

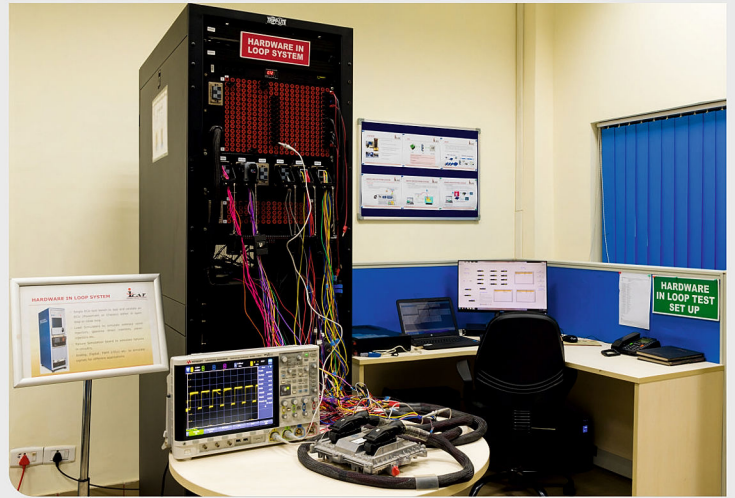


# Powertrain Centre for Excellence (PT-CoE)



Powertrain Centre for Excellence (PT-CoE) provides turnkey consultancy services to customers for Automotive Powertrain Development with a special focus on Indian specific conditions that too at a competitive and an affordable budget.

The core team has hands-on experience in the field of Powertrain Development and Calibration, Benchmarking, Engine and Vehicle functional validation, Automotive Manufacturing, Plant Audit, Field failures and production quality issues improvement etc. We work with latest development tools and methodologies required for the successful execution of the projects.



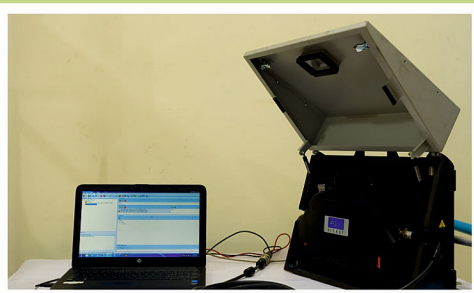
## CAPABILITIES

### A. POWERTRAIN DEVELOPMENT

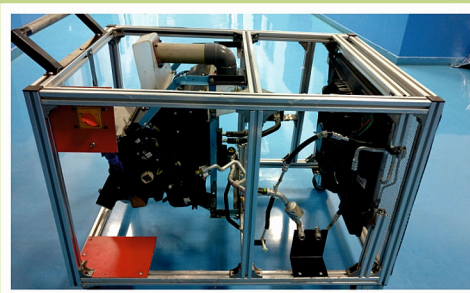
- ⬆ Power train Development and Calibration.
- ⬆ Functional Development and Validation.
- ⬆ Cold start Calibration and testing.
- ⬆ Energy audit and Friction Strip Down.
- ⬆ Functional checks under different climatic conditions.
- ⬆ Functional bench marking on component, Engine, Vehicle level.
- ⬆ Climatic and Altitude Calibration (CVTC + Real world + Virtual)
- ⬆ Drivability benchmarking.
- ⬆ Real World Emission measurement under various operating conditions (RDE).
- ⬆ OBD + Fleet Validation monitoring and data acquisition.
- ⬆ Customer specific testing and data acquisition on engine and vehicle.
- ⬆ Special testing rigs such as Alternator Load, N2 cylinder leak check, Breather Efficiency, Air conditioner Load etc.
- ⬆ Expertise in specialized high speed data measurement for combustion, temp, pressure, current, voltage, frequency, RPM etc.

### B. INFOTRONICS LAB (ECU SOFTWARE DEVELOPMENT AND VALIDATION)

- ⬆ Testing and validation of existing ECU control functions.
- ⬆ Design and development of new ECU control algorithms.
- ⬆ Plant model development for ECU close loop validation and Engine hardware simulation.
- ⬆ Virtual Calibration.
- ⬆ SIL/MIL/HIL Simulation.



