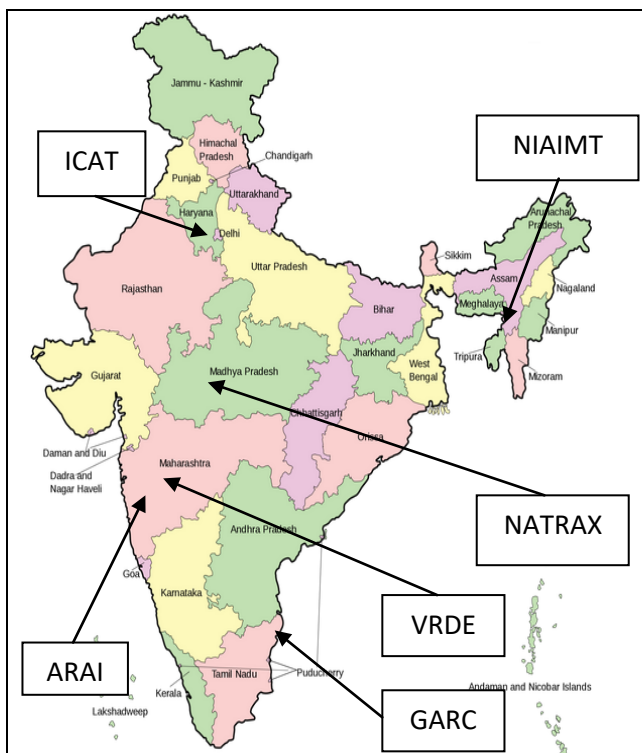




## National Automotive Testing Research & Development Infrastructure Project (Department of Heavy Industries, Government of India)

NATRIP is the most significant initiative in Automotive Sector by Govt. of India with an initial investment of Rs 1718 Cr. in 2005 revised to Rs. 3727.30 Cr in 2016. A unique project under which the Government of India, a number of State Governments and Indian Automotive Industry came together to create state-of-the-art testing and R&D facilities, so that core competencies in automotive technology in India can be created to facilitate seamless integration of the Indian Automotive Industry with the world.



**Vision** - Create state-of-art testing and R&D infrastructure to drive India into the Future of global automotive excellence.

**Mission** - NATRIP aims at setting up of seven state-of-the-art automotive testing and R&D centres across the country and thereby:

- Creating core global competencies.
- Enhancing competitive skills for products development leading to deepening of manufacturing.
- Synergizing India's unique capabilities in Information & Technology with the automotive sector.
- Facilitating seamless integration of Indian automotive industry with the world to put India strongly on the global automotive map.

### Centres -

- A full-fledged testing and homologation centre within the Northern hub at International Centre for Automotive Technology (**ICAT**) Manesar, Haryana
- A full-fledged testing and homologation centre within the Southern hub at Global Automotive Research Centre (**GARC**) Oragadam, Chennai, Tamil Nadu
- A world-class proving ground at National Automotive Test Tracks (**NATRAX**) Pithampur-Indore, Madhya Pradesh in central India.
- Up-gradation of testing & homologation facilities at Automotive Research Association of India (**ARAI**) Pune and Vehicle Research and Development Establishment (**VRDE**) of DRDO at Ahmednagar in the western hub, in Maharashtra.
- National Specialized Hill Area Driving Training Centre and Regional In-Use Vehicle management (Inspection & Maintenance) Centre at National Institute for Automotive Inspection Maintenance and Training (**NIAIMT**) at Silchar, Assam in the North-East region.



