobby Maddox (Volusia County)
Chad Dickson (Seminole County)
Hatem Abou-Senna (UCF)
Ray Marlin (FDOT)
Jared Zabele (Seminole County)

APPENDIX D - Log File Excerpts for JYP Intersection (Online Testing)

ThroughLanes: 4
LanesToCross: 4
MinimumHeadway: 4.5
Threshold: 27

Record	Left Lane	Opp Green	In Lane	Mid Lane	Out Lane	4th Lane	Time Stamp	Discrete Decision	Average Decision	#of VPH	Average Headway	Cycle Length
1	Car	Red	Car	.	Car	.	03:13:43.95 PM					
2	.	Red	Car	.	Car	.	03:13:44.99 PM					
3	.	Red	Car	.	Car	.	03:13:45.01 PM					
4	.	Red	Car	.	Car	.	03:13:45.99 PM					
5	.	Red	Car	.	Car	.	03:13:47.01 PM					
6	.	Red	Car	.	Car	.	03:13:47.73 PM					
7	.	Red	Car	.	Car	.	03:13:48.02 PM					
8	.	Red	Car	.	Car	.	03:13:49.04 PM					
9	.	Red	Car	.	Car	.	03:13:50.05 PM					
10	.	Red	Car	.	Car	.	03:13:51.07 PM					
11	.	Red	Car	.	Car	.	03:13:52.08 PM					
12	.	Red	Car	.	Car	.	03:13:53.10 PM					
13	.	Red	Car	.	Car	.	03:13:54.11 PM					
14	.	Red	Car	.	Car	.	03:13:55.13 PM					
15	.	Red	Car	.	Car	.	03:13:56.14 PM					
16	.	Red	Car	.	Car	.	03:13:57.16 PM					
17	.	Red	Car	.	Car	.	03:13:58.17 PM					
18	.	Green	Car	.	Car	.	03:13:59.18 PM					
19	.	Green	Car	.	Car	.	03:14:00.19 PM					
20	.	Green	Car	.	Car	.	03:14:01.21 PM					
21	.	Green	Car	.	Car	.	03:14:02.22 PM					
22	.	Green	Car	.	Car	.	03:14:03.24 PM					
23	Car	Green	Car	.	Car	.	03:14:04.25 PM					
24	.	Green	Car	.	Car	.	03:14:04.38 PM					
25	Car	Green	Car	.	.	.	03:14:04.88 PM					
26	Car	Green	Car	.	.	.	03:14:05.27 PM					
27	Car	Green	Car	.	Car	.	03:14:06.28 PM					
28	Car	Green	Car	.	Car	.	03:14:07.30 PM					
29	Car	Green	Car	.	Car	.	03:14:08.31 PM					
30	Car	Green	Car	.	.	.	03:14:08.62 PM					
31	Car	Green	Car	.	.	.	03:14:09.32 PM					
32	Car	Green	Car	.	Car	.	03:14:10.33 PM					
33	Car	Green	Car	.	.	.	03:14:10.84 PM					
34	Car	Green	Car	.	.	.	03:14:11.35 PM					
35	Car	Green	Car	Car	.	.	03:14:12.36 PM					
36	Car	Green	.	.	Car	.	03:14:12.97 PM					
37	Car	Green	.	.	Car	.	03:14:12.99 PM					
38	Car	Green	.	.	Car	.	03:14:13.38 PM					
39	Car	Green	.	.	.	.	03:14:13.62 PM					
40	Car	Green	Car	.	.	.	03:14:14.39 PM					
41	Car	Green	.	.	Car	.	03:14:15.04 PM					
42	Car	Green	.	Car	Car	.	03:14:15.41 PM					
43	Car	Green	.	Car	.	.	03:14:15.65 PM					
44	Car	Green	Car	Car	.	.	03:14:16.42 PM					
45	Car	Green	Car	.	.	.	03:14:16.56 PM					
46	Car	Green	.	.	.	.	03:14:17.37 PM					
47	Car	Green	.	.	.	.	03:14:17.43 PM					
48	Car	Green	Car	Car	.	.	03:14:18.45 PM					
49	Car	Green	Car	Car	.	.	03:14:18.52 PM					
50	Car	Green	Car	.	.	.	03:14:18.68 PM					
51	Car	Green	.	.	.	.	03:14:18.99 PM					
52	Car	Green	.	.	.	.	03:14:19.46 PM					
53	Car	Green	Car	Car	Car	.	03:14:20.47 PM					
54	Car	Green	.	Car	Car	.	03:14:20.60 PM					
55	Car	Green	.	Car	.	.	03:14:20.67 PM					
56	Car	Green	.	.	.	.	03:14:21.11 PM					

57	Car	Green	.	.	.	.	03:14:21.49 PM
58	Car	Green	Car	.	Car	.	03:14:22.50 PM
59	Car	Green	.	.	Car	.	03:14:22.62 PM
60	Car	Green	.	.	.	.	03:14:22.69 PM
61	Car	Green	Car	.	Car	.	03:14:23.51 PM
62	Car	Green	Car	.	.	.	03:14:23.63 PM
63	Car	Green	.	Car	.	.	03:14:24.24 PM
64	Car	Green	.	Car	.	.	03:14:24.53 PM
65	Car	Green	Car	Car	.	.	03:14:25.40 PM
66	Car	Green	Car	Car	.	.	03:14:25.54 PM
67	Car	Green	Car	.	.	.	03:14:25.81 PM
68	Car	Green	.	.	.	.	03:14:25.87 PM
69	Car	Green	.	.	.	.	03:14:26.56 PM
70	Car	Green	.	.	Car	.	03:14:27.57 PM
71	Car	Green	.	.	.	.	03:14:27.83 PM
72	Car	Green	Car	.	.	.	03:14:28.58 PM
73	Car	Green	.	.	.	.	03:14:29.04 PM
74	Car	Green	.	.	.	.	03:14:29.60 PM
75	Car	Green	Car	.	.	.	03:14:30.62 PM
76	Car	Green	.	.	.	.	03:14:30.77 PM
77	Car	Green	Car	.	Car	.	03:14:31.63 PM
78	Car	Green	.	.	.	.	03:14:32.38 PM
79	Car	Green	.	.	.	.	03:14:32.40 PM
80	Car	Green	.	.	.	.	03:14:32.64 PM
81	Car	Green	.	.	Car	.	03:14:33.60 PM
82	Car	Green	.	.	Car	.	03:14:33.66 PM
83	Car	Green	.	Car	.	.	03:14:34.25 PM
84	Car	Green	.	Car	.	.	03:14:34.67 PM
85	Car	Green	.	Car	.	.	03:14:35.68 PM
86	Car	Green	.	.	.	.	03:14:36.17 PM
87	Car	Green	.	.	.	.	03:14:36.70 PM
88	Car	Green	Car	Car	.	.	03:14:37.69 PM
89	Car	Green	Car	Car	.	.	03:14:37.76 PM
90	Car	Green	Car	.	Car	.	03:14:38.40 PM
91	Car	Green	.	.	Car	.	03:14:38.50 PM
92	Car	Green	.	.	Car	.	03:14:38.72 PM
93	Car	Green	.	.	.	.	03:14:38.80 PM
94	Car	Green	Car	.	.	.	03:14:39.74 PM
95	Car	Green	.	.	Car	.	03:14:40.27 PM
96	Car	Green	.	.	Car	.	03:14:40.76 PM
97	Car	Green	.	.	.	.	03:14:41.03 PM
98	Car	Green	.	.	.	.	03:14:41.77 PM
99	Car	Green	.	.	.	.	03:14:42.78 PM
100	Car	Green	.	.	.	.	03:14:43.80 PM
101	Car	Green	.	.	.	.	03:14:44.81 PM
102	Car	Green	.	.	.	.	03:14:45.82 PM
103	Car	Green	.	.	.	.	03:14:46.83 PM
104	Car	Green	.	.	.	.	03:14:47.85 PM
105	Car	Green	.	.	.	.	03:14:48.87 PM
106	Car	Green	.	.	.	.	03:14:49.88 PM
107	Car	Green	.	.	.	.	03:14:50.89 PM
108	Car	Green	.	.	.	.	03:14:51.91 PM
109	Car	Green	.	.	.	.	03:14:52.92 PM
110	Car	Green	.	.	.	.	03:14:53.93 PM
111	Car	Green	.	.	.	.	03:14:54.95 PM
112	Car	Green	.	.	.	.	03:14:55.97 PM
113	Car	Green	.	.	.	.	03:14:56.98 PM
114	Car	Green	.	.	.	.	03:14:58.00 PM
115	Car	Green	.	.	.	.	03:14:59.01 PM
116	Car	Green	.	.	.	.	03:15:00.02 PM
117	Car	Green	.	.	.	.	03:15:01.03 PM
118	Car	Green	.	.	.	.	03:15:02.05 PM
119	Car	Green	Car	Car	.	.	03:15:03.06 PM
120	Car	Green	.	.	.	.	03:15:03.48 PM

