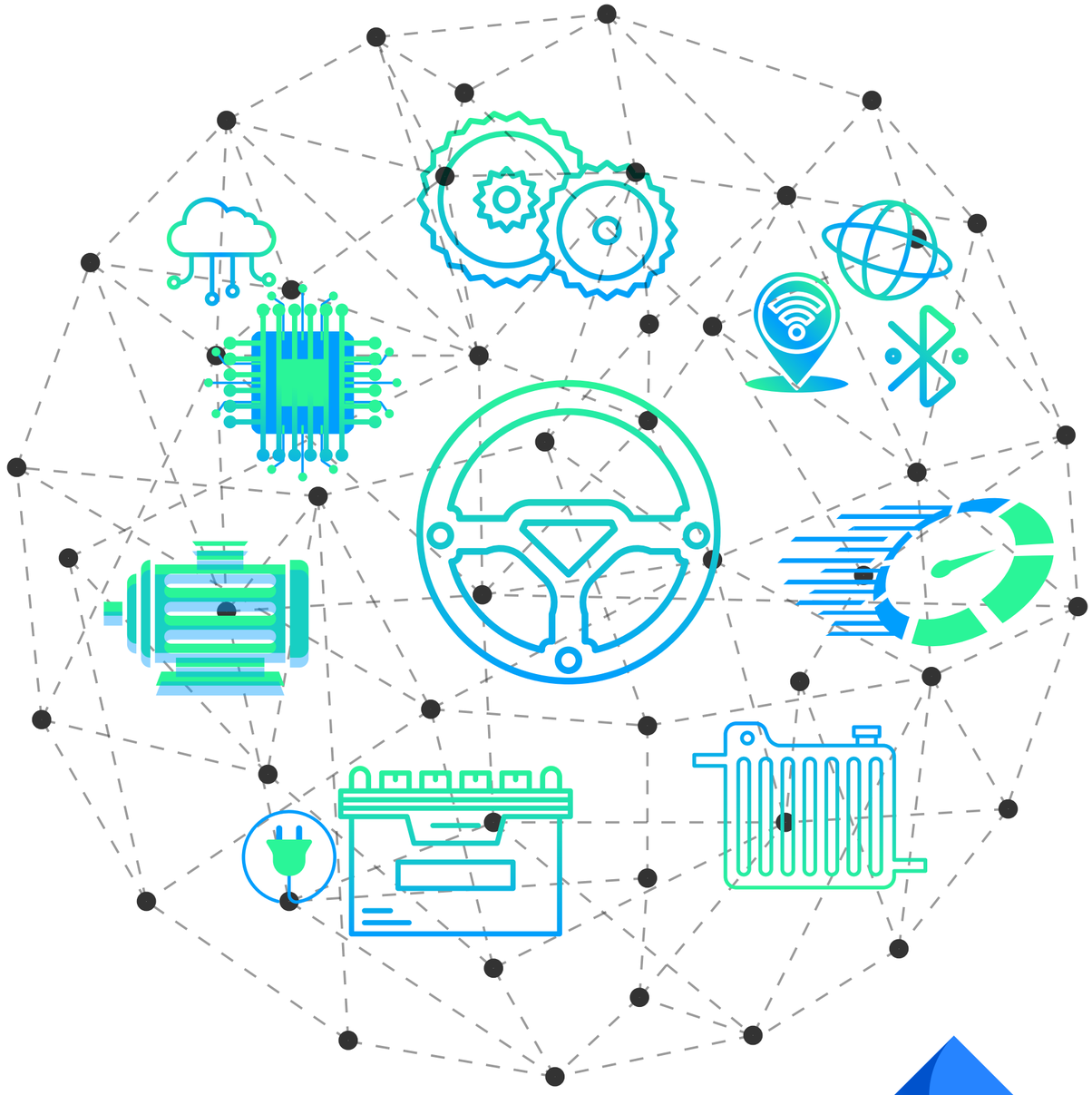
devise

Devise Electronics

Your Development Partner Since 2013



www.deviseelectronics.com

- **Incorporation**

  2013– Proprietorship
  2015- Private Limited Company

- **Business domains**

  Embedded Products
  R&D Services
  Systems Engineering
  Technical Consultancy
  Product Representation
  Mobility Skill Development

- **Clientele**

  India
  Middle East
  Europe
  USA

- **Special Initiatives**

  REPARO – Diagnostic Tool & Platforms
  ‘gyaniki’ – Your "ACCESS" to Future Mobility Knowledge

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Vision | Mission | Values

To be your global mobility solutions partner

- End-to-End support
- Quality products
- Flexibility
- Agility

Devise sustainable and innovative technology-oriented products and solutions for evolving mobility landscape

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- Innovation
- Focus
- Quality
- Commitment

