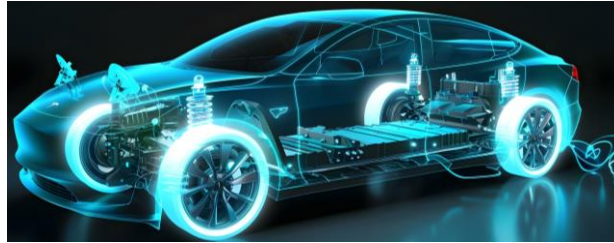




Integrated Simulation Technologies Pvt Ltd



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+91-9763909935



subir.mandal@integratedsimtech.com



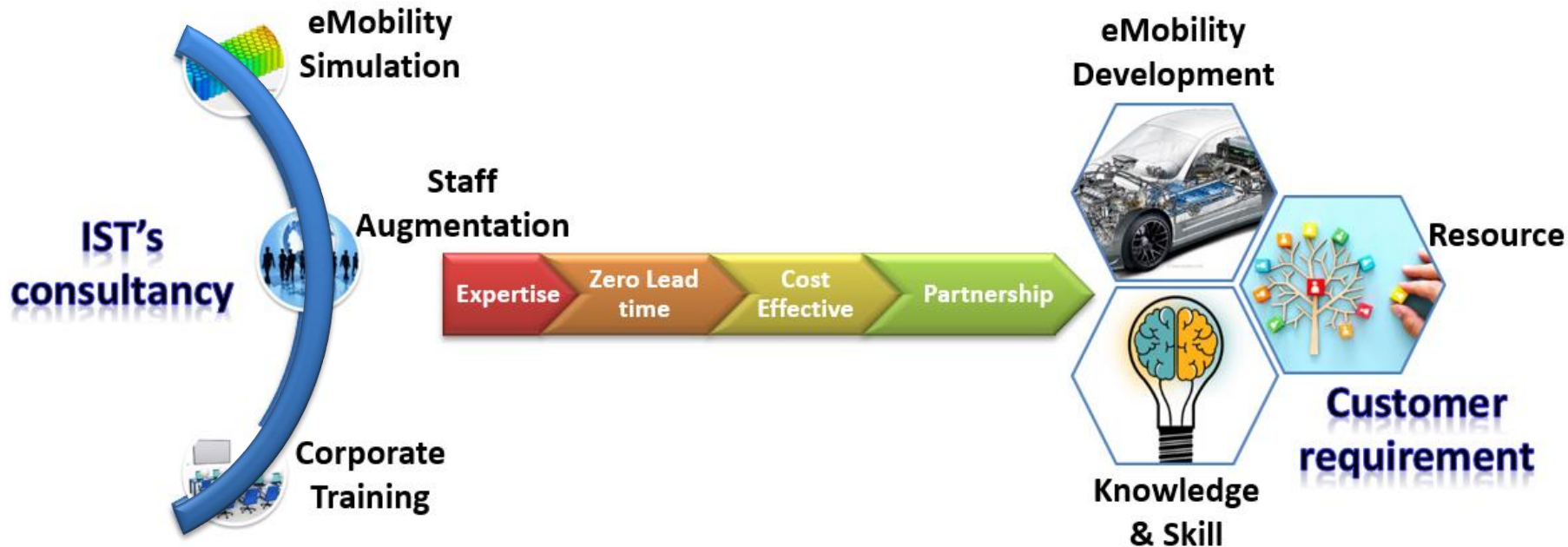
www.integratedsimtech.com

☐ About IST

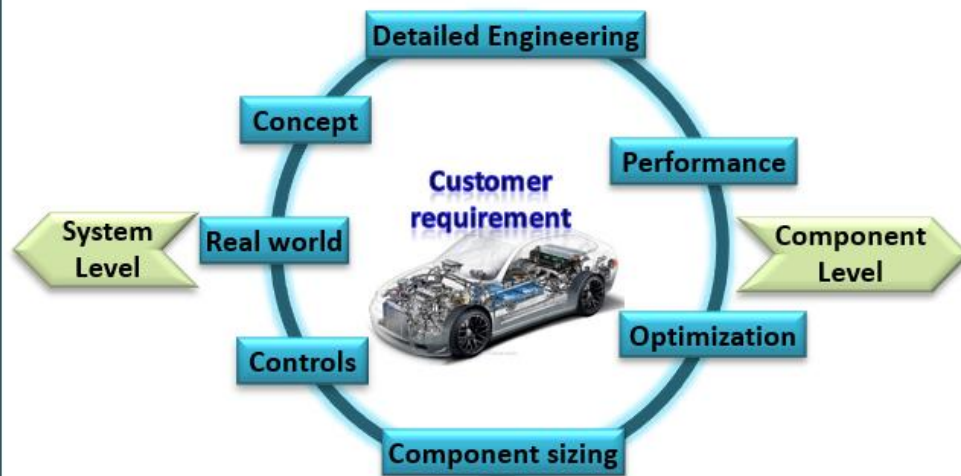
☐ Detailed capability

- ✓ 3D CFD simulation
- ✓ 1D system level simulation
- ✓ FEA
- ✓ Design
- ✓ Co-simulation

