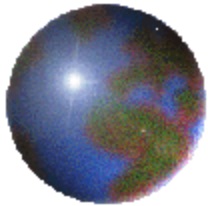


*King Fahd University of Petroleum & Mineral
Civil engineering Department*

*Uses of GIS in urban transportation
planning and management*



Prepared by:

FARAG ALI BALBAHAITH.

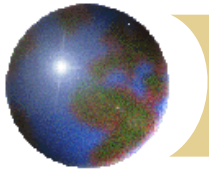
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Submitted to:

DR. BAQER AL-RAMADAN

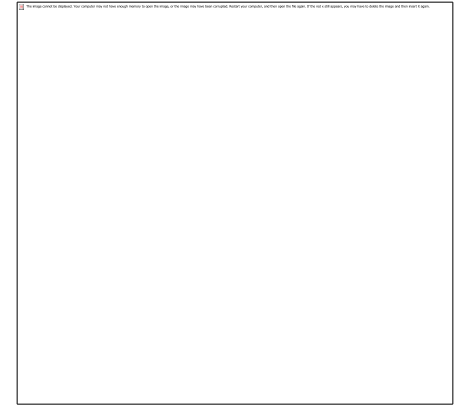
Jan 2011

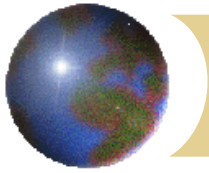




OUTLINE

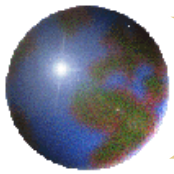
- ✦ Introduction.
- ✦ Objective .
- ✦ Benefits of GIS.
- ✦ Factors Affecting the Use of GIS in Urban Transportation Planning and Management
- ✦ Application of GIS on transportation.
- ✦ Use of GIS in Transportation Management
- ✦ Benefits of GIS on transportation management
- ✦ Case Studies





Case studies

1. Transportation system management for **Madurai city using GIS.**
2. Application of GIS in Transportation Planning: **The case of Riyadh, the Kingdom of Saudi Arabia.**
3. Analysis of Urban Planning Using GIS Techniques: **the case of Hamad Town, Kingdom of Bahrain.**
4. GIS a Tool for Transportation **Infrastructure Planning in Ghana.**

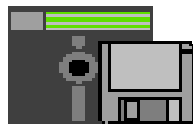


Introduction

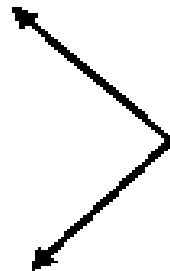
What is GIS in Transportation?



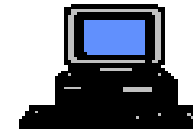
People



Software



This is a GIS in Transportation



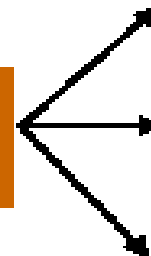
Hardware



Data (Mapping and Tabular)



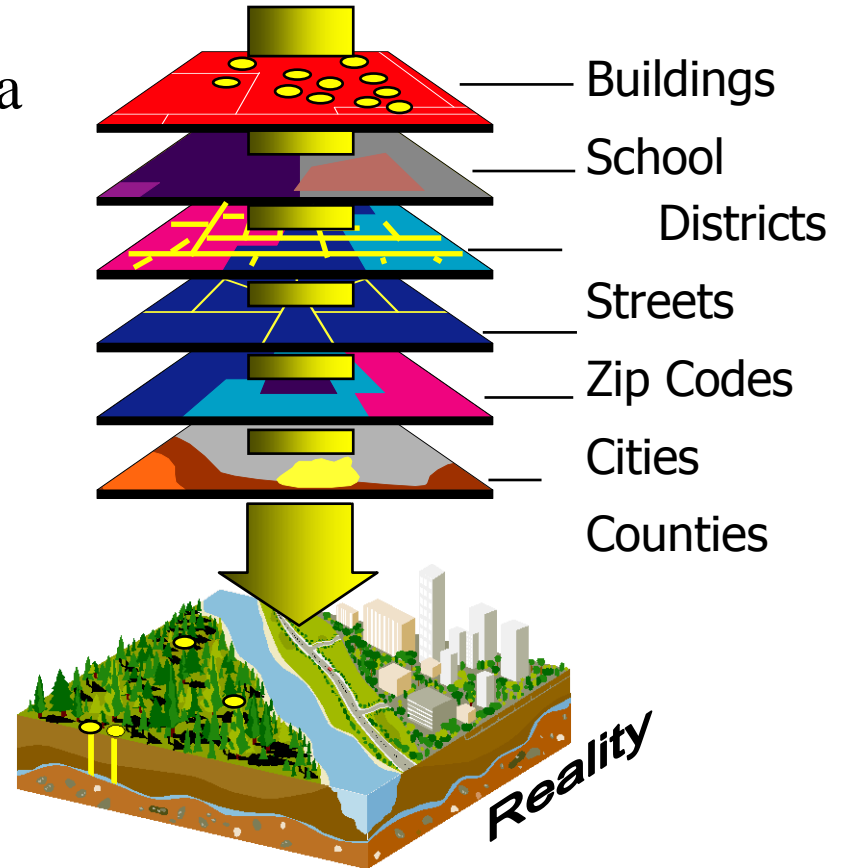
Education/Training
Policies & Procedures

