



Sri Lanka Institute of Information Technology

# E-Road Management System

## E-Path Identifier

**Project proposal – CDAP 2011**

**Project ID: P2011-072**

**Submitted by:**

V.Thivaharan

-DIT/08/C1/0235

**Submitted to:**

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**Ms. Anjana Tissera**

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**Date of submission**

## 1. Abstract

As modern societies move toward fast growing and generalized World and more governments enact laws to protect each and every individual, the management and development of roads reach the higher place with the advancement of Information Technology in this World; the road management should take advantage to upgrade their management techniques. In addition, the mobile nature of today's mobile administration requires immediate information access and total flexibility. This technology comes through as the optimal portable solution for information access, management and improved communication, while providing the strongest security measures in the market today.

Clients should be allowed to access the system anytime, anywhere and through mobile or through their personal computers. Administrator should be able to keep update the system through sending sms to the system or by accessing to the system through the internet or update through internet access able cell phones. Anyone should be able to share resources and exchange ideas through the internet.

The motivation for this research is to solve the traffic, road block's, accident's, inform the Client about the pre-planned road blocks from the government, statistical graph generations, place descriptions and provide better transport services to the Client.

A system and method for real time vehicle guidance by Central Traffic Control Unit are presented.

The proposed E-Road Management System includes a unit equipped with Individual Mobile Units (position determining system adapted to determine their present position) and communicatively linked to the E-Road Management System computer server.

The ERMS unit broadcasts the update traffic patterns in real time, thereby enabling the Clients to dynamically calculate the desired optimal travel paths.

With regards to the above problems, our team comes across with the solution called **E-Road Management System**.

## **2. Table of contents**

### 3. Literature Review

#### 3.1 Description of the project

The deliverable product is referred to as **E-Road Management System (ERMS)**. A more enhanced system with lots of new features is proposed. The existing **ERMS** is also considered when designing the system as it already facilitates some of the administration process.

Thus the proposed system is going to be used in the environment as an integrated system, using the facilities provided by other existing systems as well.

#### 3.2 Problem Specification

The typical users of the system are Travelers, Administrator of ERMS & Administration staffs.

There are number of operations that are to be supported through the proposed system. Some of them are indicate accidents, road blocks, traffic in Google map and a calendar it carries the pre-planned road blocks by the Government in addition to this the system will provide an alternative path to the Client by using the Google map by graphically.

The other problem which was brought to our attention was, how an Administrator update the system in a short predate of time, to this problem sms function is used. So it's sufficient to change the approach according to the current situation in the World.

#### 3.3 Solution Outline

The vision of our project is to provide our client with an accurate and efficient system to solve the existing problem domain.

Automate their day-to-day functions by a web based system, and a mobile based web with more features such as each and every day relevant person can update the system by just login to their account through our website, and they can easily keep track of the details of roads through our proposed system. To make their existing website more user friendly, we decided to use Google map, send sms to update the system.

Our other introducing feature is auto generate graphs, this will help to get a brief idea about the past in road vs. traffics time, road vs. no of vehicles uses a particular road, accidents per year and population vs. vehicles. This is more helpful to the government to take the decisions and other to get some idea. Also we are going to introduce a **simulator**. By using this simulator we can get what will happened in the future when no of vehicles increase, when population increase and when road conditions change what will happen. We think this is little challenge for us.

Hence satisfying all the requirements specified the project is going towards the goal of developing a reliable and easy to use tool for the ERMS.

### 3.4 Key Benefits

The new system is going to radically change the way the Traffic control, transport services, as the will be input directly into the computer in this function.

This solution will also provide the following non quantifiable benefits

- Better relation with Clients.
- More accurate motorway history and information.
- Improved management information.
- Faster processing of staffs and services details.
- This solution will provide e-mail and internet facilities to all staffs of the ERMS.

