VEHICLE TELEMATICS: INDUSTRY PERSPECTIVE

Presented at the:
National Conference on “Vehicle Telematics 2017”

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Society of Indian Automobile Manufacturers
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Overview of Industry: Volume Market Segments

**Domestic Sales – FY 16**

- **Passenger Vehicles (2,789,678)**
  - Leading Players:
    - Maruti Suzuki (47%)
    - Hyundai Motor (17%)
    - Mahindra & Mahindra (8%)
    - Honda Cars (7%)
    - Tata Motors (5%)

- **Commercial Vehicles (685,704)**
  - Leading Players:
    - Tata Motors (44%)
    - Mahindra & Mahindra (24%)
    - Ashok Leyland (19%)
    - Volvo Eicher CVs (6%)
    - Force Motors (3%)

- **Two Wheelers (16,455,911)**
  - Leading Players:
    - Hero MotoCorp (39%)
    - Honda MSI (26%)
    - TVS Motor (13%)
    - Bajaj Auto (12%)
    - India Yamaha (4%)

- **Three Wheelers (538,092)**
  - Leading Players:
    - Bajaj Auto (47%)
    - Piaggio Vehicles (30%)
    - Mahindra & Mahindra (10%)
    - Atul Auto (8%)
    - TVS Motor (3%)

Note: FY means 12 month ending March
Value-Based Share of Segments

Domestic Sales Estimated Value – FY16

- Passenger Vehicles: 51%
- Commercial Vehicles: 24%
- Three Wheelers: 2%
- Two Wheelers: 23%

Source: SIAM Data

Note: FY means 12 month ending March.
Objectives of AMP 2026 are aimed at making Indian Automotive industry the central pillar of “Make in India”

4. Promote India as a preferred destination for every segment of the automotive value chain

• Foster the promotion of “Brand India” by developing a sophisticated ecosystem of research, design, engineering and manufacturing that is conducive for a variety of players - both mass market and niche seekers

5. Define a Roadmap for Implementing policies and regulations

• **Emissions**: Reduce the lag between India & EU norms from current 6-7 years
• **Harmonisation**: Clear roadmap to adhere to 1998 Agreement of UN Global Technical Regulations (WP.29)
• **Fuel Efficiency**: Define clear roadmap for all categories of vehicles
• **Road Safety**: Reduction in accidents and fatalities as per norms specified in RTSB
Legislative Framework for Vehicle Regulations in India

Parliament of India

- Environment (Protection) Act
- Motor Vehicles Act (MVA)
- Energy Conservation Act

- Environment (Protection) Rules
- Central Motor Vehicle Rules (CMVR)

Rules for Vehicle Construction / Registration ....
“Heavy traffic” continues to be a major problem in Indian cities and the problem is exponentially growing...

Traffic chaos in Delhi costs Rs. 60,000 crore annually
CAN ‘ITS’ IMPROVE THE TRANSPORTATION PROBLEMS?

- Comfort, convenience and quality of transportation systems?
- Vehicle safety?
- Air pollution?
- Energy efficiency?
- Traffic congestion?
- Transportation efficiency?
- Traffic Safety?
- Passenger safety?
- Parking Problems?
- Manual Traffic Management
- Street Parking
- Vehicles parked at “NO PARKING”
- Peak time traffic scenario in cities
- Long queue at the toll plaza on the Delhi-Gurgaon Expressway
- When arrival time display went wrong in a major station
- An over crowded bus in chennai
- Vehicles parked at “NO PARKING”
- Manual Traffic Management
- Accidents
GOVERNMENT INITIATIVE:

Ministry of Finance set up a dedicated fund i.e. “Nirbhaya Fund” for implementation of initiatives for enhancing safety & security of women. Various Ministries/Departments to study & propose for the same.

MoRTH has engaged DIMTS to support MoRTH in formulating & implementing the scheme “Security for Women in Public Road Transport in the Country”.

MoRTH has proposed “National Level Vehicle Security & Tracking System” having following, the same has been in-principally approved by MoF:

- A National Backend Data Centre.
- City Command & Control Centre in 32 Cities, having population more than one million.
- Installation of Vehicle Tracking Device (VTD)/CCTV/Emergency buttons in notified public transport vehicles (on-board Devices) in the above cities.
ITS can be defined as the application of various technologies to improve the transportation systems in terms of efficiency, quality, comfort and safety.

Intelligent Transportation Systems (ITS) applies advanced technologies of Electronics + Communication + Computers + Sensing + Control

- ITS is not vehicle centric. ITS connects vehicles, roads/transport medium and end users on a single standard platform in order to deliver its objectives.
MoRT&H has issued the final Notification GSR 1095(E) dtd. 28th Nov 2016 for fitment of:

1. Vehicle Location Tracking Device &
2. Emergency Button (one or more emergency buttons) in all public service vehicles from 01st Apr 2018.


Vehicle location tracking device & emergency button shall be fitted by the manufacturer or their dealer or the respective operator, as the case may be, in accordance with AIS-140:2016.

Exemption from above requirements:

• Two-Wheelers, • E-rickshaw, • Three wheelers, and • Any transport vehicle for which no permit is required under the Act.
Key Automotive M2M/ITS applications

Major focus Internationally at present is on Automotive Radar Applications for Advanced Driver Assistance Systems (ADAS)

Vehicle Immobilizer
Vehicle Alarm System
Tyre Pressure Monitoring System

Automotive Radars – Why?