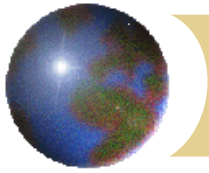




Introduction

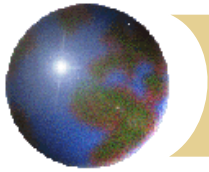
- GIS has the ability to manage data spatially in layers
- Most transportation agencies now use GIS.
- GIS now provide a wide range of tools for data management and analysis.





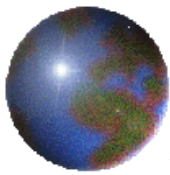
Objectives

- These are the main objective of this paper
- To provide a summary of **application of GIS in urban transportation.**
- To show how GIS can be used to **solve the transportation problems**
- To explore the applications of GIS in **transportation management.**
- Provide **four** case studies.

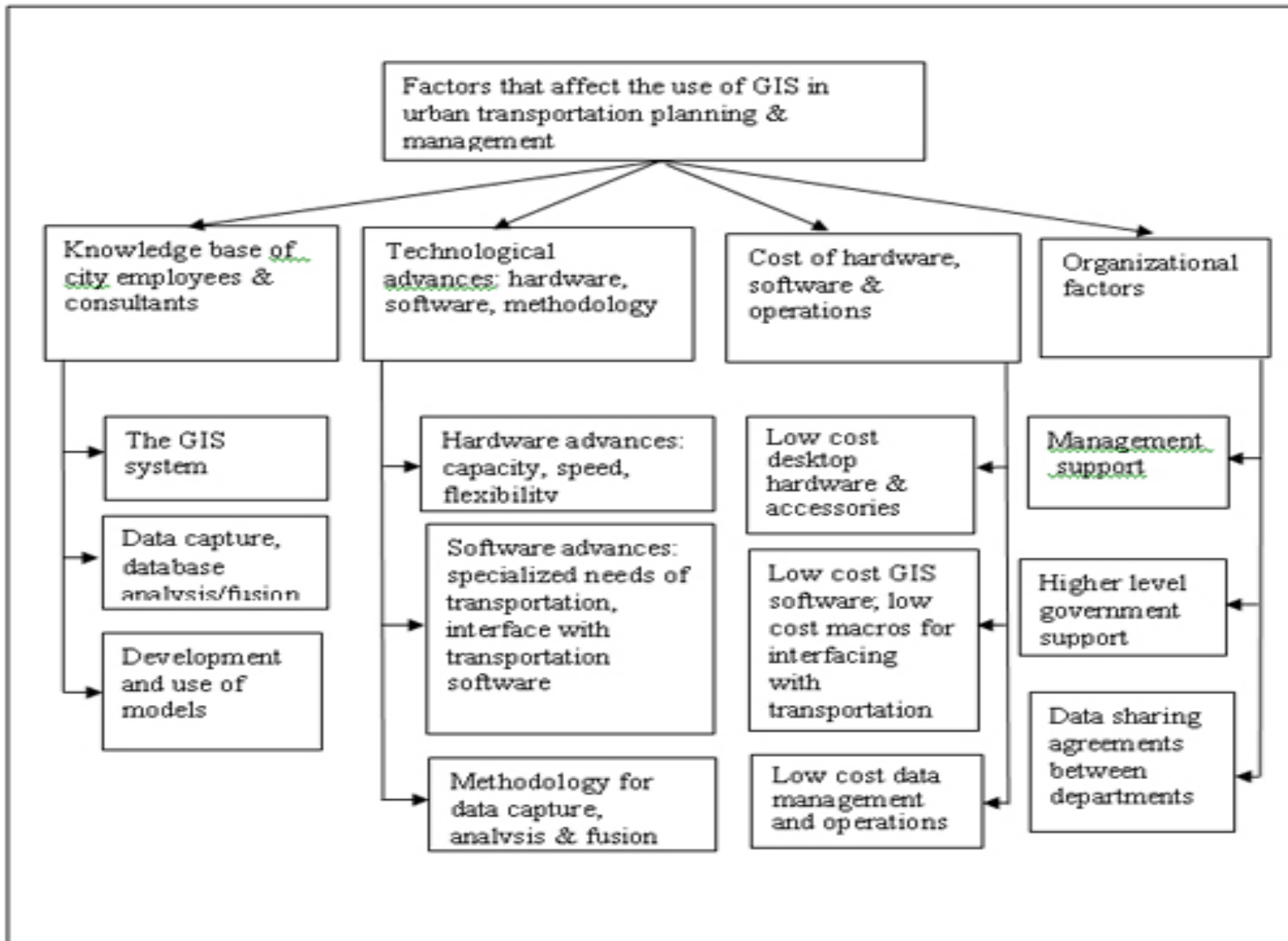


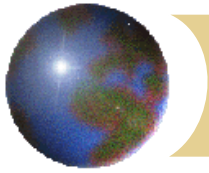
Benefits of GIS

- To maximize the efficiency of **decision making and planning**
- Provide efficient means for data **distribution and handling**.
- **Analysis of queries involving** geographical reference data for generation of new information
- Update data **quickly and at the minimum cost**.