About IST: Consultancy Areas

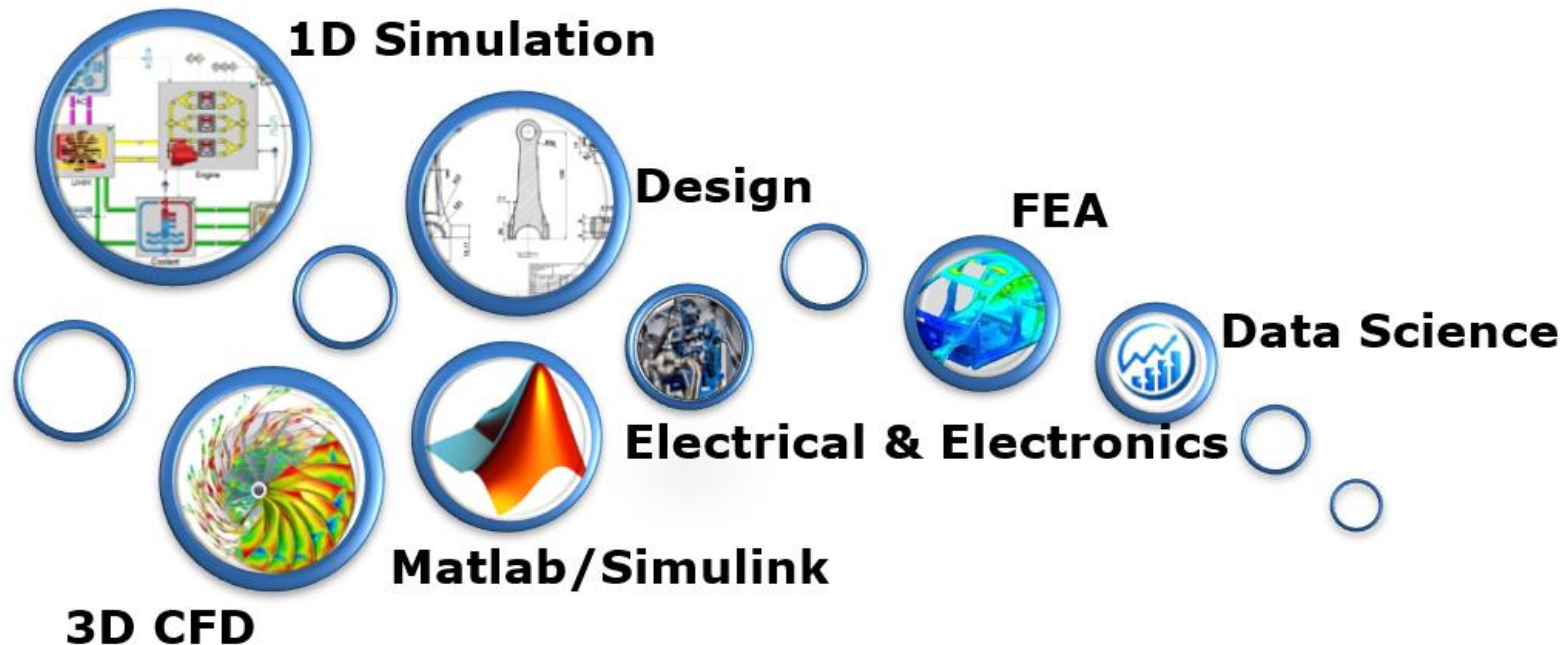


About IST: eMobility Simulation