## Architecture Diagram

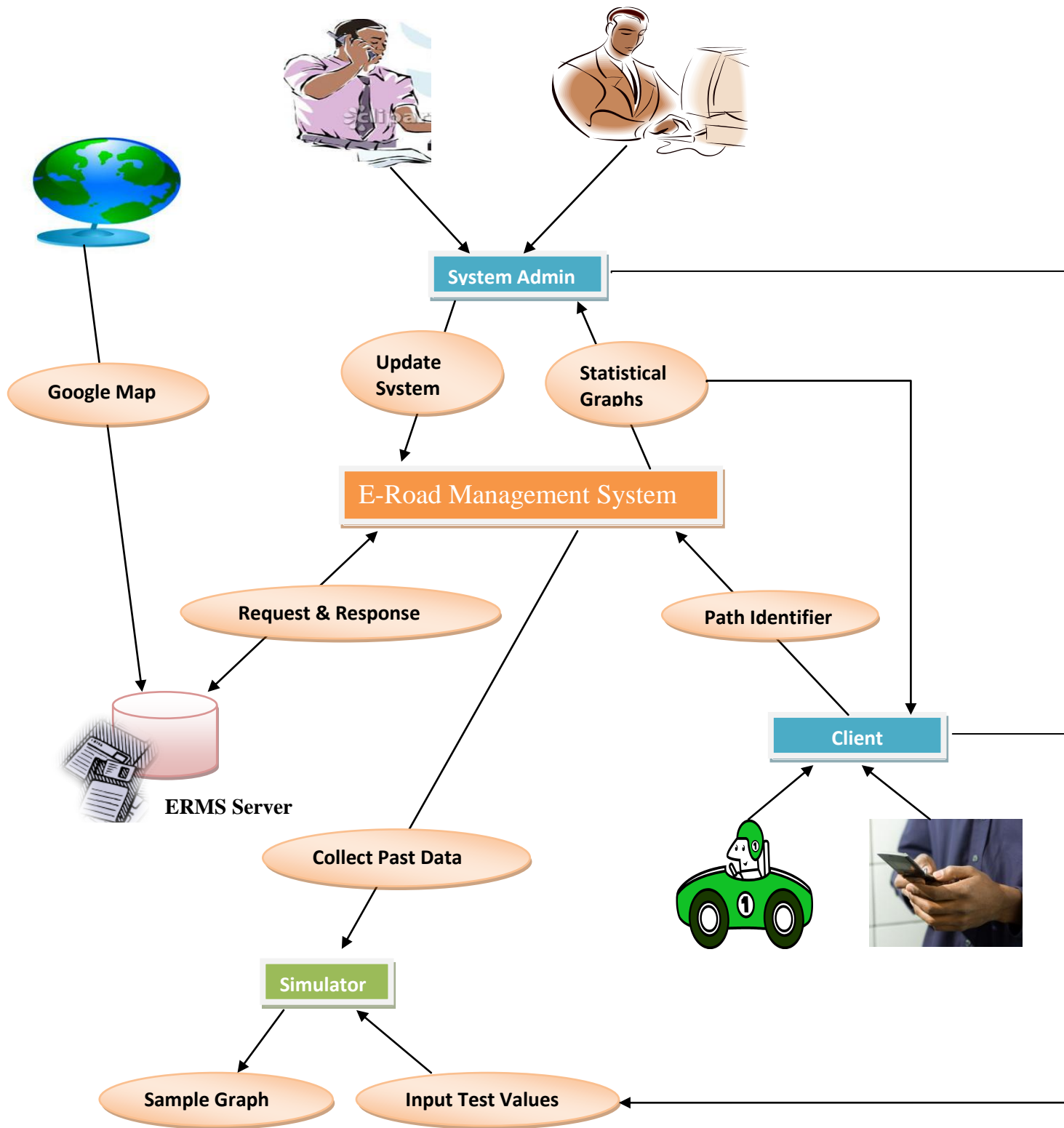


Figure -1-

## 4. Research Problem

Automotive technologies are gaining ground in modern road traffic-control systems, since the number of road vehicles and passengers is rapidly growing. There is a perpetual need for safety-critical traffic automation, and traffic engineering makes the dynamic or static analysis and the synthesis of automotive vehicle technologies possible. The main goal of engineering is the planning and management of traffic systems.

