

Chemical Logistics Policy, Infrastructure Gap and Opportunity

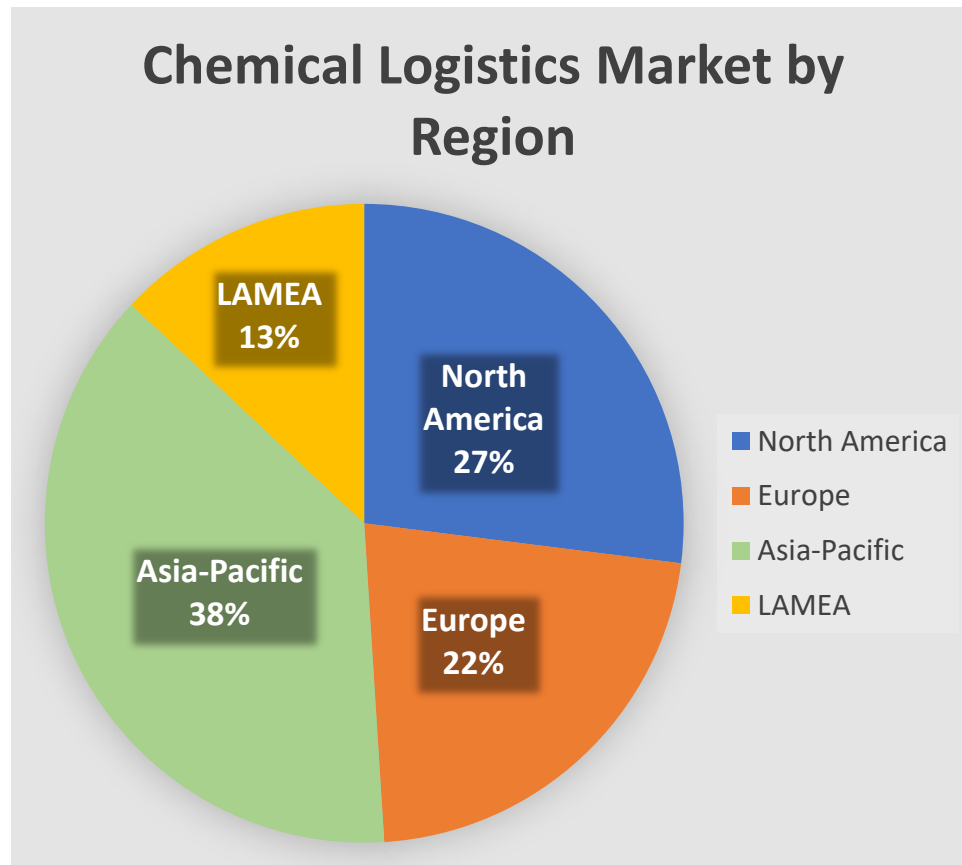
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CHEMICAL LOGISTICS MARKET - OVERVIEW

The global chemical industry is valued at US\$ 4.5 Trillion. Chemical logistics market is valued at US \$265 Billion in 2021 and is projected to reach \$377 billion by 2030, to register a CAGR of 4% during the forecast period.



Drivers of Growth

Growth in production of chemicals across various countries

Newer regulations in handling and distribution of dangerous chemicals

Restraints to Progress

Safety concerns as of material nature as well as in-transit incidents and poor infrastructure

Complexities in Planning of Chemical Logistics due to turbulent macroeconomic conditions around the world

Enablers and Facilitators

Focus of governments on domestic production of chemicals

Rise of tech-driven logistics services coupled with growing adoption of IoT enabled connected devices