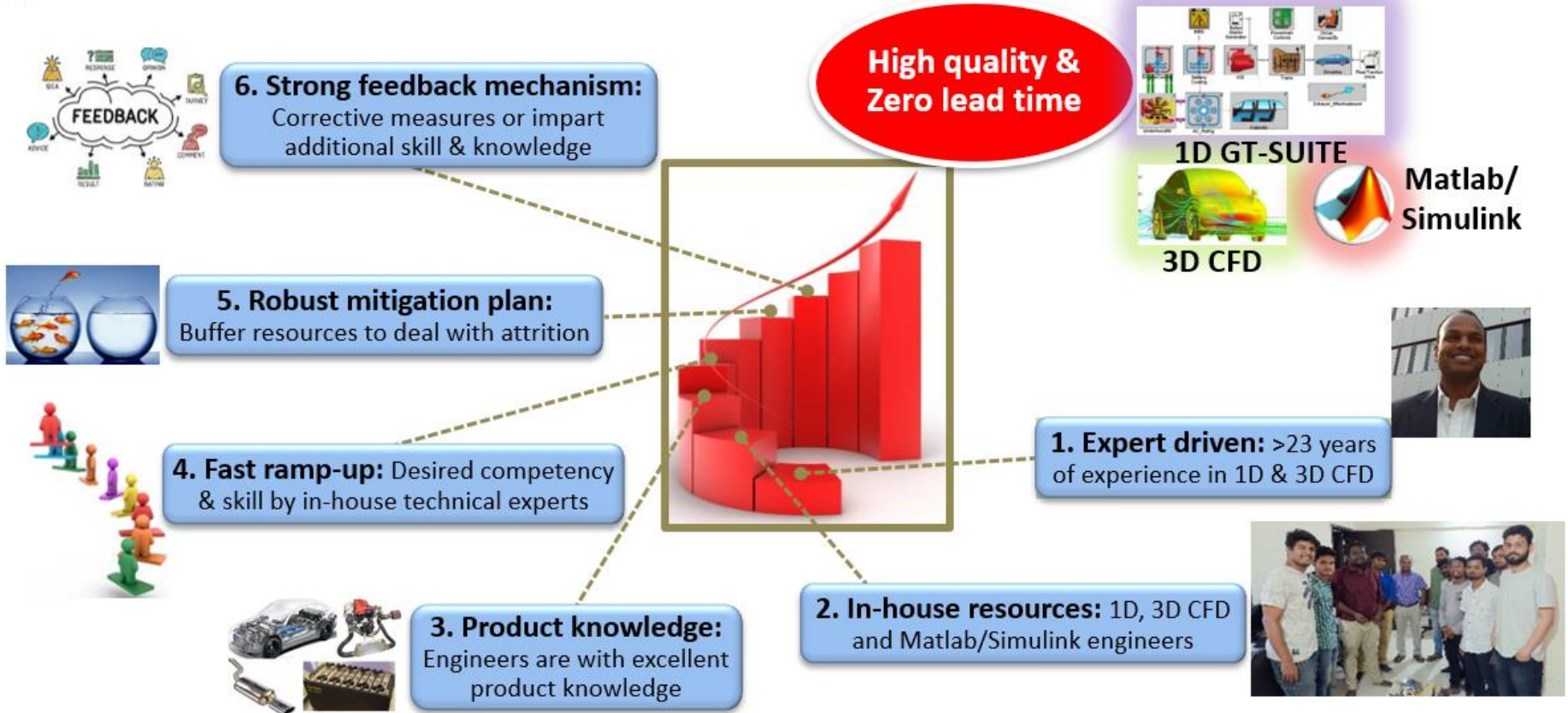
1D Simulation ■ 3D CFD Simulation ■ FEA ■ Co-Simulation