**The facilities/ laboratories planned at various centres under NATRIP**

| <b>Facility &amp; Lab</b>     | <b>Centres</b>            | <b>Test Capability</b>   |
|-------------------------------|---------------------------|--|
| Powertrain                    | ARAI, GARC, ICAT & NATRAX | Up-to Euro VI Emission + R&D   |
| Fatigue and Certification     | ARAI, GARC & ICAT         | Fatigue - R&D<br>Certification - Homologation<br>(safety regulation) + R&D |
| Passive Safety                | ARAI, GARC & ICAT         | Homologation (safety regulations) + BNVSAP                                 |
| Electromagnetic Compatibility | GARC, ICAT & VRDE         | Homologation + R&D   |
| Noise Vibration Harshness     | ICAT                      | Research & Development   |
| Test Tracks                   | GARC, ICAT, NATRAX & VRDE | Homologation + R&D   |
| Vehicle Dynamics              | NATRAX                    | Research & Development   |
| CAD-CAE                       | GARC, ICAT & NATRAX       | Research & Development   |
| Infotronics                   | GARC & ICAT               | Research & Development   |
| Mechanics & Driver Training   | NIAIMT                    | Skill Development  |
| Inspection & Maintenance      | NIAIMT                    | Fitness Check  |
| Accident Data                 | Relocated to GARC         | Research & Data Collection   |



## Powertrain -

### Facilities:

- Mileage Accumulation Chassis Dynamometer (MACD) for 2W, 3W & 4W at ICAT & GARC
- Engine Test Cell (ETC) for Heavy duty and Light duty engines at ICAT, GARC & ARAI
- Sealed Housing Evaporation Determination (SHED) facility for 2W, 3W and 4W at ICAT & GARC
- Vehicle Test Cell (VTC) for 4W at ICAT, GARC, NATRAX & ARAI
- Climatic Vehicle Test Cell & Low Temperature Soak Room for 4W at ICAT, GARC & ARAI

### To comply:

- Standard endurance testing according to EC, EPA, Indian, Japanese or other regulations
- Specific Drive Cycles, e.g. customer defined accelerated endurance cycle, vehicle running in cycle, vehicle running in cycles, journey simulation, etc
- Customer defined (R&D) test (e.g. in vehicle gearbox testing, simulated vehicle operational tests)
- Performance Tests
- The systems are equipped with Robot driving (Auto Pilot)





## Fatigue & Certification -

### Planned facilities:

- Electrodynamics vibration shakers integrated with climatic chamber at ICAT, GARC & ARAI
- Interior fitting test rig at ICAT & GARC
- Head restraint test rig for seats at ICAT & GARC
- Bus window retention test rig at ICAT & GARC
- Bumper test rig at ICAT & GARC
- High frequency Multi Axis Simulation Table (MAST) with climatic chamber for component testing at ICAT
- MAST with climatic chamber for component testing at ICAT, GARC & ARAI
- Universal Test Bench for component at ICAT, GARC & ARAI
- X-poster test rig for passenger cars at ICAT, GARC & ARAI
- Heavy duty X-poster test rig at ICAT
- Rapid Prototyping Equipment at ICAT (Component)

### To comply:

- The equipments under Fatigue & Certification facility will evaluate structural dynamics of components/ aggregates simulating real time loading conditions etc.



## Passive Safety –

### Facilities:

- Pedestrian lab at ICAT & GARC
- Airbag lab at GARC
- Static roll-over test at ICAT, GARC & ARAI
- Dynamic roll-over test at GARC
- De-celeration SLED test at ICAT & ARAI
- Side impact test at ICAT & ARAI
- Frontal impact test at ICAT, GARC & ARAI
- Rear impact test at ICAT, GARC & ARAI
- Pole impact test at ICAT, GARC & ARAI
- Offset frontal impact test at ICAT, GARC & ARAI
- Angular Car to Car crash test at GARC

### To comply:

- Regulation 78/2009 (Phase I/II) – Pedestrian protection
- Euro NCAP – Crash test as well as Pedestrian requirements
- FMVSS201U – US Regulation
- GTR9 (Global Technical Regulation)
- TRIAS 63-2004, Japanese Regulation
- JNCAP – Crash test as well as Pedestrian requirements
- ECE R12 & ECE R21
- AIS – 96, 98, 99, 100 & 101





