Requirement Analysis Document

For

A police vehicle command and control system

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1. INTRODUCTION

The police vehicle command and control system is a web-based tool to allow call-center representative to gather information from the caller in an organized manner and also to respond in real time during emergencies. It triggers a response to the police vehicle located nearest to the incident or crime scene. It will maintain a log for every call for later auditing and analysis for improvement in the system.

1.1 Purpose of the System

The purpose of the police vehicle command and control system is to enhance the response time for a police vehicle to respond as quickly as possible to reported incidents. This acts at real time to every response which will help in reducing the delay in dispatching a police vehicle during time of crisis.

1.2 Scope of the System

The scope of the system includes dispatching police vehicle by holding the current location of every police vehicle and maintaining log files for future references. This will also have priorities in case of dispatch during more than 2 incidents taking place at same time.

1.3 Objectives and Success Criteria of the Project

The primary objective of the system is to ensure that incidents are logged and routed to the most appropriate police vehicle so that they can reach the crime scene at the earliest possible time.

1.4 Definitions, Acronyms, and Abbreviations

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<tr>
<th>Acronym</th>
<th>Definition</th>
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<tr>
<td>GPS</td>
<td>Global Positioning System</td>
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<tr>
<td>GUI</td>
<td>Graphical User Interface</td>
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<tr>
<td>RAD</td>
<td>Requirements Analysis Document</td>
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<td>SDD</td>
<td>System Design Document</td>
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<td>ODD</td>
<td>Object Design Document</td>
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<td>UML</td>
<td>Unified Modeling Language</td>
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1.5 References


1.6 Overview

The goal is to build a robust and stable system, which can sustain an emergency state and act in a highly optimized manner to respond in emergency state. We will try to put an artificial intelligence into the system by analyzing the log files of the report processed. This system has to be up and running 24/7 so need to have modular approach for adding any new functionality without bring the system down for even a split second.

2. CURRENT SYSTEM

The current system is operated by 999 which also take call for other purposes and by introducing this system we can even distribute the load on 999 operators for handling police response. At present when we call at 999, the operator takes all the input from the user and then informs the police to reach the location as early as possible but by this system they need not to inform a police vehicle as soon as they inputs the requirement into the system for a police vehicle. Our system will be triggered and responses in a highly optimized manner to dispatch a police vehicle located nearest to the crime or location reported. This will reduce any delay in searching for a police vehicle nearest to the reported location. The current process is time consuming & risky depending on the severity of the emergency situation.

3.0 PROPOSED SYSTEM

3.1 Overview

The police vehicle command and control system is designed to ensure that incidents are logged and routed to the most appropriate police vehicle whenever any kind of incident occurs. Police as the user of the system, need to respond as quickly as possible to the particular reported incidents where the police who is in duty at the period of time will log incidents that are reported to them into the system. Through this system, the best location is verified to send the closest vehicle and the suitable vehicle based on the incident to the location of the incident as fast as possible.

3.2 Functional Requirements

The functional requirements of the police vehicle command and control system are to log incidents and to route the most appropriate police vehicle to the particular incident’s location. In order to accomplish this, the police who are in duty during the period of time need to log incidents that are reported to them into the system. The system will allow details of the reporter of the incidents to be logged. The police concern will later verify the type of incident and its location, check the system for the best type of vehicle that need
to be sent to the particular incident and the availability of the vehicle which is nearest to the incident and finally assign the number of personnel need to be sent immediately to the particular incident based on the massiveness of the incident. At the same time, the system will automatically alert other emergency services such as fire and ambulance services if it is necessary.

3.3 Nonfunctional Requirements

3.3.1 User Interface and Human Factors

The police vehicle command and control system should allow details of the reporter of incidents to be logged before further action. This is open to almost indefinite extension. In some cases, police vehicles may include fax terminals so that written information may be faxed when a vehicle is routed to an incident. A user interface for a system control room might be prototyped. Besides that, there is a requirement of a police service that it must respond as quickly as possible to reported incidents and the objective of a command and control system is to ensure that incidents are logged and routed to the most appropriate police vehicle.

