

## Why should ESG be your first choice for product development

Qualified designers and engineers

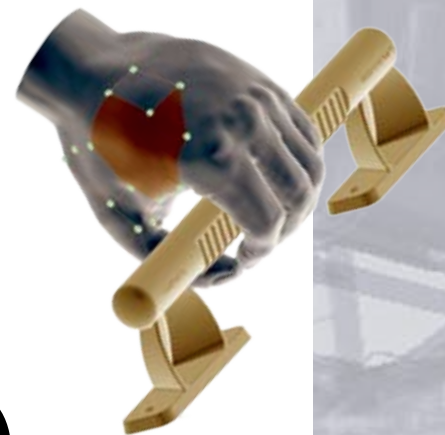
- Extensive industry experience
- Proven innovators—evidenced by over 50 patents
- Registered professional engineers on staff
- Team's educational excellence—  
PhD, Master, and Bachelor Degrees in Engineering & Industrial Design

Proficiency with the most effective industrial design and engineering tools

- Industrial Design: Rhino 3D, Corel Painter, Solid Works  
Z-Corp Scanner 700\*, Adobe Creative Suite 2
- Mechanical Engineering: Ideas, CATIA V5, Unigraphics, SolidWorks
- Engineering Analysis: LS-DYNA, HyperWorks, Hypermesh, OptiStruct, Motion Solve, Computational Fluid Dynamics

In-house prototyping

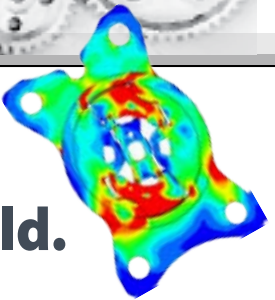
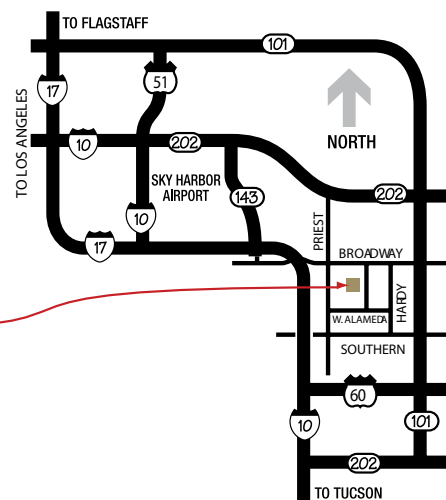
- Z Corporation rapid-prototyping 3D printing system
- Mechanical prototype construction



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## Effective Design and Engineering Solutions for Today's Demanding Design World.

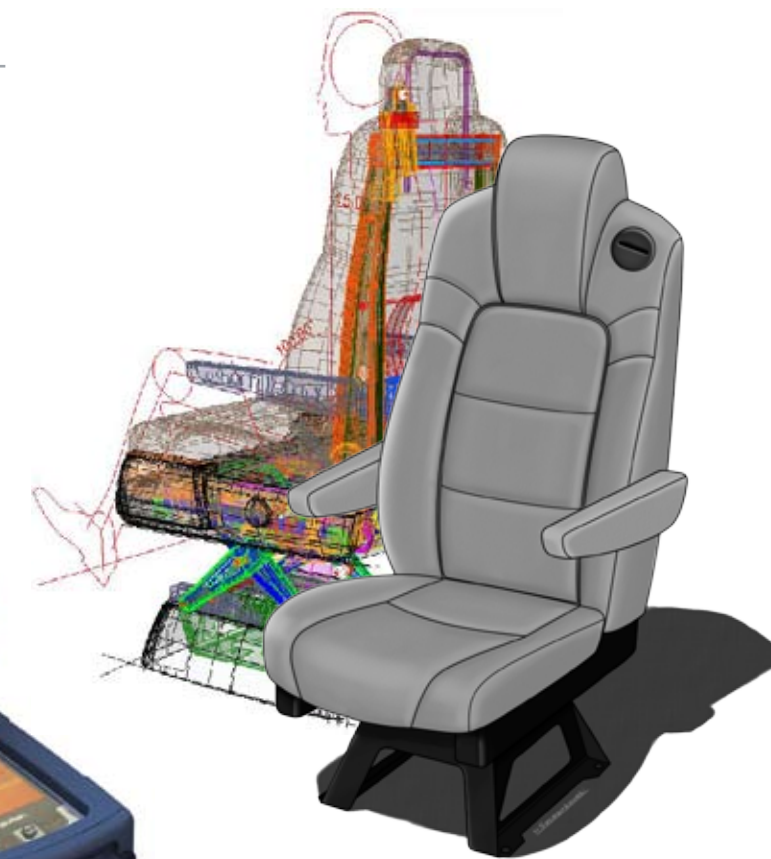
**ESG's team is a unique blend** of innovative Mechanical Engineers and creative Industrial Designers that have a passion for excellence. We bring to the table a track record of successful product design solutions with fresh insight and creative innovation to help your business successfully bring your brand vision to market.