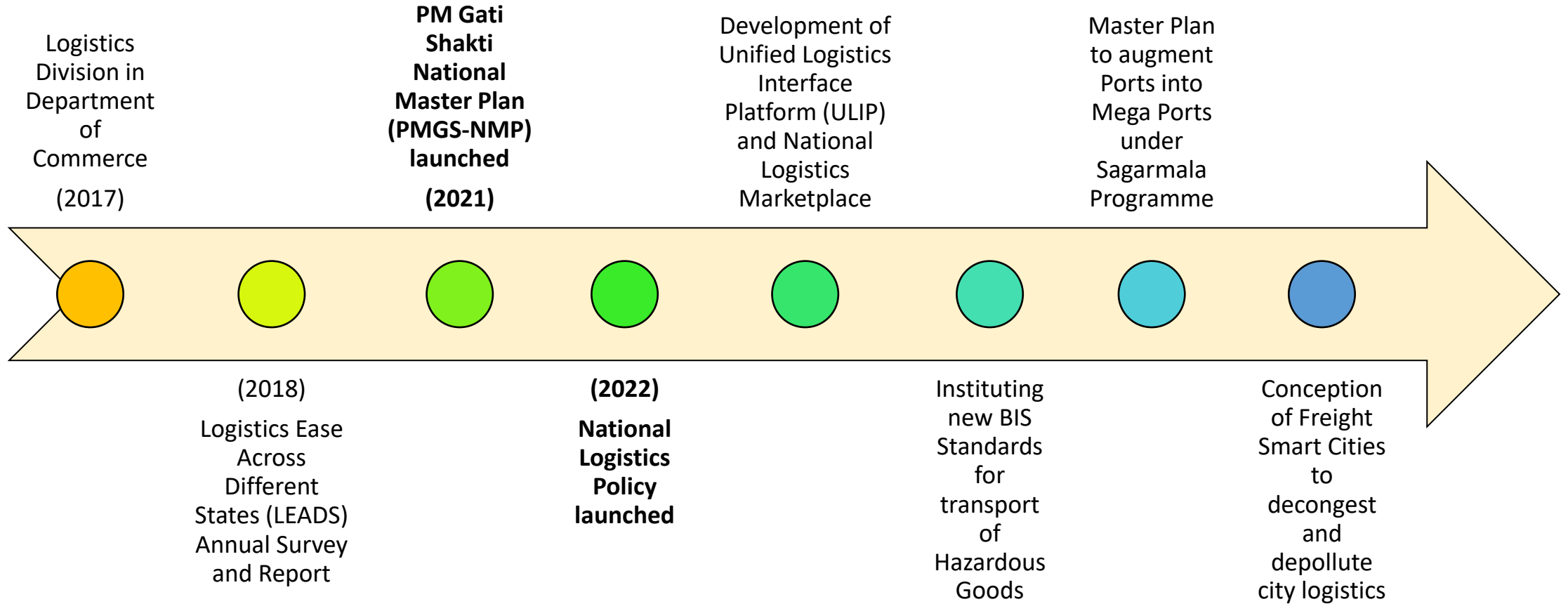
CHEMICAL LOGISTICS MARKET – INDIA IN FOCUS



- India is the sixth largest manufacturer of chemicals in the world, with chemical industry valued at US \$178 Billion.
- **Size of Chemical Logistics Market in India can be estimated to be US\$ 6.5 Billion and is bound to reach US\$ 10 Billion by 2030, growing at a CAGR of 5%**
- India is a large and growing market for Natural Gas and Liquefied Petroleum Gas (LPG), which requires import and distribution facilities. In addition, the oil refineries need inter-modal logistics and containment to optimize their output of fuels and transport the refined products to markets.
- Surge in population, rise in disposable income, and changes in economic landscape and government focus on domestic manufacturing are anticipated to drive a wider portfolio of chemical products to be imported and exported, thereby creating growth opportunities for the chemical logistics market in the country.



GOVERNMENT OF INDIA INITIATIVES



Logistics efficiency is a function of infrastructure, services and human resource.

- **PM Gati Shakti National Master Plan (PMGS-NMP)** has been envisaged to address development of integrated infrastructure and network planning. It is a transformative approach for:
 - ✓ improving logistics efficiency and reducing logistics cost,
 - ✓ with focus on integrating existing and proposed infrastructure development initiatives of different agencies,
 - ✓ to ensure first and last mile connectivity,
 - ✓ for seamless movement of people and goods.
- **National Logistics Policy (NLP)** is the logical next step for efficiency in services (processes, digital systems, regulatory framework) and human resources. This will provide a comprehensive agenda for development of entire logistics ecosystem.

PM Gati Shakti – National Master Plan (2021)

- ❖ Vision
- ❖ Pillars of Transformation
- ❖ Engines of Approach
- ❖ Infrastructure Projects Planned
- ❖ Multimodal Logistics Parks (MMLPs)



Pragati Ki **Gati**
Bharat Ki **Shakti**

**Making India
the hub of
world-class
infra**



-  Comprehensive master plan mapping all existing/planned initiatives of Ministries
-  Guide the creation of economic zones & connectivity infrastructure
-  Help remove regional & sectoral imbalances in infrastructure & connectivity
-  Aid faster growth of key sectors, employment generation & spearheading growth

Vision of PM Gati Shakti



PM Gati Shakti will incorporate the infrastructure schemes of various Ministries and State Governments and leverage technology extensively to institutionalize holistic planning for all stakeholders involved