About IST: Staff Augmentation

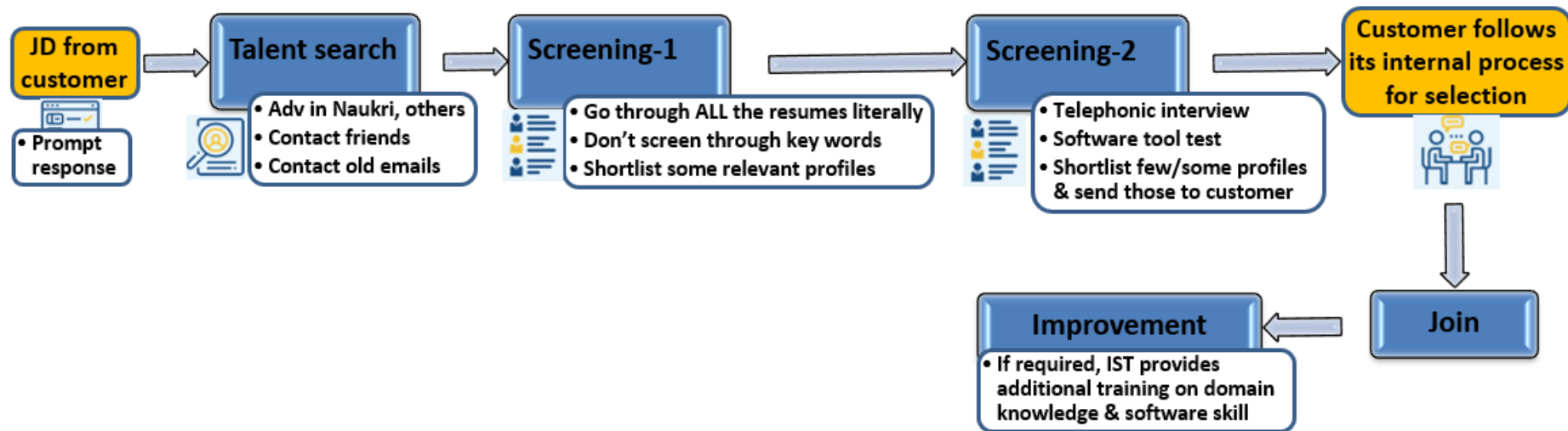


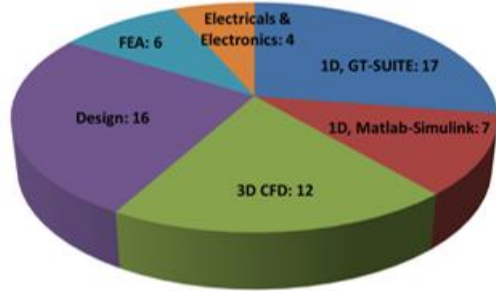
Zero Lead Time ■ High Quality Engineers ■ Cost Effective

About IST: Resource Creation for Staffing



About IST: Resource from Open Market





Subir Mandal

- Founder & Director, Head of Engineering (IST)
- M.Tech. in Thermal Engg., IIT Kharagpur
- 23+ years experience in E-mobility, ICE, Aircraft engine
- 1D & 3D CFD simulation
- GT-SUITE, Ansys Fluent, Star-CCM+
- Rolls-Royce Power System (MTU), ESI Pacific Mindware, Cummins, GE Aircraft Engine



Ankit Verma

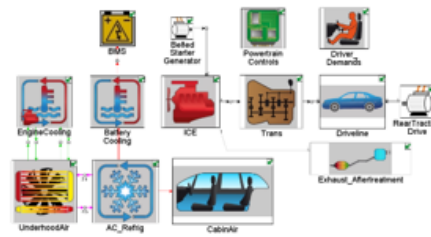
- Manager - 3D CFD simulation (IST)
- M.Tech. in Thermal Engg., NIT Agartala
- 5+ years experience in E-Mobility, ICE
- Star-CCM+, Ansys Fluent, ANSA



Pankaj Devade

- Manager - 1D simulation (IST)
- M.Tech. in Heat Power, GCoE Karad
- 5+ years experience in E-Mobility, ICE
- GT-SUITE, Matlab, Simulink, Simscape

About IST: Corporate Training



Industrial Technical Training Module

- E-Mobility Powertrain Technology
- E-Mobility Thermal Management Technology
- E-Mobility Battery Technology
- E-Mobility Fuel Cell Technology
- E-Mobility Transmission Technology
- Engine Performance & Design Technology

GT-SUITE Software Training Module

- E-Mobility Powertrain Simulation
- E-Mobility Thermal Management Simulation
- HVAC System Simulation
- Battery Cooling Simulation
- Motor Cooling Simulation
- Fuel Cell System Simulation
- Engine Performance Simulation
- Lubrication System Simulation
- Hydraulic System Simulation
- Intake & Exhaust Acoustics Simulation

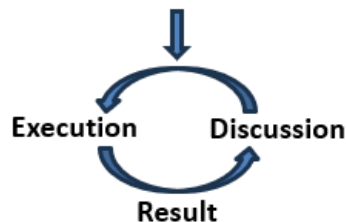
About IST: Working Model with Customer

Project

Customer requirement

Initial estimate on time, cost

Finalize objective, scope, deliverables,
inputs availability, accuracy, time, cost



Delivery

***Payment:** Advance/ intermediate/ after completion

Staffing

Customer requirement

Intimate on resource, profiles, rate

Finalize terms & conditions: Duration, rate,
rate increase, holiday, leave, absorption