**Reduce Risk and Lead Time.** ESG has developed innovative design and engineering processes that reduce your product development risks, and reduce lead-time to market. We'll work with you to develop a sound design and engineering base for your product early on in the development process so your product has a firm foundation on which to build.

**Big and Small Projects Welcome.** With our staff of over 30 and our 10,000 sq. ft. facility, we can execute large engineering projects. We are also equipped to handle small, quick turnaround projects.

### Diverse Experience

- Aerospace**
- Alternative Energy**
- Automotive**
- Consumer Products**
- Defense**
- Heavy Truck**
- Medical Devices**
- Mobility Engineering**
- Motorcycles**

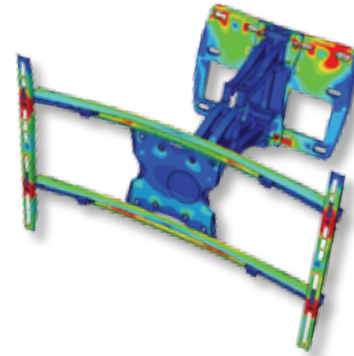




## ESG Engineering Capabilities and Tools

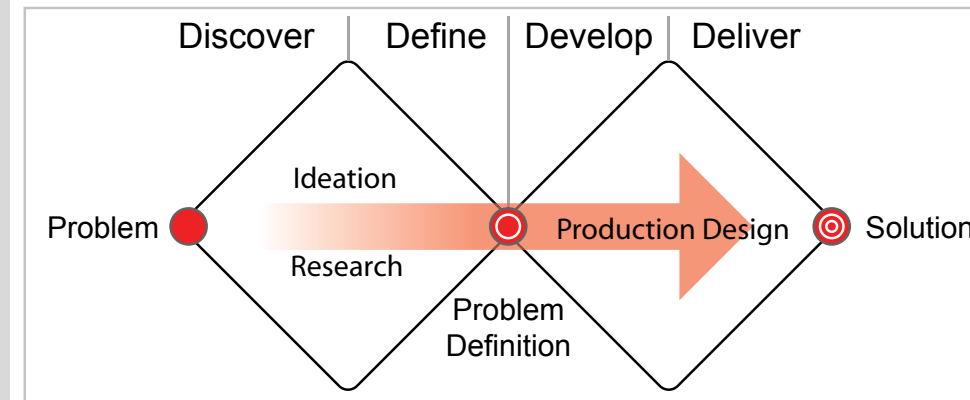
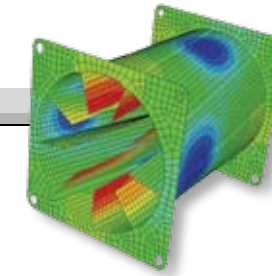
- Design and Solid Modeling
- Packaging Design
- Product Design Engineering
  - Concept to Production CAD design
  - Experienced in SolidWorks, Ideas, Unigraphics, Pro-E, CATIA, and Rhino
  - Detail Drawings Including Full Geometric Tolerancing
  - Complete Vehicle Design Capabilities
  - Complex Assemblies
  - Reverse Engineering – Scanning Capabilities for an Entire Vehicle, ZScanner 800
- Product Reverse Engineering
- Six Sigma Analysis and Implementation – DFSS, DFMEA, PFMEA, Mean Time-To-Failure Analysis
- Advanced FEA Simulations and Analysis:
  - Tools used: LS-Dyna, Optistruct, Hyperworks, etc...
  - Non-Linear Crash Analysis
  - Drop Test Simulations
  - Dynamic Analysis
  - Static Analysis
  - Fatigue Analysis / Life Prediction
  - Advanced Thermal Analysis
  - Fluid Flow Analysis
  - Thermal Multi-Physics Modeling
  - Combustion Modeling
  - Advanced Engine Simulations
  - Material Selection
  - Composite Analysis
  - Linear Statics, Buckling & Frequency Analysis
  - Design Optimization – Shape, Size & Topology
- Off-Shore Development Services - Variable Work Load Management, 24-Hour Clock for Engineering and Design (leveraging time difference), Reduced Cost, Skilled Manpower, Prototyping and Testing.

