

**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING  
THE UNIVERSITY OF TEXAS AT ARLINGTON**

**PROJECT CHARTER  
CSE 4316: SENIOR DESIGN I  
FALL 2016**



**TRAFFICNETPEONS  
PRODUCT NAME: TBD**

**PEYTON CASPER**

**RUCHITHA THALAKOLA**  
**JOSE HERNANDEZ**  
**RABIN DHOUBANJAR**  
**KYLE EDELMANN**

## REVISION HISTORY

Revision	Date	Author(s)	Description
0.1	1.19.2016	PC, JH, RT, RD, KE	document creation
0.2	2.05.2016	PC, JH, RT, RD, KE	complete draft
0.3	2.12.2016	PC, JH, RT, RD, KE	release candidate 1
1.0	2.18.2016	PC, JH, RT, RD, KE	official release
1.1	2.19.2016	PC, JH, RT, RD, KE	added customer change requests

## CONTENTS

## LIST OF FIGURES

## **1 VISION**

TrafficNetPeons is a subsidiary of TrafficNet, LLC and therefore adheres to the mission of our parent company amenably. Within the realm of this established model TNP has been born from a singular ambition, to create an affordable, low power, weatherproof camera most suitable for use in the traffic monitoring industry. Thus, our vision is to provide one solution to this ambition that supports and compliments the mission of our parent company in addition to improving the general welfare of the conventional commuter.

## **2 MISSION**

TrafficNetPeons, a subsidiary of TrafficNet, LLC is dedicated to making the flow of traffic safer, smarter, and simpler to manage. Our team is engaged in the development of the next generation of traffic monitoring camera modules to be mass produced and field deployed in a broad spectrum of outdoor environments to assist traffic managers and the millions of drivers on the roads each day. Through creative innovation and meticulous design, TrafficNetPeons delivers high-quality products and top-notch service. Let us help change the way you see traffic.

## **3 SUCCESS CRITERIA**

TNP is a business founded upon integrating municipalities with their commuters. The success of our current project hinges upon providing comprehensive and secure technology to traffic monitoring officials so that they might deliver the best possible service to their communities. In further detail, to accomplish this the traffic monitoring camera we are currently engaged in the design of must be mass produced, field deployed and easily accessible only to those persons authorized in its daily usage. Only at such time when our team can confidently expect our product to be adopted by surrounding municipalities for mass use in the outdoor environment can we say we have succeeded.

## 4 BACKGROUND

TrafficNet, LLC is a young Limited Liability Company which has made headway in the traffic monitoring industry with the BAT-433 which, uses Bluetooth technology to calculate real-time traffic analytics, including travel times, speeds, origins and destinations of local commuters. As a subsidiary of TrafficNet, TNP has accepted a role in the history of our parent company with an innovative solution to their latest ambition, the secure monitoring of even the most remote stretches of Texas highways.

## 5 RELATED WORK

The closest solution that exist would be the RaspberriPCam. The RaspberriPCam is an open source project that was built by Sons of Tone. The RaspberriPCam streams in full HD (1080p) video streaming at 30fps, has RTSP protocol which is standard protocol for video streaming in security applications, and has web server configurations. Even though the RaspberriPCam is close to what our project is, it stills lacks some additional features. One example would be that TrafficNet wanted the camera to have heating capabilities when bad weather was an issue, which the RaspberriPCam does not have. Another requirement that TrafficNet wants is the camera to have a pan and tilt, which the RaspberriPCam also does not have. Even though the RaspberriPCam would serve as the closest solution, our team still needs to add additional features to meet the requirement from TrafficNet. [?].

## 6 SYSTEM OVERVIEW

When finished, the system will run on very low power, have pan and tilt, have 180 degrees of visibility, have day and night capabilities, heating capabilities, easy to use GUI, and finally 10X zoom. To make the camera run on very low power we will use solar panels and batteries so that the power draw will be under 5W. The pan and tilt will be achieved by using stepper motors as suggested by Dr. McMurrough. The easy to use GUI and 10X zoom will all be controlled by the software, which we plan to use Linux as the operating system.