SHEKHAR MALANI
Managing Director
20+ years Automotive Electronics experience

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Core Team

HARSH SHAH
Chief Technology Officer

PRAMOD KRISHNAIAH
Business Development
Products, Market Research & Upskilling

SWAPNIL TIKLE
Business Development
Product & Services

GORDON WALKER
Business Development
Global Market

NAMITA ZAWARE
Operations Head
Training Vertical

ROSHAN KHADSE
Technical Program Manager

FAIZ KHAN
Sr. Engineer
Simulation & CAE

SUMEDH PISE
Technical
Product Manager

ARUNA BABAR
Chief Engineer
Embedded Hardware

PRADNYA LAD
Human Resources

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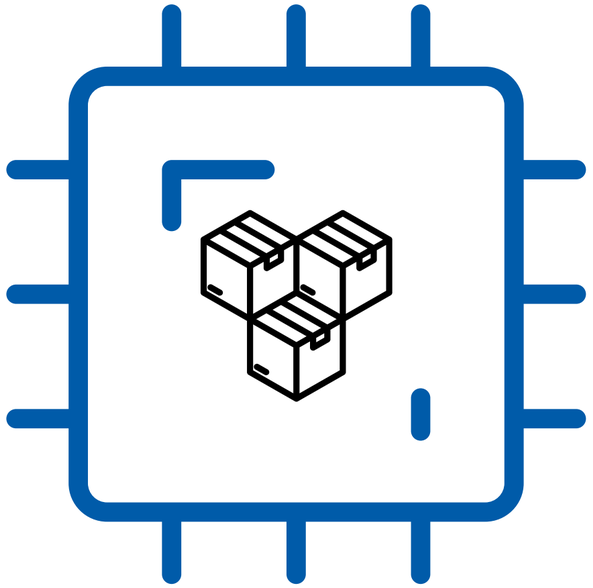
Embedded Products



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Automotive Products

VCU (Vehicle Control Unit)

- deVCU S-Lite

- deVCU N-Lite

- deVCU

IOT & Telematics

- deIOT4G-1C

- deIOT4G-3C

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R&D Services

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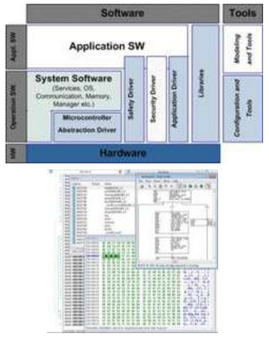
Embedded Electronics

Embedded Hardware

- Hardware Architecture Schematics
- Circuit Simulation
- PCB Design
- Prototyping
- BOM Management Validation Testing
- DFM, DFA

Firmware Engineering



- Bootloader Development
- Device Driver Development
- Application & Diagnostics Development
- Code Porting
- Library Development
- Documentation

Connectivity Solutions

- BT/BLE, Wi-Fi, LoRA
- NFC/RFID
- 3G/LTE/GPS
- LIN/CAN
- USB/Serial/Parallel
- Edge, Server and Cloud Integration
- Data Analytics
- Cloud Dashboard

System Development

- Prototype Build
- Hardware Mechanization
- System Level DFMEA
- Functional Safety
- Security
- Product MDS documentation
- VAPT Testing

Validation & Verification

- DVP & R
- Engine Durability and Emissions Testing
- Vehicle Indoor and Outdoor Testing
- EMI/EMC Validation
- Mechanical Validation
- Environmental Validation

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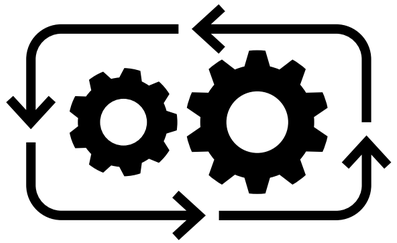
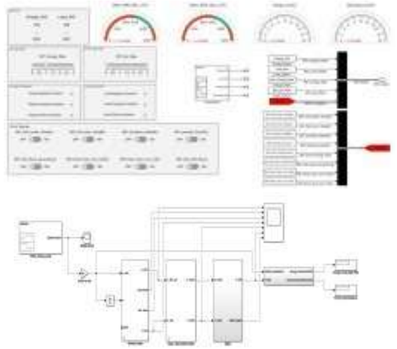
Model Based Development

Worflow



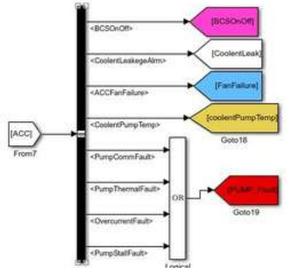
- Gather requirements and analyze the inputs.
- Decide control strategy for the inputs.
- Form a model with the required specifications.
- Simulate the model.
- Validate data based on the relevant physical system

Parameterization



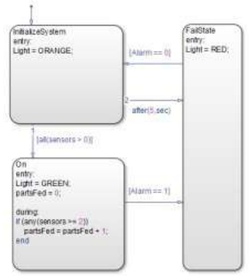
- Develop Features and Functions
- Evaluate physical system performance.
- Calculate component specification based on the performance
- Determine dependency of the component's specifications on the overall system.