First, to answer the question what type of users will be using the system is that they can be any kind of users. This means, the users can be experts, intermediate or novice which means there are more than one type user that will be using the system. In general, the system users are the authorized representative and the public. It is better to include some basic instructions to assist users who are not very familiar and use to the system. Therefore, the system be user friendly and be able to accommodate users at different locations. In addition, the system must be easy o learn, simply means easy to use. If possible, the system must be protected from making errors since the system is a control system which must and it is a requirement of a police service that it respond as quickly as possible to reported incidents. There are no special input/output devices in order for the users to enter the necessary details. The devices are computer screen, keyboard and mouse.

3.3.2 Documentation

In this section, documentation should be included which covers all use cases of the police vehicle system application. Within this documentation, there shall be sections covering the user interface and how it is to be utilized in conjunction with the rest of the police vehicle application in order to provide all the functionality covered in the problem statement. Documentation will be available on how to track the police vehicle in a particular location, alert the authorized team, track the incidents reported and conduct further action. It should also account for different environment settings where the system is used, such as tracking the incident location, or viewing a route on the road or any path the police vehicle goes. The target audience of the documentation is the users of a police vehicle system.

3.3.3 Hardware Consideration

In this system, the hardware considerations are very important in order to achieve the systems goal and objectives. Therefore, an alert system device is vital because of the need to alert other emergency services such as fire and ambulance services. The system should automatically alert these services as well. This is very crucial because the need for the information passed in alert form will work more effectively. In addition, a system such as this one is open to almost indefinite expansion. For example, police vehicles may include fax terminals so that written information may be faxed when a vehicle is routed to an incident. A user interface for a system control room might be prototyped. This concludes that, a fax machine is required as hardware consideration. Besides that, the screen that pictures the location of the incident should be large enough to accommodate the system requirement. In some areas, it may be unwise simply to respond to an incident by sending a single vehicle. In other areas, a single vehicle or policeman may be all that is needed to respond to the same type of incident. Therefore, specific requirement of a particular location may differ in conjunction with various numbers of vehicles to be sent over to the incident place.

3.3.4 Performance Characteristics

In particular, the incident report tracking subsystem should well performed and achieved. The web interface used by the public should be relatively fast over modem connection. In addition, a page should take no longer than 10 seconds to load. Therefore, the web page can not hold more than 30 KB of information. This includes the information transferred to the user as well as information obtained from databases through queries. The system should be able to sustain this rate with a moderate load of users. The dealer terminal, which means the authorized, should have a user interface with no noticeable delays. Any delay in the system should be accompanied by a status message or at least an indicator that the slowdown is a result of information retrieval and not poor programming. This is because it is important for the system to be always fast and speed to handle any incident reports at any time. The dealer should be able
to identify any needed information and present it to the user (public) within 10 seconds, with the exception of hardware or network problems.

3.3.5 Error Handling and Extreme Conditions

In this section, the errors might occur when the user key in information in an inappropriate form. For example, the public communicates with the authorized (or the server, retrieving incident reports information) via the personal PC. The data retrieval mode (copying information onto the tracking system) will be designed to eliminate, as much as possible, any opportunities to make invalid input: location of incident which may be retrieved or deleted are displayed in a list box, and no buttons may be pressed for invalid. The personal computer component of the system has the most complicated user interface, since it must allow the user to select locations for which to alert the control system. Until the functionality of this component is determined, input errors and their handling cannot be fully analyzed.

3.3.6 System Interfacing - Maintenance Subsystem

This police vehicle command and control system is primarily web base system. The interface is accessible by the administrator of the system who handles the incidents reported. But what make it look different is that the interface integrate with other subsystems like alert subsystem, police vehicle tracking subsystem, emergency service subsystem which be implemented in the future. These subsystems communicate with the system interface using standard Java.

3.3.7 Quality Issues

The system must be reliable, in the sense that it track the correct location reported by the user where it’s list down the relevant location once the user start to enter the location. This supports the degree to which the system functions correctly before the presence of invalid inputs. This means that the route and sites of location are correctly reported and ease the tracking process of the police vehicle as location name are error free. Besides, the system response time for a user request, such as for an accident case, should take a maximum of 3 seconds. The system must also be compatible with the external hardware like alert system so that it does not conflict with the system when received a report on incident. The system must be aware of how much incident report will be handled in 3 seconds. It should notify the user once action is taken to the reported incident and the system should never interfere with the other applications. The component of the system must be able to run on any hardware/operating system environment which has a Java Virtual Machine. It is important to make sure the system run properly without any interfere as the integrated interface only going to be handled in on main central unit.

