Vehicle Intersection Control

McMaster University

Draft System Design

SE 4G06

Group 6

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1 Revisions

Date	Revision Number	Authors	Comments
December 21, 2016	Revision 0	Alex Jackson Jean Lucas Ferreira Justin Kapinski Mathew Hobers Radhika Sharma Zachary Bazen	N/A

Table 1: VIC Table of Revisions

2 Introduction

2.1 Document Purpose

Insert Text Here.

2.2 System Scope

Insert Text Here.

2.3 Document Overview and Intended Audience

Insert Text Here.

2.4 Document Conventions

Insert Text Here.

2.4.1 Naming Conventions

Table 2: Naming Conventions

m_ic_variableName	Monitored variable for intersection controller
c_ic_variableName	Control variable for intersection controller
m_vc_variableName	Monitored variable for autonomous vehicle controller
c_vc_variableName	Control variable for autonomous vehicle controller
ICD#	Intersection Controller Design Component ID
ICD#.H#	Intersection Controller Hardware Design Subsystem ID
ICD#.S#	Intersection Controller Software Design Subsystem ID
VCD#	Autonomous Vehicle Controller Design Component ID
VCD#.H#	Intersection Controller Hardware Design Subsystem ID
VCD#.S#	Autonomous Vehicle Controller Software Design Subsystem ID

3 Monitored Variables

3.1 Intersection Controller

Table 3: Intersection Controller Monitored Variables

m_ic_readSensor	[8]:Boolean
m_ic_carSignal	[4]:Byte[ ]

3.2 Autonomous Vehicle Controller

m_vc_videoCapture	[x][y]:Bytes
m_vc_frontDistance	Double

m_vc_speedSignal	Boolean
m_vc_hallEffect	Double
m_vc_vehicleOrientation	Character

4 Controlled Variables

4.1 Intersection Controller

c_ic_carProceedSignal	Boolean

4.2 Autonomous Vehicle Controller

c_vc_wheelAngle	Double
c_vc_carSpeed	Integer
c_vc_vehicleBrake	Boolean
c_vc_requestIC	Byte[ ]

5 System Overview

Insert Text Here.

5.1 Behavior Overview

Insert Text or Image Here.

5.2 Context Diagrams

Insert Text or Image Here.

5.3 System Component Diagrams

Insert Text or Image Here.

6 System Components

6.1 Intersection Control Component

IDC1	
Inputs	m_ic_carSignal[4]
	m_ic_readSensors[8]
Outputs	c_ic_carSignal[4]
Description	Insert Description Here
Timing Constraints	1 second intersection arrival decision
	1 second intersection schedule

	0.5 second intersection departure decision
Deadline	Decisions must be made before the next intersection arrival poll
	-
	-
Initialization	Connect to autonomous vehicles over Bluetooth communication
	Clear all intersection arrival queues
	-

6.2 RC Vehicle Component

VCD1	
Inputs	m_vc_videoCapture[x][y]
	m_vc_frontDistance
	m_vc_hallEffect
	m_ic_carProceedSignal
	-
	m_vc_-
Outputs	c_vc_ wheelAngle
	c_vc_carSpeed
	c_vc_vehicleBreak
	c_vc_requestTheIC
Description	Insert Description Here
Timing Constraints	Process images in sufficient time to make decisions regarding wheel angles (Time: TBD)
	-
	-
Initialization	Initialize all speed controls to zero
	Initialize wheel angle to zero
	Connect to intersection over Bluetooth communication

7 Subsystem Components

7.1 Hardware

7.1.1 The First Hardware Component

Identification	-
Inputs	-
Outputs	-
Description	Insert Description Here

Timing Constraints	Insert Timing Constraints Here
Initialization	Insert Initialization Stuff Here

7.1.2 The Second Hardware Component

Identification	-
Inputs	-
Outputs	-
Description	Insert Description Here
Timing Constraints	Insert Timing Constraints Here
Initialization	Insert Initialization Stuff Here

7.2 Software

7.2.1 The First Software Component (MIS)

Identification	-
Inputs	-
Outputs	-
Description	Insert Description Here
Timing Constraints	Insert Timing Constraints Here
Initialization	Insert Initialization Stuff Here

7.2.2 The Second Software Component (MIS)

Identification	-
Inputs	-
Outputs	-
Description	Insert Description Here
Timing Constraints	Insert Timing Constraints Here
Initialization	Insert Initialization Stuff Here

8 Module Interface Design

8.1 MID 1

I thing this would get covered in the Software Component

Insert Text Here	**Insert Text Here**
Insert Text Here	-

8.2 MID 2

Insert Text Here	**Insert Text Here**
Insert Text Here	-

8.3 MID ETC

Insert Text Here	**Insert Text Here**
Insert Text Here	-

9 Normal Operation

Insert Text Here.

10 Undesired Event Handling

Insert Text Here.

11 References

Possible References Here