

Traffic Light Controller

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Chapter 1: Requirement Set: controller

Description

Implementation Status

Total	Implemented	Justified	None
11	11	0	0

Verification Status

Total	Passed	Justified	Failed	Unexecuted	None
11	0	0	0	2	9

Change Information No change issue detected.

1 System initialization

Requirement Type Functional

ID HLR1

Description

Upon resumption of power to the controller, no signals shall be displayed for a time not less than x seconds nor greater than y seconds before normal operations begin.

Change Information No change issue detected.

Links

Artifact [carriageway.slx](#)

 [off](#) (↔Implemented by)

 [\[powerButtonPressed == 1 && timer > 3\]](#) (↔Implemented by)

 [after\(10, sec\)\[powerButtonPressed == 1 && timer <= 3\]](#) (↔Implemented

by)

Implementation Status

Total	Implemented	Justified	None
3	3	0	0

Verification Status

Total	Passed	Justified	Failed	Unexecuted	None
3	0	0	0	0	3

1.1 Startup delay condition

Requirement Type Functional

ID HLR1.1

Description

If the system has already been turned off for more than x seconds, the system shall skip the start up delay. Otherwise, the system shall start operations only after a fixed delay.

Change Information No change issue detected.

Links

Artifact [carriageway.slx](#)

 [\[powerButtonPressed == 1 && timer > 3\]](#) (↔Implemented by)

 [after\(10, sec\)\[powerButtonPressed == 1 && timer <= 3\]](#) (↔Implemented

by)

Implementation Status

Total	Implemented	Justified	None
1	1	0	0

Verification Status

Total	Passed	Justified	Failed	Unexecuted	None
1	0	0	0	0	1

1.2 Resumption of normal operations

Requirement Type Functional

ID HLR1.2


Description

The controller shall resume operation at "Vehicles Passing Ready" phase. That is, a yellow light signal for the vehicle light set and a red light signal for the pedestrian light set.

Change Information No change issue detected.

Links

Artifact [carriageway.slx](#)

 [\[powerButtonPressed == 1 && timer > 3\]](#) (↔Implemented by)

 [after\(10, sec\)\[powerButtonPressed == 1 && timer <= 3\]](#) (↔Implemented by)

by)

 [vehiclesPassingReady](#) (↔Implemented by)

Implementation Status

Total	Implemented	Justified	None
1	1	0	0

Verification Status

Total	Passed	Justified	Failed	Unexecuted	None
1	0	0	0	0	1

2 Default light signals

Requirement Type Functional

ID HLR2

Description

The traffic lights for both carriageways shall remain in one default configuration until a call button on either side of the carriageway is pressed. This configuration is green for the vehicle light set and red for the pedestrian light set.

Change Information No change issue detected.

Links

Artifact [carriageway.slx](#)

 [vehiclesPassing](#) (↔Implemented by)

 [\[callButtonPressed && callButtonReady == 1\]](#) (↔Implemented by)

Implementation Status

Total	Implemented	Justified	None
1	1	0	0

Verification Status

Total	Passed	Justified	Failed	Unexecuted	None
1	0	0	0	0	1

3 Call button response

Requirement Type Container

ID HLR3

Description

When the call button on either carriageway is pressed, the system shall initiate the sequence for light transition to green for pedestrians and red for motorists.

Change Information No change issue detected.

Links

Artifact [carriageway.slx](#)

 [\[callButtonPressed && callButtonReady == 1\]](#) (↔Implemented by)

 [CarriagewaySM](#) (↔Implemented by)

Implementation Status

Total	Implemented	Justified	None
3	3	0	0

Verification Status

Total	Passed	Justified	Failed	Unexecuted	None
3	0	0	0	1	2

3.1 Pedestrian crossing wait time

Requirement Type Functional

ID HLR3.1

Description

When the call button on either carriageway is pressed, the system shall signal the pedestrian to cross in no longer than x seconds.

Change Information No change issue detected.

Links

Artifact [carriageway.slx](#)

 [CarriagewaySM](#) (↔Implemented by)

 [checkPCTimeFrame](#) (↔Verified by)

Implementation Status

Total	Implemented	Justified	None
1	1	0	0

Verification Status

Total	Passed	Justified	Failed	Unexecuted	None
1	0	0	0	1	0

3.2 Dual carriageway response

Requirement Type Functional

ID HLR3.2

Description

The system shall automatically trigger a button press on the other carriageway after x seconds when the call button on either carriageway is pressed

Change Information No change issue detected.

Links

Artifact [carriageway.slx](#)

 [vehiclesPassingDone](#) (↔Implemented by)

 [vehiclesPassingAlmostDone](#) (↔Implemented by)

 [CarriagewaySM](#) (↔Implemented by)

Implementation Status

Total	Implemented	Justified	None
1	1	0	0

Verification Status

Total	Passed	Justified	Failed	Unexecuted	None
1	0	0	0	0	1

3.3 Button request during light sequence

Requirement Type Functional

ID HLR3.3

Description

When the call button on either carriageway is pressed and the light sequence has initiated, the system shall not service any new requests.

Change Information No change issue detected.

Links

Artifact [carriageway.slx](#)

 [CarriagewaySM](#) (↔Implemented by)

Implementation Status

Total	Implemented	Justified	None
1	1	0	0

Verification Status

Total	Passed	Justified	Failed	Unexecuted	None
1	0	0	0	0	1

4 Traffic lights regime

Requirement Type Functional

ID HLR5

Description

The traffic lights shall be switched based on the standard lights regime: Green - Yellow - Red and vice versa. The yellow lights must always be between the green and red lights transitions.

Change Information No change issue detected.

Links

Artifact [carriageway.slx](#)

 [CarriagewaySM](#) (↔Implemented by)

Implementation Status

Total	Implemented	Justified	None
4	4	0	0

Verification Status

Total	Passed	Justified	Failed	Unexecuted	None
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4	0	0	0	1	3
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4.1 Green signal sonstraint

Requirement Type Functional

ID HLR5.1

Description

The vehicle and pedestrian light set on one carriageway must never be green at the same time.

Change Information No change issue detected.

Links

Artifact [carriageway.slx](#)

 [CarriagewaySM](#) (↔Implemented by)

 [checkGreenConstraint](#) (↔Verified by)

Implementation Status

Total	Implemented	Justified	None
1	1	0	0

Verification Status

Total	Passed	Justified	Failed	Unexecuted	None
1	0	0	0	1	0

4.2 Single light display on light set at a given time

Requirement Type Functional

ID HLR5.2

Description

When the light switching occurs, each signal head must display no more than one light signal at a time.

Change Information No change issue detected.

Links

Artifact [carriageway.slx](#)

 [CarriagewaySM](#) (↔Implemented by)

Implementation Status

Total	Implemented	Justified	None
1	1	0	0

Verification Status

Total	Passed	Justified	Failed	Unexecuted	None
1	0	0	0	0	1

4.3 Vehicle Passing Efficiency

Requirement Type Functional

ID HLR5.3

Description

x seconds after the pedestrian light set has been switched to red, vehicle light set shall be switched to green.

Change Information No change issue detected.

Links

Artifact [carriageway.slx](#)

 [CarriagewaySM](#) ( Implemented by)

Implementation Status

Total	Implemented	Justified	None
1	1	0	0

Verification Status

Total	Passed	Justified	Failed	Unexecuted	None
1	0	0	0	0	1

Appendix

Artifact List

Simulink models:

#	Name	Folder	Version
1	carriageway.slx	Y:\School\iti8520\lab3	1.21