System Validation



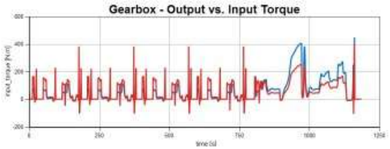
- Establish Traceability between the Model and the Code.
- Determine that the Code executes properly in its final Software and Hardware environments.
- Involve Model checks as well as SIL, PIL & HIL Testing.

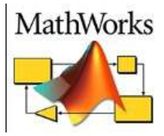
Embedded Application



- Reduce dependency on the Development environment and Protocols.
- Custom toolboxes for the controller family and architecture.
- Seamless Application flashing on the Hardware

Software Interoperability





- Utilize features of various tools.
- Produce precise results to that of real time.
- Maintain the Simulation Model in a single tool.
- Reduce Development time for custom code of a block that is already available.

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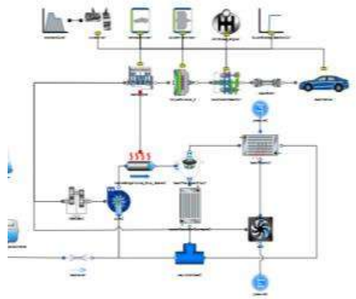
Systems Development

System Design

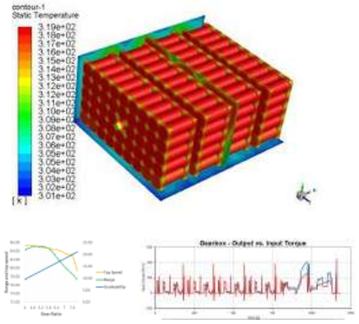


- XEV System Design
- Test System Design: after-treatment,
- Component Sizing
- Defining Boundary Conditions
- System Specification
- Component/System Architecture detailing
- Design for Certification
- D/PFMEA

Component Design

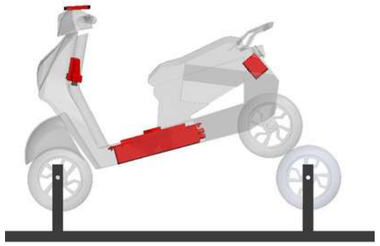
- Component Sizing and selection
- Advanced techniques like Simulink model
- Prototyping
- Frugal Engineering In-house
- Component Sourcing
- Component Sourcing
- Design for certification
- DFM, DFA, DFS
- FMEA

Simulation



- CAD and CAE support
- Physics based modeling in Simulink
- 1D simulation using GT Suite
- Design Optimization
- Data collection / Analysis / Forecasting
- Vehicle performance prediction: max speed, acceleration, gradeability

Integration



- Vehicle Integration
  - Controller/Hardware: Battery pack, VCU, BMS, OBC, etc.
  - Mechanical integration
  - 2-wheeler, 3-wheeler, 4-wheeler (Passenger and commercial vehicles)
- Vehicle Retrofitment with XEV Powertrains
- HV&LV Harness Development
- Diagnostic Troubleshooting Trees

Testing & Validation

- System & Component level
- Test & validation layout
- IS, AIS, DNV-GL etc.
- Test Rig Development
- Homologation spec validation

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Systems Engineering

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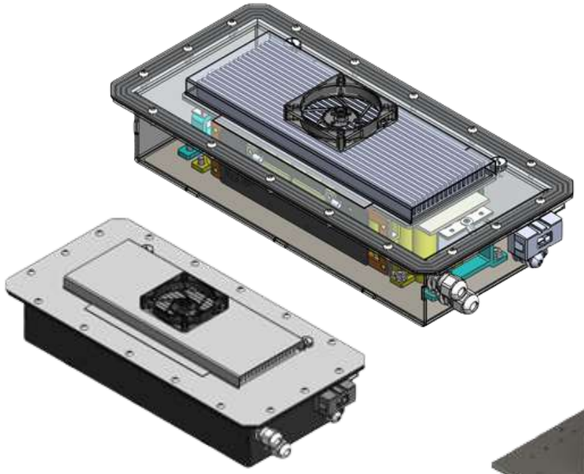
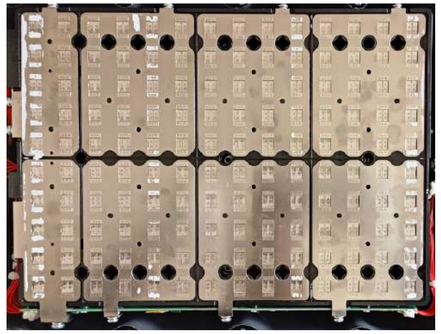
REESS Design & Development