The project supports the development of reliable and optimal control structures for urban traffic and for motorway systems. The intelligent and cooperative set-up of actuation and its linkage to the central control system is vital for avoiding traffic jams and accidents. Moreover, environmental costs (e.g. pollution) can be decreased.

One aspect of the project aims at developing a traffic control algorithm for future technology. The design of the traffic control system can be evaluated in two steps – synthesis and analysis. Several models and multiple control strategies exist, and engineers must decide between them using a priori knowledge of the real system.

Previously collected information can help to choose the appropriate model, parameters, measurement and control methodologies to create the optimal solution. In many cases, control-related variables are almost inaccessible for design unless estimation techniques are applied. In a situation like this, the approximation, computer-based estimation of the variables could be useful.

Traffic simulations can be classified in several ways, including the division between microscopic and macroscopic, and between continuous and discrete time approaches. The methodologies of static and dynamic analysis of traffic systems are known. Several state variables, derived from the description of the dynamic system, can be used for operational and planning aspects.

A newly emerged area is demand estimation through microscopic traffic modeling.

The dynamic aspect of traffic simulation requires previously measured or estimated volumes of traffic. Since the measurement of certain variables in the dynamic description is rather costly, one tries to estimate them. For instance, the observation of constantly varying turning rates at a simple intersection is fairly costly.

However, the number of turning vehicles could be applied to traffic light harmonization, or generally speaking to traffic light control.



## 5. Objective

The E-Road Management System (E-RMS), implemented by us would have both specific and general objectives. Those objectives are mentioned below.

- ❖ The attention is mainly focus on the reducing the traffic, to meet all requirements our system provide some services to our Client such as,
  - ✓ Providing best path to the Motorist with the help of Google Map. After Motorist's indicating where they want to go it may show the entire best path avoiding traffic and road blocks.
  - ✓ In real time if any road or two end points jammed in traffic, in a short amount of time it will be updated in the system. After that the system will automatically set a best path between two end points in Google Map.
  - ✓ If any accident happens, after the authorize person update the system. The system automatically looks for nearby Hospitals, Police Stations and send emergency alerts (using auto generated SMS & mails). And direct them to the point. All this happen in a short amount of time.
  - ✓ A calendar is provided in our system, using that calendar Clients can get to know about the pre-planned road blocks and the alternative paths.
- ❖ Transport services plays a huge role in a growth of a Country and tourism provides is the major income in our Country to get more income, we have to provide more and more services. To cover those two requirement our system provides following ideas,
  - ✓ Client can search a place (e.g. Colombo) and in on enter, the system will provide with pointing the place in Google Map

and pointing all important locations in that place just like Hotels, Schools, Hospitals, Airport, Railway Station, Police Station.

- ✓ Buses, bus routes and distance also shown in the Google Map when Client searching for a place.
- ✓ Hotels, Hospitals, Railways, Airports, etc. are provided from an authorized web page (profile) there they can update their services and can provide services to our Client such as online reservation. After Client Search the place in Google Map and click on it Clients can view this page or profile.

❖ Mobile accessibility,

- ✓ Using a mobile phone also Clients can get to know or identifies best path.
- ✓ Client needs the system will provide alternative paths as well, such as trains and flight services. After having a look whether our Client like to reserve tickets they can reserve tickets through our system.

❖ The best idea to plan the future is get to know the past, So to get to know about the past and develop todays motor ways our system provide features such as,

- ✓ Auto generated statistical graphs between population, accidents, vehicles and more.
- ✓ Simulator, this is use to get to know how it will look like if any change happens in population, vehicles, etc. When the Client input some values in any of those the following outcome will arrives by studying the past stored data in the system.