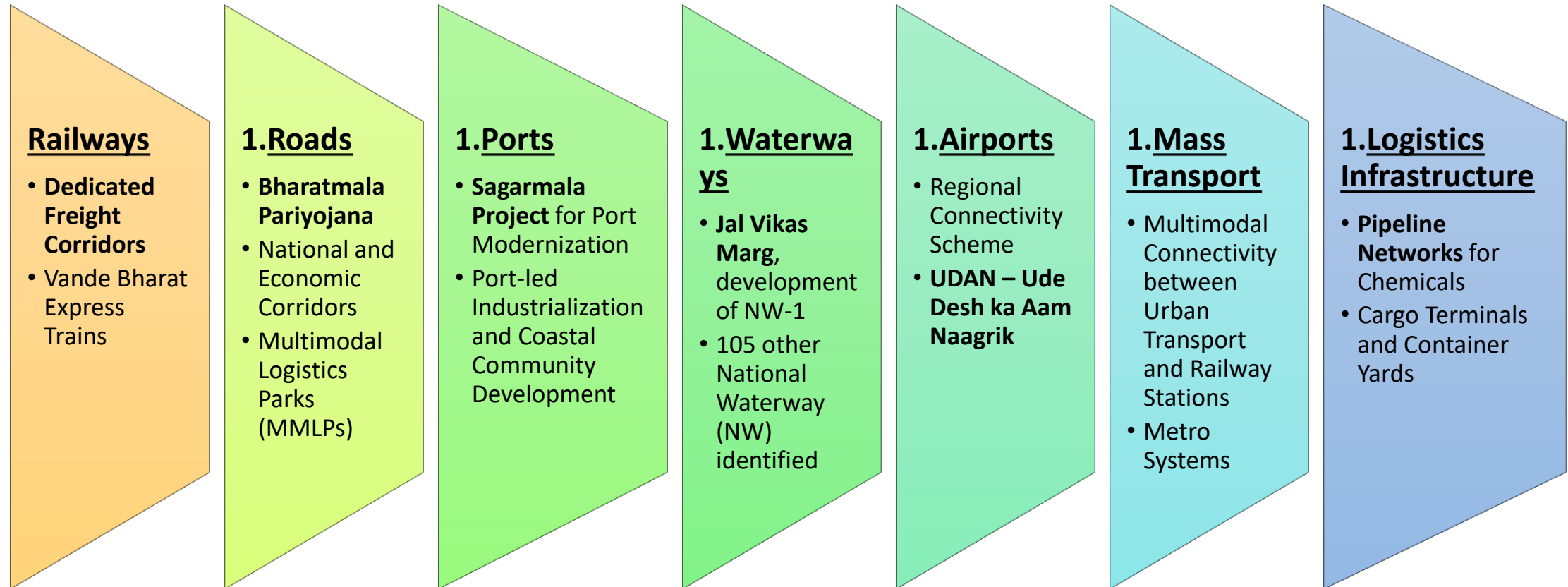
•PM Gati Shakti – National Master Plan (PMGS-NMP)

•Pillars of Transformation

<p>•Comprehensive Inclusion of all the existing and planned initiatives of various Ministries and Departments with one centralized portal for visibility and transparency</p>	<p>•Prioritization of projects through cross-sectoral interactions. For example, Multimodal connectivity is an area of priority</p>	<p>•Optimization in planning for projects after identification of critical gaps.</p>	<p>•Synchronization of Individual Ministries and Department across departments and governance layers for holistic planning</p>	<p>•Analytical tools like Geographic Information System (GIS) platform will provide the entire data at one place, spanning 200+ layers, enabling better visibility to the executing agency.</p>	<p>•Dynamic mapping of all infrastructure projects with real-time updation will be provided by way of a map developed by BISAG-N*. It will help in identifying the vital interventions</p>
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*[Bhaskarcharya National Institute for Space Applications and Geoinformatics](#)

Engines of Approach and associated Projects



All 7 engines will pull forward the economy in unison. The projects pertaining to these 7 engines in the “National Infrastructure Pipeline” will be aligned with PM Gati Shakti framework. The touchstone of the Master Plan will be world-class modern infrastructure and logistics synergy among different modes of movement – both of people and goods – and location of projects. This will help raise productivity and accelerate economic growth and development.