- Experience with
  - NMC, LFP, NCA, Li-S, Lead acid
- Form factors worked with:
  - Pouch, cylindrical, prismatic, elliptic cylindrical etc.
- c
- Cell selection
- Capacity / Power optimization
- Performance Simulations (Thermal Runaway, Vibration, Structural)
- Telematics
- BMS Application Engineering
- Pack integration
- Proto builds
- Guidance on assembly line setup and equipment selection
- Homologation & Certification Support meeting the latest AIS 156 and/or AIS 038





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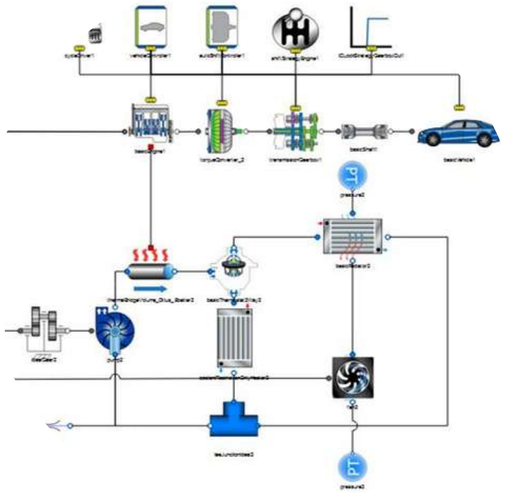
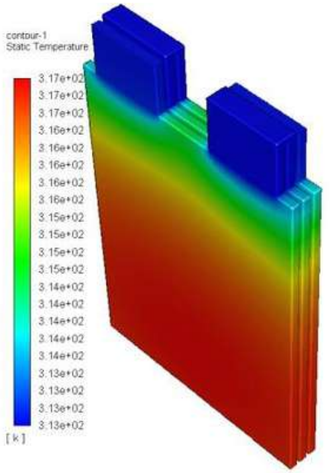
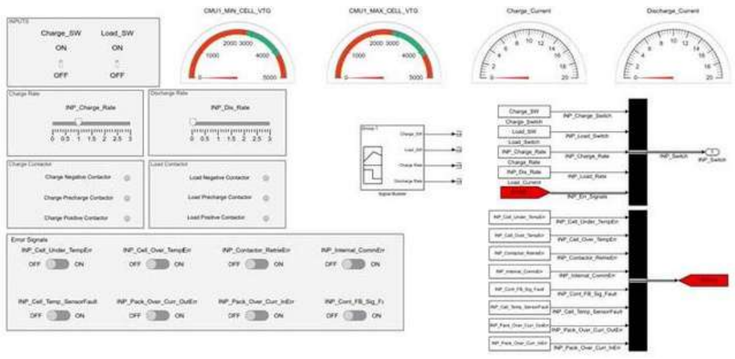
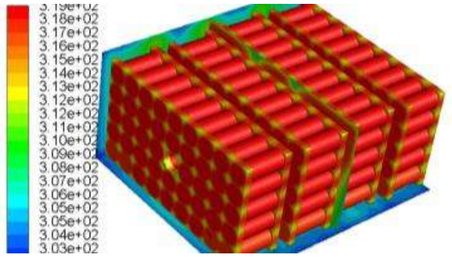
CAE Services

- Engineers with hands-on experience on EV related applications
- Can support as extended teams
- CAD – Solidworks (End to End Component Design)
- CAE support
  - Structural
  - Thermal
  - Fluid









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IoT | Data Science | ML

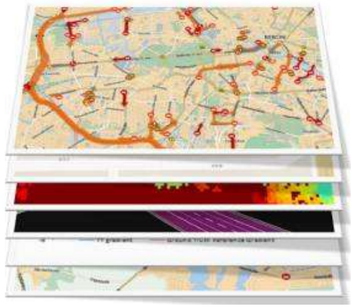
Data Collection

- Live Tracking
- IoT Enablement
- OBD and CAN Data
- Fuel and Driver Behavior Monitoring
- Server and Cloud Setup
- Data Validation
- Data Security

Data Analysis

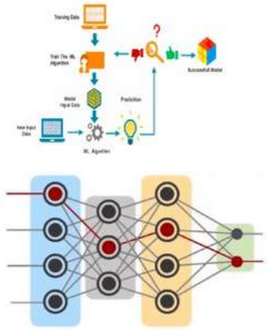
- Feature Extraction
- Clustering and Profiling
- Sorting
- Data calibration
- Data synchronization
- Thresholds
- Trends

Data Fusion



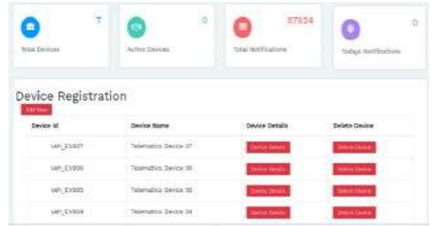
- GNSS/IMU Fusion Systems
- Competitive Fusion
- Distributed and Centralized Architecture

