Detroit Engineered Products (DEP) is an Engineering Solutions and Product Development company. Since its inception in 1998 in Troy, Michigan, USA, DEP is now a global company with footprints in Europe, China, Korea, Japan and India.

At the soul of DEP is a passion for engineering and to transform the product development process associated with vehicle and powertrain systems. Passion, together with partnerships across various global automotive OEMs has led to MeshWorks, as well as products like IC Sensor and processes like 3G+ optimization and MDO. These software tools and processes have resulted in several creative solutions to many of our clients problems, thus providing significant value.
Several tools in MeshWorks have been created with deeper understanding of the needs of power train engineering teams. Tools like rib addition, feature removal, model checker, fuse welding, wall thickness reduction options, design space building tools and other model assembly tools have accelerated the way engineers perform model changes for what if studies and optimization.Transformation driven by MeshWorks tools has helped both engine and transmission teams, as well as full vehicle teams. This transformation has been extended to other industry verticals as well.

DEP IC sensor(In-Cylinder) offers comprehensive portfolio of combustion analysis to the engine design and testing teams in terms of real time gathering data and make decisions considering emissions, combustion, timing, pressure pattern and performance parameters. This is applicable for single and multiple fuel engines.

The DEP TRIO of IC Sensor, MeshWorks tools and process like MDO can significantly add value to Powertrain Engineering.

DEP

Smarter solutions. Realized.

ENGINE DESIGN, DEVELOPMENT & CONSULTING

### Production engine development
Capabilities like thermodynamics, systems modeling, combustion, heat/thermal management, induction/intake, block-head durability, crank-train dynamics, engine/powertrain NVH, ventilation, lubrication, etc.

In-cylinder sensor, industry's
first volume production combustion sensor that provides combustion and emissions parameters to the ECU, in real time.