Factors Affecting the Use of GIS in Urban Transportation Planning and Management





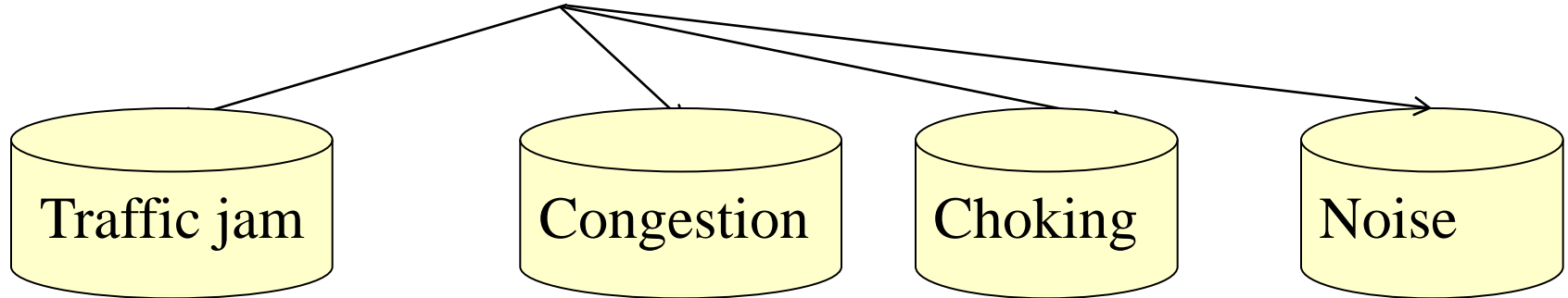
Applications of GIS in Urban Transportation

- There are many application of GIS on transportation .
Some of these applications include
 - Transportation master **plans and Site plans**
 - Multimodal transportation planning (e.g., **travel demand forecasting**)
 - Asset management systems including **infrastructure maintenance management**
 - Safety management including **accident analysis**
 - Transportation system **control and management** (TSC-TSM)
 - Construction management and **Hazardous cargo** or **overweight/oversize** vehicles permit routing.

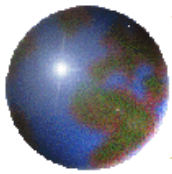


Use of GIS in Transportation Management

- According to the growth number of vehicles in countries, especially in an urban country
- There are many problems will face the people



- To solve these problems the engineer needs data.
- GIS can be used as an effective tool in Managing and Planning transportation problems.



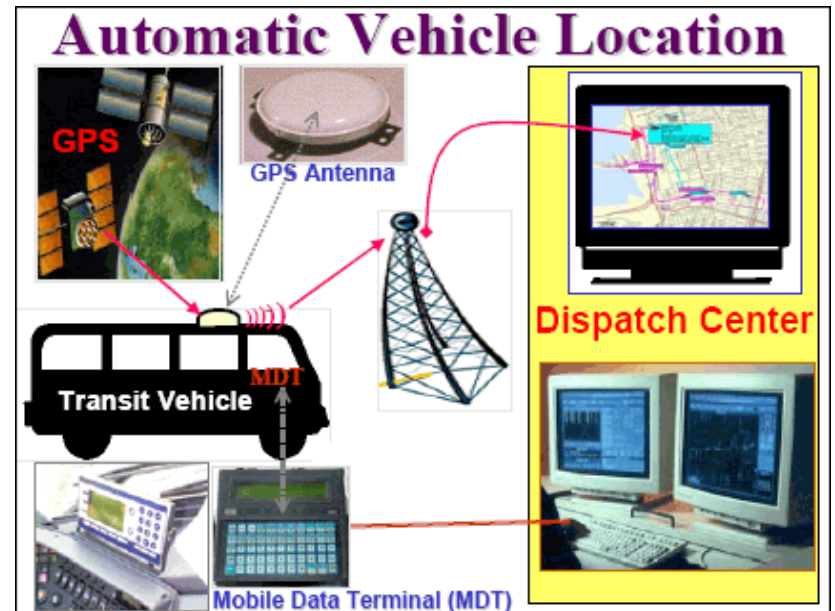
Use of GIS in Transportation Management

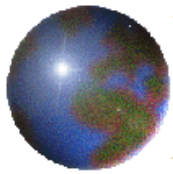




Methodology

- There are many Technologies can be used to manage the problems in the transportation.
- Automatic Vehicle Location (AVL) Technology is used to fleet management
- Vehicles fitted with the GPS and has a centralized traffic control room to view and analyses the location of every vehicle on the road.
- Traffic Control Devices