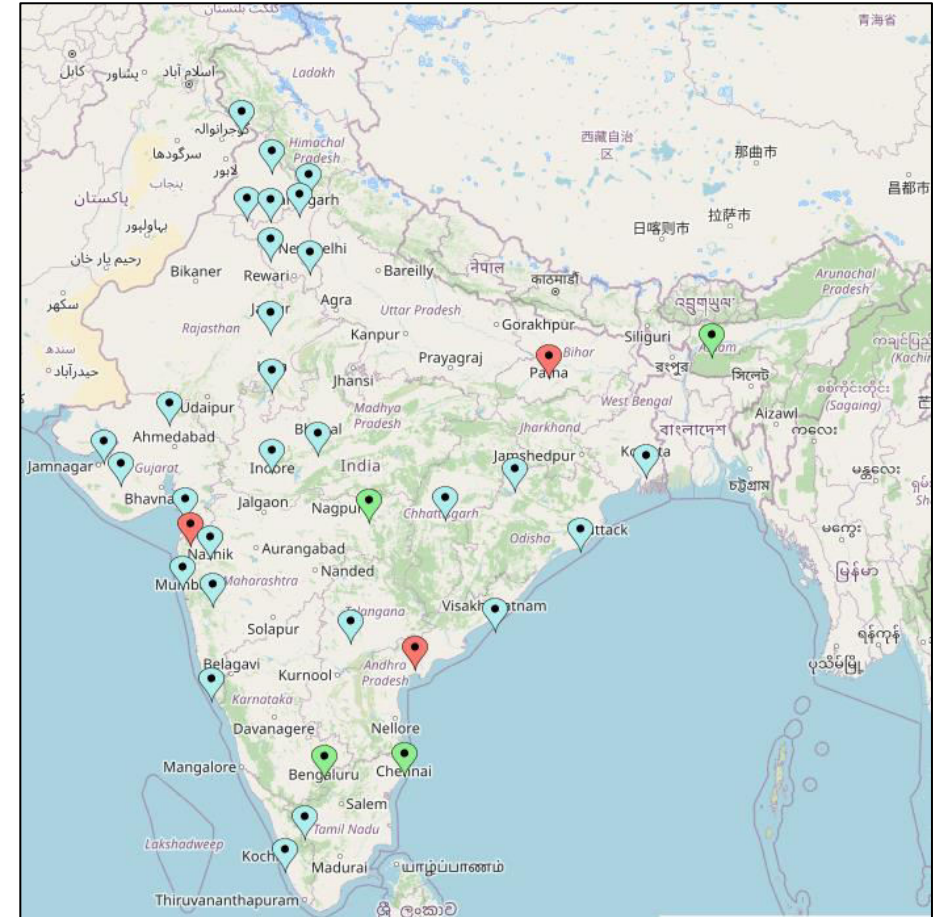
Multi-Modal Logistics Parks (MMLPs)

Under the PM Gati Shakti National Master Plan (PMGS-NMP), the Ministry of Roads, Transport and Highways (MoRTH) has already announced plans to develop 6 national corridors, 44 economic corridors, feeder and connectivity roads, and **35 Multi-Modal Logistics Parks (MMLPs)** under the **Bharatmala Pariyojana Phase I** (investment of INR 5.35L Crores)

MMLPs are to be developed under Public Private Partnership (PPP) on Design, Build, Finance, Operate and Transfer (DBFOT) mode.

First of its kind, MMLP in Chennai is being developed over an area of 185 acres at a cost of 1400 Crs.

- Expected to be a cutting-edge facility with smart technologies that will address the long-standing "last-mile" delivery difficulty.
- Warehouses, cold storage, cargo terminals, custom facilities, truck terminals, accommodation and boarding facilities for truckers, commercial facilities, and the ability to handle diverse commodities.



National Logistics Policy (2022)

- ❖ Vision
- ❖ Comprehensive Logistics Action Plan (CLAP)
- ❖ Unified Logistics Integrated Platform (ULIP)



Vision of National Logistics Policy



To develop a technologically enabled, integrated, cost-efficient, resilient, sustainable and trusted logistics ecosystem in the country for accelerated and inclusive growth

Currently, Logistics sector of India is highly defragmented, and very complex with:

- More than 20 government agencies, 40 PGAs, 37 export promotion councils, 500 certifications, 10000 commodities, 160 billion market size, 22 million employment base.
- 200 shipping agencies, 36 logistics services, 129 ICDs, 168 CFSs, 50 IT ecosystems and banks & insurance agencies. Furthermore, 81 authorities and 500 certificates are required for EXIM.

