Telematics for Intelligent Transportation Systems

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Build better & smarter infrastructure public transport i.e. "**Intelligent Transportation System**" (ITS) that will:

- Increase on road safety
- Save money
- Reduce travel-times and congestions
- Be environment friendly

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Telematics – Technology enabling ITS

Anyone who thinks telematics is only as good as any GPS unit hasn't looked into telematics lately.

Learn how telematics has a positive impact on:
- ✓ Vehicles
- ✓ Humans
- ✓ Business
- ✓ Society

Image: Courtesy Government fleet

This is what we always aimed at, correct?

Vehicles	Citizens	Business benefits	Social benefits
Improved traceability	Improved driver performance	Reduced miles, Lesser fuel consumption	Reduced congestions
Proactive repairs	Passenger convenience	Better utilization of infra leading to greater revenue	Reduced emissions
Preventive maintenance /diagnostics	Increased passenger safety	Increased technology solutions	

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Smaller problems cause bigger issues!

A small Problem	Turning into a bigger Issue	Reasons
Delays	- *Avoiding public transport* - *Increased congestions because of more vehicles on road*	- *Casual drivers* - *Poor infrastructure*
Breakdowns	- *Congestions / traffic jams / Accidents* - *Loss of revenue and brand*	- *Improper / irregular maintenance*
Security	- *Thefts / robberies* - *Crimes against women* - *Rampant and on-going corruption*	- *Greed and of course no fear of being caught*

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Overview of components of telematics

Application	Usage
Operations / traffic management	Congestion control and real-time vehicle information
Vehicle safety	Continuous health monitoring
Emergency services	Instant accident notifications, medical help
Electronic payment	ETC tags for tolls and ticketing
Surveillance	Surveillance cameras for security
Passenger friendly	All travel info on smartphone
Better transport	Demand response management, shared transportation

Operations / traffic management

- Can be achieved by connecting to:
  - GPS modules
- Short time benefits
  - Dynamic re-scheduling
  - Demand – supply management
  - Traffic signal priority
- Analytics can be used for deriving
  - Driver performance / schedule adherence
  - Finding out alternate routes
  - Better traffic management / load planning

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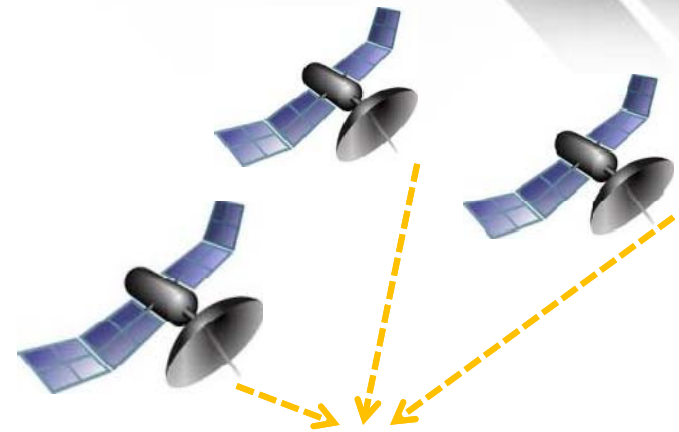
Vehicle safety

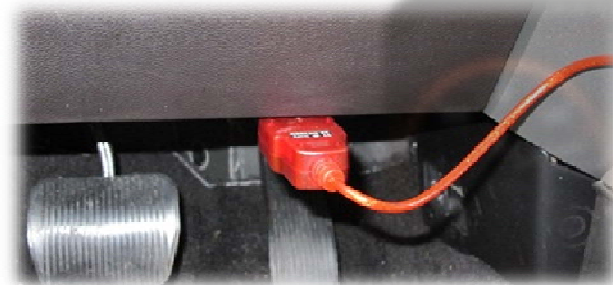- Can be achieved by connecting to:
  - ECU
  - Accelerometer
- Short term advantages
  - No abrupt breakdowns
  - No accidents
- Long term advantages
  - Reduced operational costs on repair and maintenance
  - Analyzing driving patterns and driver behaviors
  - Increased vehicle life