## 7 ROLES & RESPONSIBILITIES

The sponsoring company we are dealing with is TrafficNet. Ryan Guadagnolo from TrafficNet keeps close contact with Dr. McMurrough and our team. The scrum master would be the Kyle Edelmann, who ensures that the team is fully functional and productive, while also enables close cooperation across all roles and functions. The team member names are Jose Hernandez, Peyton Casper, Kyle Edelmann, Ruchitha Thalakola, and Rabin Dhaubanjari. The course leader would be Dr. McMurrough, who is in charge of gathering parts and helping the team make progress with the project. The only responsibilities each team member has had so far is to finish the project charter tasks that were assigned to each team member. Since the project is at the early stages of development the team does not have concrete roles for each team member. Although some team members like Peyton and Kyle have taken the time to setup the Raspberry Pi which the team will need to begin testing. Once the team has the necessary materials and has everything setup to begin building the project, the team will begin assigning roles to each team member.

## 8 FACILITIES & EQUIPMENT

Most of our testing and team member meetings will be done at the senior design lab and at the FAB lab, where we have access to different type of tools. Some of the equipment that we will use for the project are a Raspberry Pi, Raspberry Pi camera, infrared camera, some type of surface mount which the team is still unsure of, Axis 214, stepper motors, solar panels, and battery. Since the project is at the early stages of development some of the equipment might change.

## **9 COST PROPOSAL**

### **9.1 PRELIMINARY BUDGET**

The University of Arlington is giving us an initial budget of 800.

### **9.2 CURRENT & PENDING SUPPORT**

TrafficNet has sponsored our project and pledged an additional 2500.

## **10 DOCUMENTATION & REPORTING**

Lorem ipsum dolor sit amet, quidam omnesque ea vis. Eum an aliquip legendos recusabo. Mea ex purto natum, ne movet fuisset sit. Labore audiam eos ad, facer ornatus posidonium ne ius, et eos dui delent nusquam.

### **10.1 PROJECT CHARTER**

The project charter will be based off a SBRI and inform readers of the different aspects of the project. It will cover the details of project background information, cost proposals, team structure, sprint planning, individual status reports, engineering notebooks, and deliverables.

### **10.2 PRODUCT BACKLOG**

The Product backlog will include any features that need to be finished at some point in the future. Any new features get added to the backlog and transferred to the sprint backlog at the start of the sprint.

### **10.3 SPRINT PLANNING**

Sprint planning is detail description of the task that the team members will be doing in a whole sprint cycle. The planning will include goal for a certain period which is usually two weeks, backlog that need to be completed in the cycle is discussed and task breakdown between the team members is done.

#### **10.3.1 SPRINT GOAL**

The sprint goal is the list of the tasks that need to be completed during the sprint cycle. There will be different goals for different sprint cycle. Every member of the team will be familiar with the sprint goal.

#### **10.3.2 SPRINT BACKLOG**

The sprint backlog is a list of tasks that are decided in the sprint meeting and that are to be completed during the sprint cycle. The tasks are chosen from the product backlog. The team members keep track of the sprint backlog, which also indicates the progress of the project.

#### **10.3.3 TASK BREAKDOWN**

After the backlog has been decided the tasks are divided between the scrum team members. The division of the task is done in such a way that it will help the scrum team member to meet the sprint goal in a timely manner. The main goal of the task breakdown is to break a complex task into simpler and smaller tasks.

### **10.4 SPRINT BURNDOWN CHARTS**

Sprint burn down chart is the chart that represents a progress during the sprint cycle. The scrum team is required to have a sprint burn down chart after completion of sprint cycle. This chart will show if the scrum team members are utilizing enough time on the tasks or not. The chart contains an estimated time to complete tasks and actual time spent on those tasks.



