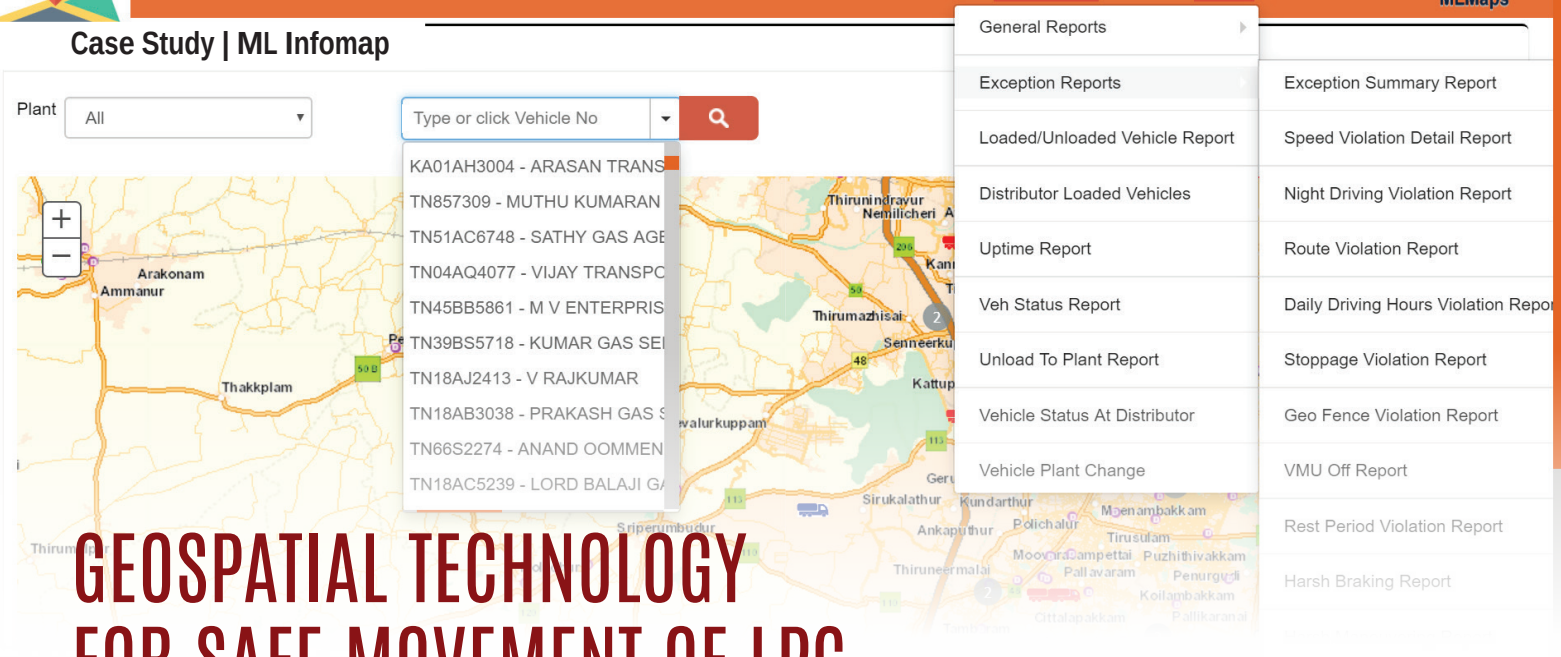

GEOSPATIAL TECHNOLOGY FOR SAFE MOVEMENT OF LPG

Implemented in Tamil Nadu and Puducherry by ML Infomap, New Delhi

Indian Oil Corporation Limited (IndianOil), a Navaratna Company and Fortune 500 Corporation, is India's largest commercial enterprise. It is engaged in the business of refining, transporting and marketing of crude oil and petroleum products, including Liquid Petroleum Gas (LPG). As these are inflammable products, it is critical to transport them safely across the country.

Taking cognisance of the serious nature of the issue, the Ministry of Petroleum and Natural Gas notification of 17.10.2018 Recommendation 6 brought into focus `Safety during Transportation of Petroleum Products'. To avoid any possibility of accidental hazards that might compromise products, property and lives, IndianOil has taken pre-emptive technological measures.

Contractors transport LPG from bottling plants to the distributor godowns and LPG filling stations. In the past, it was noticed that transporters deviated from allocated routes and made unscheduled stoppages along the way. Pilferage and adulteration by drivers who deviated from their routes was also noticed. This problem needed to be tackled to avoid accidents on the way and ensure timely delivery of quality products to the godowns.

The Tamil Nadu State Office (TNSO) of IndianOil (Marketing Division), introduced Vehicle Tracking System (VTS) to monitor movement of LPG. The purpose of undertaking this exercise was to ensure that all delivery trucks complied with driving regulations along the approved routes. Deviation or unplanned stoppages were alerted to the authorities through the GIS application in real-time. ML Infomap has successfully implemented the solution state-wide in Tamil Nadu and Puducherry.

ML Infomap's strategy was to maximise the integrative capability of a GIS platform to analyse the location and time data from VTS mounted on the trucks. The end-to-end ICT based solution was designed on available hardware, proprietary and open source software products, both from the market and our own internal resources.

Accurate and detailed digital all-weather motorable road maps were earlier developed in-house using Machine Learning (AI ML) from high resolution satellite images and these became the chief source for the geo-database.

The VTS devices were voice enabled (multilingual), tamperproof, dustproof and waterproof. They became inactive when the truck entered an inflammable area, like a depot, to ensure fire safety. To address the local drivers of the state, the VTS send out voice alerts like `you are over speeding' in Tamil or English.

The VTS data identified the truck position and the time of data polled (every 30 seconds) on the Web map. Using in-house software programming capabilities, we then developed multiple apps addressing different challenges, including a fully automated approval process for routes on digital maps.

It is not possible to track very large numbers of trucks visually on maps. So, several reports were generated to track trucks along routes. The principle was NOT to create reports for ALL trucks, but only EXCEPTION reports when transporters did not follow an approved route or made unplanned stops or drove rashly. At the same time an alert was ssent to the official responsible for the erring transporter.

The success of this project depends on the ability to provide a robust end-to-end integrated IT/GIS solution. All components, including GPS hardware, GIS software, navigation ready intelligent digital maps, voice triggers, telecommunication, geo-database, spatial analytics, SAP interface and text messaging, require working in sync in the Data Centre and Cloud. Reliance on the Internet for near real time data transfers also implies the availability of a good telecom service network across the area.

IndianOil can monitor the entire fleet of trucks online. Transporters now view this as compliance more than surveillance. Drivers understand the certainty of being identified if deviating from approved routes and stopping on the way to deliver LPG.

This project is ongoing, and the entire work is delivered under Service Delivery Model. It has already shown remarkable improvement in driving compliance and safety of movement of LPG in the state.

The model is now replicated in Bihar, Jharkhand, Odisha and West Bengal.