Additional requirement

Continuous/ Intermittent

***Payment:** Monthly

Training

Customer requirement

Standard modules/ customized

Finalize agenda, duration, cost, schedule

Conduct

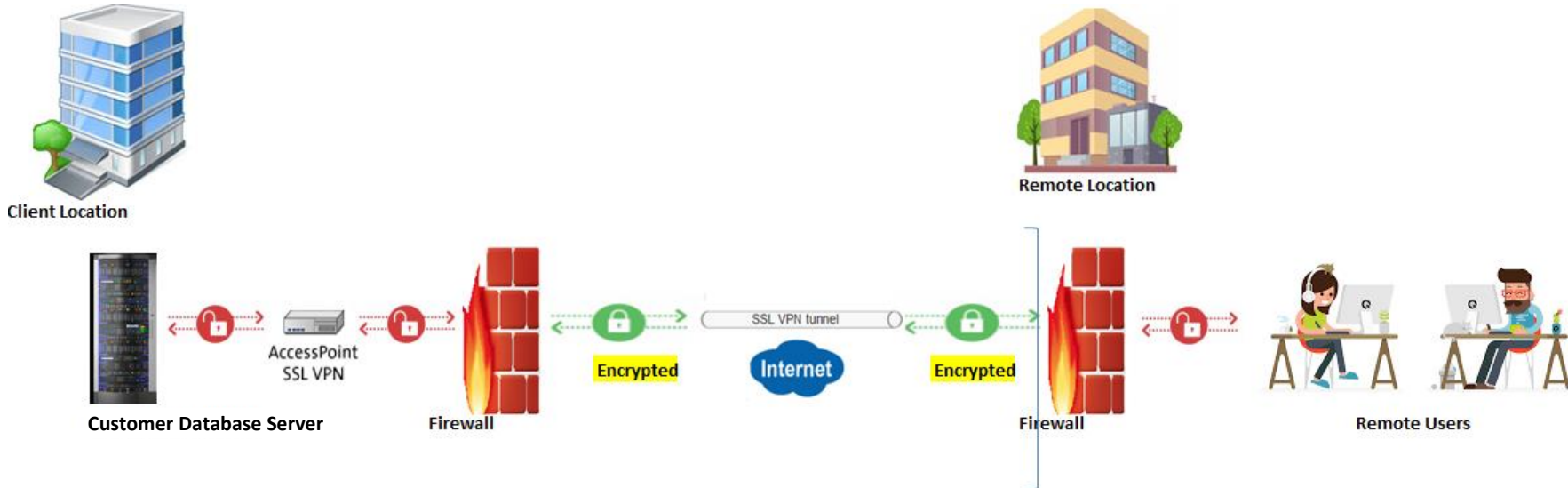
***Payment:** Advanced

Hybrid




About IST: Working Model with Customer

ODC




About IST: Collaboration with GT (Gamma Technologies, USA)





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[Industries & Applications](#)
[Resources](#)
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Gamma Technologies frequently receives requests from companies who wish to outsource GT-SUITE simulation projects. While we are pleased to receive such requests, GT's primary focus has always been on providing the best and most advanced simulation software, rather than on consulting services. For this reason, GT refers such requests to professional consulting firms. It is in this spirit that we have established the "Consulting & Services Providers List" program, listing high quality consulting firms experienced in the use of GT-SUITE, which have built long term relationships with Gamma Technologies.

- [Powertech Engineering](#)
- [Czero](#)
- [Mahle Powertrain](#)
- [Powertrain Technology](#)
- [EngSim](#)
- [InDesA](#)
- [M Plan](#)
- [FEV](#)
- [IAV](#)
- [Integrated Simulation Technologies Pvt. \(IST\)](#)
- [AVL-LMM](#)
- [Thermotec](#)
- [Porsche Engineering](#)
- [Danielson Engineering](#)
- [TheSys](#)
- [Roush](#)
- [Design Department](#)