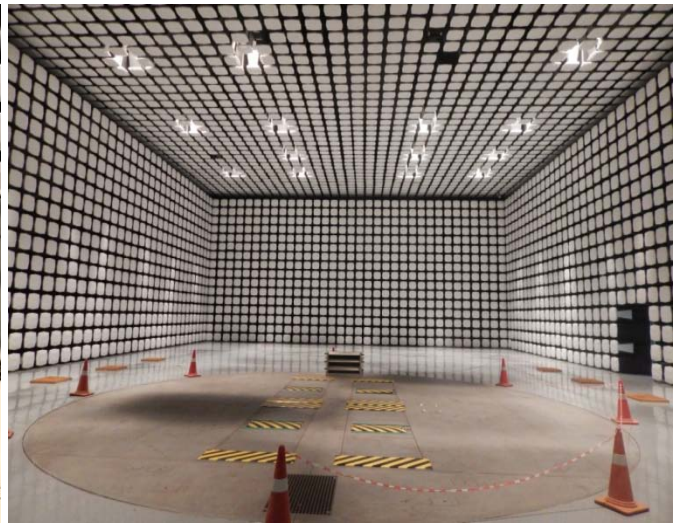
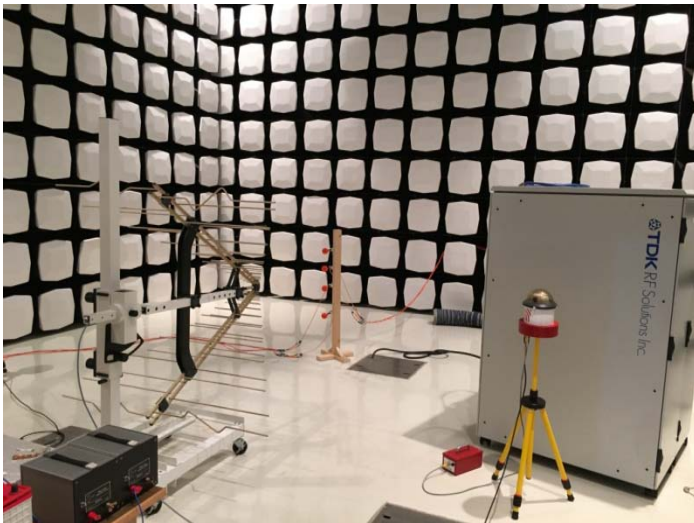
## Electromagnetic Compatibility (EMC) -

### Planned facilities:

- Vehicle Semi Anechoic Chamber (VSAC) for electromagnetic compatibility up-to heavy commercial vehicle at ICAT, GARC & VRDE
- Component Semi Anechoic Chamber (CSAC) at ICAT & VRDE
- Vehicle Semi Anechoic Chamber for passenger car and components at GARC

### To comply:

- EN 50147-1, 50147-2, 55022 & 61000-4-3+A1
- IEEE 299
- NSA 65-6
- ANSI C 63.4-2001
- CISPR 16, 22 & 25
- IEC 61000-4-3
- NRL 8093-1, -2, -3, -4, -5
- DIN 4102 B1, A2
- EU directive 95/54/EC
- ECE R 10
- ISO 7637 & 11452-2
- AIS 004/1999
- SAE J555





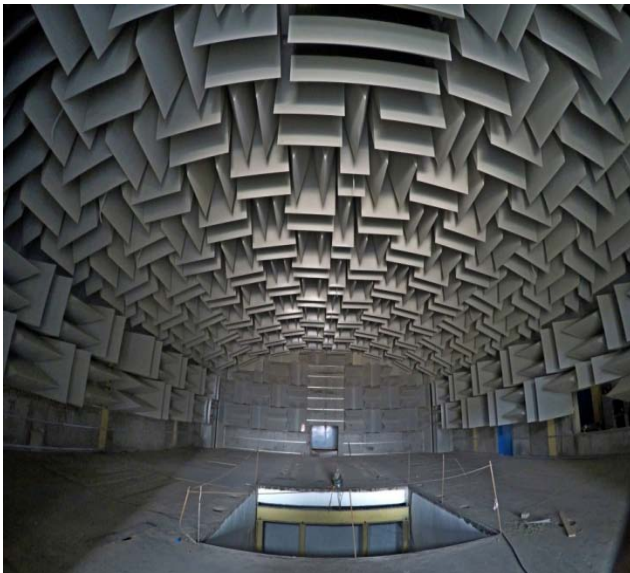
## Noise Vibration Harshness - NVH (Only at ICAT) –