## 6. Methodology

**E-Road Management System (ERMS) provides the information regarding road traffic, road block, accidents, preplanned road blocks, guiding the easiest path or alternative path via the mobile phone or any other devices with the help of Google Map.**

**ERMS** is also considered when designing the system as it already facilitates some of the administration process. Thus the proposed system is going to be used in the environment as an integrated system, using the facilities provided by other existing systems as well. It acts through mainly Google map by provide the information via the web base system to the Clients.

The users of the system are Motorist, Travelers and ERMS administrator and it has to be maintained continuously by the Administrator of ERMS and Administrative staffs of ERMS.

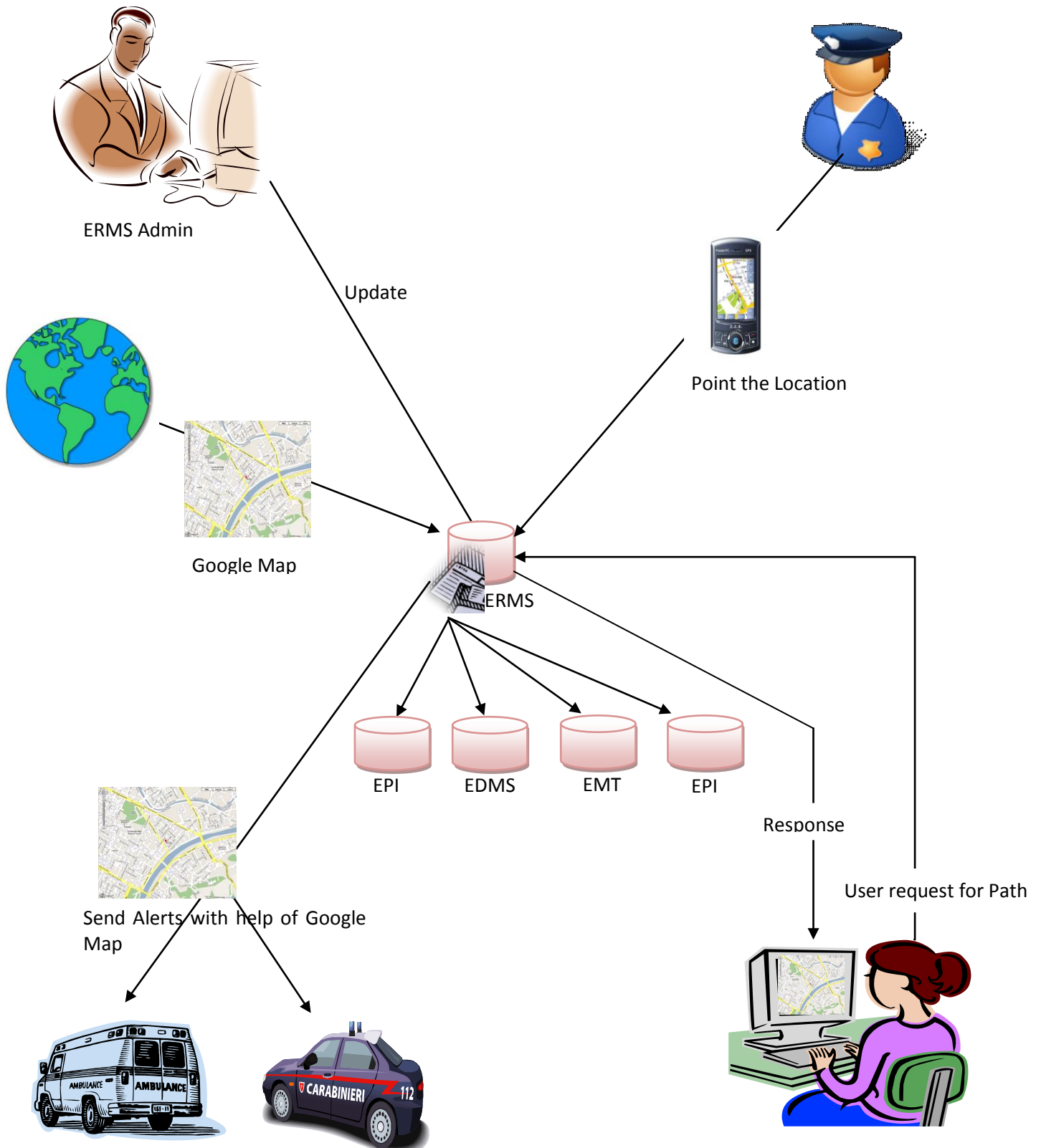
ERMS can be divvied into for modules:

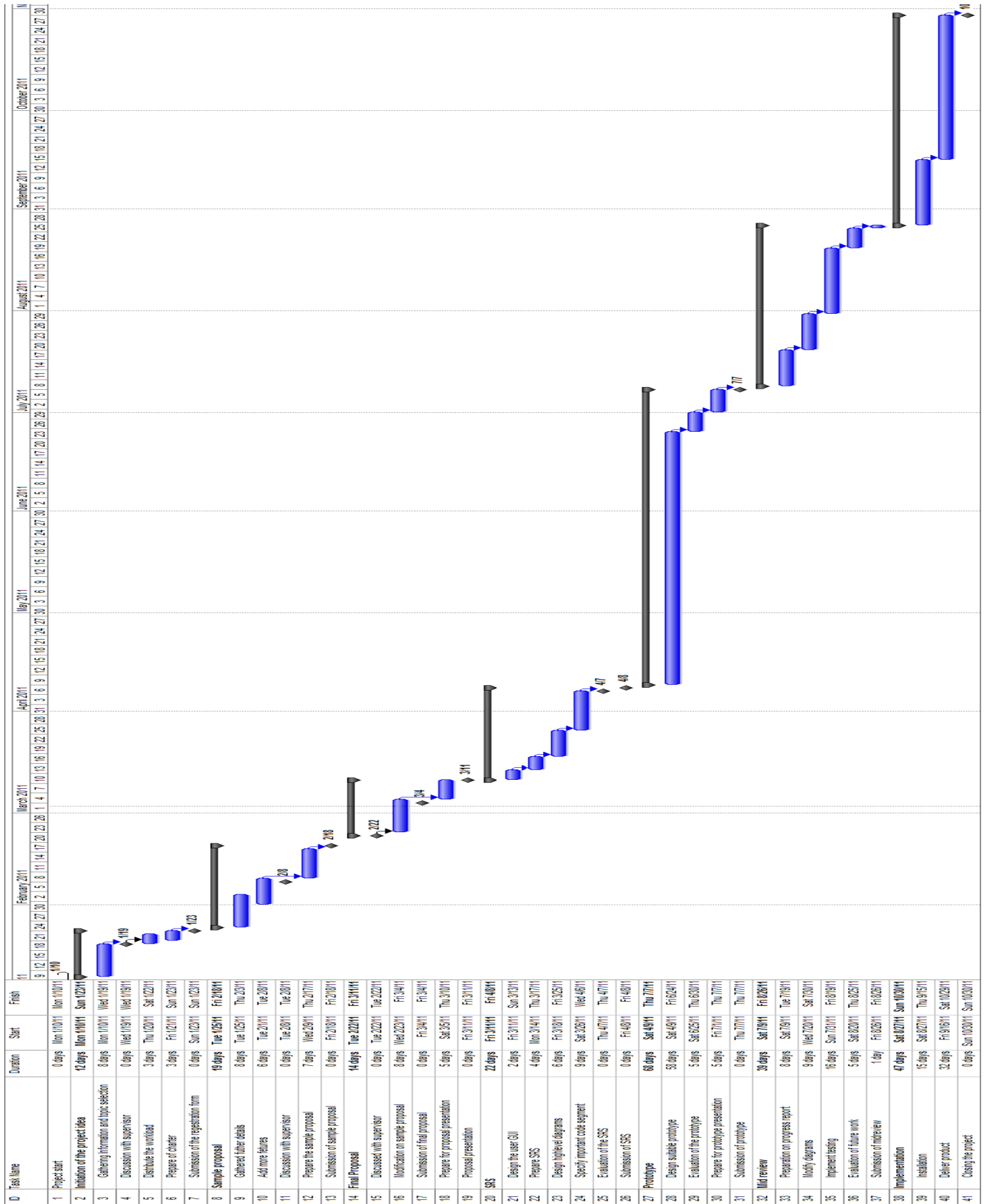
- E-Destination Management Service (EDMS)
- E-Path Identifier (EPI)
- E-Mobile Tracker (EMT)
- E-Statistical Analyzer (ESA)

