Design Solutions
- Conceptual Design and Detailing
- Design evaluation studies
- Design modifications / alternatives
- Composites design & development
- 3D solid & surface modeling
- Advanced surfacing, A-class surface generation
- Top-down & Bottom-up assembly modeling & design
- Parametric design studies
- Design & detailing of sub-systems like BIW, Chassis, Powertrain, Engine
- Value engineering
- NC tool path generation for 2/3/5 axis machining & verification
- Building customized post-processes for specific controllers
- Process automation & customization
- Manufacturing support
- Tool design & detailing

Analysis & Simulation (CAE, CFD, NVH, Crash, Durability, Vehicle Dynamics, Virtual Prototyping, PDM)

Computer Aided Engineering (CAE) Solutions
- FE modeling & meshing for NVH, Durability, Crash
- Stress, vibration, thermal & heat transfer analysis
- Interior/Exterior acoustic analysis
- Frequency, point mobility, NVH analysis
- Durability & damage tolerance analysis
- BIW (Body In White) normal modes & static stiffness analysis
- Crashworthiness of a vehicle (offset/side/front/rear etc) and of seats
- Rollover analysis
- Airbags & occupant safety analysis (with/without dummies)
- Virtual manufacturing simulations for quality production of manufactured parts like forging, metal forming, rolling, welding, etc
- Optimization (sizing, shaping, topology, acoustic pressure)
- Multi Disciplinary Optimization (MDO)
- Vibro-acoustics analysis
- Sloshing studies
- Process automation, customization & knowledge capture
- CAD/CAE integration/migration services

Virtual Prototyping Solutions
- Full vehicle dynamic simulation
- Functional virtual prototyping & test validation of mechanical systems
- Control systems simulation
- Suspension design & simulation
- Powertrain dynamics calculation
- Driveline & chassis component interactions
- Dynamic system behavior assessments
- Bearing dynamics & elastics
- Tire handling

Computational Fluid Dynamics (CFD) Solutions
- Mesh generation (Hybrid, Hexa & Tetra) for variety of CFD simulations
- External aerodynamics calculation
- Transient simulations involving moving meshes viz sliding, rotating, dynamic cell distortion techniques
- Combustion and simulation in IC engines
- HVAC & climate control analysis
- Thermal management of an engine
- Thermal analysis across intercooler of a centrifugal compressor system
- Brake cooling analysis
- Underhood flow analysis
- Exhaust manifold & exhaust systems analysis
- Emissions & NOX calculations
- Conjugate heat transfer analysis
- Coupled FSI analysis
- Free surface simulation techniques for sloshing problems
- Various CFD solvers catering to application based flow simulations
- Large problem-solving using HPC techniques

Digital Manufacturing
- Translation of design data to manufacturing
- Process planning
- Production operations & machining process planning
- Assembly definition & sequencing
- Detailed line, cell, station, and task design
- Simulation and analysis of shop-floor activities, facilities, resources and capabilities
- Robotics & machine simulation
- Plant layout & ergonomics

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ISO 9001:2000
Product Data Management
- Gap analysis, process analysis
- System design, workflow design
- System implementation, installation & customization
- Data conversion, data loading
- System interfaces, documentation, system support

Body NVH
- Chassis NVH
- Powertrain NVH
- Break noise
- Tire noise
- Exhaust system acoustic analysis
- Pass by noise
- Panel contribution
- Transmission loss studies on enclosures

Automotive Project Experience
- Design of an automotive vehicle using top-down assembly approach
- Automotive gear box design and generation of manufacturing drawings
- Modeling of various automotive components like transmission, suspension, fuel brake etc and solutions to streamline vehicle layout
- 3D modeling and details of assembly pictures
- FE modeling of full car body using super element technique
- Durability and NVH analysis of car body for its global behavior
- Joint stiffness analysis of various joints in an automobile
- Structural optimization of a car body
- Transient analysis of complete vehicle for road loads
- FE analysis of seat suspension assembly
- Car wiper analysis
- BIW meshing
- Eigen value/static analysis of engine block
- Sheet metal forming simulation of an automotive component
- Tyre inflation and foot-print studies
- Durability studies of instrument panel
- Airbag inflation analysis
- FE meshing of SUV for NVH/Durability/Crash
- Suspension design validations and improvements
- Car vehicle dynamics study (ride comfort and maneuverability)
- Four-post test rig simulation of a car
- Dynamic load calculations of transmission systems
- NVH analysis of a car
- Hexa meshing of components like crankshaft, connecting rod, piston, manifold duct, transmission casing, steering wheel, plastic components, carrier plate, rotor assembly and railway components like bogie, carriage equipment, etc.
- Seat fatigue analysis
- Damage tolerance calculations of speaker systems