Emergency services

- Can be achieved by connecting to:
  - ECU
  - Panic / alarm buttons
- Helps during
  - Breakdown of vehicle or collision
  - Medical conditions, or other non-criminal incident requiring medical support
  - Assault, aggressive or security incidents requiring police / security response
  - Weather-related events and restrictions

Surveillance

- Can be achieved by connecting to:
  - Live streaming cameras or still image cameras
  - High speed data connection / WiMax is must
- Helps for
  - Incident monitoring, to detect assaults / accidents / etc.
  - Improved security / safety among passengers
  - Gather presentable evidence for prosecution of violations
 - Gather presentable evidence for defence against claims
  - Images useful for passenger counting

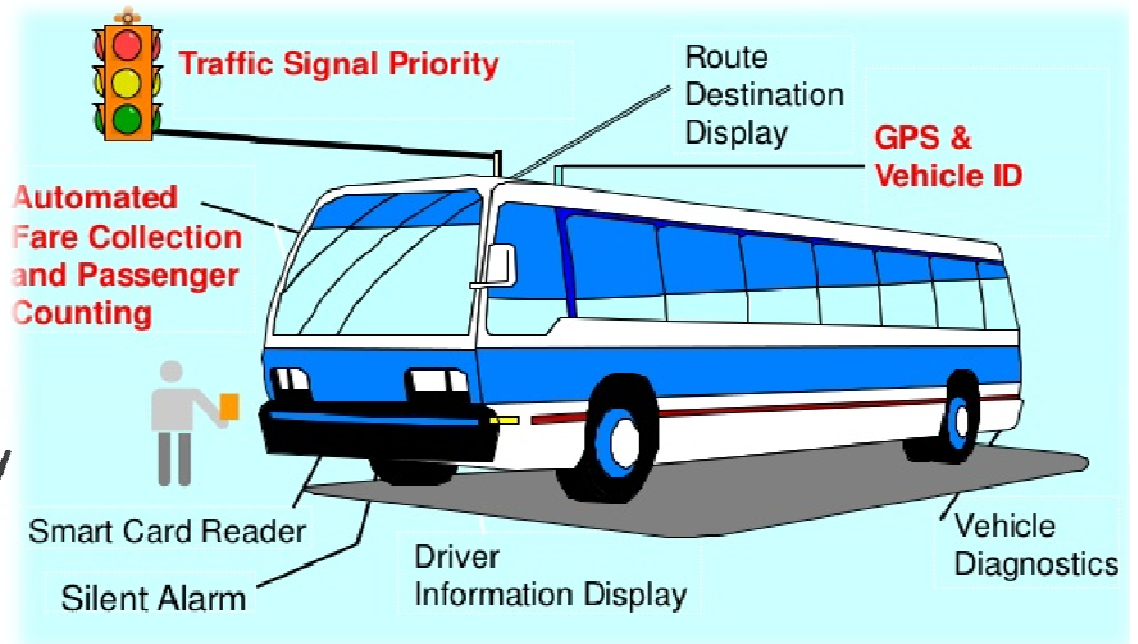Video surveillance

Still image camera

Passenger convenience

- Can be achieved by connecting to:
  - Smartphone connectivity to cloud
- Helps to
  - Provide passengers with real-time information on buses, routes, any other alerts
  - Provide advance information on delays / service changes
  - Gain revenue opportunities from advertising
  - Emergency services / help on smartphones
  - Dynamic journey planning options

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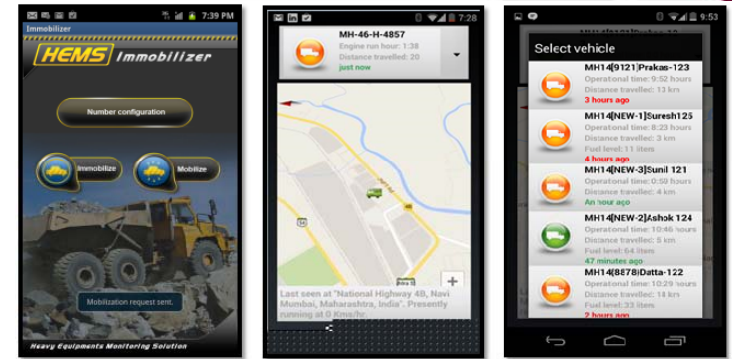
Better transport