In module EPI (E-Path Identifier), under ERMS number of functions proposed. Some of them are indicate accidents, road blocks, traffic in Google map and a calendar it carries the pre-planned road blocks by the Government in addition to this the system will provide an alternative path to the Client by using the Google map by graphically.

The main function in this module is when an accident is indicated to the system so after the system look for the nearby Hospitals and Police stations send them emergency alerts (SMS and mails). All this are done in a short time period. So this will make huge impact in the future motorway. And by just login to the system user can get to know about the pre-planned road blocks. This is done with the help of Google map and it carries

alternative path as well.





Ultimately the client can get the precise location and easiest way for his destination in an effective manner within a short time and more accurate way. Thus it should need a global system by getting the information of all locations in a defined area for the client and conveyed via GSM providers at the same time for the user. Thus the revelation of our project is to provide our client with an accurate and efficient way to solve the existing problem domain.

Automate their day-to-day functions by a web based system, and a mobile based web with more features such as each and every day relevant person can update the system by just login to their account through our website, and they can easily keep track of the details of roads through our proposed system.

To make their existing website more user friendly, we decided to use Google map, send sms to update the system.

Our other introducing feature is auto generate graphs, this will help to get a brief idea about the past in road vs. traffics time, road vs. no of vehicles uses a particular road, accidents per year and population vs. vehicles. This is more helpful to the government to take the decisions and other to get some idea. Also we are going to introduce a **simulator**. By using this simulator we can get what will happened in the future when no of vehicles increase, when population increase and when road conditions change what will happen. We think this is little challenge for us.

Hence satisfying all the requirements specified the project is going towards the goal of developing a reliable and easy to use tool for the ERMS.

The new system is going to radically change the way the Traffic control, transport services, as the will be input directly into the computer in this function.

- This solution will also provide the following non quantifiable benefits.
- Better relation with Clients.
- More accurate motorway history and information.
- Improved management information.

- Faster processing of staffs and services details.
- This solution will provide e-mail and internet facilities to all staffs of the ERMS.

For our web based mobile access system initially the place and area of our research will be defined in terms of precise location using longitude and latitude. We are selecting an area that can be easily accessible in various ways with the optimal transportation to the destination points with ticket reserving facilities.

After the definite of the area the information entry points, exit ways and roads will be collected manually and web access basis from the governance, police department and road development authority with the proper direction, accurate length, grading of the road, important landmarks, such as historical points, government institutions, private firms and various important places in view of the client.

As doing this, the most effective care on our clients and travelers kept in mind for their easily accessible paths in a quick web access basis via the GSM providers while they travelling. For that the collection of data regarding the roads and the land marks will be done in an effective manner with their distance between each landmark, distance from every road, distance between the roads and distance of the roads.

This will enable the client in an accurate way to guide the destination point from the start point or from the point on the way.

