



1. ARAI - Center of Excellence for Electric Mobility

2. International Transportation Electrification Conference (ITEC) India 2017

□ ARAI - Center of Excellence for Electric Mobility

In line with National Electric Mobility Mission and thrust of Government of India on Electric Mobility, rapid growth in Electric Vehicle development is envisaged in India.

ARAI, premier Automotive R&D and Certification Institute in the country, has set up Center of Excellence (CoE) for Electric Mobility to support automotive industry for development, evaluation and certification of Electric Vehicles. This Center of Excellence houses comprehensive state-of-the-art facilities for vehicles (2-wheelers, 3-wheelers, passenger cars, buses and commercial vehicles), their components such as traction batteries, motors, controllers, chargers, etc. The center also has capabilities in the area of light weighting, structural integrity, materials, simulation, etc. which are important for electric vehicle development.

Battery Performance and Safety Testing

- Evaluation Testing of EV Traction Batteries as per AIS 048, ECE R100, USABC, FreedomCAR Battery Test Manual, SAE J2464, UN38.3, ISO 12405, IEC and UL standards at Cell Level and Battery Pack Level for different battery chemistries such as lead acid, Li-ion, NiMH, etc. under environmental conditions.
- Performance testing, life cycle testing, safety/abuse (Thermal, Electrical, Mechanical) testing.
- Material characterization of battery electrodes and electrolytes for elemental, thermal, topographical analysis.

30 Channel Cell level Test System



EUCAR Level 6 Environmental Chamber



800V / 600A, 250 kW Pack Level Test System



Electric Motor Characterization

- Net Power, 30 Min Power and efficiency as per AIS 041 and ECE R85.
- Reliability, durability and overload capacity.
- Dynamic behavior and dynamic measurements.
- Evaluation of torque speed characteristics of electric motors, torque analysis.
- Power and efficiency maps of electric motors and converters/Motor Controller.
- Cold start performance measurement
- Testing of regenerative braking.
- Blocking tests
- Thermal Characteristics
- Overload Capacity



150kW and 220kW E-Motor Test bed With Environmental Chamber



Vehicle Performance and Homologation as per CMVR on Chassis Dynamometer and Test Tracks (2 Wheeler, 3 Wheeler, 4 Wheeler Passenger cars, Commercial Vehicles and Buses)

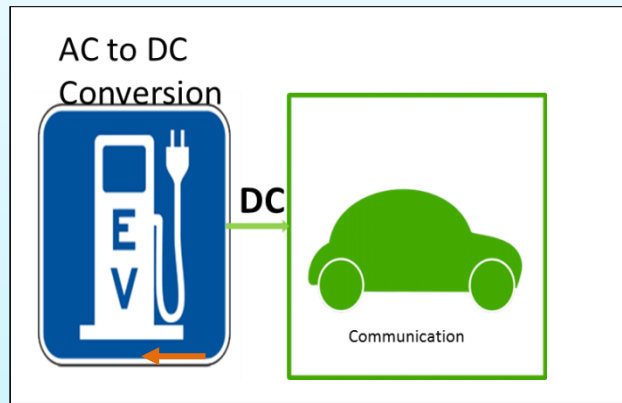
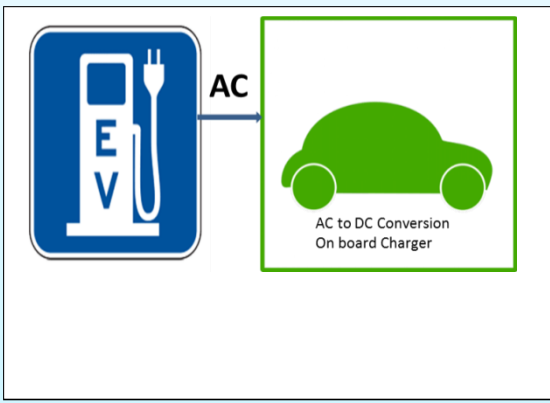
- Electric Energy Consumption as per AIS 039 and ECE R101
- Electric Range measurement as per AIS 040 and ECE R101
- Power at Wheels as per AIS 041
- Brakes, Gradeability, Pass-by Noise
- Constructional and functional safety, EMC





