

Telematics and Potential in Indian Market

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ABSTRACT

This paper presents an overview of the telematics domain, with specific focus on the Indian Market. Telematics service areas broadly includes V2X (vehicle-to-vehicle and vehicle-to-infrastructure) and safety communications, fleet management and monitoring, vehicle security, diagnostics, emergency and roadside assistance, automatic crash notification, service appointment scheduling, toll collection, vehicle insurance. Navigation, infotainment and in-car communications are also closely related areas. An emerging trend is that V2X telematics may be delivered using smartphones and networks such as 4G. The primary reason is cost advantage in utilizing smartphones as the platform to bring services to vehicles. Smartphone based applications and web portals can be used to enable remote access features. In fact, if Federal Communications Commission (FCC) decides to eventually share the 5.9 GHz DSRC band, telematics may in fact rely much more on standard telecommunications infrastructure. Thus, a good strategy in the near future may be to reduce reliance on DSRC equipment in vehicles and use smartphones and standard 4G and other telecommunication infrastructure to provide useful telematics services, especially for emerging markets such as India.

For India, where road and vehicle safety are major issues and opportunities for customized value added services abound, a detailed analysis of the trends in telematics is required. In terms of telematics services, India is significantly behind other BRICS countries such as China and Brazil. This paper presents some insights into technologies and services that are likely to take off in India in the near future. A user survey has been conducted to gauge the market preferences for Telematics services in India.

CITATION: Sreekumar, A., Meena, A., and Shahabudeen, S., "Telematics and Potential in Indian Market," *SAE Int. J. Passeng. Cars – Electron. Electr. Syst.* 7(2):2014, doi:10.4271/2014-01-0251.

INTRODUCTION

Telematics is defined as the integrated use of telecommunications and informatics. It broadly includes the areas of vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communications. Commonly cited functions include fleet management, tracking, remote vehicle status, security, diagnostics, emergency, and roadside assistance, automatic crash notification, service appointment scheduling, toll collection, insurance telematics, OTA (over-the-air) software updates etc. Navigation, infotainment and in-car communications are also closely related areas. Safety is a key objective. Therefore, all telematics systems and applications need to consider driver distraction reduction.

TELEMATICS - SUCCESSFUL PRODUCTS AND SYSTEMS

Here we briefly look at some of the popular telematics products and services.

Global Scenario

Solutions such as TomTom fleet management services, delivered via the web as software as a service [1] are very popular. Toll collection systems include very successful systems such as the Electronic Road Pricing (ERP) system of Singapore. Google Navigation is very popular as a navigation tool. Mirror Link, Miracast are successful in-vehicle communications solutions.

Through Contran 245, the Brazilian government plans for all vehicles to be equipped with tracking devices. This is intended to reduce car thefts and vehicle insurance rates. 20% of all new cars, vans, trucks and utility vehicles produced for the Brazilian market must be equipped with the Contran 245-specified tracking device by January 2014. The target is set to 100% by December 2014. In Russia, it was decided in 2009 to set up a countrywide emergency call service for road accidents. The GLONASS satellites launch was completed by April 2013. The service, ERA GLONASS will be ready for test operations by December 2013[Z].

IRIS" (Intelligent Route Information System) is an information service provided by SBS Transmit, a public transport operator in Singapore. Through IRIS, people are able to plan their travel with shortest travelling time and get the real time update of bus services. These services are available through website, SMS, GPRS, WAP and smartphone applications[8].

Indian Scenario

Telematics systems are just beginning to come up in India. Most automobile users still do not use such services. The following example shows the beginning of interest in such services. In the coming years, the market should be very receptive to such products and services.

Highly successful Indian car manufacturer Mahindra's e2o[9] is the first connected car in India. Mahindra e2o partnered with Vodafone for powering its electric cars with M2M communication services. With the help of Vodafone's services and a smart phone (or any Internet-connected computer), e2o owners can access the following services:

- Know the state of charge in the battery of their car and how far they can travel with the available charge
- Remotely control its air-conditioning, lock or unlock the car doors
- Find the nearest charging stations
- Receive alerts on various events with the car such as a disruption in charging due to power cuts, safety-related reminders such as a door being left unlocked or if a parking brake not applied
- Get an emergency boost charge with a command on the smartphone to go an extra 8 km to 10 km.
- Have the Mahindra Reva Tech Help Desk remotely do prognosis and diagnostics of the car.

For machine-to-machine (M2M) services, Indian telecom service provider Vodafone has developed an ultra-compact, robust, corrosion-resistant and solderable SIM chip that is compliant with the stringent specifications required in demanding environments such as extreme range of temperatures and vibrations[10].

Navigation systems in the Indian sub-continent is getting a boost through the Indian satellite IRNSS-1A that was launched on July 2nd 2013, as the first of the seven satellites constituting the space segment of the Indian Regional Navigation Satellite System (IRNSS). IRNSS is an independent regional navigation satellite system designed to provide position information in the Indian region and 1500 km around the Indian mainland. IRNSS would provide two types of services, namely, Standard Positioning Services (SPS) - provided to all users - and Restricted Services (RS) provided only to authorized users. It will provide an accurate real time Position, Navigation and Time (PNT) services to users on a variety of platforms with

24×7 service availability under all weather conditions. The entire IRNSS constellation of seven satellites is planned to be completed by 2015-16[11][12].

Commercial/Fleet Systems

We present some examples of commercial and fleet systems deployed in India. In fact Telematics have had a much better adoption in fleets as compared to individual vehicles in India.