Multi-Disciplinary Optimization,
which helps meet design targets, minimize product weight and minimize manufacturing costs, while meeting all performance targets.
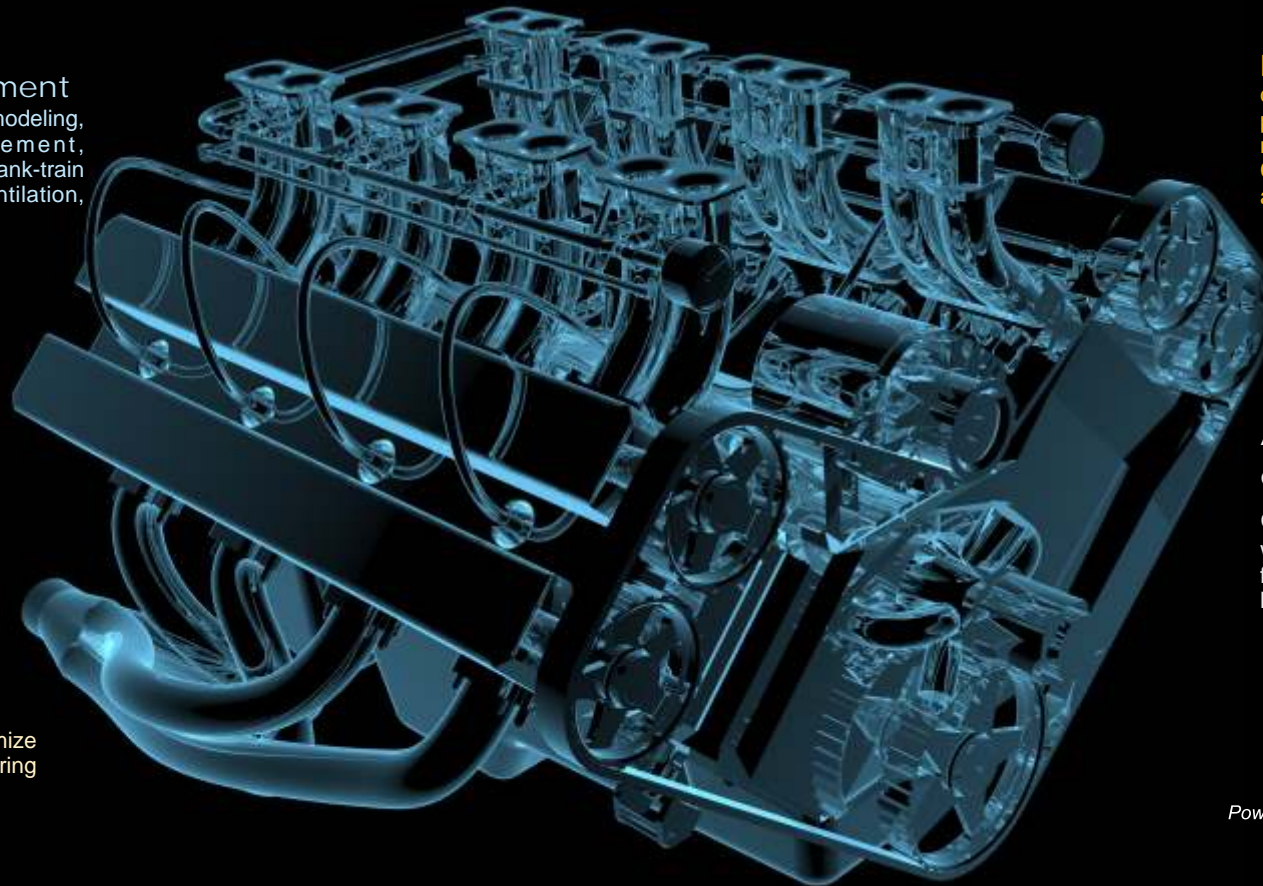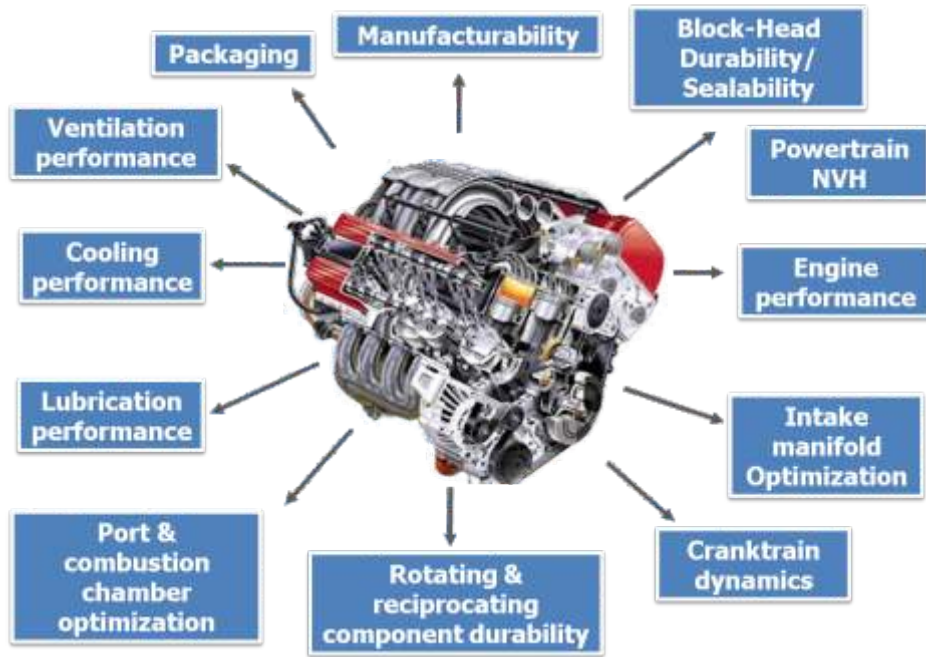
DEP MeshWorks,
our proprietary CAE driven software platform for rapid concept CAE and CAD model generation, parameterization of CAE models, enabling optimization, advanced meshing and CAD morphing.

Advanced high efficiency engine development,
which helps engines provide upto 40% fuel economy improvement at vehicle level.