Various Advanced Driver Assist Systems (ADAS) use Radars as Core Sensors

Source: M.S. Greco, 2012 IEEE Conference, Atlanta
What are ADAS – Some Examples

- Adaptive Cruise Control
- Forward Collision Warning
- Blind Spot Monitoring

Supports the driver during long distance drives.
Helps to prevent rear-end collisions.
Helps to prevent side collisions.

Enhancement of road safety

Many countries around the world are promoting vehicles with ADAS to improve Road Safety
Technologies deployed in India: Some Examples

- Tyre Pressure Monitoring System
- Anti-theft Devices (Immobilizers & Vehicle Alarm Systems)
- RFID Tags for ETC (fitted on all vehicles)
- Navigation and Vehicle Tracking
- Passenger Information System
- Integrated Navigation and Infotainment Systems
- Emergency Calling System
- Remote Diagnostics and control of Vehicle Functionalities

A range of technologies running on de-licensed Frequencies are extensively being offered by OEMs in India.
Evolution of RF based Technologies in Vehicles Manufactured in India

Current Level
- Simple Radio
- Bluetooth
- Navigation
- Online services
- Smartphone link
- Voice Recognition

Technologies Envisaged in coming years
- ADAS
- EV/HEV driving route assistance
- Location Based Services
- E-Call, B-Call
- Remote Diagnostics
- V2V/V2I based services

New Technologies demand allocation of requisite Frequency Bands as summarized in subsequent Slides
## Frequency requirement for Automotive Applications

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Frequency Range</th>
<th>Max. Power</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>24.00 - 24.25 GHz</td>
<td><strong>Peak Power:</strong> 20 dBm</td>
<td>Advance Driver Assistance Technologies (Automotive radar)</td>
</tr>
</tbody>
</table>
| 2       | 24.25 - 26.65 GHz (UWB) | **RMS power density (e.i.r.p)**  
23.60 - 24.00 GHz : -74 dBm/MHz  
24.25 - 25.65 GHz: -41.3 dBm/MHz  
25.65 - 26.65 GHz : -41.3 ....-61.3 dBm/MHz (linear interpolation)  
**Peak Power density (e.i.r.p)**  
24.25 - 25.65 GHz: -24.44 dBm/3 MHz  
25.65 - 26.65 GHz : -24.44 ...- 44.44 dBm/3 MHz (linear interpolation) | Blind Spot Detection  
• Lane departure prevention system  
• Collision avoidance system  
• Adaptive Cruise Control |
| 3       | 76 - 77 GHz     | **Peak Power (e.i.r.p) :** 55 dBm  
**Mean Power (e.i.r.p) :** 23.5 dBm (for pulsed doppler radar)  
50 dBm (for systems other than pulsed doppler radar) | |
| 4       | 77 - 81 GHz     | **Peak Power (e.i.r.p) :** 55 dBm  
**Mean Power (e.i.r.p) :** -3 dBm | |
Frequency requirement for Automotive Applications (Contd...)

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<th>Sr. No.</th>
<th>Frequency Range</th>
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<th>Applications</th>
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<tbody>
<tr>
<td>5</td>
<td>5.9 GHz</td>
<td>23 dBm / MHz</td>
<td>Car to Car &amp; Car to Infrastructure communication</td>
</tr>
<tr>
<td>6</td>
<td>868.10 - 868.40 Mhz</td>
<td>-17 dBm</td>
<td>Short range communication devices (20- 50m)- Keyless On/Off</td>
</tr>
<tr>
<td>7</td>
<td>433 - 434.79 MHz</td>
<td>10 mW with a channel bandwidth within 10 kHZ (ERP)</td>
<td>Remote Keyless Entry, Tyre Pressure Monitoring System, Immobilizers, Keyless go applications</td>
</tr>
<tr>
<td>8</td>
<td>314 - 315 MHz</td>
<td>87 dBuV/m</td>
<td>Remote keyless Go, TPMS</td>
</tr>
<tr>
<td>9</td>
<td>1.602 GHz</td>
<td>N.A. (only receiver)</td>
<td>GLONASS</td>
</tr>
<tr>
<td>10</td>
<td>1.575 GHz</td>
<td>N.A. (only receiver)</td>
<td>GPS</td>
</tr>
</tbody>
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ITS APPLICATIONS FOR TODAY'S TRANSPORTATION PROBLEMS

Traffic Safety

Comfort, convenience and quality of transportation systems

Vehicle safety

Air pollution

Transportation efficiency

Energy efficiency

Traffic congestion

Advanced Traffic Management Systems (ATMS)

Advanced Public Transport Systems (APTS)

Advanced Traveler Information Systems (ATIS)

Advanced Vehicle Control Systems (AVCS)

Advanced Parking Management System (APMS)

Commercial Vehicle Operations

Electronic Toll Collection (ETC)

Incident Management

Incident / Emergency Management
WAY FORWARD:

• Create standard operating procedures and minimum specification
• Necessary infrastructure to support the ITS
• Data Privacy and Cyber Security
Thanks