ON THE ROAD OPACIMETER (OTR)



AC LOADING RIG



COLD CHAMBER

# SPECIFICATIONS OF TEST EQUIPMENTS

## A. FUNCTIONAL DEVELOPMENT

### COLD CHAMBER

Used for cold start development of engines of Genset, Passenger cars, SUV, Tractor & components testing etc. Temp range is -28 to 60 DegC. Internal dimension in mm is (5800 X 2150 X 2300)

### MICRO SOOT SENSOR

Micro soot sensor works on photo-acoustic principle & is useful for measuring soot emissions which is an important indicator of combustion quality. MSS can detect soot in the range of 0.001- 50 mg/m<sup>3</sup> without dilution; 0.001 - 1000 mg/m<sup>3</sup> with dilution DR=20. It is one of the essential development tool required for emission calibration of BS VI Diesel engines.

### AIR CONDITIONING LOADING RIG

Used for simulating real-life AC compressor load on the engine. This rig will be useful while executing accelerated durability cycles in Engine Dyno and will also aid in evaluating impact of AC load on engine's BSFC and Emissions.

### ALTERNATOR LOADING RIG

Used for simulating alternator load on the engine via equivalent electrical load

### BREATHER EFFICIENCY RIG

Used for measuring oil separation efficiency in blow-by gases of engine.

### ON THE ROAD OPACIMETER (OTR)

Used for measuring real time opacity with data logging. Can be used at both engine and vehicle level.

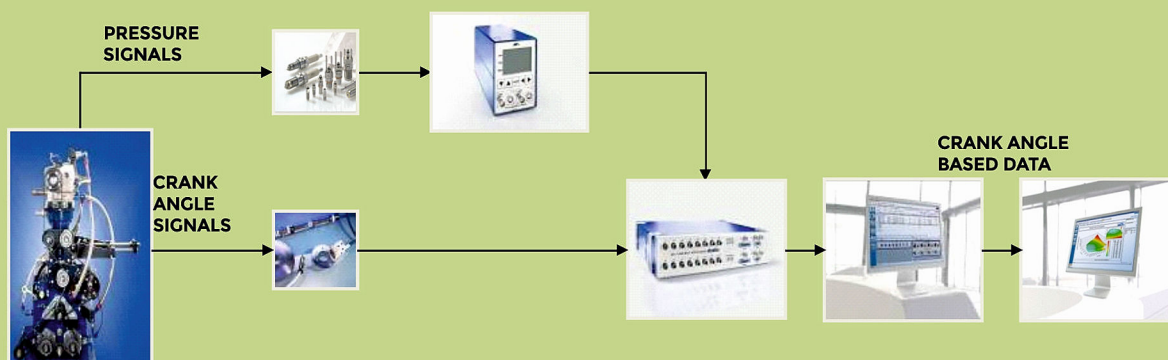
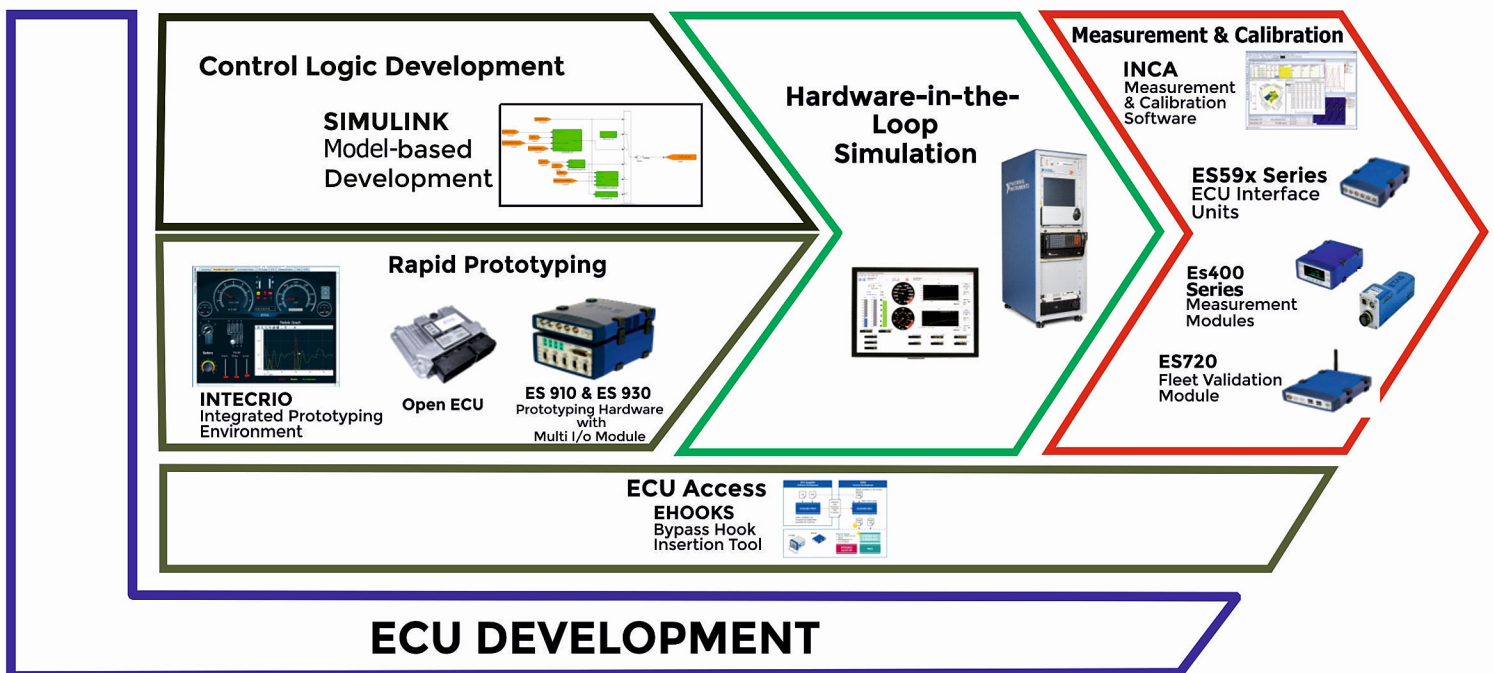
### N2 LEAK CHECK