121	Car	Green	.	.	.	.	03:15:03.53 PM
122	Car	Green	.	.	.	.	03:15:04.07 PM
123	Car	Green	.	Car	.	.	03:15:05.09 PM
124	Car	Green	.	.	.	.	03:15:05.45 PM
125	Car	Green	Car	.	.	.	03:15:06.11 PM
126	Car	Green	.	.	.	.	03:15:06.56 PM
127	Car	Green	.	.	.	.	03:15:07.12 PM
128	Car	Green	.	.	.	.	03:15:08.14 PM
129	Car	Green	.	.	.	.	03:15:09.15 PM
130	Car	Green	Car	Car	.	.	03:15:10.16 PM
131	Car	Green	Car	.	.	.	03:15:10.30 PM
132	Car	Green	.	.	.	.	03:15:10.45 PM
133	Car	Green	.	.	.	.	03:15:11.17 PM
134	Car	Green	.	.	.	.	03:15:12.12 PM
135	Car	Green	.	.	.	.	03:15:12.20 PM
136	Car	Green	.	.	.	.	03:15:13.20 PM
137	Car	Green	.	.	.	.	03:15:14.21 PM
138	Car	Green	.	.	.	.	03:15:15.24 PM
139	Car	Green	.	.	.	.	03:15:16.25 PM
140	Car	Green	.	Car	.	.	03:15:17.26 PM
141	Car	Green	.	.	.	.	03:15:17.69 PM
142	Car	Green	.	.	.	.	03:15:18.27 PM
143	Car	Green	.	.	Car	.	03:15:19.29 PM
144	Car	Green	.	.	.	.	03:15:19.71 PM
145	Car	Green	.	Car	.	.	03:15:20.31 PM
146	Car	Green	.	.	.	.	03:15:20.92 PM
147	Car	Green	.	.	.	.	03:15:21.31 PM
148	Car	Green	Car	.	Car	.	03:15:22.33 PM
149	Car	Green	.	.	Car	.	03:15:22.69 PM
150	Car	Green	.	.	.	.	03:15:22.79 PM
151	Car	Green	.	.	.	.	03:15:23.34 PM
152	Car	Green	.	Car	.	.	03:15:24.36 PM
153	Car	Green	.	.	.	.	03:15:24.81 PM
154	Car	Green	Car	Car	.	.	03:15:25.38 PM
155	Car	Green	.	Car	.	.	03:15:25.63 PM
156	Car	Green	.	.	.	.	03:15:26.03 PM
157	Car	Green	.	.	Car	.	03:15:26.39 PM
158	Car	Green	.	Car	.	.	03:15:27.04 PM
159	Car	Green	.	.	.	.	03:15:27.14 PM
160	Car	Green	.	.	.	.	03:15:27.40 PM
161	Car	Green	Car	.	.	.	03:15:28.25 PM
162	Car	Green	.	.	.	.	03:15:28.35 PM
163	Car	Green	.	.	.	.	03:15:28.41 PM
164	Car	Green	Car	Car	.	.	03:15:29.43 PM
165	Car	Green	.	.	.	.	03:15:29.76 PM
166	Car	Green	.	.	.	.	03:15:29.79 PM
167	Car	Green	Car	.	.	.	03:15:30.44 PM
168	Car	Green	.	.	.	.	03:15:30.50 PM
169	Car	Green	.	.	.	.	03:15:31.38 PM
170	Car	Green	.	.	.	.	03:15:31.46 PM
171	Car	Green	.	.	.	.	03:15:32.29 PM
172	Car	Green	.	.	.	.	03:15:32.46 PM
173	Car	Green	.	Car	.	.	03:15:33.20 PM
174	Car	Green	.	.	.	.	03:15:33.48 PM
175	Car	Green	.	.	.	.	03:15:33.51 PM
176	Car	Green	.	.	.	.	03:15:34.21 PM
177	Car	Green	.	Car	.	.	03:15:34.49 PM
178	Car	Green	.	.	.	.	03:15:34.98 PM
179	Car	Green	Car	Car	Car	.	03:15:35.51 PM
180	Car	Green	Car	.	Car	.	03:15:35.63 PM
181	Car	Green	Car	.	.	.	03:15:35.74 PM
182	Car	Green	.	.	.	.	03:15:35.89 PM
183	Car	Green	.	.	Car	.	03:15:36.53 PM
184	Car	Green	Car	.	.	.	03:15:37.10 PM