- KELTRON-iTAC is a venture that was rolled out in Bangalore for the taxis with a high-performance GPS device at low cost with KELTRON- iTAC's own control centre. The taxis were made women-safe with a "Panic" or alarm button fitted on each taxi that would alert a competent authority when pressed. KELTRON is planning to extend the iTAC services as mobile enabled GPS tracking for school buses, public transport and goods transport[13].
- Auto-rickshaws in Chennai will have meters fitted with GPS and a panic button that passengers can press to alert officials about erring auto drivers. The GPS installed in the vehicle will immediately send details about the location and vehicle to the control room, which will send alerts to the police and transport officials[14].
- In January 2013, autos of Delhi were mandated to have GPS enabled panic buttons. But the tracking of the information from approximately 50,000 auto-rickshaws became difficult and most of the time GPS was switched off, showcasing some of typical enforcement issues in India[15] [16].
- Delhi Integrated Multi-modal Transit System (DIMTS), an automatic vehicle location system has been successfully developed, deployed and maintained for the state owned transit buses in the Indian capital city Delhi. The Research team of DIMTS divided the entire state of Delhi into 17 clusters and has identified the profitability of each route in these clusters. Each cluster has been given out to a private company through open bidding. The operation is monitored by the analysts at DIMTS. GPS systems are installed in the vehicles, which constantly communicate via satellites, providing data such as location and engine running parameters. The data received via these GPS modules are collected and are intelligently processed in the back-end by integration applications. Required information is projected to the users. AVLS project was launched in 2010 and collects data from 2500 buses[17].
- eTrack is an online tracking system powered by telecom service provider BSNL to manage fleet comprising of trucks, car carriers, trailers, tankers, containers or vehicles moving hazardous and explosive chemicals. The vehicles are mounted with devices which periodically send SMS/GPRS to a network command centre. The authenticated data is forwarded to the application centre via internet. Some of the eTrack products are Economic locator (GSM based tracking), Precision locator (GSM+GPS based tracking) and Intrinsically safe locator. Mahindra & Mahindra, Hindustan Lever, Express Roadways, Patel Roadways, Tamilnadu

Petro Products are some of the companies already using the BSNL eTrack[18].

Non Standard Automobiles and Others

We present an example of non-standard vehicle systems deployed in India.

- Agriculture: manufacturers of tractors, backhoe loaders etc are updating their systems for providing value added services for owners. Owners will be able to track the exact engine hours used, diagnostics information to prevent vehicle damages, location of the vehicle etc via SMS or other mobile applications.
- Mahindra & Mahindra introduced a new Earth Master Backhoe loader in Indian market with an innovative intelligent telematics system called Remote Care which updates business owners or managers about the operating activity of their Earth Master through SMS. Alerts about coolant temperature, diesel level, and other vital signs are delivered directly to your mobile phones.

SMARTPHONES AND TELEMATICS

According to many analysts, smartphones may soon play an integral role in vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) systems [2]. The future of telematics may rely significantly on smartphones and mainstream networks such as LTE/4G and Wifi Direct and their continuing evolution. Automakers see huge cost advantages to leveraging the ubiquity of smartphones to bring the latest technology into vehicles. Ford's Sync App Link, Mercedes-Benz's DriveStyle app and BMW's ConnectedDrive are all examples of such initiatives. Cloud services will play an important role in delivering telematics services using standard networks.

General Motors announced that it will deliver a new generation of connected cars and trucks with embedded 4G LTE mobile broadband. It is said to be the largest deployment in the automotive industry till date. The first GM cars, trucks and crossovers to get 4G LTE will be most 2015 Chevrolet, Buick, GMC and Cadillac models available in 2014. It is said to begin in the United States and Canada in collaboration with AT&T Mobility. Expected benefits for GM customers could include in-vehicle Wi-Fi hot spots, new infotainment options like streaming video entertainment in the back seat, real-time updates and faster application downloads.

DSRC and Alternative Technologies

Dedicated Short-Range Communication DSRC and associated proposals plan for a dedicated spectrum for automotive applications, primarily aimed at improving safety. Collision warning is one of the most important objectives. Toll collection and other secondary functions are also possible.

However many of the secondary functions are possible via other locally adopted systems as well. An example is the electronic road pricing system (ERP) in existence in Singapore since 1998. Speed warnings can also be achieved via other means, such as through a generic wireless internet based navigation system. Lane departure warning can be done through other methods such as camera and image processing based ADAS systems. Camera based ADAS systems can also aid in functions such as vehicle security, potential collision detection and warning, navigation etc.

Another significant matter is the possibility of the Federal Communications Commission (FCC) allowing the sharing of the 5.9 GHz DSRC band, which could raise serious concerns about signal interference. An FCC proposal allows unlicensed wireless devices to operate in spectrum currently reserved for DSRC[4][5]. Unlicensed wireless devices operating in DSRC spectrum may interfere and interrupt safety critical DSRC communications. This leaves OEMs such as GM unsure of the future strategies for vehicle connectivity [2].

Thus, ways to put minimal DSRC equipment into vehicles and leaving the rest to the smartphone are being pursued [2]. GM is currently considering ways that smartphones using telecommunication networks can complement dedicated short-range communication (DSRC) technology to create feature rich V2V and V2I systems [2].

WHAT MAKES SENSE FOR INDIA?

When thinking of solutions for India, one has to keep in mind the stark differences in road quality, typical driving scenario compared to the developed world. Telematics solutions must make a difference in this context.



Figure 1. A dual carriageway section of National Highway 8 connecting Delhi to Gurgaon.

In the current timeframe, Indian roads are a mix of modern and the medieval. There are some highways such as that shown in Figure 1 that are of international standards, but many are not.