Decision Making



- Neural Nets
- Hierarchical Decision Making
- Redundancy
- Collision Avoidance
- Integration with Robot Operating System (ROS)

Data Dashboard



- Cloud Dashboard
- Login Authentication
- Data Visualization
- Device Management and Administration

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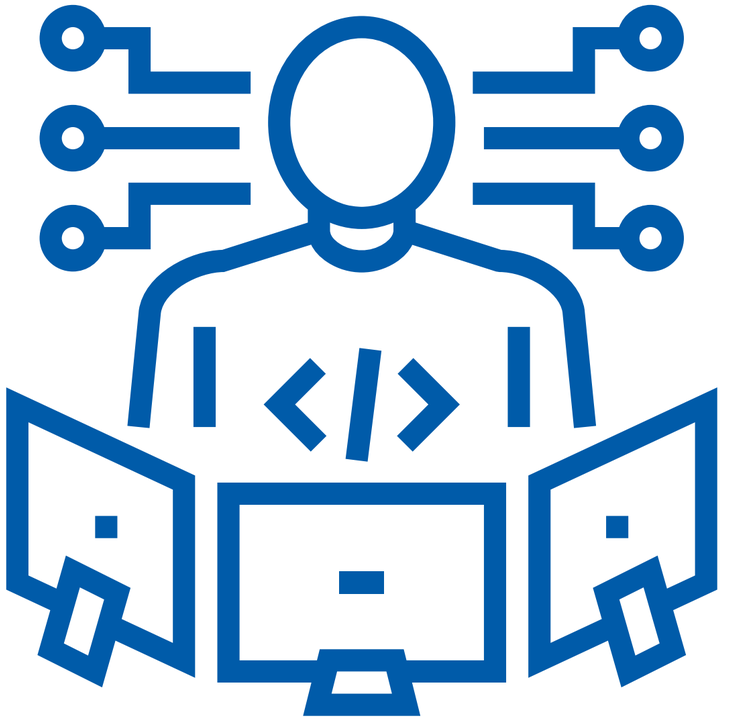
Technical Consultancy



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Technical Consultancy

Technical Assessment / Due Diligence Projects Undertaken

DOMAIN	Details	No. of Projects Undertaken
Vehicle &/or Component Teardown & Benchmarking	EV 2W, Type-2 AC Chargers, Hub Motors, PMSM based e-axle	12
New Technology Assessment, Due Diligence &/or Evaluation	Alternate Battery Chemistry, OTA based Diagnostics Platform, Motor Companies for a traditional Tier 1, Pedelec MCU Company	14+
Facilitation of J-V, Technology Transfer Partnerships	J-Vs between Motor Tier 1 & EMS vendor, Between BMS Tier 1 & EMS, Between BMS Tier 1 & ESS Supplier	8
Safety Audits	Plant safety audits. Build, Process and Operations	5+

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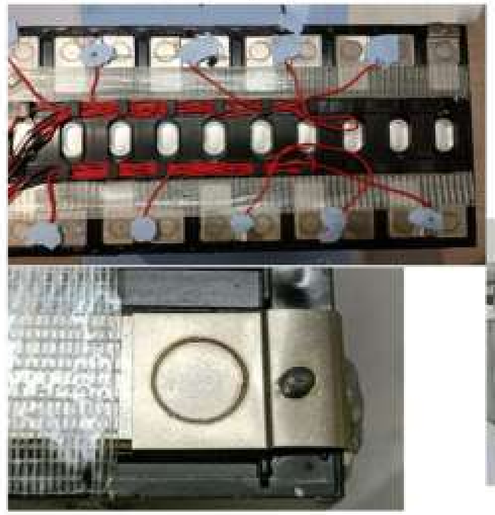
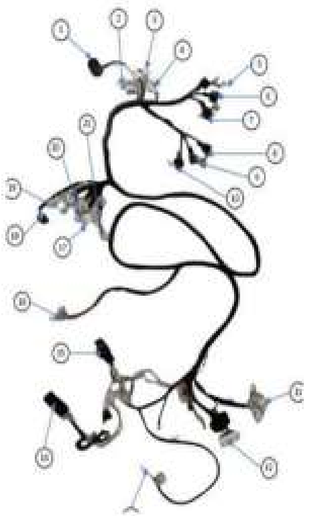
Benchmarking | Teardown

- Performance Evaluation on Chassis Dyno
- On-road testing loop (DTE, Charge Retention, Accuracy of Display, Thermal Performance)
- Benchmarking (Subjective and Objective for 6 2W EV's on sale today)
- BOM Costing Comparison
- Teardown:
  - All powertrain components
  - Wiring & Connector Quality Assessment
  - Vendor tra

Sr.No	Parameters
1	Looks/ Aesthetics
2	Ride comfort/ Ergonomics
3	Pillion Comfort
4	Performance
5	Braking
6	Passive Safety
7	Cluster/ HMI
8	Convenience
9	Connectivity
10	Charging
11	Storage/ Boot Space
	OVERALL





