

Implementing Telematics System Design for Traffic Violations & Challans on Vehicles

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Abstract—This research creates a way to create telematics and interact between cars and people through a digital platform.

There are many ways to use CAD/CAM software systems, considering the experimental theoretical framework focused on measuring instruments. Telematics is a way of tracking cars, trucks, equipment and other assets using GPS technology and onboard diagnostics (OBD) to show the movement of the asset on a computer map. It is a two-way connection to the vehicle for data and information transfer from the vehicle. Today, every car is equipped with a telematics system.

Index Terms— vehicle; GPS technology; cars; Trucks; experimentation.

I. INTRODUCTION

In its broadest sense, telematics is the combination of two sciences: telecommunications (infrastructure including wires and cables) and Information systems (including computer systems). Today, the term is often used to refer to telematics solutions used in the trucking industry. According to Gartner, wireless telematics devices and "black box" technology collect and transmit information about vehicle use, maintenance, and service. A popular option for today's companies is to use fleet management software (telematics competition) to manage the vehicles they manage and gain a better view of the health, profitability, efficiency and productivity of their entire fleet. Today, wireless is used more and more. The wireless industry in India is expected to grow at a very high rate in the coming years compared to other countries. Population size will replace India on the world platform in the coming years.

By the end of 2030, 30 million households in India will use data connections. Every region relies on this wireless technology. Intel's Otellini predicts that by 2030, 1.5 billion PCs will have wired or wireless broadband connections. The operating margins of cable broadband services are around 60%. The consumer wants more production. Customers pay Rs.3,000 per month for cell phone and internet service. The average Indian citizen drives 541 hours per year (1.5 hours per day) (NTPS). 97 million people in India work on their brains for at least 37 minutes a day. The automotive industry is also highly competitive; to provide the best features and services necessary for success.

The telematics system has a vehicle (cell phone, GPS, vehicle information) which is a wireless interface that pro

vides support for back-end systems.

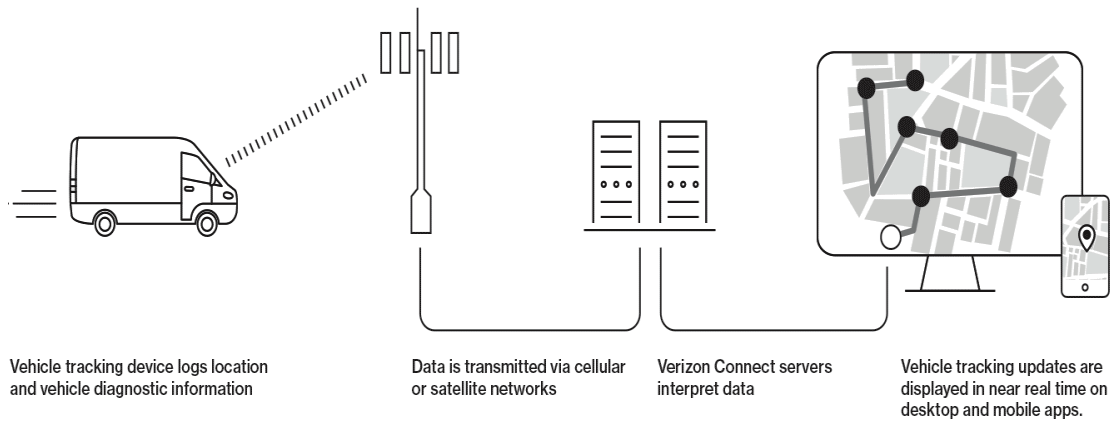


Figure 1.1 Structure

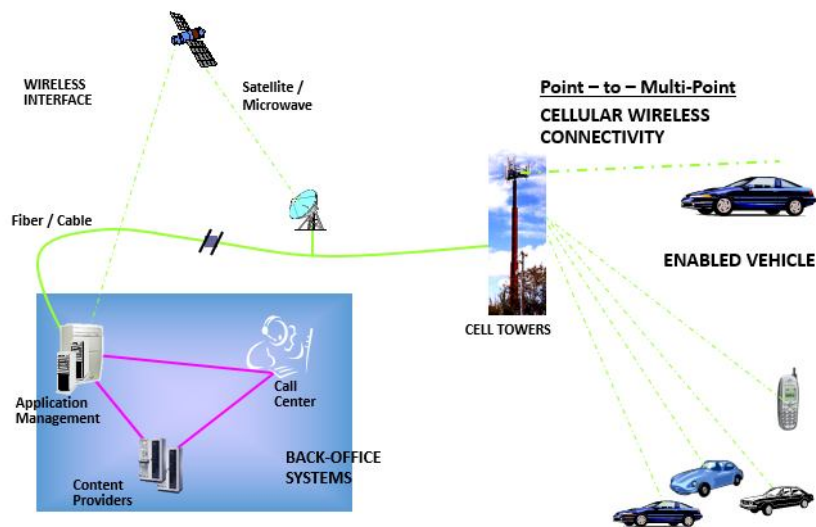


Fig 1.2 - Potential Components in a Telematics System

A Wireless Technologies Applicable for Telematics:

- Cellular (Analog, CDMA, GSM; Voice, Data/SMS)
- Short Range Communication (Bluetooth)
- Medium Range Communication (802.11)
- Satellite Communication (Boeing Thuraya, XM Radio, Sirius)

Commercial telematics for the automotive industry applies to all categories.