Comprehensive Logistics Action Plan (CLAP)

Unified Logistics Integrated Platform (ULIP)

- Open-source platform that integrates multiple systems of different stakeholders & works on a request-response-based system

Warehousing Standards

- Standardization of Physical Assets and Benchmarking Service Quality Standards

State Engagement

- Assessment of States via Logistics Ease Across Different States (LEADS) Annual Report

e-LogS Dashboard for Ease of Logistics Services

- Digital Dashboard
- Grievance Redressal Management System (GRMS)
- Service Improvement Group (SIG)

Integrated Government Online Training (IGoT)

- Logistics Human Resources Development and Capacity Building
- EXIM (Export-Import) Logistics

Sectoral Plan for Efficient Logistics (SPEL)

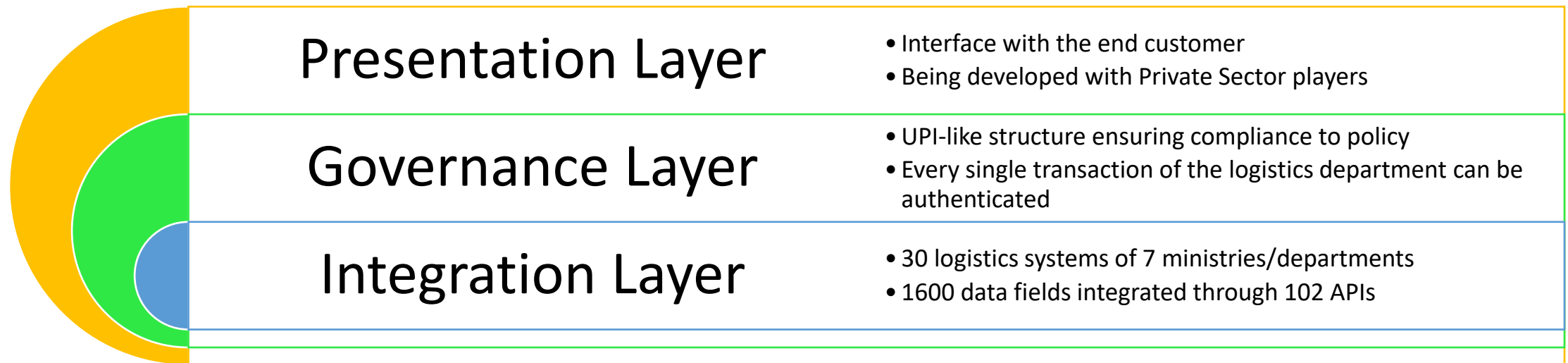
- Prioritize cross-sectoral cooperation to complement and not duplicate efforts and focus on optimization of modal mix

Facilitation of Development of Logistics Parks

- Multi Modal Logistics Parks, Air Freight Stations, Inland Container Depots, Container Freight Stations, Cargo terminals

Unified Logistics Interface Platform (ULIP)

- ULIP was identified as one of the seven initiatives under the “Technology Commons” initiative which leverages technology in specifically identified priority areas by developing world-class products/services incorporating key user and stakeholder.
- NICDC’s Logistics Data Bank Project has been leveraged to develop ULIP to address the challenges of delayed processes and manual activities in India’s logistics sector
- ULIP will be utilized by various Govt. and private agencies, service providers, shippers, consignees etc. to enable information exchange on a real/near real time basis amongst all stakeholders in a confidential manner. This will be a game changer for the Indian logistics landscape.



Spaces For Collaboration between Industry Players

Vehicle Technology, Emergency Preparedness, Incident Handling,
IoT enabled connected devices, Driver Programs, Industry Outlook

Technology Adoption in Commercial Vehicles

Active Safety

Front Collision Warning

Autonomous Emergency Braking System (AEBS)

Tyre Pressure Monitoring System (TPMS)

Retarder in heavier vehicles

Blind Spot Assist

Immobilizer against theft/looting

Reverse Warning

Passive Safety

Air Bag

Automated Manual Transmission/
Automated Transmission

Driver Management/Assistance

Adaptive Cruise Control (ACC)

Automatic Speech Recognition (ASR)

360-degree Camera

Driver Attention Assist

Active Side Guard Assist

Breathalyzer Ignition Lock

Lane Departure Warning System (LDWS)

Vehicle Stability

Antilock Braking System (ABS)

Electronic Stability Control (ESC)