After collecting all the data, the data will entered to our database in terms of longitude, latitude, location, distance of the roads and landmarks. Then entering data will be synthesized in a clear manner for an easy detection purpose to save the time in a quick access way.

It should be kept in mind the easiest landmarks not be missed and the names of the roads will be in their ancient name with their grading.

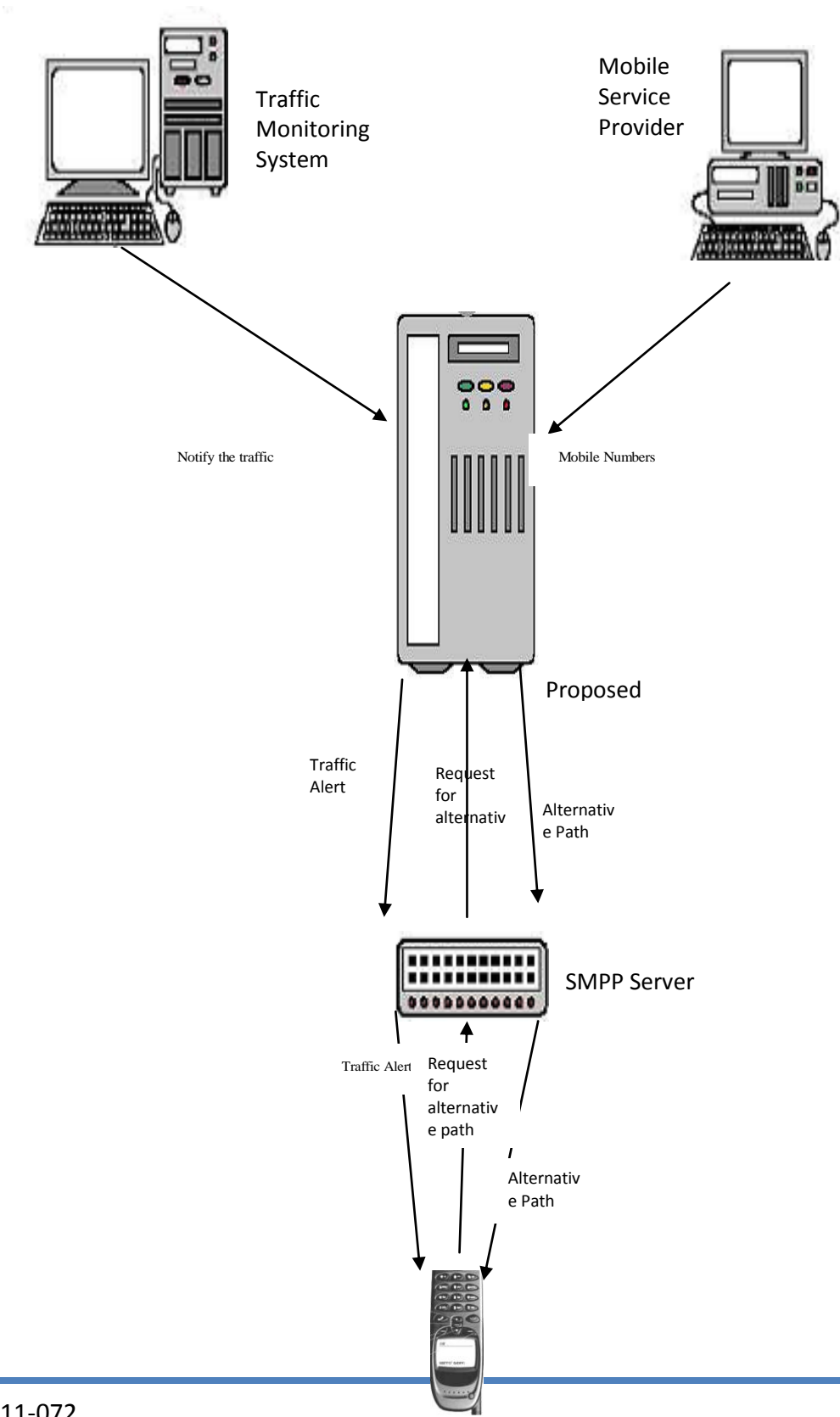
After processing all these data the map will be constructed with the geographical distribution by using the proper indemnification system as in the same way which has mentioned inversely at present. The identification marks will be put on clearly first then they will be noticed with their own names. Then only the client can easily palatable for our system in various occasions i.e. the user friendly accessibility. For an example to name the road in our map,