185	Car	Green	.	.	.	.	03:15:37.35 PM					
186	Car	Green	.	.	.	.	03:15:37.54 PM					
187	Car	Green	.	Car	.	.	03:15:38.55 PM					
188	Car	Green	.	.	.	.	03:15:39.02 PM					
189	Car	Green	Car	.	.	.	03:15:39.57 PM					
190	Car	Green	.	.	.	.	03:15:39.98 PM					
191	Car	Green	.	.	.	.	03:15:40.58 PM					
192	Car	Green	Car	Car	Car	.	03:15:41.59 PM					
193	Car	Green	.	Car	Car	.	03:15:41.67 PM					
194	Car	Green	.	.	Car	.	03:15:41.95 PM					
195	Car	Green	.	.	.	.	03:15:42.01 PM					
196	Car	Green	Car	.	.	.	03:15:42.61 PM					
197	Car	Green	.	.	.	.	03:15:43.16 PM					
198	Car	Green	.	.	Car	.	03:15:43.62 PM					
199	Car	Green	Car	.	.	.	03:15:43.97 PM					
200	Car	Green	.	.	Car	.	03:15:44.48 PM					
201	Car	Green	.	.	Car	.	03:15:44.63 PM					
202	Car	Green	Car	.	.	.	03:15:44.84 PM					
203	Car	Red	Car	Car	.	.	03:15:45.34 PM	Not Compu	Not Compu		0	0	0
204	Car	Red	.	Car	.	.	03:15:45.50 PM					
205	Car	Red	.	Car	.	.	03:15:45.65 PM					
206	Car	Red	.	.	.	.	03:15:46.10 PM					
207	Car	Red	.	.	.	.	03:15:46.67 PM					
208	Car	Red	.	.	.	.	03:15:47.68 PM					
209	Car	Red	Car	.	.	.	03:15:48.70 PM					
210	Car	Red	.	.	.	.	03:15:49.04 PM					
211	Car	Red	.	.	.	.	03:15:49.71 PM					
212	Car	Red	.	.	.	.	03:15:50.72 PM					
213	Car	Red	.	Car	.	.	03:15:51.73 PM					
214	Car	Red	.	.	.	.	03:15:52.62 PM					
215	Car	Red	.	.	.	.	03:15:52.75 PM					
216	Car	Red	.	.	.	.	03:15:53.76 PM					
217	Car	Red	.	.	.	.	03:15:54.77 PM					
218	Car	Red	.	.	.	.	03:15:55.79 PM					
219	Car	Red	.	.	.	Car	03:15:56.81 PM					
220	Car	Red	.	Car	.	.	03:15:57.82 PM					
221	Car	Red	.	.	.	.	03:15:58.69 PM					
222	Car	Red	.	.	.	.	03:15:58.84 PM					
223	Car	Red	Car	.	.	.	03:15:59.85 PM					
224	Car	Red	.	.	.	.	03:16:00.41 PM					
225	Car	Red	.	.	Car	.	03:16:00.86 PM					
226	Car	Red	.	Car	.	.	03:16:01.57 PM					
227	Car	Red	.	Car	.	.	03:16:01.87 PM					
228	Car	Red	.	.	.	.	03:16:02.68 PM					
229	Car	Red	.	.	.	.	03:16:02.89 PM					
230	Car	Red	Car	.	.	.	03:16:03.90 PM					
231	Car	Red	.	Car	.	.	03:16:04.75 PM					
232	Car	Red	.	Car	.	.	03:16:04.92 PM					
233	Car	Red	.	Car	.	.	03:16:05.93 PM					
234	Car	Red	.	.	.	.	03:16:06.12 PM					
235	Car	Red	.	.	.	.	03:16:06.95 PM					
236	Car	Red	.	Car	.	.	03:16:07.96 PM					
237	Car	Red	.	Car	Car	.	03:16:08.98 PM					
238	Car	Red	.	.	Car	.	03:16:09.46 PM					
239	Car	Red	.	.	.	.	03:16:09.76 PM					
240	Car	Red	.	.	.	.	03:16:09.98 PM					
241	Car	Red	.	Car	Car	.	03:16:11.00 PM					
242	Car	Red	.	Car	Car	.	03:16:12.01 PM					
243	Car	Red	.	Car	.	.	03:16:12.04 PM					
244	Car	Red	.	.	.	.	03:16:12.74 PM					
245	Car	Red	.	.	.	.	03:16:13.03 PM					
246	Car	Red	.	.	.	.	03:16:14.04 PM					
247	Car	Red	.	Car	.	Car	03:16:15.05 PM					
248	Car	Red	.	Car	.	Car	03:16:16.07 PM					

249	Car	Red	.	Car	.	.	03:16:17.08 PM
250	Car	Red	.	Car	.	.	03:16:18.10 PM
251	Car	Red	.	Car	.	.	03:16:19.11 PM
252	Car	Red	.	Car	Car	.	03:16:20.13 PM
253	Car	Red	.	Car	Car	.	03:16:21.14 PM
254	.	Red	.	Car	Car	.	03:16:21.60 PM
255	.	Red	.	Car	Car	.	03:16:22.16 PM
256	.	Red	.	Car	Car	.	03:16:23.11 PM
257	.	Red	.	Car	Car	.	03:16:23.18 PM
258	Car	Red	.	Car	Car	.	03:16:24.19 PM
259	Car	Red	.	Car	Car	Car	03:16:25.19 PM
260	Car	Red	.	Car	.	Car	03:16:25.43 PM
261	Car	Red	.	Car	.	.	03:16:26.21 PM
262	Car	Red	.	Car	.	.	03:16:27.22 PM
263	Car	Red	.	Car	.	.	03:16:28.24 PM
264	Car	Red	.	Car	.	.	03:16:29.25 PM
265	Car	Red	.	Car	.	.	03:16:30.27 PM
266	Car	Red	.	Car	.	.	03:16:31.28 PM
267	Car	Red	.	Car	.	.	03:16:32.30 PM
268	.	Red	.	Car	.	.	03:16:33.31 PM
269	.	Red	.	Car	.	.	03:16:33.34 PM
270	Car	Red	.	Car	.	.	03:16:34.32 PM
271	Car	Red	.	Car	.	.	03:16:35.34 PM
272	.	Red	.	Car	.	.	03:16:35.41 PM
273	.	Red	.	Car	.	.	03:16:35.70 PM
274	Car	Red	.	Car	.	.	03:16:36.37 PM
275	Car	Red	.	Car	.	.	03:16:37.37 PM
276	Car	Red	.	Car	Car	.	03:16:38.38 PM
277	.	Red	.	Car	Car	.	03:16:39.24 PM
278	Car	Red	.	Car	Car	.	03:16:39.40 PM
279	Car	Red	.	Car	Car	.	03:16:40.40 PM
280	.	Red	.	Car	Car	.	03:16:41.10 PM
281	.	Red	.	Car	.	.	03:16:41.18 PM
282	.	Red	.	Car	.	.	03:16:41.42 PM
283	.	Red	.	Car	.	.	03:16:42.43 PM
284	.	Red	.	Car	.	.	03:16:43.45 PM
285	.	Red	.	Car	.	.	03:16:44.46 PM
286	.	Red	.	Car	.	.	03:16:45.48 PM
287	.	Red	.	Car	.	.	03:16:46.49 PM
288	.	Red	.	Car	.	.	03:16:47.51 PM
289	.	Red	.	Car	.	.	03:16:48.52 PM
290	.	Red	.	Car	.	.	03:16:49.53 PM
291	.	Red	Car	Car	.	.	03:16:50.55 PM
292	.	Red	Car	Car	.	.	03:16:51.56 PM
293	.	Red	.	Car	.	.	03:16:52.03 PM
294	.	Green	.	Car	.	.	03:16:52.58 PM
295	.	Green	.	Car	.	.	03:16:53.59 PM
296	.	Green	.	Car	.	.	03:16:54.60 PM
297	.	Green	.	Car	.	.	03:16:55.62 PM
298	.	Green	.	Car	.	.	03:16:56.64 PM
299	.	Green	.	Car	.	.	03:16:57.65 PM
300	.	Green	Car	Car	.	.	03:16:58.66 PM
301	.	Green	.	Car	.	.	03:16:59.11 PM
302	.	Green	.	Car	.	.	03:16:59.68 PM
303	.	Green	.	.	Car	.	03:17:00.27 PM
304	.	Green	.	.	Car	.	03:17:00.69 PM
305	.	Green	.	.	Car	.	03:17:01.71 PM
306	.	Green	.	.	Car	.	03:17:02.72 PM
307	.	Green	.	.	Car	.	03:17:03.73 PM
308	.	Green	.	.	.	.	03:17:04.02 PM
309	.	Green	.	.	.	.	03:17:04.75 PM
310	.	Green	.	Car	.	.	03:17:05.76 PM
311	.	Green	.	.	.	.	03:17:06.44 PM
312	.	Green	.	.	.	.	03:17:06.77 PM