Sr. No	Parameters
1	Subjective Evaluation
2	Acceleration Performance
3	Braking Performance
4	Gradeability Performance
5	Charging Ecosystem
6	Range (Claimed vs. Obtained)
7	Battery Pack
8	BMS
9	Motor & MCU
10	Wiring Harness & Power Electronics.
11	HMI
	Overall

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Product Representation

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Lithium Balance

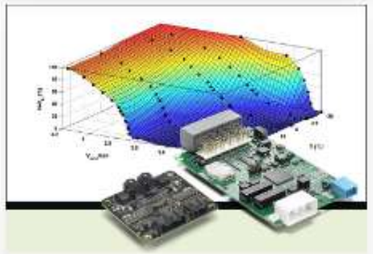
Battery Management System

Lithium Balance has been involved in battery development since 2006.
Devise is an Indian Authorised Distributor & Application Partner for Li-Bal.

s-BMS™

MAIN FEATURES:

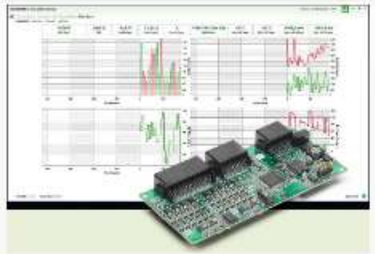
- Distributed system
- 8 voltage channels per slave
- 256 cells in series
- 2 temp. channels per slave
- 12 – 1000 V
- 1 CAN channel
- PRO configuration software



n-BMS™

MAIN FEATURES:

- Distributed system
- 12 voltage channels per slave
- 384 cells in series
- 4/12 temp. channel per slave
- 12 – 1000 V
- 2 CAN channels
- CREATOR config. software



c-BMS™

MAIN FEATURES:

- Integrated system
- Up to 24 voltage channels
- 6 temperature channels
- 12 – 100 V
- 1 CAN channel
- CREATOR config. software

s-BPU™

MAIN FEATURES:

- Battery protection with embedded s-BMS
- 8-32 voltage channels
- 24 – 80 V
- 200 – 800 Amp continuos
- 1200 Amp peaking 10 sec.
- PRO config. software

i-BMS™

MAIN FEATURES:

- Integrated system
- Up to 15 voltage channels
- 6 temperature channels
- 17 – 60V
- Parallel pack & Hot Swap functionality
- On-board pre-charge circuit, shunt, battery disconnect, and power supply

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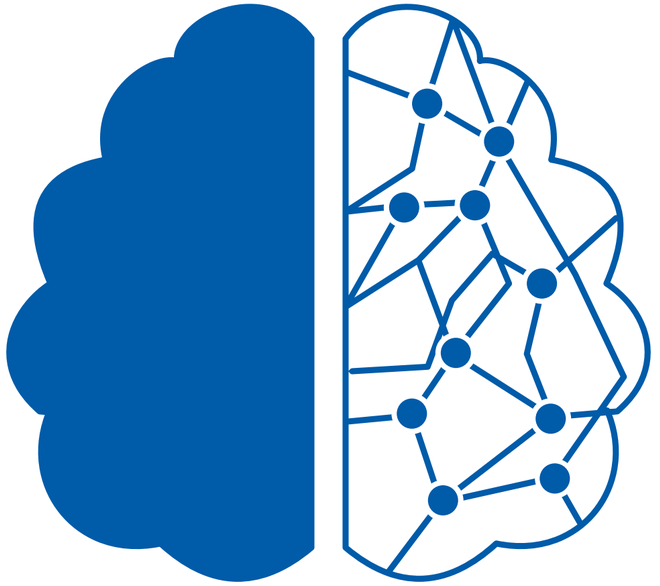
Mobility Skill Development



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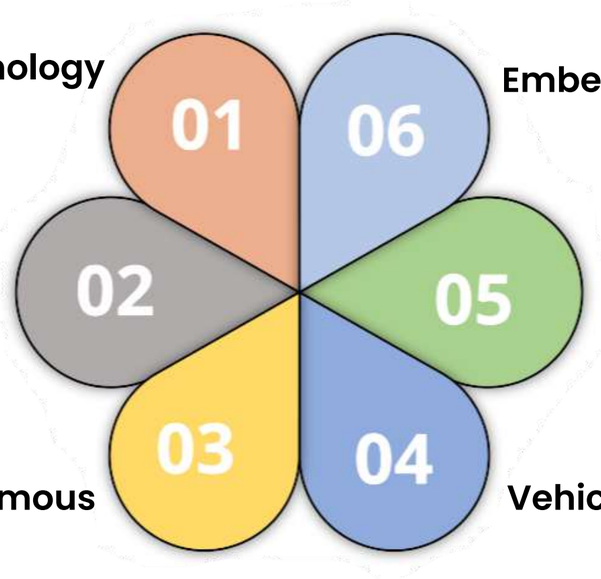
Training Modules