Ocean

Route

Airline

II. TELEMATICS WORK

The heart of a telematics system consists of a vehicle-mounted vehicle tracking device that enables the sending, receiving and storing of telemetry data. It connects to the SIM card via the vehicle's own On-Board Diagnostics (OBDII) or CAN-BUS port, and the in-car modem communicates in the wireless network. The device collects GPS data along with various other vehicle



Fig 1.3 – WABCO Telematics Device

specific data and sends it to a central server via GPRS (General Packet Radio Service), 4G mobile data, and cellular networks or satellite communications. The server interprets the data and makes it visible to end users on secure websites and smart apps for smartphones and tablets. The data stored in telematics can be location, speed, run time, acceleration or braking, fuel consumption, vehicle idling, etc. may contain. When analyzing specific conditions and patterns, this data can provide information about the entire fleet. Telematics equipment fitted to personal vehicles: cars, trucks, boats, motorcycles, commercial aviation. Service vehicles: mail vans, semitrailers, border patrol cars, coast guard, ambulances, etc. Vehicle owners use technology for personal, boat, military purposes. It has many security features for customers. It saves time (navigation) and increases productivity (cars). It makes the most of their assets (monitoring equipment, operational monitoring) for fleet service providers. Business model Additional information (recognition, driving) of the car is removed. Increases car sales (or "survival rates"). Telematics services are now available to ensure the safety of customers' vehicles. Airbag deployment warning, seat belt warning, emergency assistance, roadside assistance. Security features include automatic theft alert, theft detection, geofencing, car crash, and remote support. Other Telematics Services -

Fleet provides fleet operations and helps manage fleet tracking, asset management, vehicle information, usage tracking and vehicle tracking. Fleet Leverage Client Transactions Paperless Checklist User Log Instant Messaging and Job Scheduling. It has many floors ahead for service information, software downloads Content downloads, vehicle diagnostics and repairs. Expansion into other dimensions of the vehicle cycle (manufacturing, vehicle development, design) will be an important contributor to future services/developments. Communication bandwidth includes (wireless) traffic access, traffic communication (messaging). It reduces costs (equipment, service) and its structure (Bluetooth, car messaging) will help a lot.

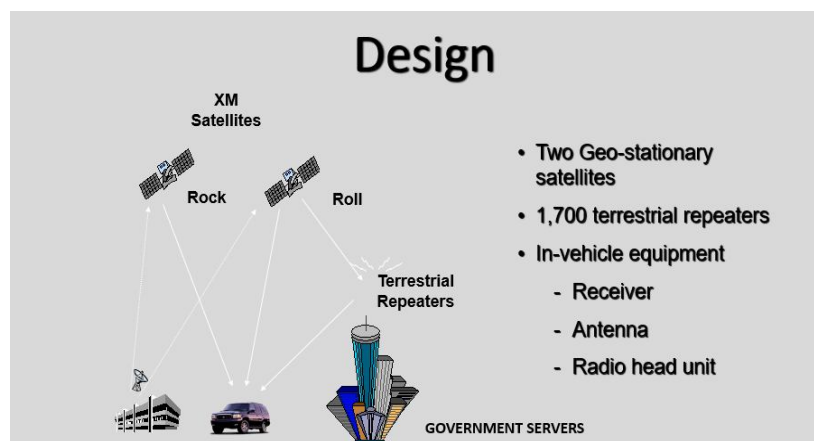


Fig 2.1 - Conceptual design of the proposed work

III. TELEMATICS DEVICE INSTALLATION

Many companies today install GPS tracking and telematics systems directly on their trucks. If the vehicle does not come with this technology, a rear GPS device can be installed. These can be used from the battery or from the vehicle's own electrical system. Some OEMs (such as Volvo, Mack, Ford, and General Motors) have also partnered with telematics service providers to provide the highest level of customer experience. In the coming years, the

auto industry will likely continue to develop smart cars that use telematics to deliver better value to customers. These systems will also help connect cars to cities and smart transportation technologies, taking advantage of the Internet of Things (IoT) landscape.