313 .	Green	.	.	.	.	03:17:07.79 PM
314 .	Green	.	.	.	.	03:17:08.80 PM
315 .	Green	.	.	Car	.	03:17:09.82 PM
316 .	Green	.	.	.	.	03:17:10.39 PM
317 .	Green	.	.	.	.	03:17:10.83 PM
318 .	Green	.	.	.	.	03:17:11.85 PM
319 .	Green	.	.	.	.	03:17:12.86 PM
320 .	Green	.	.	.	.	03:17:13.87 PM
321 .	Green	.	.	.	.	03:17:14.89 PM
322 .	Green	.	.	.	.	03:17:15.90 PM
323 .	Green	.	.	.	.	03:17:16.91 PM
324 .	Green	.	.	.	.	03:17:17.93 PM
325 .	Green	.	.	.	.	03:17:18.94 PM
326 .	Green	Car	.	.	.	03:17:19.96 PM
327 .	Green	.	.	.	.	03:17:20.14 PM
328 .	Green	.	.	.	.	03:17:20.97 PM
329 .	Green	.	.	.	.	03:17:21.98 PM
330 Car	Green	.	.	.	.	03:17:23.00 PM
331 Car	Green	.	.	.	.	03:17:24.01 PM
332 Car	Green	.	.	.	.	03:17:25.02 PM
333 Car	Green	.	.	.	.	03:17:26.04 PM
334 Car	Green	.	.	.	.	03:17:27.06 PM
335 Car	Green	.	.	.	.	03:17:28.07 PM
336 Car	Green	.	.	.	.	03:17:29.08 PM
337 Car	Green	.	.	.	.	03:17:30.10 PM
338 Car	Green	.	.	.	.	03:17:31.11 PM
339 Car	Green	.	.	.	.	03:17:32.12 PM
340 Car	Green	.	.	.	.	03:17:33.13 PM
341 Car	Green	.	.	.	.	03:17:34.15 PM
342 Car	Green	.	.	.	.	03:17:35.16 PM
343 Car	Green	.	.	.	.	03:17:36.18 PM
344 Car	Green	.	.	.	.	03:17:37.19 PM
345 Car	Green	.	.	.	.	03:17:38.21 PM
346 Car	Green	.	.	.	.	03:17:39.22 PM
347 Car	Green	.	.	.	.	03:17:40.23 PM
348 Car	Green	.	.	.	.	03:17:41.25 PM
349 Car	Green	.	.	.	.	03:17:42.26 PM
350 Car	Green	.	.	.	.	03:17:43.28 PM
351 Car	Green	.	.	.	.	03:17:44.29 PM
352 Car	Green	.	.	.	.	03:17:45.30 PM
353 Car	Green	.	Car	.	Car	03:17:45.88 PM
354 Car	Green	.	Car	Car	.	03:17:46.32 PM
355 Car	Green	.	.	Car	.	03:17:46.44 PM
356 Car	Green	Car	.	.	.	03:17:46.89 PM
357 Car	Green	.	.	.	.	03:17:47.24 PM
358 Car	Green	.	.	.	.	03:17:47.34 PM
359 Car	Green	.	.	.	.	03:17:48.35 PM
360 Car	Green	.	.	.	.	03:17:49.02 PM
361 Car	Green	.	.	.	.	03:17:49.36 PM
362 Car	Green	.	Car	.	.	03:17:50.38 PM
363 Car	Green	.	.	.	.	03:17:50.73 PM
364 Car	Green	.	Car	.	Car	03:17:51.39 PM
365 Car	Green	.	.	.	.	03:17:51.94 PM
366 Car	Green	.	.	.	.	03:17:52.40 PM
367 Car	Green	.	.	.	.	03:17:53.41 PM
368 Car	Green	.	Car	.	.	03:17:54.27 PM
369 Car	Green	.	Car	.	.	03:17:54.43 PM
370 Car	Green	.	.	.	.	03:17:54.62 PM
371 Car	Green	.	.	Car	.	03:17:55.44 PM
372 Car	Green	Car	.	Car	.	03:17:56.46 PM
373 Car	Green	Car	Car	.	.	03:17:56.90 PM
374 Car	Green	.	Car	.	.	03:17:57.10 PM
375 Car	Green	.	.	.	.	03:17:57.17 PM
376 Car	Green	.	.	.	.	03:17:57.48 PM

377	Car	Green	.	.	Car	.	03:17:58.32 PM
378	Car	Green	.	Car	Car	.	03:17:58.49 PM
379	Car	Green	.	Car	.	.	03:17:58.62 PM
380	Car	Green	.	.	.	.	03:17:59.08 PM
381	Car	Green	Car	.	.	.	03:17:59.50 PM
382	Car	Green	.	.	Car	.	03:17:59.94 PM
383	Car	Green	Car	.	Car	.	03:18:00.52 PM
384	Car	Green	Car	Car	.	.	03:18:00.59 PM
385	Car	Green	.	Car	.	.	03:18:00.94 PM
386	Car	Green	.	.	.	.	03:18:01.19 PM
387	Car	Green	.	.	Car	.	03:18:01.52 PM
388	Car	Green	Car	.	.	.	03:18:02.10 PM
389	Car	Green	Car	.	.	.	03:18:02.54 PM
390	Car	Green	.	.	.	.	03:18:02.81 PM
391	Car	Green	.	.	.	.	03:18:03.55 PM
392	Car	Green	.	.	.	.	03:18:04.57 PM
393	Car	Green	.	.	.	.	03:18:05.58 PM
394	Car	Green	.	.	Car	.	03:18:06.36 PM
395	Car	Green	Car	.	.	.	03:18:06.56 PM
396	Car	Green	Car	.	.	.	03:18:06.63 PM
397	Car	Green	.	.	.	.	03:18:07.27 PM
398	Car	Green	.	.	.	.	03:18:07.62 PM
399	Car	Green	Car	.	.	.	03:18:08.38 PM
400	Car	Green	.	.	.	.	03:18:08.63 PM
401	Car	Green	.	.	.	.	03:18:08.68 PM
402	Car	Green	Car	.	.	.	03:18:09.59 PM
403	Car	Green	Car	.	.	.	03:18:09.67 PM
404	Car	Green	.	.	.	.	03:18:09.90 PM
405	Car	Green	.	.	.	.	03:18:10.66 PM
406	Car	Green	.	Car	.	.	03:18:11.56 PM
407	Car	Green	.	Car	.	.	03:18:11.67 PM
408	Car	Green	.	.	.	.	03:18:11.81 PM
409	Car	Green	.	.	.	.	03:18:12.68 PM
410	Car	Green	.	.	.	.	03:18:13.64 PM
411	Car	Green	.	.	.	.	03:18:13.71 PM
412	Car	Green	.	Car	.	.	03:18:14.71 PM
413	Car	Green	.	.	.	.	03:18:15.00 PM
414	Car	Green	.	.	.	.	03:18:15.72 PM
415	Car	Green	.	Car	.	.	03:18:16.74 PM
416	Car	Green	.	Car	.	.	03:18:16.77 PM
417	Car	Green	.	.	.	.	03:18:17.32 PM
418	Car	Green	.	.	.	.	03:18:17.75 PM
419	Car	Green	Car	.	Car	.	03:18:18.76 PM
420	Car	Green	Car	.	.	.	03:18:18.84 PM
421	Car	Green	.	.	.	.	03:18:19.04 PM
422	Car	Green	.	.	.	.	03:18:19.78 PM
423	Car	Green	.	Car	Car	.	03:18:20.79 PM
424	Car	Green	.	.	.	.	03:18:20.82 PM
425	Car	Green	.	.	.	.	03:18:20.87 PM
426	Car	Green	.	.	.	.	03:18:21.77 PM
427	Car	Green	.	.	.	.	03:18:21.86 PM
428	Car	Green	Car	Car	.	.	03:18:22.82 PM
429	Car	Green	.	Car	.	.	03:18:23.19 PM
430	Car	Green	.	.	.	.	03:18:23.29 PM
431	Car	Green	.	.	.	.	03:18:23.83 PM
432	Car	Green	.	.	Car	.	03:18:24.85 PM
433	Car	Green	.	.	.	.	03:18:25.26 PM
434	Car	Green	.	.	.	Car	03:18:25.87 PM
435	Car	Green	.	.	.	.	03:18:26.87 PM
436	Car	Green	.	.	.	.	03:18:27.73 PM
437	Car	Green	.	.	.	.	03:18:27.89 PM
438	Car	Green	.	.	.	.	03:18:28.90 PM
439	Car	Green	.	.	.	.	03:18:29.92 PM
440	Car	Green	.	.	.	Car	03:18:30.93 PM