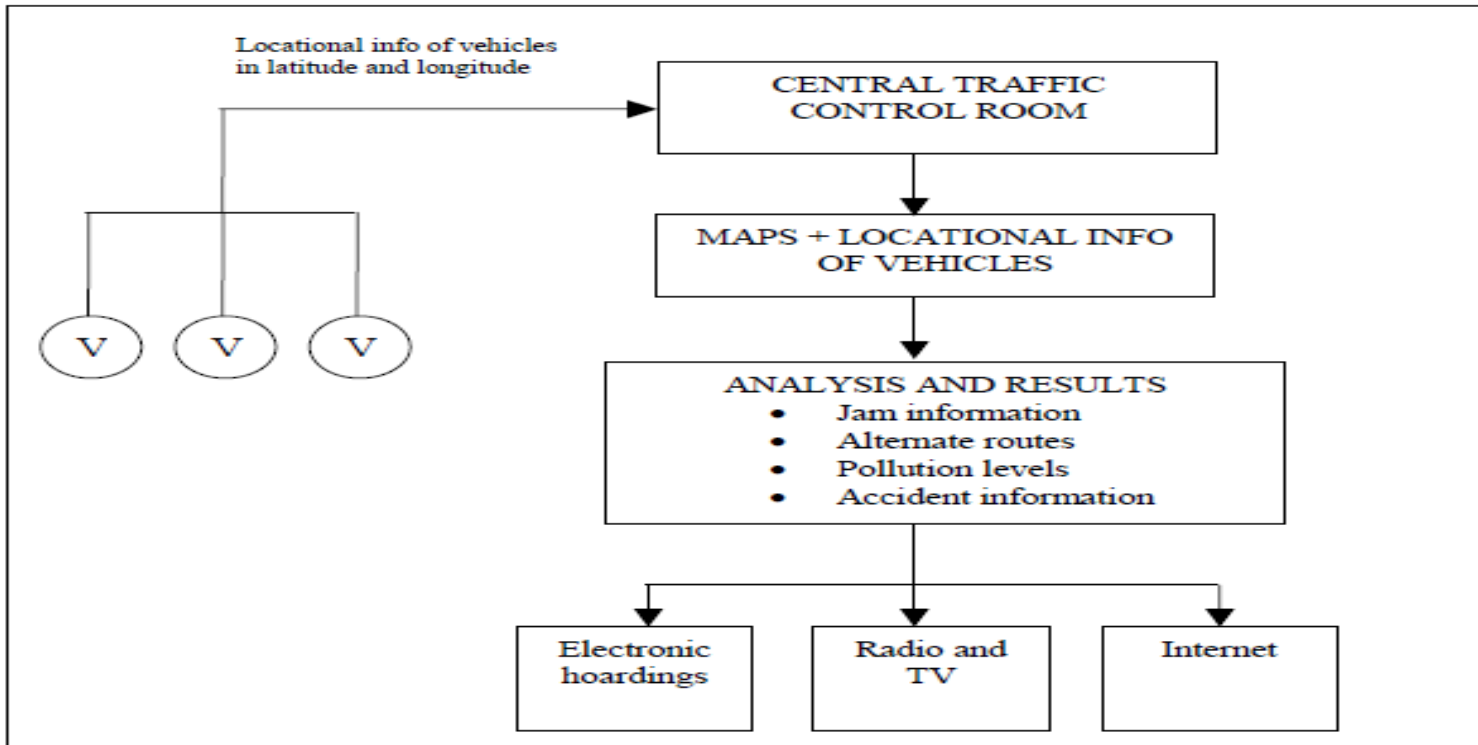
Benefits of GIS on transportation management