3.3.8 System Modifications

Initially the only component that stimulated will be the detection of the location by the main central unit system based on reported incident location by the user and later routed to the most appropriate police vehicle. If time permits this would be further extended where the system itself can directly keep track the vehicle near the incident location and directly routed the report to the most appropriate police vehicle. As the java mainly concerned with the object oriented approach the system will greatly support any future modification, new implementation of sub model. Besides with such great features this system also increases the ability of the system to deal with new technology or to fix defects.

3.3.9 Physical Environment

At this time, the target equipment is the alert system and police vehicle tracker. However, the design of this system should be generic enough to take on new features of police vehicle tracker, as well as new types of alert system. For example, if there is new type of police vehicle tracker than the performance in term of the speed per second to track the police vehicle will increase.

3.3.10 Security Issues

Access to the website must be controlled. The information key in to the system needs some mandatory information like the sender’s details that have to specify by the user before proceeds to lodge report. This information will be only can viewed by the system administrator of the web server, who will deal with the incident reported. Any employee at management level should not be able to view all the information about the sender. Access to the web server must be restricted to the system administrator only by using the alternative that is currently available like face recognition, voice interpreter or thumbprint verifier.

3.3.11 Resource Issues

The logbook system will be installed along with the police command system to direct the incident logged to store inside the logbook for future references. This logbook plays an important role as an archive to track the entire incident that had reported through out the use of the system.
3.4 Constraints

Time constraint is the main problem in this police vehicle command and control system. Whenever the user/police tend to make errors while logging in the details of an incident and re-logging the information again, it will prolongs the immediate action that supposed to be taken for a certain period of time where each second is very precious during that crucial time. Wrong details that been logged also tend to result the vehicles to be routed to the wrong destination. Cost is another constraint that exists in this system. The cost to support external hardware such as fax terminals and so on is quite high and is difficult to be handled.

3.5 System models

3.5.1. Scenarios

Police vehicle command and control system is utilized to log incidents and routed it to the most suitable police vehicle. Based on this information, police are required to act quickly to the reported incidents. First of all, police will log incidents that are reported into system, since no particular officer administer this, police in charged on that period of time whom report the incident received are requisite to key in their particulars like police Id, name and other relevant information. Then the police concern will check the system for available vehicle and its position, then will verify the type of incident and location in term of how many vehicle is necessary, is the incident is massive, how many personnel need to address this incident and so forth, then finally assign the most appropriate vehicle and number of personnel to the reported location immediately. In the case of emergency, this system will automatically alert the fire and ambulance services to act quickly to the reported incident.

3.5.2. Use case model

![Use case diagram]

3.5.3. Object model

3.5.3.1 Data dictionary

Incident Detail:
This is the description of the Incident that will include the type of the incident, location, time and what the emergency needed for the purpose to log for each reported incident.

Vehicle Info:
This will consist of a position of available vehicles, type of vehicle and the number of vehicles needed.

Messages:
These are simple event notification that tells what emergency service that needed, how many vehicle required and which position of vehicles are required to send its vehicles to incident location.

Reporter Detail:
This is the description of the reporter who is managing the incident case. This detail consists of reporter name, idNo, and incidentIdNo.

3.5.3.2 Class diagrams
3.5.4 Dynamic models

**Statechart Diagram**

[Diagram of Statechart showing the flow of incidents]

**Sequence Diagram**

[Diagram of Sequence showing interactions between entities]

3.5.5 User interface
NAVIGATIONAL PATH

Police Vehicle Command and Control System

- User moves cursor to system's icon and then double clicks it. Then the system establishes and police select report case
  button to key in reported incident into the system's incident form and Police detail in personnel details form.

Incident Form
- Police key in location and select type of incident from list of incident

Personnel Details Form
- Police key in personal details

List of Incidents
- Officer selects location(s)

Vehicle Link
- Police click on vehicle button and check for available vehicle and its position. Then route the appropriate vehicle and
  personnel to the reported incident.

Main interface

Personnel Details form interface

DETAILS OF PERSONNEL

ID of personnel
Name of personnel logged system
Time reported the incident
Details of incidents form interface

Details of vehicle form interface

4. Glossary

**Authentication**  The process of associating a person with access rights.

**GPS**  Global Positioning System uses satellites to triangulate position on earth

**Login**  Procedure used to get access to an operating system, or application, usually in a remote computer.

**Scenario**  Instance of a use case. A scenario represents a concrete sequence of interactions between one or more actors and the system.