IST as service provider

<https://www.gtisoft.com/simulation-service-providers/#ist>

About IST: IST's Participation in GT Conference

Exhibition & Presentation



2018

Exhibition



2020

Exhibition



2023

Exhibition



2025

2019



Exhibition

2021



Presentation

2024



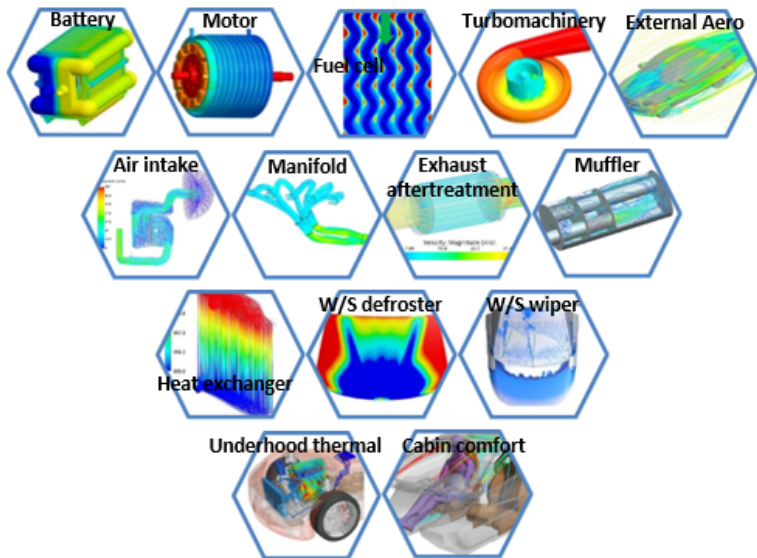
Exhibition & Presentation

About IST: Our Office



Detailed Capability

Project



Physical phenomenon

- Steady state/ transient
- Compressible/ incompressible
- Multi-phase/ Volume of fluid (VOF)
- Conjugate heat transfer (CHT)
- Moving reference frame (MRF)
- Moving mesh
- Electromagnetic

Expertise ■ Ownership ■ Cost Competent ■ Star-CCM+ ■ Ansys Fluent

eMobility Simulation: 1D System Level

Vehicle Powertrain



- Acc time, tip-in time, gradeability
- Range/ mileage, max speed
- Weight, frontal area, Cd, tire radius
- Battery, motor, transmission, differential
- Acc time, gradeability
- Range/ mileage, max speed
- HEV - mild, strong
- MT, AMT, AT, CVT, DCT
- BMS, MCU, regenerative braking
- Driver, ECU, TCU
- Gear shift schedule opt
- Coast down simulation

Vehicle Thermal Management



- Temperature, heat load, flow rate, Δp
- Energy consumption, efficiency
- Ambient, road grade
- Charging, traction
- Radiator, pump, fan, blower
- Valve, piping, thermostat
- Energy economy
- HT, LT, UHC system
- Pump, fan, valve
- Electric heater
- UHS with inclined HEX & fan
- Water heating

HVAC



- T_Cabin, COP, heat load, power
- Cabin pull down/ heat up time, efficiency
- Cabin load, solar flux
- Compressor, evaporator, condenser, TXV
- COP, refrigerant charge, % oil
- WHR
- Heat pump
- Dual evaporator
- Fan, TXV, valve, electric heater
- Waste heat recovery (WHR)
- Refrigerator performance

Expertise ■ Ownership ■ Cost Competent ■ GT-SUITE ■ Matlab & Simulink

eMobility Simulation: 1D System Level

Fuel Cell Electric Vehicle



H2 Tank Filling



Engine Performance



Performance prediction

- Current, power, pol. curve, heat, stack & system eff, transient response, VehPerf

- Time to fill-up, transient change in temperature, pressure & flow, heat

- Power, torque, BSFC, efficiency
- Emissions, knock

System variable change

- Pressure, temperature, humidity, flow
- H2 stoich ratio

- Compressor speed, tank volume, valves, pipe diameter

- Ambient, altitude, engine load
- CR, SOI, InjPr, %EGR, back pressure

Component sizing

- Fuel cell
- Air, cooling, vehicle systems components

- Tank volume, pipe diameter, valves,

- Turbocharger, manifold, camshaft

Performance opt

- Power density, voltage, stack eff
- Transient response, VehPerf parameters

- Time to fill-up, maximum pressure

- Power, torque, BSFC, emissions

Architecture opt

- H2 feeding, air handling, cooling, vehicle drivetrain systems

- FGT/WGT/VGT, 1S/2S turbo
- EGR system

Control system opt

- Pressure, flow, temperature, humidity, turboshaft speed, recirculation, power

- Valves, compressor, temperature

- Turbo, EGR, fuel, throttle

Any specific

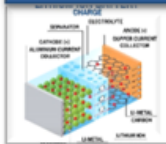
- PEMFC, SOFC and Electrolysis

- H2ICE, CNG, VVT, genset load step
- ECU map generation

Expertise ■ Ownership ■ Cost Competent ■ GT-SUITE ■ Matlab & Simulink

eMobility Simulation: 1D System Level

Battery (design & cooling)



Motor (design & cooling)



EEE Component Cooling



Performance prediction

- Cell performance & life (electrochemistry)
- Cell temperature (thermo-fluid-electric)
- Torque, eff, flux, Ld/Lq (electromagnetic)
- Component temp (thermo-fluid-electric)
- Component temperature, Time to cool
- System efficiency

System variable change

- Charging/ discharging mode
- Coolant temperature, flow rate, load
- Current, speed, switching frequency
- Coolant temperature, flow rate
- Current
- Coolant temperature, flow rate

Component sizing

- Cell & pack design parameters
- Motor design parameters
- Cooling system components