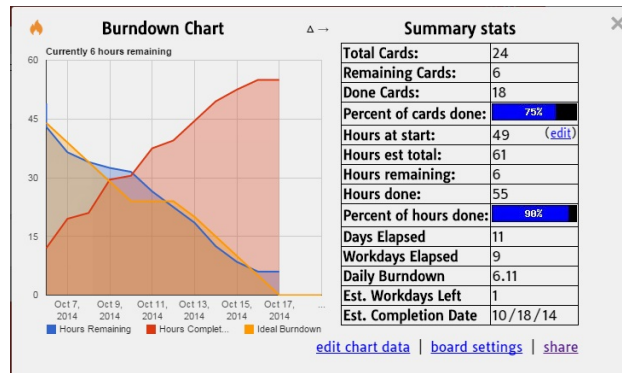


Figure 1: Example sprint burndown chart

## 10.5 SPRINT RETROSPECTIVE

Sprint retrospective is done after every sprint in which whole team participate and discuss about what is working and what is not working. Sprint retrospective is a last thing to work on after completion of the sprint cycle. Things that need to be improved are discussed during the meeting. Product owner, scrum members and scrum master take part in the meeting.

## 10.6 INDIVIDUAL STATUS REPORTS

All the members are required to have this report at the end of the sprint cycle. The main goal of this report is to keep track of team members. In this report team members have to include task they have completed along with time, they have spent and the task they will be working on. Scrum team members are also supposed to include if any other unexpected task appear while completing the given task.

## 10.7 ENGINEERING NOTEBOOKS

Engineering notebooks will be used by all team members to record ideas, observations, designs, progress, and what was discussed in team meetings. In addition, the engineering notebook represents official documentation that could be used for patent activities or legal issues.

## 10.8 CLOSEOUT MATERIALS

All the members are required to have this report at the end of the sprint cycle. The main goal of this report is to keep track of team members. In this report team members have to include task they have completed along with time, they have spent and the task they will be working on. Scrum team members are also supposed to include if any other unexpected task appear while completing the given task.

### 10.8.1 SYSTEM PROTOTYPE

The system prototype will consist of a raspberry pi, raspberry pi camera board, pan and tilt motor and brackets, day and night lens, and zoom lens. All of these components will be connected and arranged in an enclosure.

### 10.8.2 PROJECT POSTER

The project poster will contain information regarding the project's vision, mission, background, and the finished product's hardware and software details. The poster will be presented at the conclusion of Computer System Design Project II in August, 2016.

### **10.8.3 WEB PAGE**

A web page will be presented to allow the user to view the stream from the camera in a secured manner. They will be allowed to have access with a valid login, password, and IP address.

### **10.8.4 DEMO VIDEO**

A demo video will be provided to show how to appropriately use and manage the camera and the software. It will demonstrate all the features of the camera, explain how to view the stream, and describe how to customize the settings in order to fit the needs of the user. The demo video will be delivered through a USB.

### **10.8.5 SOURCE CODE**

The source code will consist of software of the user interface to utilize and control the camera. In addition, the source code to allow the user to view the stream of the camera will be provided. The source code will be delivered in a USB.

### **10.8.6 SOURCE CODE DOCUMENTATION**

The provided source code will be documented properly by including comprehensive comments to allow TrafficNet LLC or their customers to maintain and evolve the software efficiently. The source code documentation will be delivered in a USB.

### **10.8.7 HARDWARE SCHEMATICS**

The design files for the circuit board will be provided to display what was customized in order to attain the appropriate board for the camera. This will be delivered in a USB.

### **10.8.8 CAD FILES**

The CAD files will be provided for any custom made components that are developed. The files will be delivered in a USB.

### **10.8.9 INSTALLATION SCRIPTS**

The installation scripts of the web page and the firmware for the camera will be provided. The scripts will be delivered in a USB.

### **10.8.10 USER MANUAL**

A user manual will be provided to describe how to properly operate the camera and utilize the software. It will explain in detail the purpose of each feature of the camera and how to appropriately use them. In addition, the manual will describe the software interface and how to make changes according to the user's preferences. This will be delivered in a USB.