IV. USES OF TELEMATICS IN FLEETS

Telematics solutions can be integrated with existing applications and systems, enabling a wide range of applications for ships of all sizes, such as:

A. Vehicle Tracking

Vehicles can be tracked by connecting GPS satellites and receivers, GPRS network and cloud computing. GPS receivers download data from GPS satellites and process it for use by applications such as the driver's GPS navigation system. It also sends this information via GPRS to the web server used by office staff, which can be used to send the closest driver to the new job.

B. Trailers and Asset Tracking

Fleets can attach GPS trackers to trucks and other non-motorized assets and use them to guide drivers directly to trucks to ensure they don't get lost. Drivers can mark the position of the GPS unit while towing the trailer, and the integrated systems communicate easily, allowing the driver to go directly to the trailer. The system can also be configured to instantly alert the manager's mobile phone in case of unauthorized movement on the trailer or property.

C. Improvements

Vehicle maintenance and asset lifecycle management can be improved by using fleet telematics to monitor time data and schedule preventive maintenance, and also helps to monitor backup protection, logbook and service monitoring information. With access to diagnostic information such as battery voltage, coolant temperature, drivetrain failures, intake valve problems, oxygen sensor problems and more, fleet managers can reduce costs and keep vehicles in safe working order.

D. Safety Monitoring

Managers can use fleet telematics to monitor vehicle speed and position, as well as adverse driving conditions and seat usage. Telematics provides a digital map of all aspects of vehicle operation, helping fleet managers understand where accident prevention and driver safety standards can be improved.

E. Insurance risk analysis

Insurance companies can use the Internet of Vehicles to monitor drivers' behavior to make better decisions and adjust premiums accordingly. Telematics equipment can also report that the vehicle is being used outside of a certain area, known as a geofence.

V. THE BENEFITS OF TELEMATICS IN FLEET MANAGEMENT

Telematics technology can help fleets make improvements in key areas:

A. Reduce fuel costs

Telematics can help identify areas of waste such as idling vehicles or fuel leaks, allowing fleet managers to address these issues in a timely manner, which is beneficial over time. It also helps to manage the most efficient route planning for each driver to minimize unnecessary kilometers.

B. Enhancing Safety

Continuous feedback on driving and behavior allows fleet managers to guide drivers and reduce undesirable driving behaviors such as speeding or braking. Improvements can be made as far as possible to support new safety targets and information based on driver performance information.

C. Potential

With realtime GPS data logging, drivers can help avoid traffic delays and prepare for severe weather conditions. Fleet managers can quickly and easily make any new location or addition to the nearest vehicle and guide them to the most efficient route to their destination.

D. Better Financial Management

By tracking the exact time the car starts to shut down for a day, fleet managers can shut down and close staff working hours. This helps employers verify that employees are paid timely and accurately for hours worked, while comparing hours to orders, eliminating unnecessary hours spent manually.

VI. THE FUTURE OF TELEMATICS IN INDIA

Telematics will grow exponentially as new applications are developed to take advantage of the widespread use of modern GPS and mobile devices. More and more ships are realizing the need to monitor ship operations to control costs, increase productivity, improve accountability and maintain compliance with government regulations. Telematics will become an integral part of all operations today as fleet owners move beyond the basics to provide "broad integration with the business, including mobile workforce management, ERP software, and business management."

VII. USE OF TELEMATICS ON NHAI AND GOVERNMENT SERVERS

Improving infrastructure management (transport, toll) and vehicle maintenance through telematics design on government servers will be very effective. Violation will result in fines, fines and fines. Govt may launch telematics as a future project to help comply with CMVR regulations across India. Section Harassment Section Harassment.

A. Speed Control 80 km/h

You will be fined if you are not within 80 km/h of the NHAI.

B. PUC Regulations

Thanks to the developed telematics system, the PUC readings of the vehicle can be taken and Challan can be written in case the level is not in good condition.

C. NHAI's Accident Warning System and Roadside Assistance

If the vehicle is involved in an accident in a particular area. Government officials will track and monitor the location. Nearby calls will be directed to the hospital and onscene support will be provided. Roadside Assistance Tax can be taxed based on the vehicle's movement in India.

D. Payment of Excess Tax

Heavy fines may apply if the vehicle is operating with high tonnage NHAI. Such studies will be based on vehicles capable of carrying loads. Their information will be collected in a telematics system through penalties and fines will be imposed.

VIII. TELEMATICS DATA

Vehicle telematics solution has 3 building blocks: telematics control unit, telematics cloud server, front-end web application and mobile application. The Telematics Control Unit (TCU) is the host of telematics equipment that communicates with the vehicle network (CAN bus) and backend cloud server (GPRS). The TCU collects important vehicle information (in different ways) such as diagnostic information, real-time location and vehicle speed, and sends it to the cloud server in a special packet format over wireless networks such as GPRS/cellular/LTE. End users can access the telematics data stored in the cloud telematics server via a web application or mobile application.