Charger Testing and Certification

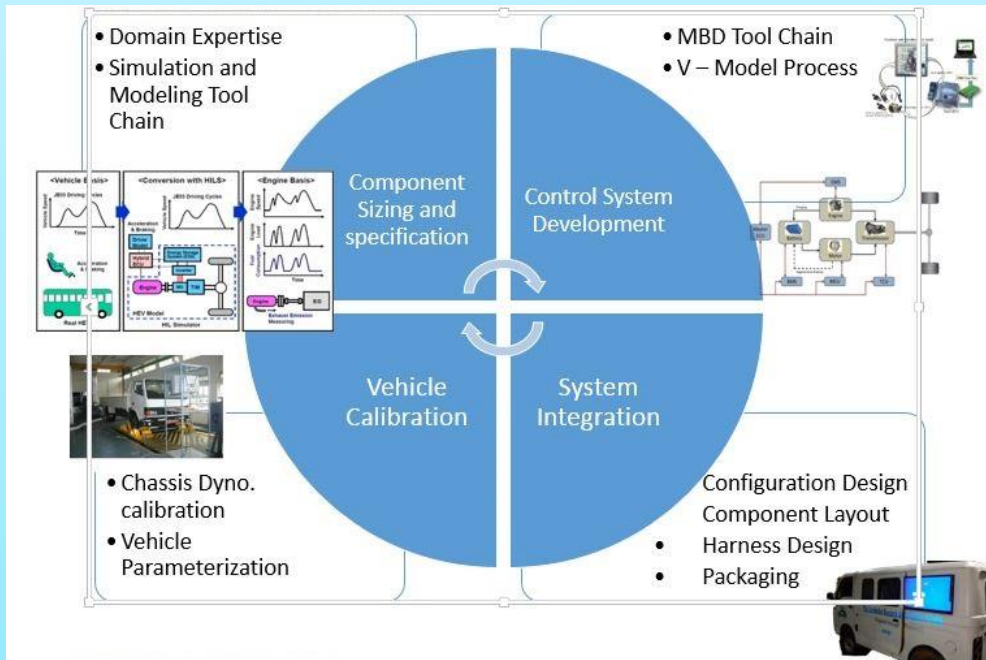
- Testing as per AIS 138 Part 1 and Part 2
- Testing as per Bharat EV Charger Specifications AC001 and DC001