Performance opt

- Energy/power density cell, battery life
- Cell temperature, thermal runaway
- Torque, efficiency
- Power consumption, efficiency

Architecture opt

- Battery cooling type & layout
- Motor cooling type & layout
- Different types of cooling techniques

Control system opt

- BMS & BTMS
- Charging strategy
- MCU

Any specific

- Battery warranty
- Harmonic frequency
- Converter, inverter, controller
- OBC, MCU

Expertise ■ Ownership ■ Cost Competent ■ GT-SUITE ■ Matlab & Simulink

eMobility Simulation: 1D System Level

Acoustics (intake & exhaust)



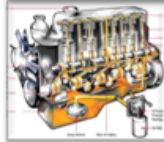
- Intake & tail pipe noise, Δp , audio file
- Transmission loss, insertion loss

- Engine OP

- Muffler, airfilter box, resonator, piping

- Intake & tail pipe noise
- Transmission loss

Lubrication



- Pressure, flow, temperature, power loss
- MOFT, time for priming & warm-up

- Ambient temperature, oil grade
- Engine OP

- Bearing design parameters, piping, valve
- Pump

- Flow, time for priming & warm-up
- Min oil film thickness (MOFT), power loss

Hydraulics



- Pressure, flow, power loss, temperature
- Actuation (force, displacement)

- Pump speed

- Pump
- Valve (DCV, check, relief, spool, ball)

- Actuation, power loss

- Many components

- Detailed pump modeling

- Application - brake, clutch, HEV, transmission
- Detailed pump – gerotor, swashplate, screw

Performance prediction

System variable change

Component sizing

Performance opt

Architecture opt

Control system opt

Any specific

Expertise ■ Ownership ■ Cost Competent ■ GT-SUITE ■ Matlab & Simulink

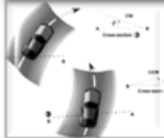
eMobility Simulation: 1D System Level



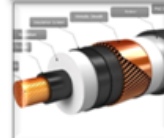
Cranktrain & Valvetrain



Vehicle Dynamics



Electrical & Electronics



Performance prediction

- CT - UB force & moment, torsional, bearing
- VT - lift, bounce, gap, pressure, surge
- Angle - steer, roll, pitch, FE dive, RE squat
- Steer torque, lateral acc, sprung mass dis
- HV & LV wire temperature & hotspot
- Transient voltage of converter, inverter

System variable change

- Engine OP, oil grade

- Castor angle, offset, wheelbase

- Current, ambient temperature, material, wire diameter

Component sizing

- CT - balancing weight, damper, flywheel
- VT- valve & Spring parameters

- Castor angle, offset, wheelbase

- Wire diameter, material, cable-connector combination

Performance opt

- UB force & moment

- Sprung mass vertical displacement
- Some other performance parameters

- Wire temperature, hotspot, weight

Architecture opt

Control system opt

Any specific

- CT - balancing, torsional, bending
- VT- camphaser, HLA, dynamics, kinematics

- Target - safety, comfort, performance, controllability

- HV & LV wire thermal analysis
- Modeling – converter, inverter, OBC, MCU

Expertise ■ Ownership ■ Cost Competent ■ GT-SUITE ■ Matlab & Simulink

eMobility Simulation: 1D System Level

Microgrid



Performance prediction

- Cost of electricity

System variable change

- Weather (temp, solar radiation, etc)
- Load demand, electricity from different sources

Component sizing

- Battery, genset

Performance opt

- Cost minimization of electricity

Architecture opt

- Energy producing & storing systems – power plant, wind, solar, genset, battery

Control system opt

- Electricity storage & distribution

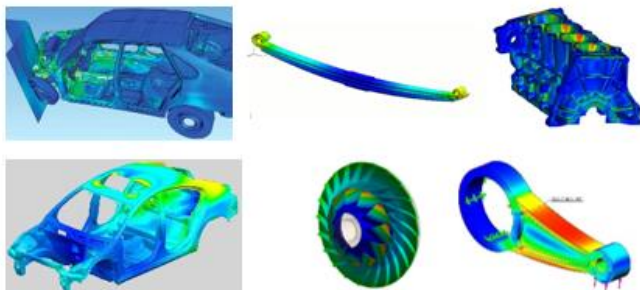
Any specific

- Residential microgrid

Expertise ■ Ownership ■ Cost Competent ■ GT-SUITE ■ Matlab & Simulink

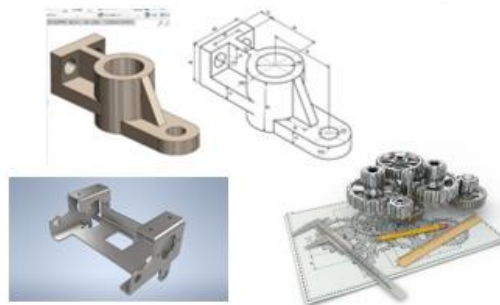
FEA

- Linear & non-linear
- Fatigue & durability
- Dynamic & impact
- Crash simulation
- Thermal stress
- Optimization
- Multi-body simulation