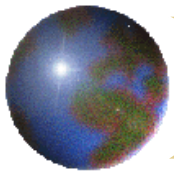




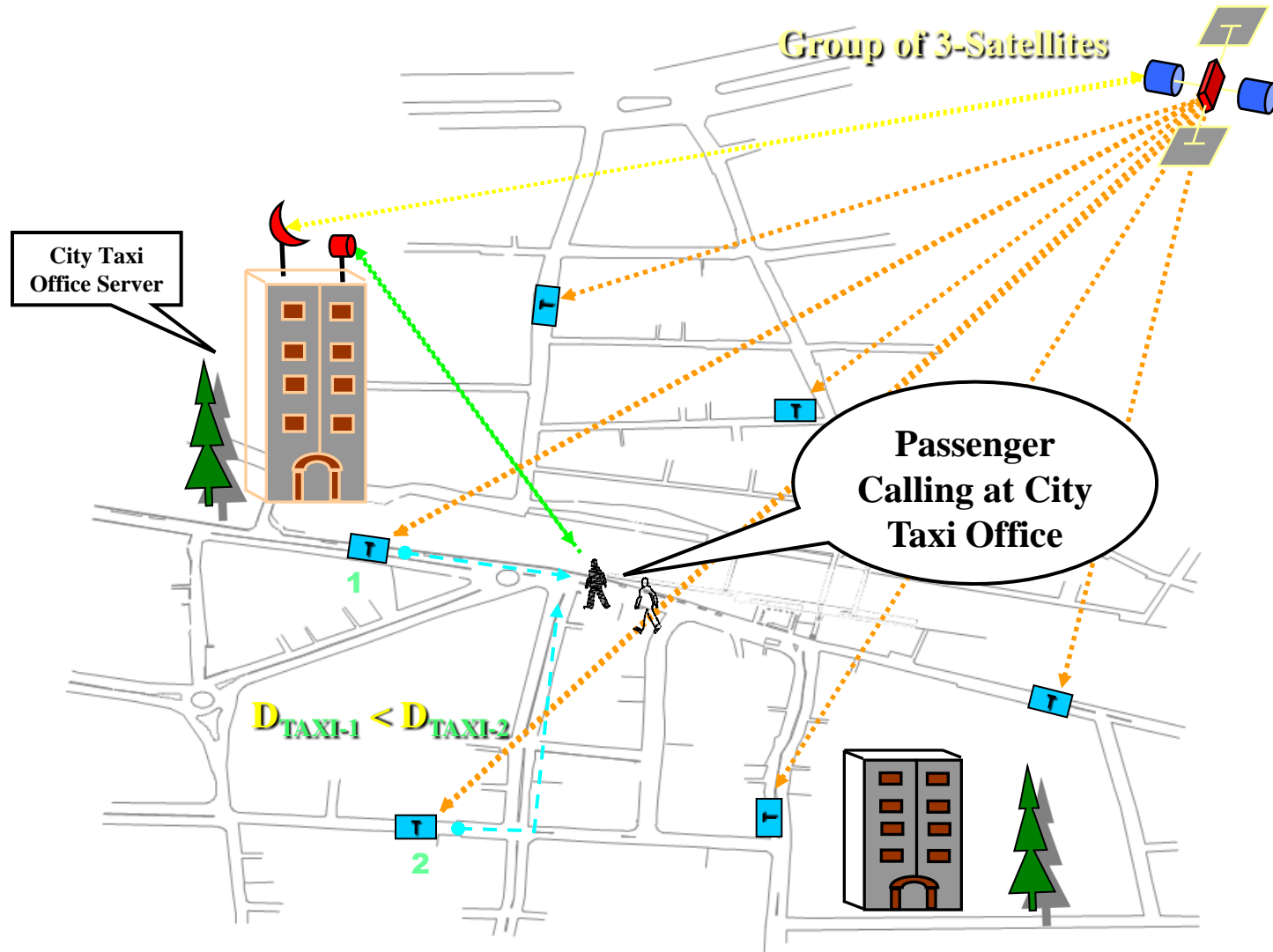
Methodology

➤ All important data that is about the roads where there are **jams** and the **details of alternate roads** can be displayed on **huge electronic sign boards** that can be installed at important traffic junctions, roads and even on the **internet**

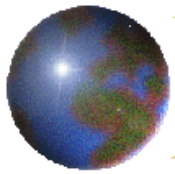




To reduce the delay time



Each of the taxi is fitted with Global Positioning System (GPS) which can send & receive signals from the master hub



Benefits of GIS on transportation management

- Transportation management can be managed effectively using the GIS technology
- GIS helps to **create maps, integrate information, visualize scenarios, solve complicated problems, present powerful ideas, and develop effective solutions like never before.**
- Lesser time on roads.
- Effective transport planning.
- The ability to manage, solve, and present the information in a new way.



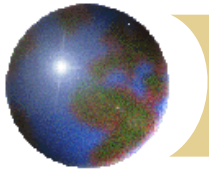
Case Studies

Transportation System Management for Madurai City Using GIS. The case study

- Madurai is the second largest City in Tamilnadu State in India
- The land use details of the urban and rural settlement of the Local Planning Area are given

Sl.No	Land use zone	Area (ha)	Percentage of developed area
1	Residential	1817.60	74.89
2	Commercial	41.42	1.70
3	Industrial	76.76	3.16
4	Educational	99.50	4.10
5	Public and semi-public	181.79	7.48
6	Transportation	212.38	8.74

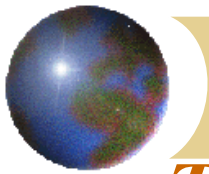
- The area for transportation infrastructure is less than ten percent of the developed area leading to transportation problems in the LPA.