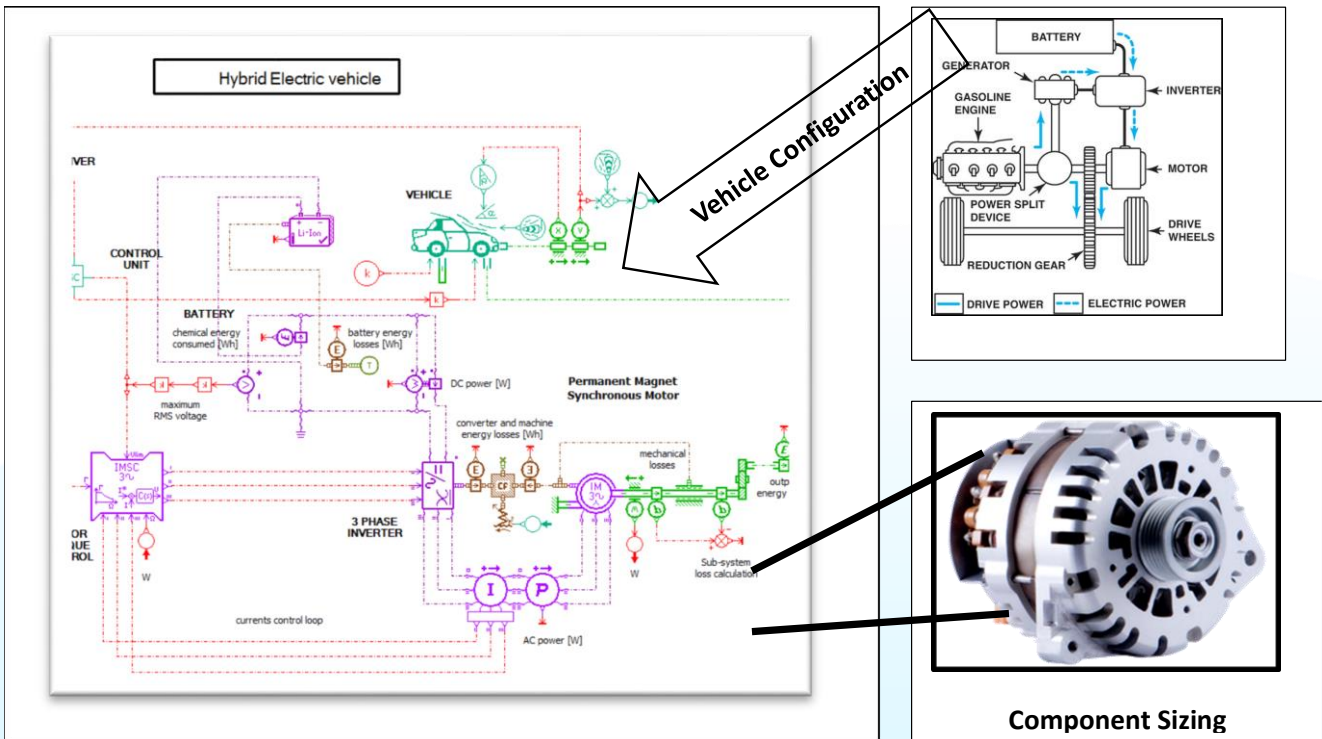


Electric Vehicle Development

Competency in Electric vehicle development for,

- Component (Motor, Battery) sizing and specifications using simulation tools
- Control System development
- System integration
- Vehicle calibration