The Internet of Vehicles Control Unit (TCU) is the main computer of the Internet of Vehicles, which communicates with the vehicle network (CAN bus) and air support (GPRS). The TCU collects important vehicle information (in different ways) such as diagnostic information, real-time location and vehicle speed, and sends it to the cloud server in a special packet format over wireless networks such as GPRS/cellular/LTE. An end user can access the radio data stored in the cloud telematics server via a web app or mobile app.

A. Telematics Control Unit (TCU)

Telematics control unit (TCU) is the core of the telematics system and controls many functions such as:

- Vehicle data collection from CAN-BUS port
- Management of data collection from various communication interfaces such as CAN, GPS, UART, GUI

- 4 two battery management control servers
- Control Communication with Telematics Cloud Server User Board/HMI Device

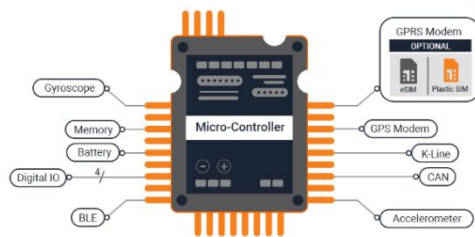
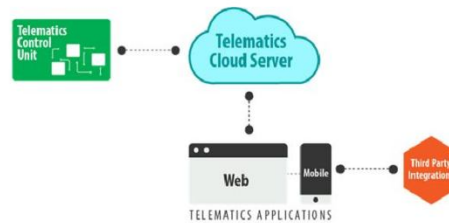


Fig 8. 2 – Micro Controller Fig



8. 3 – Micro Controller Process

The telematics control unit (TCU) uses hardware and software to perform these functions. Let's take a detailed look at this hardware and software.

B. TCU hardware architecture policy

- Global Positioning System (GPS) module to monitor vehicle latitude and longitude information.
- Central office with memory management and file processing.

Commercial telematics systems rely on microcontrollers, microprocessors, and even programmable gate arrays (FPGAs) to control the various processes occurring in the TCU.

Highperformance processor from Telit Devices, Renesas Electronics and STMicroelectronics is mainly used to develop telematics systems

C. CAN bus modules Communication and vehicle ECU

Many telematics devices also support OBD II, MOST, TCU to communicate with the vehicle ECU via the CAN bus and receive important information such as engine speed, etc. The telematics system can also use the K/Line bus to warn users of theft (warning the user if the vehicle has been unlocked by anyone) or to detect theft.

- Memory unit required to store information in unreliable or nonnetwork conditions; or, in some cases, save traffic information for future use. The memory module can also be used to support social media such as speech recognition. Flash memory and dynamic random access memory are some of the types of memory commonly used in car telematics systems.
- Network connectivity to support multiple communications including Wi-Fi, cellular, LTE and more.
- GPRS module for data connection and sometimes voice communication with remote devices. In addition to the GPRS modem, the GPRS module usually comes with a SIM card, electronic SIM card or plastic SIM card to communicate with a remote mobile phone.
- Internal battery module rated 3.2 to 3.4 volts for integrated power management. The battery body can be used in many situations such as: Realtime recharging when the car engine is off. For accessing telematics data while the vehicle is off, tracking and recovering stolen cars
- Communication etc. Bluetooth module for connecting nearby devices to mobile phones.
- Interface microphone for hands-free calls, voice commands and more. It also supports stereo output to play audio files from the car.
- General Purpose Input/Output Interface (GPIO) system for connecting lights, buttons. This includes analog and digital I/O type interfaces.
- Navigation maps, vehicle speed, fuel consumption etc. HMI/User Interface devices to display important information such as Users can use the HMI to access free cell phone calls, view maps, play media files and more. Connects to TCU via HMI, GUI or HDMI port.

IX. RESULT

Telematics system is currently only used for vehicle tracking and navigation purposes. However, it could be a turning point for the future government. None of the models listed above are currently available worldwide. Such studies can be implemented in India as an example to other countries and transportation will be greatly improved and the risks of accidents and incidents will be reduced. The use of telematics system design will improve

transportation management. The Quick Check Alert, PUC Standard and Overweight Alert features will help the government collect taxes and fines from citizens without corruption. In addition, technology is changing very fast, in the field of telematics, the future of the ADAS system (Advanced Driver Assistance System), DSMS (Driver Condition Monitoring System) and Radar system will be installed in the car, which will strengthen the security of transport platforms and other networks and governments.

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