441	Car	Green	Car	.	.	.	03:18:31.68 PM					
442	Car	Green	.	.	.	.	03:18:31.94 PM					
443	Car	Green	.	.	.	.	03:18:32.01 PM					
444	Car	Green	.	.	Car	.	03:18:32.96 PM					
445	Car	Green	.	.	.	.	03:18:33.15 PM					
446	Car	Green	Car	.	.	.	03:18:33.98 PM					
447	Car	Green	Car	.	.	.	03:18:34.99 PM					
448	Car	Green	.	.	.	.	03:18:35.58 PM					
449	Car	Green	.	Car	.	.	03:18:36.01 PM					
450	Car	Green	.	.	.	.	03:18:36.69 PM					
451	Car	Green	.	.	.	.	03:18:37.02 PM					
452	Car	Green	.	Car	Car	.	03:18:37.96 PM					
453	Car	Green	.	Car	Car	.	03:18:38.04 PM					
454	Car	Green	.	Car	.	.	03:18:38.36 PM					
455	Car	Green	Car	.	.	.	03:18:38.77 PM					
456	Car	Green	Car	.	.	.	03:18:39.05 PM					
457	Car	Green	.	.	.	.	03:18:39.22 PM					
458	Car	Green	Car	.	.	.	03:18:40.06 PM					
459	Car	Green	.	.	.	.	03:18:40.28 PM					
460	Car	Green	Car	.	.	.	03:18:41.07 PM					
461	Car	Green	.	.	.	.	03:18:41.54 PM					
462	Car	Green	.	Car	.	.	03:18:42.09 PM					
463	Car	Green	.	.	.	.	03:18:42.60 PM					
464	Car	Green	.	.	.	.	03:18:43.10 PM					
465	Car	Green	.	Car	.	.	03:18:44.11 PM					
466	Car	Green	Car	.	Car	.	03:18:44.68 PM					
467	Car	Green	.	.	Car	.	03:18:44.93 PM					
468	Car	Green	.	.	Car	.	03:18:45.13 PM					
469	Car	Red	.	.	Car	.	03:18:45.33 PM	Not Compu	Red Arrow	720	5	180
470	Car	Red	.	.	.	.	03:18:45.43 PM					
471	Car	Red	Car	Car	.	.	03:18:46.15 PM					
472	Car	Red	Car	.	.	.	03:18:46.30 PM					
473	Car	Red	.	.	.	.	03:18:46.40 PM					
474	Car	Red	.	.	.	.	03:18:47.16 PM					
475	Car	Red	Car	.	.	.	03:18:48.17 PM					
476	Car	Red	.	.	Car	.	03:18:49.13 PM					
477	Car	Red	.	.	Car	.	03:18:49.20 PM					
478	Car	Red	.	.	.	.	03:18:49.43 PM					
479	Car	Red	Car	Car	.	.	03:18:50.20 PM					
480	Car	Red	.	Car	.	.	03:18:51.09 PM					
481	Car	Red	.	Car	.	.	03:18:51.21 PM					
482	Car	Red	.	Car	.	.	03:18:52.22 PM					
483	Car	Red	Car	.	Car	.	03:18:52.76 PM					
484	Car	Red	Car	.	Car	.	03:18:53.24 PM					
485	Car	Red	Car	.	.	.	03:18:53.62 PM					
486	Car	Red	.	.	.	.	03:18:53.93 PM					
487	Car	Red	.	.	.	.	03:18:54.25 PM					
488	Car	Red	Car	.	.	.	03:18:55.27 PM					
489	Car	Red	Car	Car	.	.	03:18:56.28 PM					
490	Car	Red	.	Car	.	.	03:18:56.71 PM					
491	Car	Red	.	Car	.	.	03:18:57.30 PM					
492	Car	Red	.	.	.	.	03:18:58.18 PM					
493	Car	Red	Car	.	.	.	03:18:58.31 PM					
494	Car	Red	Car	Car	.	.	03:18:59.33 PM					
495	Car	Red	Car	Car	Car	.	03:19:00.34 PM					
496	Car	Red	Car	Car	.	.	03:19:01.11 PM					
497	Car	Red	Car	Car	Car	.	03:19:01.36 PM					
498	Car	Red	Car	Car	Car	.	03:19:02.37 PM					
499	Car	Red	Car	.	Car	.	03:19:02.78 PM					
500	Car	Red	Car	.	Car	.	03:19:03.38 PM					
501	Car	Red	Car	.	Car	.	03:19:04.39 PM					
502	Car	Red	Car	.	Car	.	03:19:05.41 PM					
503	Car	Red	Car	.	Car	.	03:19:06.43 PM					
504	Car	Red	.	.	Car	.	03:19:07.44 PM					

505	Car	Red	.	.	Car	.	03:19:07.50 PM
506	Car	Red	.	.	Car	.	03:19:08.45 PM
507	Car	Red	.	.	Car	.	03:19:09.47 PM
508	Car	Red	.	.	.	.	03:19:09.76 PM
509	Car	Red	.	.	.	.	03:19:10.48 PM
510	Car	Red	.	.	.	.	03:19:11.49 PM
511	Car	Red	.	.	.	.	03:19:12.51 PM
512	Car	Red	.	.	.	.	03:19:13.52 PM
513	Car	Red	.	.	Car	.	03:19:14.53 PM
514	Car	Red	.	.	Car	.	03:19:15.55 PM
515	Car	Red	.	.	Car	.	03:19:16.57 PM
516	Car	Red	.	.	Car	.	03:19:17.58 PM
517	Car	Red	.	.	Car	.	03:19:18.59 PM
518	Car	Red	.	.	Car	.	03:19:19.61 PM
519	Car	Red	.	.	Car	.	03:19:20.62 PM
520	Car	Red	.	.	Car	.	03:19:21.63 PM
521	Car	Red	.	.	Car	.	03:19:22.65 PM
522	Car	Red	.	.	Car	.	03:19:23.66 PM
523	Car	Red	.	.	Car	.	03:19:24.68 PM
524	Car	Red	.	.	Car	.	03:19:25.69 PM
525	Car	Red	.	.	Car	.	03:19:26.71 PM
526	Car	Red	.	.	Car	.	03:19:27.72 PM
527	Car	Red	.	.	Car	.	03:19:28.74 PM
528	Car	Red	.	.	Car	.	03:19:29.75 PM
529	.	Red	.	.	Car	.	03:19:30.76 PM
530	.	Red	.	.	Car	.	03:19:30.79 PM
531	Car	Red	.	.	Car	.	03:19:31.77 PM
532	Car	Red	.	.	Car	.	03:19:32.78 PM
533	Car	Red	.	.	Car	.	03:19:33.80 PM
534	.	Red	.	.	Car	.	03:19:34.63 PM
535	.	Red	.	.	Car	.	03:19:34.81 PM
536	Car	Red	.	.	Car	.	03:19:35.83 PM
537	Car	Red	.	.	Car	.	03:19:36.84 PM
538	Car	Red	.	.	Car	.	03:19:37.85 PM
539	Car	Red	.	.	Car	.	03:19:38.88 PM
540	Car	Red	.	.	Car	.	03:19:39.89 PM
541	Car	Red	.	.	Car	.	03:19:40.90 PM
542	Car	Red	.	.	Car	.	03:19:41.92 PM
543	Car	Red	.	.	Car	.	03:19:42.93 PM
544	.	Red	.	.	Car	.	03:19:43.63 PM
545	.	Red	.	.	Car	.	03:19:43.95 PM
546	.	Red	.	.	Car	.	03:19:44.96 PM
547	.	Red	.	.	Car	.	03:19:45.97 PM
548	.	Red	.	.	Car	.	03:19:46.98 PM
549	.	Red	.	.	Car	.	03:19:48.00 PM
550	.	Red	.	.	Car	.	03:19:49.01 PM
551	.	Red	.	.	Car	.	03:19:50.02 PM
552	.	Red	.	.	Car	.	03:19:51.04 PM
553	.	Red	.	.	Car	.	03:19:52.06 PM
554	.	Red	.	.	Car	.	03:19:53.07 PM
555	.	Red	.	.	Car	.	03:19:54.08 PM
556	.	Green	.	.	Car	.	03:19:55.10 PM
557	.	Green	.	.	Car	.	03:19:56.11 PM
558	.	Green	.	.	Car	.	03:19:57.13 PM
559	.	Green	.	.	Car	.	03:19:58.14 PM
560	.	Green	.	.	Car	.	03:19:59.16 PM
561	.	Green	.	.	Car	.	03:20:00.17 PM
562	.	Green	.	.	Car	.	03:20:01.19 PM
563	.	Green	.	Car	Car	.	03:20:02.19 PM
564	Car	Green	Car	Car	Car	.	03:20:03.21 PM
565	Car	Green	Car	.	Car	.	03:20:04.05 PM
566	Car	Green	Car	.	Car	.	03:20:04.22 PM
567	Car	Green	.	.	.	.	03:20:05.17 PM
568	Car	Green	.	.	.	.	03:20:05.20 PM