Configuration management
- Change management
- CAD-PDM integration
- Integration with ERP/SCM packages
- Advanced Engineering Solution
- Interior cabin acoustics
- Noise path and source identification
- Sound quality
- Buzz, squeak & rattle and vibration
- Active / passive noise control
- Acoustic optimization studies
- Aero-acoustic analysis
- Experimental & CAE co-relation
- Frontal, side impact analysis of a pick-up truck
- Fatigue & impact analysis of the car wheel
- Static, normal modes & random response analysis of automotive frame
- FE analysis of exhaust system
- Child restraint anchorage analysis
- Fatigue analysis of lower control arm
- Roof crush and roll over analysis of automotive
- Fatigue analysis of transmission shaft
- Static & frequency response analysis of mirror
- FE modeling & stiffness analysis of car hood & chassis
- Fuel tank sloshing simulation
- Multi-stage forging simulation
- Static analysis & weight optimization
- Product data management & integration with legacy systems
- Configuration & change management
- Installation / implementation & support services of ENOVIA-VMC/CATIA for automatic process
- Workflow solutions & process mapping
- Implementation & customization of various PDM tools
- Integration of PDM systems with in-house enterprise systems

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Crash
- Vehicle Structural
  - Front Impact
  - Rear Impact
  - Side Impact
- System Structural
  - Seat Belt Anchorages
  - Child Seat Restraints
  - Roof Crush
- Vehicle Occupant
  - Head Impact
  - System Occupant
  - Head Restraints
Vehicle Dynamics
- ISO lane change studies
- Suspension design and validation
- Four-post test rig simulations
- Rolling resistance calculations
- Vehicle maneuvering studies

Durability
- Integrated durability studies (from load calculations to life estimation)
- Virtual 4 post test rig simulations
- Life estimation & design optimization studies
- Full vehicle durability studies

Additional Services
- Material characterization (metals, composites, elastomers)
- Noise & vibration studies
- Manufacturing support
- Tool design & manufacturing support
- Spot weld failure & optimization studies
- Joint stiffness & stiffness evaluation (BIW, trimmed body and fatigue life estimation)
- Durability studies of chassis, body joints, hood, doors, seat belts, roof, etc.
- Component / subsystems’ durability analysis and optimization

Software Expertise

| CFD       | STAR-CD, FLUENT, CFX, ICEM CFD, GAMBIT, pro-am |
| CAD       | CATIA, Unigraphics, Pro/E, I-Deas, Solidworks  |
| CAE       | MSC.Nastran, ANSYS, MSC.Patran, LS-Dyna, MSC.Adams, Hypermesh, MSC.Dytran, MSC.Marc, Ansa, MSC.Fatigue, ABAQUS, SYSNOISE, OptiStruct |
| Manufacturing Simulations | MSC.Superform, MSC. Superforge, Hyperform |
| Digital Manufacturing | Delmia (ENVISION, IGRIP, QUEST, VIRTUAL NC) |
| PDM       | Enovia, Smarteam, Windchill, TeamCenter |

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- AEG does not accept design responsibility as part of its role as a contract analyst of the customer design.
- AEG does not have familiarity with, nor can it anticipate or control process or product variation, or variation in service environments which may affect or impact design considerations.
- AEG cannot fully analyze the functionality of the current design regarding foreseeable uses or misuse of the part.
- AEG does not know, nor can it fully appreciate the design safety factor issues that are incumbent on the buyer design.
- AEG recommend buyers to verify this computer-based engineering design analysis and simulation results using component testing in the laboratory.

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