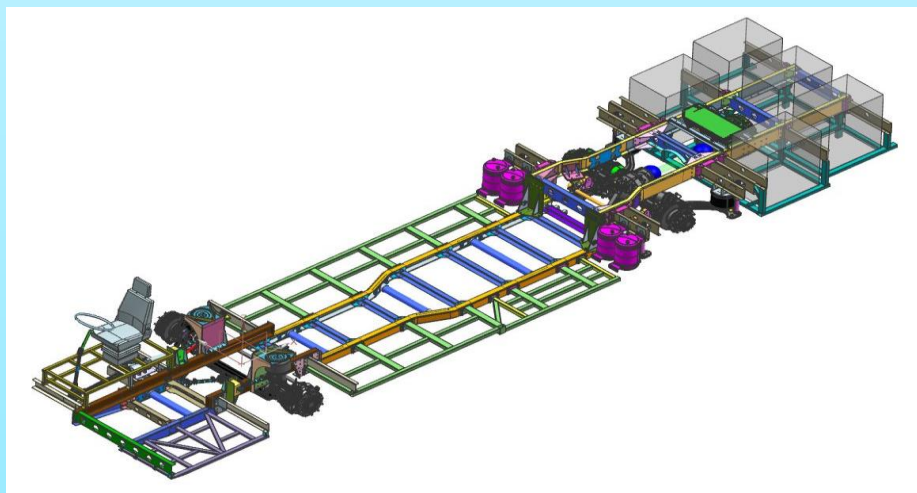




Lithium Ion Battery Technology from Space to Automotive



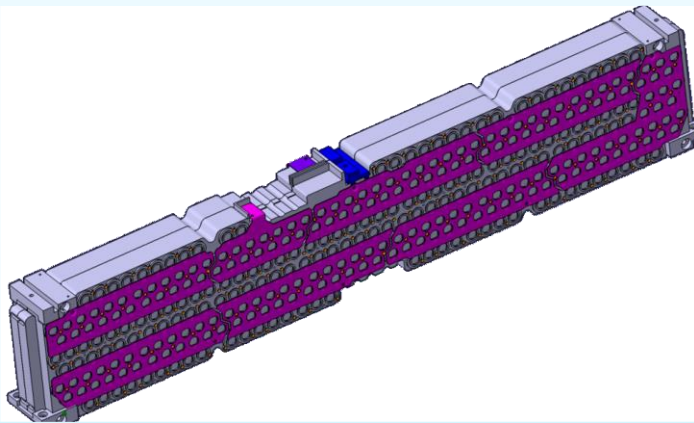
Chassis Design and Development for Electric City Bus



Electric Bus Chassis Layout

- Design of Bus chassis for maximum strength and minimum weight
- Modular design of Chassis for compatibility of different Power pack viz. Electric/Other Fuels
- Seamless Vehicle Integration Capabilities considering all External & Internal Packaging with chassis aggregates
- Vehicle Performance Prediction viz. Tractive effort calculation for Motor selection including wheel slip, Steering performance predictions
- Driveline calculations & selection
- Brake calculations considering Electric bus weight distribution
- Steering system kinematic analysis using MBD. Prediction of Bounce steer, Re-bounce steer, under steer, over steer, etc.
- CAE analysis of Electrical Bus Chassis as per standard load cases
- Optimization of chassis with virtual

Rechargeable Energy Storage System (REESS) Evaluation using CAE

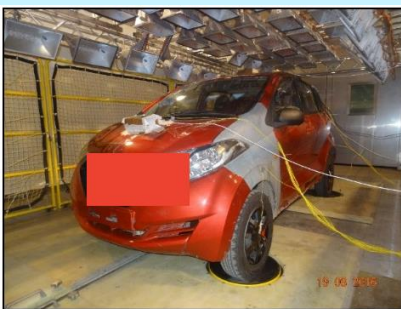


Evaluation of REESS (Battery Pack) main components.

- Battery Disconnect Unit (BDU)
- Battery Array consisting of
 - Battery Cells (Li-ion or Lead Acid)
 - Separating Shield
 - Locking Structure (Bolts)
- Battery Management System
- Battery Tray (for Mounting)
- Battery Casing (for Packaging)

Four Poster durability of Electric Vehicle in Climatic Chamber for structural adequacy

- ✓ Laboratory Simulation of Roads & tracks for Durability Evaluation
- ✓ Environmental simulation for temperature, humidity and sunlight



Suspension Evaluation of Electric vehicles using Multi axis Technique



Evaluation of Battery Structure and supports using Multi-axis Shaker table "MAST"





ARAI, in association with SAE India and IEEE, is organising International Transportation Electrification Conference (ITEC) India 2017 from 13-15 December 2017 in Pune.

India is the most happening country in the world at the moment in the automotive sector. The focus of the Indian Government on reducing air pollution, encouraging electric mobility has driven industry to advance their R&D efforts. ITEC India 2017 happening on this backdrop will be an ideal platform for the researchers around the globe to put forth and deliberate their ideas to address India-specific and global challenges and solutions for transition towards electric mobility.

The theme of ITEC India 2017 is "Electric Vehicle Ecosystem – Resetting the Future of Mobility". The event features parallel sessions on topics of current interest such as motors, power electronics, battery & BMS, EV system architecture, modelling and simulation, smart grid, standards, policies and regulations, etc.

An exposition is being organised concurrently, giving a platform to exhibitors to showcase technologies / products in this niche area of transportation technology.

ITEC India 2017 aims at creating a knowledge sharing platform to exchange ideas, benchmark best practices and leverage opportunities.

ITEC India 2017 offers different avenues for the participants in terms of exhibition of technologies, products and services in the area of EV / HEV through technical papers, keynote papers, exposition and branding.

For further details, please visit ITEC India 2017 website www.itecindia-conf.com or write us on itecindia2017@araiindia.com.

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