Hill Holder

Air Suspension

Robotics use case examples in Chemical Logistics

Autonomous cargo movement

- BASF partnered with the VDL Group to develop an autonomous guided vehicle at Ludwigshafen site.
 - The Automated Guided Vehicle (AGV) is steered via transponders embedded in the road surface.
 - Owing to the sophisticated safety features and equipment and the state-of-the-art vehicle control the AGVs can drive together with other traffic on normal streets.
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- Katoen Natie started operating its first driverless truck at ExxonMobil's world-scale integrated manufacturing site in Singapore in 2018, transporting products between the company's packaging and intermediate storage facilities
 - The pilot truck will operate on a **24/7 basis moving some 250,000 tons of product annually**
 - After a six-month test run, the project will be gradually expanded to 12 trucks, moving some 3 million tons of product annually



BASF & VDL's autonomous guided vehicle (AGV) transports chemicals



Katoen Natie's autonomous guided vehicle transports chemicals

SOURCE: VDL Group, BASF, Katoen Natie, ExxonMobil

Emergency Response System (ERS)

Organisation needs to develop in-house road transport emergency procedures as part of an emergency preparedness, and train and equip an emergency team to safely and professionally cope with all possible offsite transport emergencies

Emergency Response System (ERS):

Level 1 – Remote information and general advice

Level 2 – Advice, followed by professional assessment of the incident

Level 3 – Assistance with equipment and personnel at the incident location

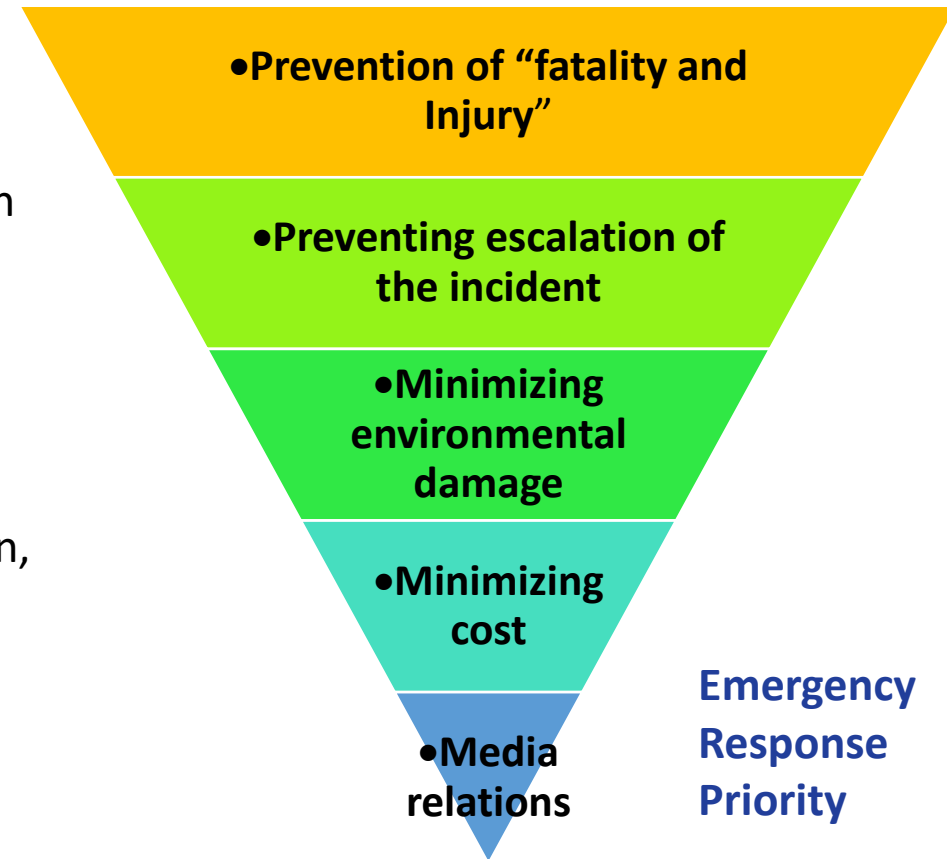
Quick Response Teams (QRTs):

Developed for level 3 emergency response in fixed locations on the entire distribution network.