Powered by **DEP**
MeshWorks

Packaging

Manufacturability

Block-Head Durability/ Sealability

Ventilation performance

Powertrain NVH

Cooling performance

Engine performance

Lubrication performance

Intake manifold Optimization

Port & combustion chamber optimization

Rotating & reciprocating component durability

Cranktrain dynamics

DEP MeshWorks

POWER TO TRANSFORM PRODUCT DEVELOPMENT

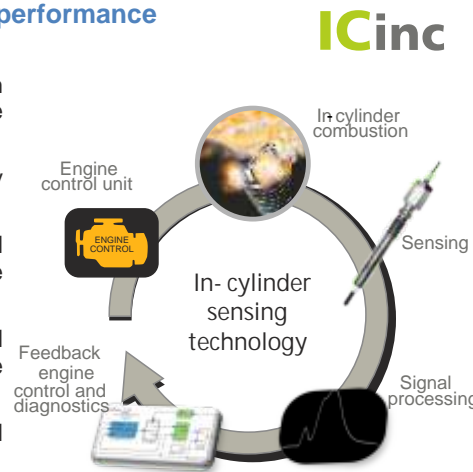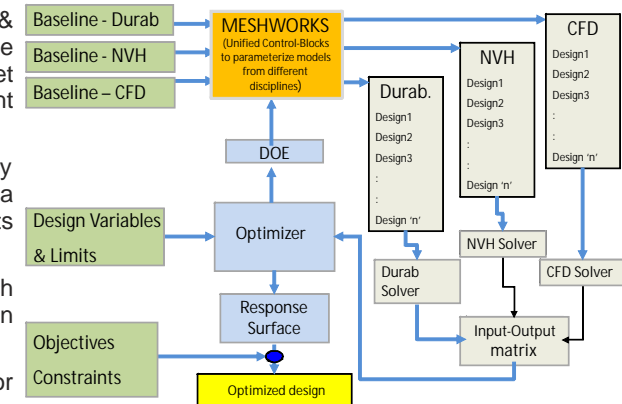| CAE Morphing tools	Parametric CAE	Non-parametric CAE models	CAD-Morpher Technology	Design Enablers
Reduces Finite Element(FE) & Computational Fluid Dynamics(CFD) model building time by 50 to 80%	Rapidly converts FE & CFD models to intelligent parametric CAE models, enabling fast design iterations & Design Of Experiment(DOE) studies	Enables Multi-Disciplinary Optimization to meet design targets, minimize product weight and minimize manufacturing cost	Generates morphed CAD models with optimized designs rapidly & forms the main link between CAE & Design teams	Enables creation and removal of ribs or such features directly in the FE model stage without CAD

THERMODYNAMICS   CRANK SHAFT OPTIMIZATION   MOTION ANALYSIS   COMBUSTION ANALYSIS   COOLING STUDIES   DURABILITY ANALYSIS

IC sensing technology can help meet stringent emissions standards in addition to targets for fuel economy and performance

ICinc

- In-cylinder combustion sensors facilitate high response electronic control feedback of the engine in real time

- Enables individual cylinder control on a cycle by cycle basis to meet upcoming fuel economy

- Volume production system and as such low initial and maintenance cost compared to pressure transducers

- Can be retro fitted in existing gasoline and diesel engines with no need to drill another hole in the cylinder head

- Can be utilized for remote monitoring and diagnostics of engines

In-cylinder combustion

Engine control unit

Sensing

In- cylinder sensing technology

Feedback engine control and diagnostics

Signal processing

ENGINE CONTROL

Multi Disciplinary Optimization (MDO)

- DEP MeshWorks based parametric & non-parametric CAE models facilitate Multi-Disciplinary Optimization to meet design targets, minimize product weight and minimize manufacturing costs

- Parametric models can robustly generate multiple runnable analysis data sets given a Design of Experiments (DOE) matrix

- MeshWorks can be executed in a batch mode and can be integrated within automated work flows

- Ready interface available to major optimization softwares