569	Car	Green	.	.	.	.	03:20:05.27 PM
570	Car	Green	Car	.	Car	.	03:20:06.25 PM
571	Car	Green	.	Car	Car	.	03:20:07.09 PM
572	Car	Green	.	Car	Car	.	03:20:07.27 PM
573	Car	Green	.	Car	.	.	03:20:07.70 PM
574	Car	Green	Car	.	.	.	03:20:08.21 PM
575	Car	Green	Car	.	.	.	03:20:08.28 PM
576	Car	Green	.	Car	.	.	03:20:09.30 PM
577	Car	Green	.	Car	.	.	03:20:09.34 PM
578	Car	Green	Car	.	.	.	03:20:10.23 PM
579	Car	Green	Car	.	.	.	03:20:10.31 PM
580	Car	Green	.	.	.	.	03:20:11.24 PM
581	Car	Green	.	.	.	.	03:20:11.32 PM
582	Car	Green	.	Car	.	.	03:20:12.33 PM
583	Car	Green	Car	.	.	.	03:20:13.01 PM
584	Car	Green	Car	.	.	.	03:20:13.35 PM
585	Car	Green	.	.	.	.	03:20:13.66 PM
586	Car	Green	.	.	.	.	03:20:14.37 PM
587	Car	Green	Car	.	.	.	03:20:15.39 PM
588	Car	Green	Car	.	.	.	03:20:15.42 PM
589	Car	Green	.	.	.	.	03:20:16.04 PM
590	Car	Green	.	.	.	.	03:20:16.39 PM
591	Car	Green	.	.	.	.	03:20:17.35 PM
592	Car	Green	.	.	.	.	03:20:17.42 PM
593	Car	Green	.	.	.	.	03:20:18.42 PM
594	Car	Green	.	Car	.	.	03:20:19.43 PM
595	Car	Green	Car	.	.	.	03:20:20.03 PM
596	Car	Green	.	.	.	.	03:20:20.28 PM
597	Car	Green	.	.	.	.	03:20:20.44 PM
598	Car	Green	.	.	.	.	03:20:21.46 PM
599	Car	Green	Car	Car	Car	.	03:20:22.48 PM
600	Car	Green	.	Car	.	.	03:20:23.07 PM
601	Car	Green	.	.	.	.	03:20:23.14 PM
602	Car	Green	.	.	.	.	03:20:23.17 PM
603	Car	Green	.	.	.	.	03:20:23.49 PM
604	Car	Green	Car	.	.	.	03:20:24.50 PM
605	Car	Green	.	.	.	.	03:20:24.89 PM
606	Car	Green	.	.	.	.	03:20:25.52 PM
607	Car	Green	.	.	.	.	03:20:26.30 PM
608	Car	Green	.	.	.	.	03:20:26.53 PM
609	Car	Green	Car	.	.	.	03:20:27.54 PM
610	Car	Green	.	Car	.	.	03:20:28.17 PM
611	Car	Green	.	Car	.	.	03:20:28.55 PM
612	Car	Green	.	Car	.	.	03:20:29.57 PM
613	Car	Green	.	.	.	.	03:20:30.04 PM
614	Car	Green	.	.	.	.	03:20:30.59 PM
615	Car	Green	.	Car	.	.	03:20:31.62 PM
616	Car	Green	.	.	.	.	03:20:32.37 PM
617	Car	Green	.	.	.	.	03:20:32.62 PM
618	Car	Green	.	.	.	.	03:20:33.63 PM
619	Car	Green	.	.	.	.	03:20:34.65 PM
620	Car	Green	.	.	.	.	03:20:35.66 PM
621	Car	Green	.	.	.	.	03:20:36.67 PM
622	Car	Green	.	.	.	.	03:20:37.69 PM
623	Car	Green	.	.	.	.	03:20:38.70 PM
624	Car	Green	.	.	.	.	03:20:39.71 PM
625	Car	Green	.	.	.	.	03:20:40.73 PM
626	Car	Green	Car	.	.	.	03:20:41.74 PM
627	Car	Green	.	.	.	.	03:20:42.33 PM
628	Car	Green	.	Car	.	.	03:20:42.75 PM
629	Car	Green	.	.	.	.	03:20:43.14 PM
630	Car	Green	.	.	.	.	03:20:43.77 PM
631	Car	Green	.	.	.	.	03:20:44.65 PM
632	Car	Green	.	.	.	.	03:20:44.78 PM