01 Electric Vehicle Technology

02 Future Mobility – Connected, Shared, Functional Safety & Cybersecurity

03 ADAS & Autonomous Technology

04 Vehicle Engineering

05 IOT & Advanced Computing

06 Embedded Hardware & Software

- Experience of OEM Skill Development
- Expert in Audience Centric Skill Development
- Application Oriented Knowledge Transfer with Hands-on Activities
- Largest Topic Coverage in the Industry
- Strategic Partners for Niche Training Requirements
- Domain Experts as Faculties
- Strong Association with Reputed Educational Institutes across India

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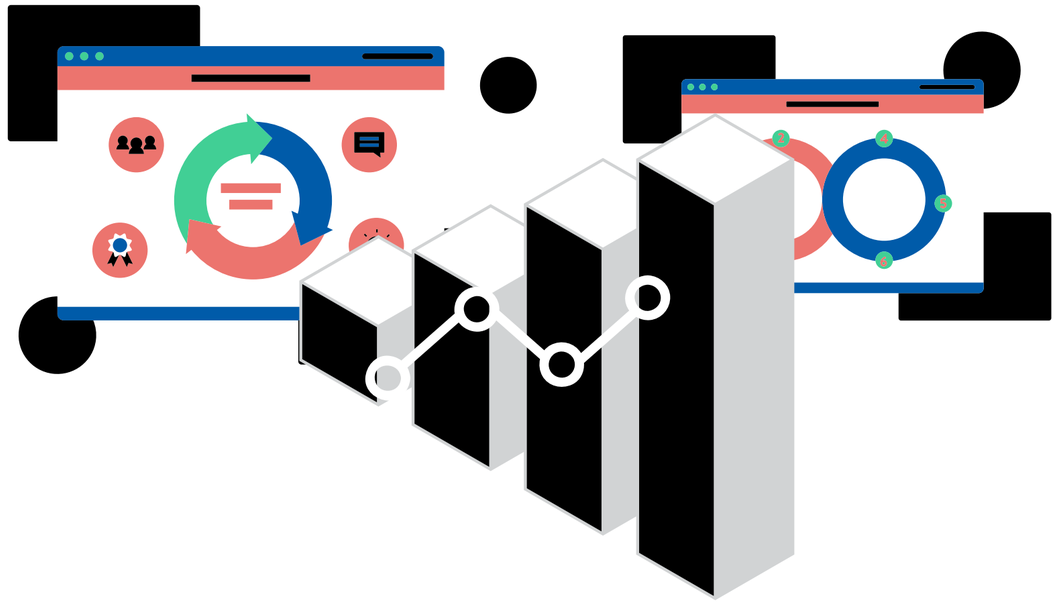
Project Experience



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Project Experience

R&D Services

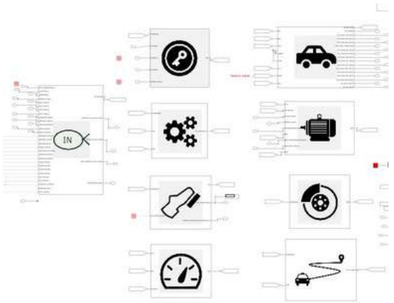
Techno-Commercial Consulting

- EV Industry Entry Point Analysis for traditional Tier 1
- Supply Chain Localization for EV
- JV Setup for Local Manufacturing
- Should Cost Analysis for Motor + Inverter

Embedded Electronics

- UCMS-Ultra Capacitor Monitoring System
- MOSFET based Battery Disconnect Unit
- Master Slave Data Acquisition System

Model-Based Development



- Model based Application software for IC Engine
- Model based on- board diagnostics module and EV
- Low-Cost HIL and Smart Breakout Box

IoT | Data Science | ML

- Devise guided trouble shooting
- EV fleet data analysis
- Perception and localization
- E-catalogue – Augmented reality

Vehicle Integration

- Powertrain integration in LCV
- Battery pack for Hybrid LCV
- VCU integration in Bus
- Powertrain 2W Hybrid EV

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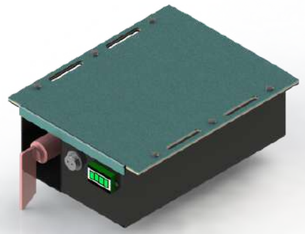
Project Experience