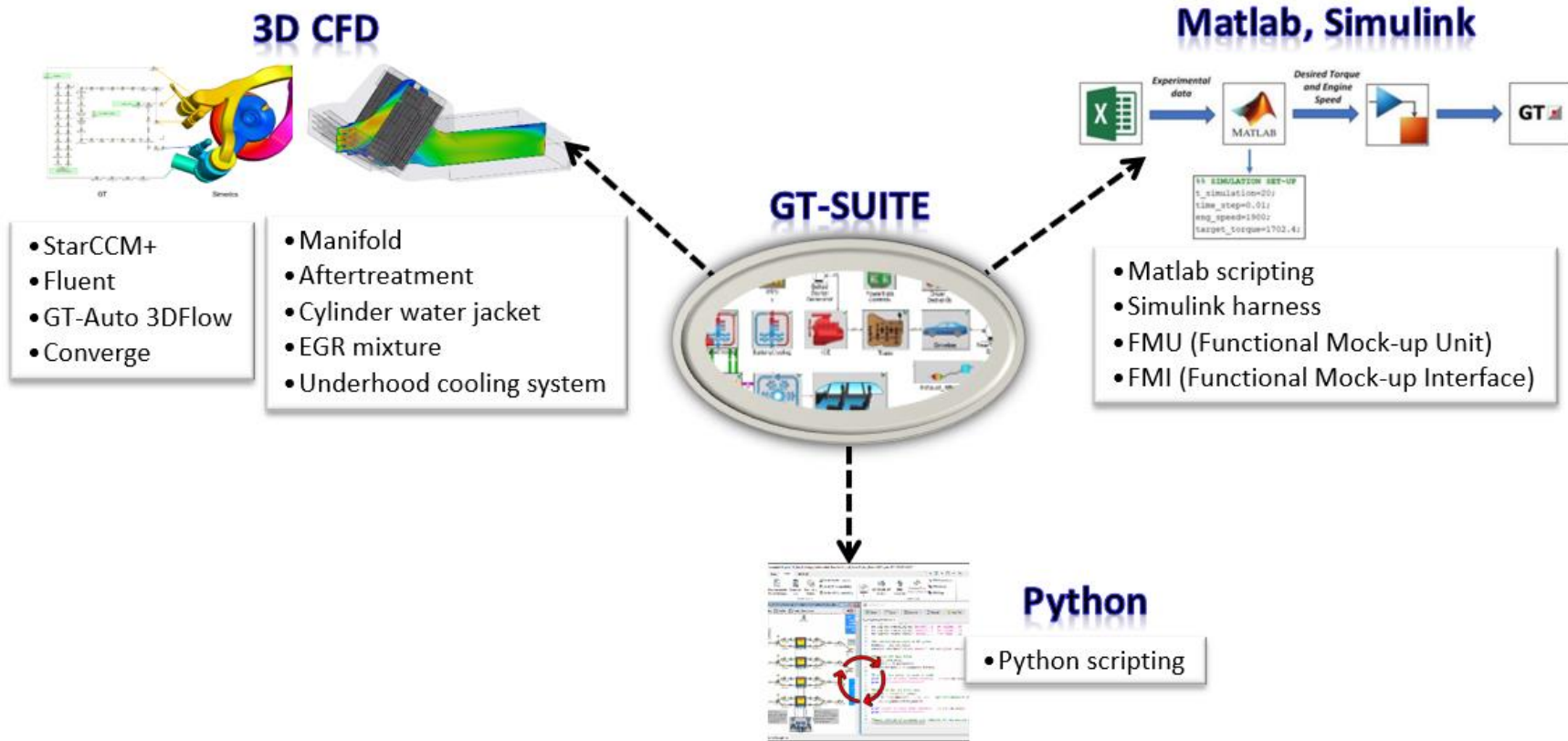


Design

- 3D CAD modeling
- Parametric modeling
- Design conceptualization
- NPD/ NPI support
- Design optimization
- Product validation
- Cost optimization



eMobility Simulation: Co-Simulation



Thank You

Contact Us

We appreciate you for visiting our website. Please drop us a line for any inquiry on project, staffing, training or case study.

Integrated Simulation Technologies Pvt. Ltd.

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Drop us a line!