Case Studies

Transportation System Management for Madurai City Using GIS. The case study

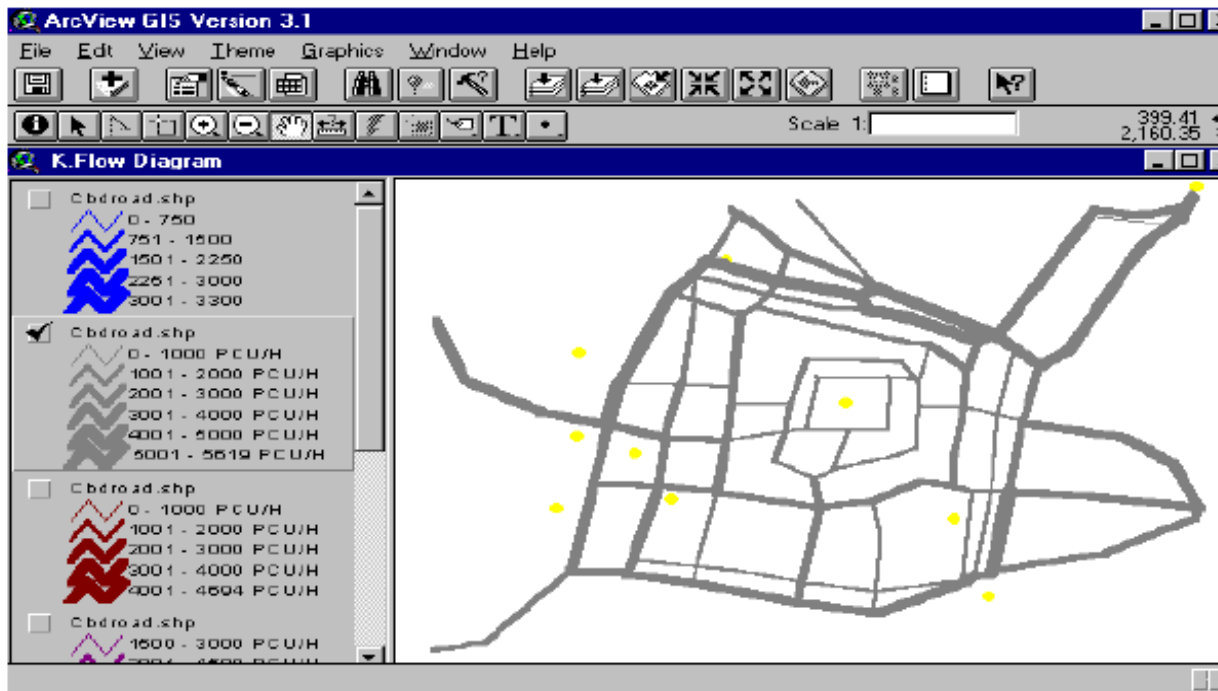
- The heavy settlement has made Madurai highly congested.
- GIS is used to study the effect of TSM measures
- Conversion of one-way streets, diversion of traffic, odd-even vehicle restrictions, parking management, effect of ring roads, and overall improvement in the network are studied with the aid of GIS.
- The TSM has solved these problems by conversion the existing two-way streets to one-way streets

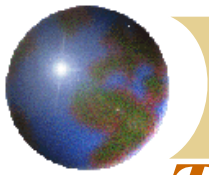


Case Studies

Transportation System Management for Madurai City Using GIS.

- The traffic volume growth is forecasted according to the vehicle growth rate and the sample survey conducted at different locations
- Using ArcView 3.1 a map of peak hour traffic flow is obtained