- the starting of the road,
- its end point,
- the direction of the road,
- the grade of a road ( A-2) ,
- the ancient name ( Galle road)
- geographical distribution ( longitude & latitude)
- The directions to and fro the destination and start points.

And for the mapping of a land mark

- The precise location in longitude and latitude
- The road name
- The importance
- Identification mark ( e.g. Red cross for hospital)
- Its proper name





## 7. Description of Personal and Facilities

Group Members	Module Name	Description
P.Premje DIT/08/C1/0215	E-Destination Management Service	-DestinationManagementService. -Audio tracker.
R.Darshitha DIT/08/C1/0195	E-Mobile Tracker	-Mobile access to the system.
Y.Tharangini DIT/08/M3/1604	E-Statistical Analyzer	-AnalyticalSimulator. -Statistical Graphs.
V.Thivaharan DIT/08/C1/0235	E-Path Identifier	-Traffic Controller
Group Members	Roles	Resources
<b>P.Premje</b>	Feasibility study Requirement Gathering Requirement Analysis Design Coding Testing Documentation	<ul style="list-style-type: none"> <li>• Microsoft SQL Server 2008</li> <li>• WinA&amp;D</li> <li>• Rational Rose</li> <li>• Visual Studio 2010</li> <li>• Flash</li> <li>• Photoshop</li> </ul>
<b>R.Darshitha</b>	Feasibility study Requirement Gathering Requirement Analysis Design Coding Testing Documentation	<ul style="list-style-type: none"> <li>• Microsoft SQL Server 2008</li> <li>• WinA&amp;D</li> <li>• Rational Rose</li> <li>• Photoshop</li> <li>• Visual Studio 2010</li> </ul>

<b>Y.Tharangini</b>	Feasibility study Requirement Gathering Requirement Analysis Design Coding Testing Documentation	<ul style="list-style-type: none"><li>• Microsoft SQL Server 2008</li><li>• WinA&amp;D</li><li>• Rational Rose</li><li>• Photoshop</li><li>• Visual Studio 2010</li></ul>
<b>V.Thivaharan</b>	Feasibility study Requirement Gathering Requirement Analysis Design Coding Testing Documentation	<ul style="list-style-type: none"><li>• Microsoft SQL Server 2008</li><li>• WinA&amp;D</li><li>• Rational Rose</li><li>• Visual Studio 2010</li><li>• Flash</li><li>• Photoshop</li></ul>

## 8. Budget with Budget Justification

Description	Amount Rs.
<b>8.1 Software Expenses</b>	
Microsoft SQL server 2008	8500/=
Rational rose	9000/=
Visual Studio2010	37,500/=
Photoshop-CS3	5700/=
Coral Draw	10,000/=
Flash Professional-CS3	10,000/=
MS-Office	13,700/=
<b>Total Software Expense</b>	<b>94400.00</b>
<b>Total Employee Salary</b>	<b>2, 70,000.00</b>
<b>8.2 Other Expenses</b>	
Printouts	2000/=
Photocopies	1000/=
Traveling expenses	1000/=
Internet browsing	4000/=
Stationery	1000/=
Transport expense	5000/=
<b>Total other expenses</b>	<b>14000.00</b>
Domain Server	6000/=
<b>Total Expenses</b>	<b>20000.00</b>

## **9. References**

## **10. Appendixes**