633	Car	Green	.	Car	.	.	03:20:45.80 PM
634	Car	Green	.	.	Car	.	03:20:46.07 PM
635	Car	Green	.	.	.	.	03:20:46.43 PM
636	Car	Green	.	.	.	.	03:20:46.81 PM
637	Car	Green	.	.	.	.	03:20:47.82 PM
638	Car	Green	.	.	.	.	03:20:48.84 PM
639	Car	Green	Car	Car	.	.	03:20:49.86 PM
640	Car	Green	Car	.	.	.	03:20:50.16 PM
641	Car	Green	.	.	.	.	03:20:50.47 PM
642	Car	Green	.	.	.	.	03:20:50.86 PM
643	Car	Green	.	Car	.	.	03:20:51.89 PM
644	Car	Green	.	.	.	.	03:20:52.39 PM
645	Car	Green	.	.	.	.	03:20:52.89 PM
646	Car	Green	.	.	.	.	03:20:53.90 PM
647	Car	Green	.	.	.	.	03:20:54.92 PM
648	Car	Green	.	.	.	.	03:20:55.93 PM
649	Car	Green	Car	.	.	.	03:20:56.95 PM
650	Car	Green	.	.	.	.	03:20:57.04 PM
651	Car	Green	.	.	.	.	03:20:57.97 PM
652	Car	Green	Car	.	.	.	03:20:58.98 PM
653	Car	Green	.	.	.	.	03:20:59.52 PM
654	Car	Green	Car	.	.	.	03:20:59.99 PM
655	Car	Green	.	.	.	.	03:21:00.58 PM
656	Car	Green	.	.	.	.	03:21:01.01 PM
657	Car	Green	.	.	.	.	03:21:02.02 PM
658	Car	Green	.	Car	.	Car	03:21:02.76 PM
659	Car	Green	.	.	Car	Car	03:21:03.01 PM
660	Car	Green	.	.	Car	Car	03:21:03.09 PM
661	Car	Green	.	.	.	.	03:21:03.57 PM
662	Car	Green	.	.	.	.	03:21:04.05 PM
663	Car	Green	.	.	.	.	03:21:05.07 PM
664	Car	Green	.	.	.	.	03:21:06.08 PM
665	Car	Green	.	.	.	.	03:21:07.09 PM
666	Car	Green	.	.	Car	.	03:21:08.10 PM
667	Car	Green	.	.	.	.	03:21:08.62 PM
668	Car	Green	.	.	.	.	03:21:09.12 PM
669	Car	Green	Car	.	.	.	03:21:10.13 PM
670	Car	Green	.	Car	.	.	03:21:10.39 PM
671	Car	Green	.	.	.	.	03:21:10.89 PM
672	Car	Green	.	.	.	.	03:21:11.14 PM
673	Car	Green	.	.	.	Car	03:21:12.16 PM
674	Car	Green	.	Car	.	.	03:21:13.18 PM
675	Car	Green	.	.	.	.	03:21:13.98 PM
676	Car	Green	.	.	.	.	03:21:14.19 PM
677	Car	Green	Car	.	.	.	03:21:15.20 PM
678	Car	Green	.	.	.	.	03:21:15.40 PM
679	Car	Green	.	.	.	.	03:21:16.22 PM
680	Car	Green	.	.	Car	.	03:21:17.23 PM
681	Car	Green	.	.	Car	.	03:21:18.18 PM
682	Car	Green	.	.	Car	.	03:21:18.28 PM
683	Car	Green	.	.	.	.	03:21:19.19 PM
684	Car	Green	.	.	.	.	03:21:19.28 PM
685	Car	Green	.	.	.	.	03:21:20.20 PM
686	Car	Green	.	.	.	.	03:21:20.28 PM
687	Car	Green	.	.	.	.	03:21:21.29 PM
688	Car	Green	.	.	.	.	03:21:22.30 PM
689	Car	Green	.	.	.	.	03:21:23.28 PM
690	Car	Green	.	.	.	.	03:21:23.37 PM
691	Car	Green	.	Car	.	.	03:21:24.33 PM
692	Car	Green	.	.	.	.	03:21:24.90 PM
693	Car	Green	.	.	.	.	03:21:25.34 PM
694	Car	Green	.	.	Car	.	03:21:26.36 PM
695	Car	Green	.	.	.	.	03:21:26.52 PM
696	Car	Green	.	.	.	.	03:21:27.37 PM

697	Car	Green	Car	.	.	.	03:21:28.38 PM						
698	Car	Green	.	.	.	.	03:21:28.94 PM						
699	Car	Green	.	.	.	.	03:21:29.40 PM						
700	Car	Green	.	.	Car	.	03:21:30.41 PM						
701	Car	Green	.	Car	.	.	03:21:30.56 PM						
702	Car	Green	.	.	.	.	03:21:31.17 PM						
703	Car	Green	.	.	.	.	03:21:31.42 PM						
704	Car	Green	.	.	.	.	03:21:32.44 PM						
705	Car	Green	.	.	.	.	03:21:33.45 PM						
706	Car	Green	.	.	.	.	03:21:33.53 PM						
707	Car	Green	.	.	.	.	03:21:34.47 PM						
708	Car	Green	.	.	.	.	03:21:34.55 PM						
709	Car	Green	.	.	.	.	03:21:35.48 PM						
710	Car	Green	.	.	.	.	03:21:36.50 PM						
711	Car	Green	.	.	.	.	03:21:37.39 PM						
712	Car	Green	.	.	.	.	03:21:37.51 PM						
713	Car	Green	.	.	.	.	03:21:38.30 PM						
714	Car	Green	.	Car	.	.	03:21:38.52 PM						
715	Car	Green	Car	.	.	.	03:21:39.11 PM						
716	Car	Green	Car	.	.	.	03:21:39.53 PM						
717	Car	Green	.	.	.	.	03:21:39.71 PM						
718	Car	Green	.	.	.	.	03:21:40.55 PM						
719	Car	Green	.	.	.	.	03:21:41.56 PM						
720	Car	Green	.	.	.	.	03:21:42.25 PM						
721	Car	Green	.	.	.	.	03:21:42.58 PM						
722	Car	Green	Car	.	.	.	03:21:43.59 PM						
723	Car	Green	.	.	.	.	03:21:43.86 PM						
724	Car	Green	.	.	.	.	03:21:44.61 PM						
725	Car	Red	.	Car	Car	.	03:21:45.33 PM	Yellow Arro	Red Arrow		560	6.4	180
726	Car	Red	.	.	Car	.	03:21:45.43 PM						
727	Car	Red	.	.	Car	.	03:21:45.62 PM						
728	Car	Red	.	.	.	.	03:21:45.68 PM						
729	Car	Red	.	.	.	.	03:21:46.64 PM						
730	Car	Red	Car	.	.	.	03:21:47.45 PM						
731	Car	Red	Car	.	.	.	03:21:47.65 PM						
732	Car	Red	Car	.	.	.	03:21:48.67 PM						
733	Car	Red	.	.	.	.	03:21:49.17 PM						
734	Car	Red	.	.	.	.	03:21:49.68 PM						
735	Car	Red	.	.	Car	.	03:21:50.59 PM						
736	Car	Red	.	.	Car	.	03:21:50.70 PM						
737	Car	Red	.	.	.	.	03:21:51.05 PM						
738	Car	Red	.	Car	.	.	03:21:51.71 PM						
739	Car	Red	.	.	.	.	03:21:52.40 PM						
740	Car	Red	.	.	.	.	03:21:52.72 PM						
741	Car	Red	.	.	.	.	03:21:53.73 PM						
742	Car	Red	.	.	.	.	03:21:54.75 PM						
743	Car	Red	.	Car	.	.	03:21:55.76 PM						
744	Car	Red	.	.	.	.	03:21:56.55 PM						
745	Car	Red	.	.	.	.	03:21:56.77 PM						
746	Car	Red	.	.	.	.	03:21:57.79 PM						
747	Car	Red	.	.	.	.	03:21:58.81 PM						
748	Car	Red	Car	.	.	.	03:21:59.82 PM						
749	Car	Red	Car	.	.	.	03:22:00.83 PM						
750	Car	Red	Car	.	.	.	03:22:01.85 PM						
751	Car	Red	Car	.	Car	.	03:22:02.87 PM						
752	Car	Red	Car	.	.	.	03:22:03.59 PM						
753	Car	Red	.	.	.	.	03:22:03.69 PM						
754	Car	Red	.	.	.	.	03:22:03.88 PM						
755	Car	Red	.	.	Car	.	03:22:04.89 PM						
756	Car	Red	.	.	.	.	03:22:05.66 PM						
757	Car	Red	.	.	.	.	03:22:05.91 PM						
758	Car	Red	.	.	.	.	03:22:06.92 PM						
759	Car	Red	Car	.	.	.	03:22:07.93 PM						
760	Car	Red	Car	.	.	Car	03:22:08.94 PM						