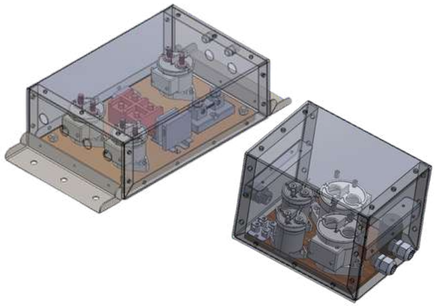
Systems Engineering

Re-chargeable Energy Storage System



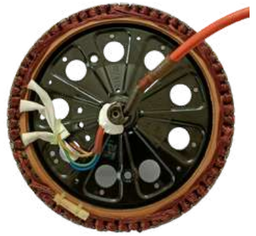
- 2W / 3W- Modular and Swappable Battery Pack
- 350 V Battery Pack for Bus Hybridization
- BMS Integration for battery pack
- Flexible Wiring Harness Integration
- Ultra Capacitor Monitoring System
- Battery Pack for ESS Applications
- Refurbishment of Battery Pack
- Repurposing of Used Li cells

HV Integration



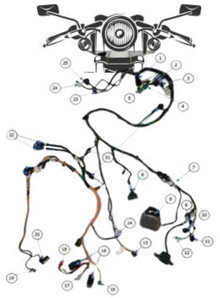
- Power Distribution Box
- 350 V Vehicle Integration for Hybrid Mini Truck
- 350 V– EV integration for Retrofittment
- HV Integration– Electric Bus
- MOSFET based Battery Disconnect Unit
- Contactor Integration
- Smart Disconnect Unit for ESS
- Accessory Power Unit for Recreational Marine Application

Motor Development



- Axial Flux Motor Development
- Axle Integrated Motor Development for Heavy Applications
- Auxiliary Motors for Skid Steer Loaders
- BLDC Motor integration for 2 wheeler with transmission optimization
- Motor/Generator Integration Logic for Hybrid Application

E/E Interface



- Electrical Architecture Development for 3- Wheeler
- EMI/C Testing and Validation at Component and System level
- Electrical Architecture for AGV
- EV Retrofitment for Forklift
- Powertrain Integration in LCV
- Battery Pack for Hybrid LCV
- VCU Integration in Bus
- Vehicle Integration for series Hybrid

Vehicle Electronics

- Smart Dashboard for 2 Wheeler/3 Wheeler
- IoT Enabled Remote Control for EV
- Solar Integration for 2 Wheeler charging
- Retrofitment of existing ECUs with configurable ECUs
- Vehicle Controller for 3 Wheeler Application
- Vehicle Controller Logic for Electric Bus
- Smart Logic for Charging optimization for Forklift

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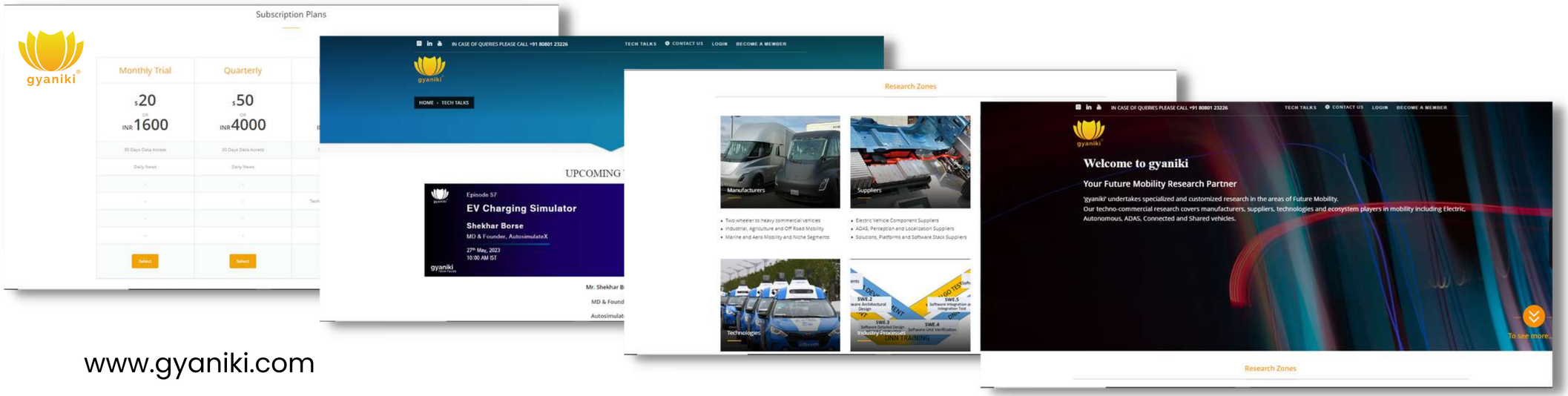

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- Accidental Alert
- ANTI-THEFT Technology with MCU OFF
- ZONE Alert
- Vehicle ON/OFF Alert
- Speed Alert
- Battery Health Detector
- Keyless Ignition ON (Bluetooth based)

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Address: 1st floor, Plot No. 4, Survey No. 5,
Bavdhan Khurd, near Carwala garage,
DSK Ranwara road, Pune – 411021,
Maharashtra, INDIA.
Phone No: +91 7030401122
Email: webadmin@deviseelectronics.com
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