Special rig to check gasket/cylinder head leakage without opening cylinder head.

### COMBUSTION ANALYSIS SYSTEM

High speed data acquisition system to measure cylinder pressure, manifold pressures, fuel line pressure, injection and ignition duration.

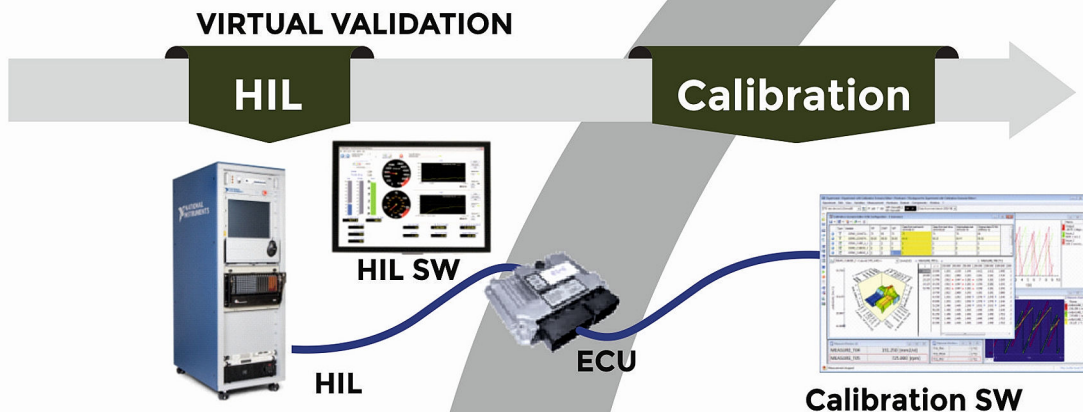
## B. INFOTRONICS LAB (ECU Software development and Validation)





## SPECIFIC CAPABILITIES

- ⬆ New Development program Management.
- ⬆ Euro VI development.
- ⬆ OBD & Fleet validation.
- ⬆ Hardware in loop testing of EMS ECU, ABS ECU etc.
- ⬆ Automated OBD testing on HILS with log report generation.
- ⬆ ECU software development for 2-wheeler, Genset and Tractor.
- ⬆ Plant model development of engine or vehicle based on actual data and its integration with HIL system.



## KEY PROJECTS

- ⬆ Energy Audit of CV Diesel Engine.
- ⬆ Friction strip down of small diesel engine.
- ⬆ Real Driving Emission (RDE) and Lab Emission correlation.
- ⬆ Cold start calibration for Diesel Genset Engine.
- ⬆ NVH analysis for small petrol engine during cold start.
- ⬆ Cold start validation for defence project.
- ⬆ Complex data acquisitions for various different projects.
- ⬆ ECU software development for a small gasoline and a diesel engine.
- ⬆ Hardware in loop testing on gasoline and a diesel engine ECU.
- ⬆ FEAD belt noise measurement.
- ⬆ EGR cooler degradation/fouling testing.
- ⬆ Vehicle Evaluation under IDC using PEMS.



## POWERTRAIN CENTER OF EXCELLENCE (PT-CoE)

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