761 Car	Red	Car	.	.	.	03:22:09.96 PM
762 Car	Red	Car	Car	Car	.	03:22:10.97 PM
763 Car	Red	Car	Car	.	.	03:22:11.52 PM
764 Car	Red	.	Car	.	.	03:22:11.59 PM
765 Car	Red	.	.	.	.	03:22:11.92 PM
766 Car	Red	.	.	.	.	03:22:12.00 PM
767 Car	Red	.	.	.	.	03:22:13.00 PM
768 Car	Red	.	.	.	.	03:22:14.02 PM
769 Car	Red	.	.	.	.	03:22:15.03 PM
770 Car	Red	.	.	.	.	03:22:16.05 PM
771 Car	Red	.	.	.	.	03:22:17.06 PM
772 Car	Red	.	.	.	.	03:22:18.07 PM
773 Car	Red	.	.	.	.	03:22:19.08 PM
774 Car	Red	.	.	Car	.	03:22:20.09 PM
775 Car	Red	.	.	Car	.	03:22:21.11 PM
776 Car	Red	.	.	Car	.	03:22:22.12 PM
777 Car	Red	.	.	.	.	03:22:22.90 PM
778 Car	Red	.	.	.	.	03:22:23.15 PM
779 Car	Red	.	.	.	.	03:22:24.16 PM
780 Car	Red	.	.	.	.	03:22:25.17 PM
781 Car	Red	.	.	.	.	03:22:26.19 PM
782 Car	Red	.	.	.	.	03:22:27.20 PM
783 Car	Red	.	.	.	.	03:22:28.21 PM
784 Car	Red	.	.	.	.	03:22:29.22 PM
785 Car	Red	.	.	Car	.	03:22:30.24 PM
786 Car	Red	.	.	Car	.	03:22:31.25 PM
787 .	Red	.	.	Car	.	03:22:31.99 PM
788 Car	Red	.	.	Car	.	03:22:32.26 PM
789 Car	Red	Car	.	Car	.	03:22:33.28 PM
790 Car	Red	Car	.	Car	.	03:22:34.29 PM
791 Car	Red	Car	.	Car	.	03:22:35.31 PM
792 Car	Red	Car	.	Car	.	03:22:36.32 PM
793 Car	Red	Car	.	.	.	03:22:37.00 PM
794 Car	Red	Car	.	.	.	03:22:37.33 PM
795 Car	Red	Car	.	.	.	03:22:38.36 PM
796 Car	Red	Car	.	.	.	03:22:39.37 PM
797 .	Red	Car	.	.	.	03:22:40.24 PM
798 Car	Red	Car	.	.	.	03:22:40.38 PM
799 Car	Red	Car	.	.	.	03:22:41.39 PM
800 .	Red	Car	.	.	.	03:22:41.55 PM
801 Car	Red	Car	.	.	.	03:22:42.41 PM
802 Car	Red	Car	.	.	.	03:22:43.42 PM
803 .	Red	Car	.	.	.	03:22:43.97 PM
804 .	Red	Car	.	.	.	03:22:44.43 PM
805 Car	Red	Car	.	.	.	03:22:45.44 PM
806 Car	Red	Car	.	.	.	03:22:46.46 PM
807 Car	Red	Car	.	.	.	03:22:47.48 PM
808 Car	Red	Car	.	.	.	03:22:48.49 PM
809 .	Red	Car	.	.	.	03:22:49.28 PM
810 .	Red	Car	.	.	.	03:22:49.50 PM
811 .	Red	Car	.	.	.	03:22:50.52 PM
812 .	Red	Car	.	.	.	03:22:51.53 PM
813 .	Red	Car	.	.	.	03:22:52.55 PM
814 .	Red	Car	.	.	.	03:22:53.56 PM
815 .	Red	Car	.	.	.	03:22:54.57 PM
816 .	Red	Car	.	.	.	03:22:55.59 PM
817 .	Red	Car	.	.	.	03:22:56.60 PM
818 .	Red	Car	.	.	.	03:22:57.61 PM
819 .	Red	Car	.	.	.	03:22:58.63 PM
820 .	Red	Car	.	.	.	03:22:59.65 PM
821 .	Green	Car	.	.	.	03:23:00.66 PM
822 .	Green	Car	.	.	.	03:23:01.67 PM
823 .	Green	Car	.	.	.	03:23:02.69 PM
824 .	Green	Car	.	.	.	03:23:03.70 PM

825 .	Green	Car	.	.	.	03:23:04.71 PM
826 .	Green	Car	.	.	.	03:23:05.73 PM
827 .	Green	Car	.	.	.	03:23:06.74 PM
828 .	Green	.	.	.	.	03:23:07.54 PM
829 .	Green	.	.	.	.	03:23:07.76 PM
830 .	Green	.	Car	.	.	03:23:08.77 PM
831 .	Green	.	Car	.	.	03:23:09.78 PM
832 .	Green	.	.	.	.	03:23:10.36 PM
833 .	Green	.	.	.	.	03:23:10.80 PM
834 Car	Green	.	.	.	.	03:23:11.81 PM
835 Car	Green	.	Car	.	.	03:23:12.82 PM
836 Car	Green	.	.	.	.	03:23:13.36 PM
837 Car	Green	.	.	.	.	03:23:13.85 PM
838 Car	Green	Car	.	.	.	03:23:14.86 PM
839 Car	Green	.	.	.	.	03:23:15.38 PM
840 Car	Green	.	.	.	.	03:23:15.87 PM
841 Car	Green	.	.	.	.	03:23:16.89 PM
842 Car	Green	.	.	.	.	03:23:17.89 PM
843 Car	Green	.	.	.	.	03:23:18.91 PM
844 Car	Green	.	.	.	.	03:23:19.92 PM
845 Car	Green	.	.	.	.	03:23:20.94 PM
846 Car	Green	.	.	.	.	03:23:21.95 PM
847 Car	Green	.	.	.	.	03:23:22.97 PM
848 Car	Green	.	.	.	.	03:23:23.98 PM
849 Car	Green	.	.	.	.	03:23:25.00 PM
850 Car	Green	.	.	.	.	03:23:26.01 PM
851 Car	Green	.	.	.	.	03:23:27.03 PM
852 Car	Green	.	.	.	.	03:23:28.03 PM
853 Car	Green	.	.	.	.	03:23:28.07 PM
854 Car	Green	.	.	.	.	03:23:28.87 PM
855 Car	Green	.	.	.	.	03:23:29.05 PM
856 Car	Green	.	.	.	.	03:23:30.06 PM
857 Car	Green	.	.	.	.	03:23:30.99 PM
858 Car	Green	.	.	.	.	03:23:31.08 PM
859 Car	Green	.	.	.	.	03:23:32.09 PM
860 Car	Green	.	.	.	.	03:23:33.10 PM
861 Car	Green	.	Car	.	.	03:23:34.13 PM
862 Car	Green	.	Car	.	.	03:23:34.16 PM
863 Car	Green	Car	.	.	.	03:23:34.58 PM
864 Car	Green	.	.	.	.	03:23:35.09 PM
865 Car	Green	.	.	.	.	03:23:35.16 PM
866 Car	Green	.	.	.	.	03:23:36.15 PM
867 Car	Green	.	.	.	.	03:23:37.16 PM
868 Car	Green	.	.	.	.	03:23:38.18 PM
869 Car	Green	Car	.	.	.	03:23:39.19 PM
870 Car	Green	.	.	.	.	03:23:39.29 PM
871 Car	Green	.	.	.	.	03:23:40.15 PM
872 Car	Green	.	.	.	.	03:23:40.22 PM
873 Car	Green	.	.	.	.	03:23:41.06 PM
874 Car	Green	.	.	.	.	03:23:41.22 PM
875 Car	Green	.	.	.	.	03:23:42.23 PM
876 Car	Green	.	.	.	.	03:23:43.25 PM
877 Car	Green	.	.	.	.	03:23:44.27 PM
878 Car	Green	.	.	.	.	03:23:45.28 PM
879 Car	Green	.	.	.	.	03:23:46.29 PM
880 Car	Green	.	Car	.	.	03:23:47.31 PM
881 Car	Green	.	.	.	.	03:23:47.89 PM
882 Car	Green	.	.	.	.	03:23:48.32 PM
883 Car	Green	.	.	.	.	03:23:49.09 PM
884 Car	Green	.	.	.	.	03:23:49.33 PM
885 Car	Green	.	.	.	.	03:23:50.21 PM
886 Car	Green	.	.	.	.	03:23:50.34 PM
887 Car	Green	.	.	.	.	03:23:51.22 PM
888 Car	Green	.	.	.	.	03:23:51.36 PM