



# 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 Hober 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

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

## 3 Monitored Variables

### 3.1 Intersection Controller

Table 3: Intersection Controller Monitored Variables

<b>m_ic_readSensor</b>	[8]:Boolean
<b>m_ic_carSignal</b>	[4]:Byte[ ]

### 3.2 Autonomous Vehicle Controller

<b>m_vc_videoCapture</b>	[x][y]:Bytes
<b>m_vc_frontDistance</b>	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
<b>Deadline</b>	Decisions must be made before the next intersection arrival poll
	-
	-
<b>Initialization</b>	Connect to autonomous vehicles over Bluetooth communication
	Clear all intersection arrival queues
	-

## 6.2 RC Vehicle Component

VCD1	
<b>Inputs</b>	m_vc_videoCapture[x][y]
	m_vc_frontDistance
	m_vc_hallEffect
	m_ic_carProceedSignal
	-
	m_vc_-
<b>Outputs</b>	c_vc_wheelAngle
	c_vc_carSpeed
	c_vc_vehicleBreak
	c_vc_requestTheIC
<b>Description</b>	Insert Description Here
<b>Timing Constraints</b>	Process images in sufficient time to make decisions regarding wheel angles (Time: TBD)
	-
	-
<b>Initialization</b>	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

<b>Identification</b>	-
<b>Inputs</b>	-
<b>Outputs</b>	-
<b>Description</b>	Insert Description Here

<b>Timing Constraints</b>	Insert Timing Constraints Here
<b>Initialization</b>	Insert Initialization Stuff Here

### 7.1.2 The Second Hardware Component

<b>Identification</b>	-
<b>Inputs</b>	-
<b>Outputs</b>	-
<b>Description</b>	Insert Description Here
<b>Timing Constraints</b>	Insert Timing Constraints Here
<b>Initialization</b>	Insert Initialization Stuff Here

## 7.2 Software

### 7.2.1 The First Software Component (MIS)

<b>Identification</b>	-
<b>Inputs</b>	-
<b>Outputs</b>	-
<b>Description</b>	Insert Description Here
<b>Timing Constraints</b>	Insert Timing Constraints Here
<b>Initialization</b>	Insert Initialization Stuff Here

### 7.2.2 The Second Software Component (MIS)

<b>Identification</b>	-
<b>Inputs</b>	-
<b>Outputs</b>	-
<b>Description</b>	Insert Description Here
<b>Timing Constraints</b>	Insert Timing Constraints Here
<b>Initialization</b>	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