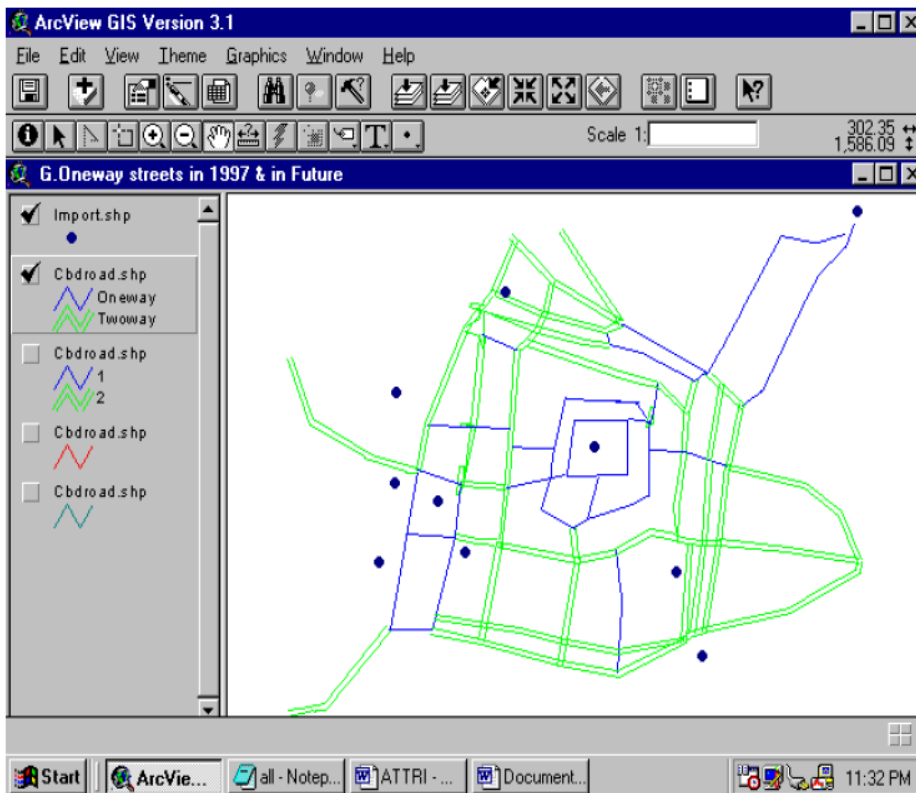




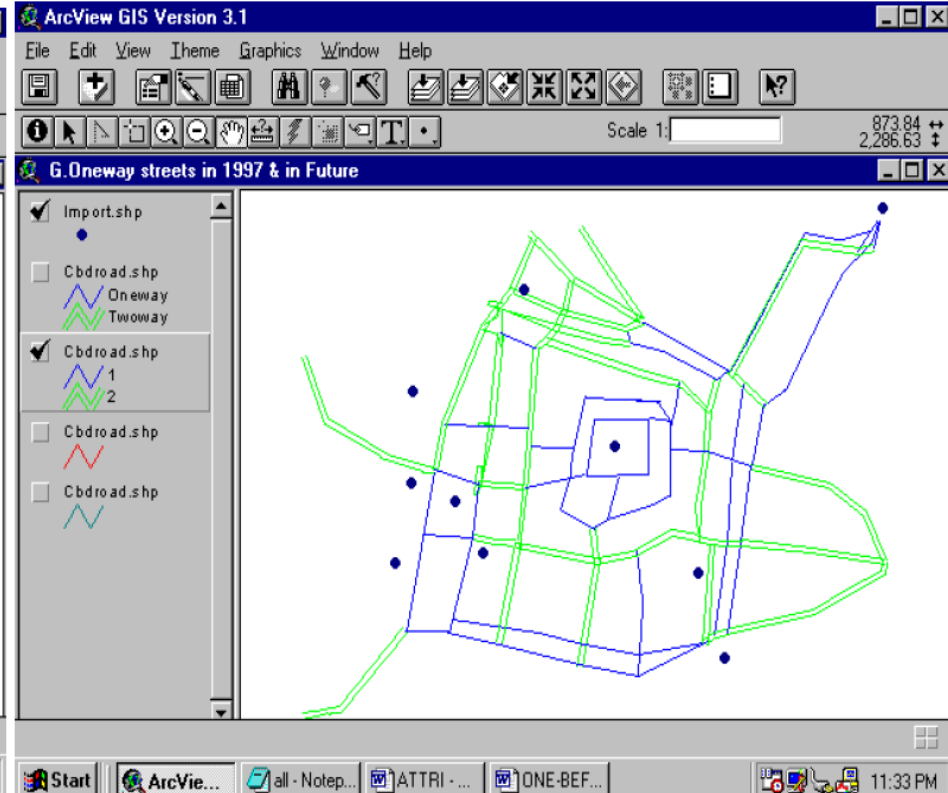
Case Studies

Transportation System Management for Madurai City Using GIS.

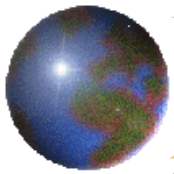
- One of the suggested solutions is to convert the most highly congested streets into one-way streets



Before



After



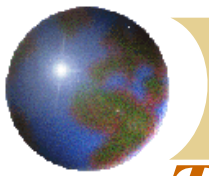
Case Studies

Transportation System Management for Madurai City Using GIS.

➤ Improvement of LOS

The screenshot displays the ArcView GIS interface. The main window shows a map titled 'F.CBD road network' with a green road network and several red dots. A dialog box titled 'LOS LIST' is open, showing a list of LOS options: A, B, C, D, E, and F. The 'A' option is selected. The dialog box has 'OK' and 'Cancel' buttons. In the background, a script window is visible with the following code:

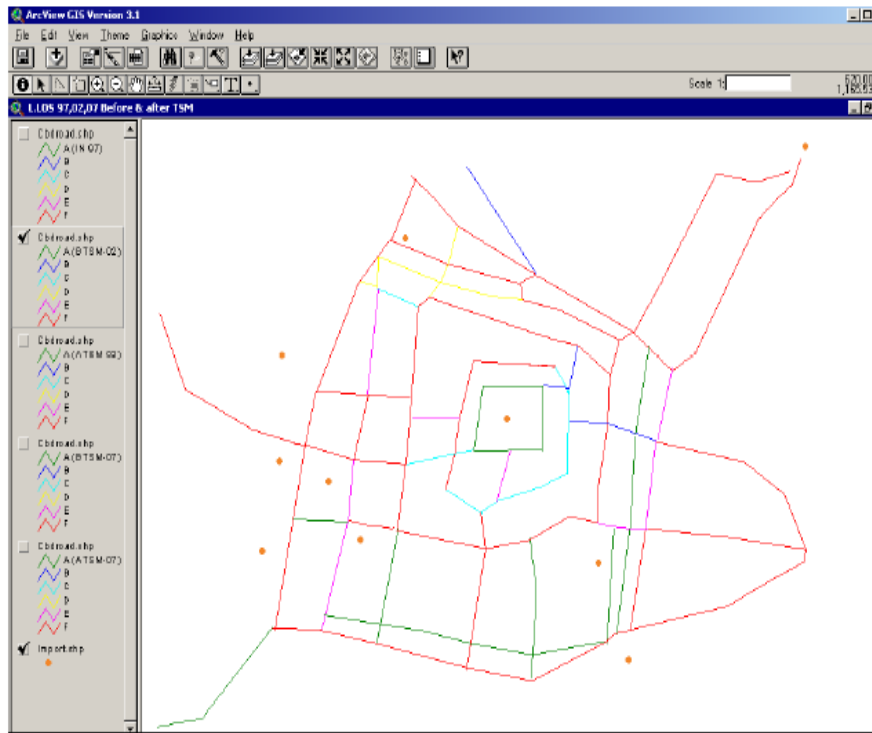
```
theView=av.GetActiveDoc
for each t in theView.GetAct
  LOS=MsgBox.ListAsString({'A
    "D " "E " "F " }, 'C
  if (LOS="A ") then
    theFTab=t.GetFTab
    thefmap=theFTab.Getselect
    expr="([fv/c_02]>=0)and(
    theFTab.Query(expr, thefma
    theFTab.refresh
```



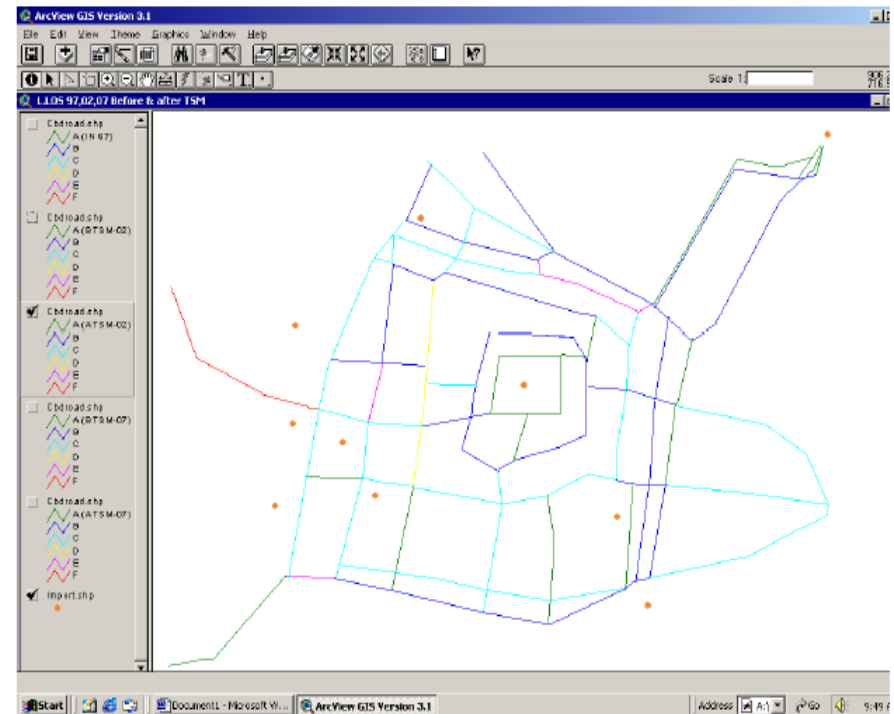
Case Studies

Transportation System Management for Madurai City Using GIS.

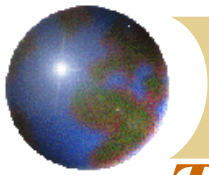
- The effect on LOS for the year 2002 before and after application of all TSM measures is shown in the following figures



Before



After

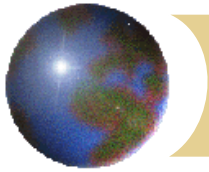


Case Studies

Transportation System Management for Madurai City Using GIS.

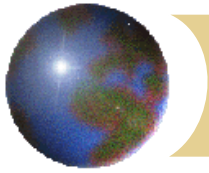
Discussion

- TSM studies are effectively carried out using ArcView GIS 3.1.
- GIS helps to study different alternative scenarios of future condition.
- The use of colored and coded maps help the planner to choose the roads that has to be considered for the upgrading in the present and for the future traffic conditions.
- The use of ArcView GIS reduces the amount of paper maps and data that could be used in absence of ArcView GIS.
- ArcView GIS helps to obtain clearer and accurate results



Conclusion

- The other case study are covered on my paper .
- GIS includes the application of the global positioning system and the integration of remote sensing technology.
- The growth of GIS and its significant cost needs more examination of its financing and economic impacts.
- The GIS helps the engineer to plan many projects in the same time .



**THANK YOU
FOR
YOUR ATTENTION!**