### Facilities (at ICAT only):

- Transmission test bed
- Vehicle Semi Anechoic Chamber (VSAC) for passenger car with 4X4 chassis dyno
- Heavy Duty Semi Anechoic Chamber for trucks with 4X2 chassis dyno
- Quiet Room
- Coupled Acoustic Rooms
- Listening Room

### To comply:

- Measurement of Transmission loss under ISO 140 & SAE J 1400
- Measurement of Sound Absorption under ISO 354
- Exterior & Interior Noise of the Vehicle including Noise allocation
- Vibration Path Analysis
- Acoustic allocation & Structural vibrations
- Acoustic Isolation & Source identification
- Modal analysis of vehicle frame/ body/ engines etc
- Pass by Noise Tests ISO 362-1





## Test Tracks & Vehicle Dynamics –

### Facilities:

- Oval track (High Speed) at NATRAX
- Oval track at ICAT & GARC
- Braking surface track at ICAT, GARC, NATRAX & VRDE
- Hill track at ICAT, GARC & NATRAX
- Steering pad at ICAT & GARC
- External noise track at ICAT, GARC & NATRAX
- Dynamic platform at NATRAX
- Accelerated fatigue track at NATRAX
- Gravel and Off-road track at NATRAX
- Dry handling circuit at NATRAX
- Handling track for 2&3 wheelers at NATRAX
- Sustainability track at NATRAX
- Wet skid pad at NATRAX
- Water flood track at NATRAX
- Comfort track at ICAT & NATRAX
- Test tracks instrumentation and Weighing Pads at ICAT, GARC & NATRAX

### To comply:

- IS - 3028, 10299, 12222, 14554, 11852, 14785, 10278, 11827, 11877, 11921, 10276, 11716, 13670, 11852-2003(Part9), 11948 etc
- ISO - 362, 5130, 13325 etc
- ECE - R51, R79, R13 etc
- AIS - 014, 003, 042 etc



## Vehicle Dynamics (Only at NATRAX) –

### Facilities:

- Kinematic & Compliance (K&C) machine
- Steering test rig
- Elastomer test rig
- Damper test rig

### To comply:

- Research & Development support for the proving ground test performed and assists in simulating real road conditions for establishing road-test correlation.





## Infotronics -

### Facilities:

- MATLAB (Software) at ICAT & GARC
- Measurement Calibration & Diagnostic Tools (MCDF) at ICAT & GARC
- Hardware in Loop (HIL) system for Single ECU test bench for Powertrain & Chassis at ICAT & GARC
- Plant models (Software) for Car & Engine development at ICAT & GARC
- Rapid prototyping system for ECU development at ICAT & GARC

### To comply:

- Facility for automotive sector where development, testing, evaluation, validation, training etc can be carried out on Electronic Control Units (ECU) devoted to Vehicles or Vehicle components in terms of the hardware and software





