

**GS Engineering** is an agile small business with corporate offices in **Houghton, Michigan** delivering advanced engineering solutions to military and commercial transportation markets through structural design, analysis, product development, and correlated testing services.



**DEFENSE / MILITARY**

WHEELED & TRACKED VEHICLES, COMPONENT/SYSTEM DESIGN, WEIGHT/COST REDUCTION, PROTOTYPING, TESTING

**COMMERCIAL / SPECIALTY**

GROUND-UP VEHICLE DESIGN, DESIGN FOR COST/MFG/ASSEMBLY, COMPONENT SOURCING & INTEGRATION, BUILD SUPPORT

**AVIATION / AEROSPACE**

AVIONICS DESIGN, DO-160G ROBUSTNESS, WEIGHT REDUCTION AND HIGH STRENGTH MATERIALS, STRUCTURAL OPTIMIZATION

**MECHANICAL ENGINEERING & DESIGN**

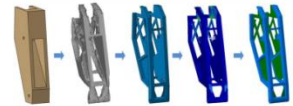
**3D Solid Modeling:**

- Creo, CATIA, Siemens NX
- SolidWorks Premium
- Behavioral Modeling
- Skeleton Modeling
- Detailed Drawing Packages



**Benchmarking:**

- Faro Arm Capabilities
- Support On-site & Remote Measuring
- IGES Data for 3D Model Creation
- ATOS White Light Camera:
- Develop 3D Models From Point Cloud

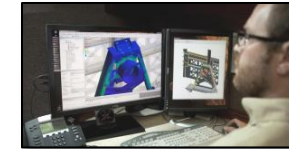


**Finite Element Analysis:**

- Ansys
- Altair Hyperworks
- Load Case Determination
- Topology Optimization
- Dynamic & Thermal Analysis
- Linear/Nonlinear Stress Analysis
- Composite Materials

**Iterative Design Tools:**

- MathCAD & In-House Processes



**Dynamic Simulation Modeling :**

- ADAMS Car Template Development / Modeling
- Altair MotionSolve
- Vehicle/System Kinematics & Dynamics
- Handling, Ride, Durability & Stability Analysis
- Suspension Tuning
- Component Forces to Support FEA/Durability Analysis

**ELECTRICAL ENGINEERING & DESIGN**

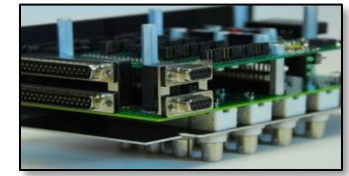
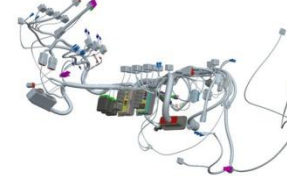
**Electrical Engineering & Design:**

- Analog/Digital PC Design
- Custom Hardware
- Avionics Design
- Automated Test Equipment
- Custom Firmware
- DO-160G Robustness
- 3-D Harness Design
- CAN/A815/A664/A429 Communications



**Design Software / Tools:**

- CadSoft Eagle
- PSPICE
- Boardstation
- DxDesigner
- Simulink
- Matlab
- MathCad



**PROTOTYPE BUILD & MANUFACTURING**

**Procurement Support:**

- Accelerated Development for Build
- Sourcing of COTS Components
- Prototype Manufacturing: (Weldments, Sheet metal, Castings, & Forgings)
- Established & Audited Supplier Network
- Quality Control Plans
- Quality Inspections & Verification



**Assembly & Installation:**

- 6000 sq. ft. High Bay Facility
- On-site Installation Assistance



**Low Volume Production:**

- Production Level Quantity Builds
- Supply Chain Management
- MIL-STD Packaging Design

**AS9100 / ISO9001 Certification In-Process 2014**

**ADVANCED MATERIALS**

**Process Engineering:**

- Heat Treat
- Casting
- Extrusion
- Material Joining (Welding)
- Coatings

**Metallurgical Testing:**

- Mechanical Testing
- Metallography
- Microstructural Analysis
- Corrosion Testing
- Elemental Characterization

**Materials Expertise:**

- Metal Matrix Composites (MMCs)
- Forged, Investment & Squeeze Cast Al & Mg
- High Strength Steel
- Austempered Ductile Iron
- Investment Cast Titanium

**TESTING - VALIDATION**

**Customizable Courses:**

- Gravel & Paved Slopes of 15% - 40%, 60%
- Paved 1" & 2" RMS Courses – 500'
- Vertical Steps of 18", 24" & 36"
- Paved Side Slopes of 20%, 30% & 40%
- Stability Tilt Table (22 ton)
- Multiple Secondary Road Endurance Areas
- Multiple Off-Road Endurance Areas
- Gravel Frame Twist
- Urban Rubble Course
- Paved Half Rounds 4", 6", 8", 10", 12"
- Paved Vehicle Dynamics Area

*GS Engineering's 500+ acre vehicle test course features a low visibility location, ideal for private vehicle testing and development.*



**In-Vehicle Data Acquisition**

**Standard Test Scenarios:**

- Performance Testing
- Strain & Torque Measurement
- Suspension Testing/Tuning
- Brake System Testing
- Power-train Development
- Fuel Economy (Meter Based)
- Vehicle Comparison
- Correlation of FEA
- Noise, Vibration, & Ride Quality
- Simulation Correlation
- Endurance Testing