- Can be achieved using intelligent analytical conclusions!
- Helps in
  - Route optimization to save on time and fuel utilization
  - Better maintenance to ensure more vehicles are on road and less in garage
  - Monitor fuel spending and also leaks
  - Computer aided dispatch to streamline process
  - Monitor carbon emissions and help the green cause
  - Traffic signal priority

Traffic Signal Priority

Route Destination Display

GPS & Vehicle ID

Automated Fare Collection and Passenger Counting

Smart Card Reader

Silent Alarm

Driver Information Display

Vehicle Diagnostics

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Electronic payment

- Can be achieved by connecting to:
  - RFID readers and tags
- Helps in
  - Payment of the appropriate fare on boarding
  - Automatic toll payment to reduce waiting times and congestions
  - Easy recharge
  - No more free travellers and thus no reduced revenues!

High level components of ITS

- **Basic hardware**
  - GPS
  - GPRS
  - Panic buttons
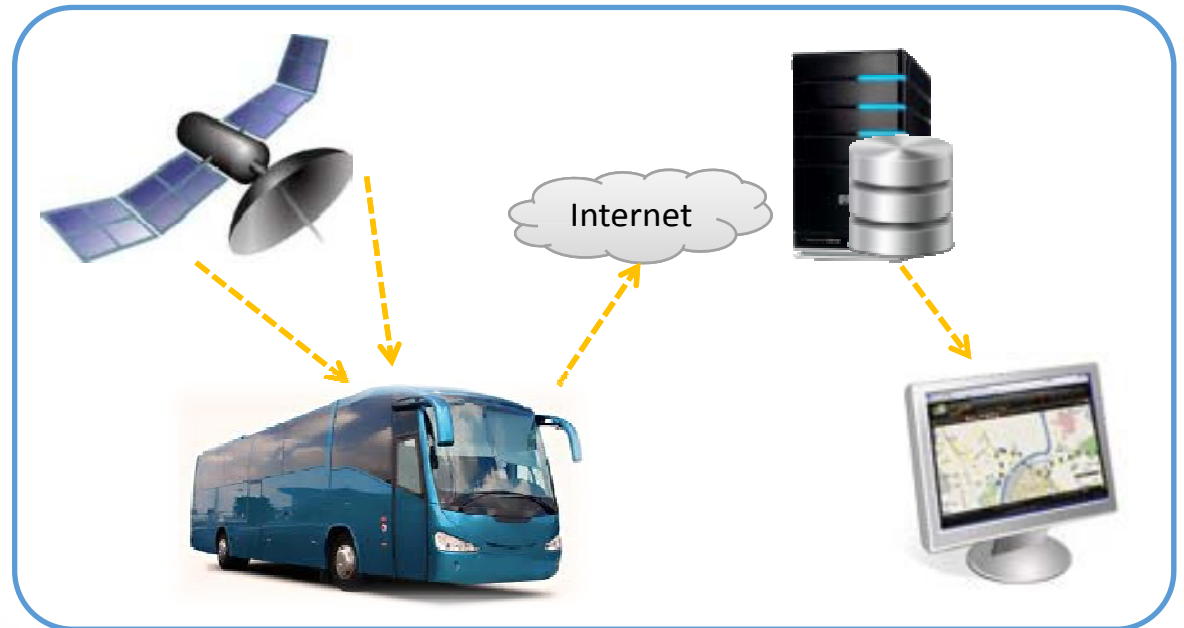 - ECU connectivity
  - RFID
  - Local storage
- **Advanced hardware**
  - Camera connectivity

- **Cloud software**
  - Real-time monitoring dashboards
  - Analytics dashboards
- **Smartphone connectivity**

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Long term vision

> Advanced Crash-Avoidance Technologies

> Automatic Crash and Incident Detection, Notification and Response

> Widespread Deployment of Onboard Collision Notification

> Multimodal Public Transportation Management with co-relation between transport ways like airways, railways waterways, buses etc.

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Helping build the next generation ITS