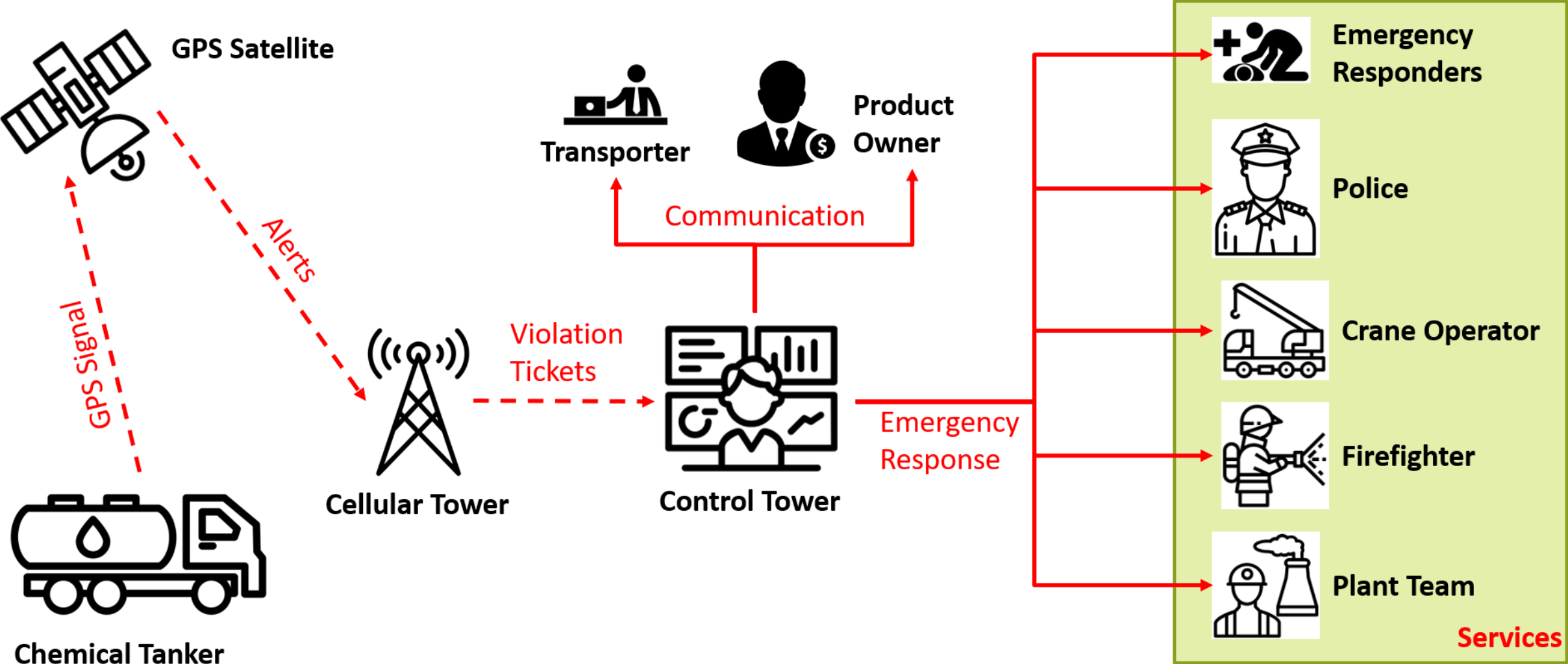
Coverage radius of 50-100 kms distance with a response time of 60-90 min, envisaged for attending to ground zero incident site.

Each QRT is a two-member team comprising:

- Retired Police personnel
- Technical personnel

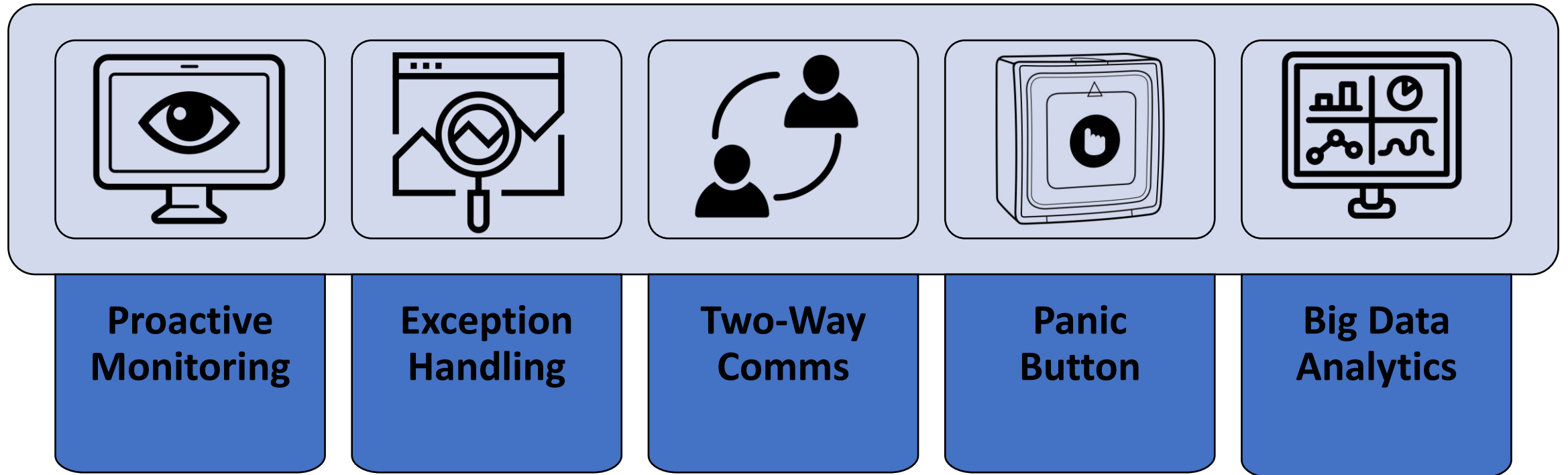


Incident Handling via Violation Monitoring and ERS



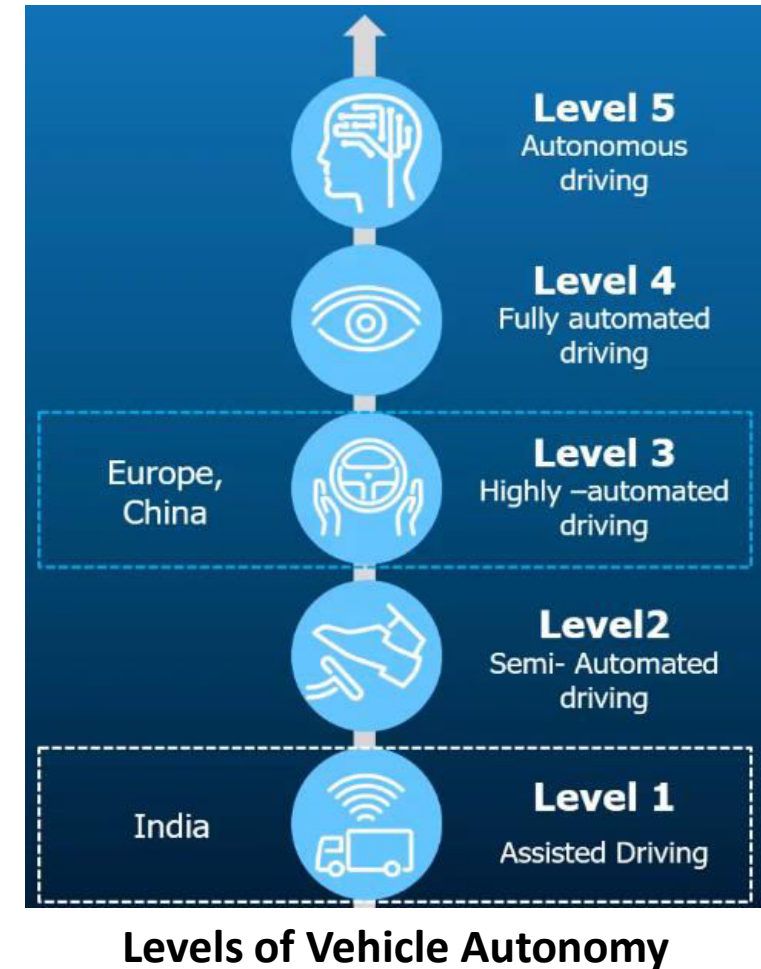
Technology Touchpoint: IoT enabled connected devices

Employing Vehicle Tracking System (VTS) and Advanced Driver Assistance System (ADAS) provides following functionalities:



Industry Outlook

- Capacity building initiatives: customer outreach, ex-works standards, vendor outreaches, third party checks, trip level inputs
- Prepare for challenges of new fuel/de-carbon propulsion tech
- Prepare for autonomy in vehicles as outlined.
- Areas of Industry Collaboration:
 - Services like **TRANSCAER** and **CHEMTREC** for emergency response absent in India
 - **SQAS, an assessment system** to evaluate the performance of Logistics Service Providers and Chemical Distributors, managed by European agency CEFIC. Similar system absent in India.



Sources

- Various government portals – MoRTH, MoCI, AAI, IWAI, NITI, PIB, DPIIT
- Press Information Bureau – Media Releases, Archives

THANK YOU