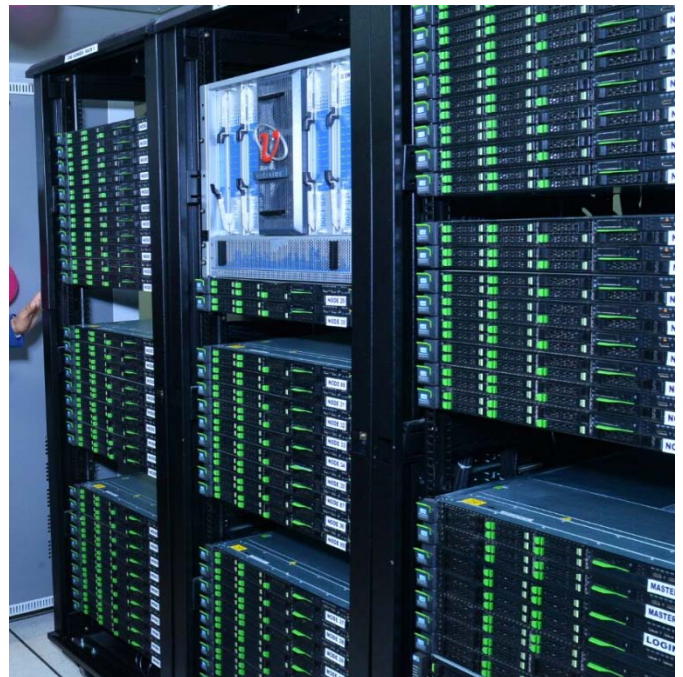
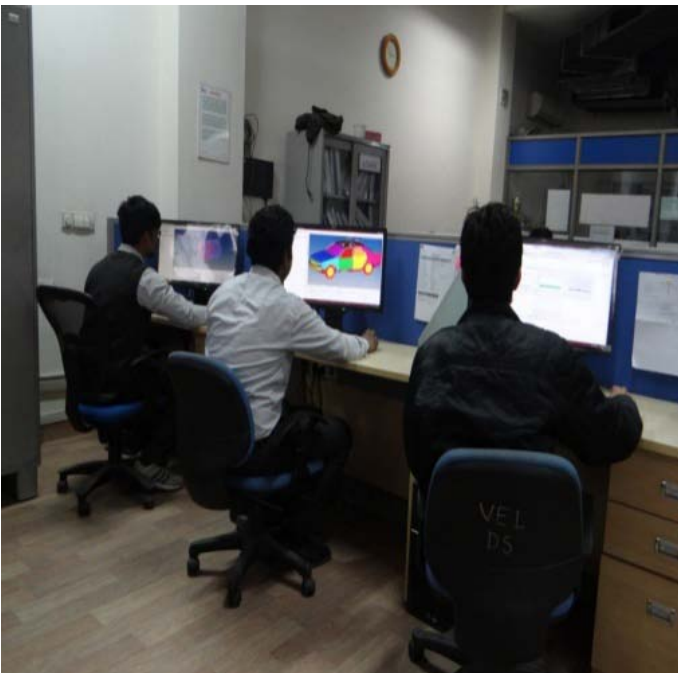
## CAD/CAE –

### Software available for the Industry:

- Simulia-Abaqus
- Ansys
- Altair-Hyperwork
- Catia V6
- Siemens NX 13100
- MSC-Nastran
- MSC-Fatigue
- MSC-Adams.
- MSC-Adams Car

### To comply:

- Facilities where people from Industry can do the Designing, Creation, Modification, Optimization, Analysis etc of component & assemblies of vehicles on software, so that cost and time can be reduced in developing new & advanced products





## **Mechanics & Driver Training –**

### **Facilities:**

- Driving Simulator
- Driving training Class Room & Track
- Diesel Engine lab, Gasoline Engine lab, Diagnostic & Repair lab, Welding lab and Auto-electric lab
- E-learning class-rooms

### **To comply:**

- Facilities for skill development including certified courses for Drivers & Mechanics



## **Inspection & Maintenance –**

### **Facilities:**

- Fixed and Mobile lane for vehicle inspection

### **To comply:**

- Fitness test for on road commercial vehicles as per rule 62 of CMVR
- Provide Authorised fitness certificate





## Accident Data (Relocated to GARC) –

### Facilities:

- Real time accurate In-Depth accident data collection
- Data compilation & Database Creation
- Analysis of Contributing Factors
  - ↳ Driver, Vehicle, Road Architecture, Traffic Behavior, Environment etc
- Scientific Analysis
  - ↳ Virtual Reconstruction
- Conducting Road Safety awareness and training programs

### To comply:

- Design and Establishment of a National Research Center for Accident Data Analysis
- Creation and compilation of National Accident Database
- Implementation of Accident Data Collection methodology at a Pan India Level.
- Develop safety systems in terms of Vehicle and Road Infrastructure Design
- Contribution towards National Road Safety Policy and R & D in safety standard improvement of Vehicles





**For more details, the following web-links of respective centres may kindly be referred:**

**ICAT – Manesar**      ([www.icat.in](http://www.icat.in))

**GARC – Chennai**      ([www.garc.co.in](http://www.garc.co.in))

**NATRAX – Indore**      ([www.natrip.in](http://www.natrip.in))

**ARAI – Pune**      ([www.araiindia.com](http://www.araiindia.com))

**VRDE – Ahmednagar**      (<https://www.drdo.gov.in/drdo/labs1/VRDE/English/indexnew.jsp?pg=facility.jsp>)