- Industrial Design
- Market Research
  - Competitive Analysis
  - Benchmarking
  - Interviews
  - Rapid Ethnography
- Concept Ideation – Brainstorming, Concept Sketching
- Concept Development – Rendering, Preliminary Product Breakup (Exploded View)
- Human Factors
  - Comfort/Usability Studies, People Packaging
- Packaging Design – Assemblies and Subassemblies
- 3D Development
  - Sketch Model Development – FreeForm Modeling
  - Finished Model Prototype
  - Conceptual and Class A Production Surface Design
- Graphic Design- Photoshop, Illustrator, InDesign
- Rapid Prototyping – Z Corp. Rapid Prototyping in Color and Black & White
- Program Management – Multiple Vendor Management, Quality Management and Process Control

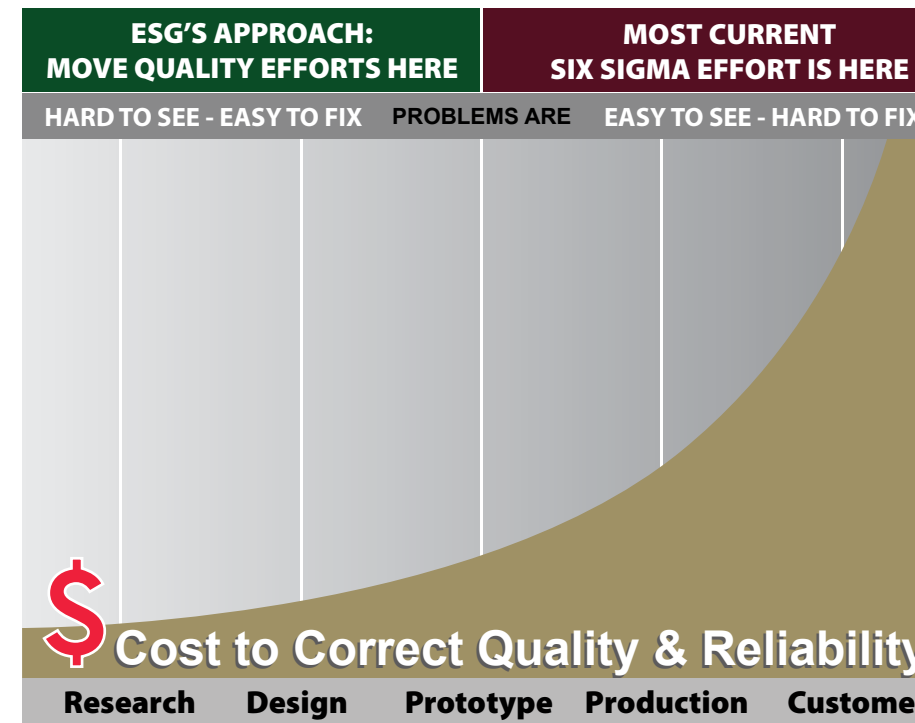


REGISTERED WITH CCR  
(CENTRAL CONTRACTOR REGISTER - UNDER ELIO ENGINEERING)

## THE CORE OF ESG ENGINEERING is INNOVATION



ESG uses the Double Diamond approach to product development



## ESG's Proven Process

- DISCOVERY**
- Listen. Ask questions. Research competition. Understand users' motivations and needs.
  - Seek input from component manufacturers.
  - Define problems to be solved.

- PROJECT PLANNING**
- Define project scope and deliverables.
  - Develop project timeline and budgeting.

- DESIGN IDEATION**
- Concept ideation developed.
  - Styling exploration, evaluation models.
  - Alternatives, materials, trade-offs evaluated.

- ENGINEERING**
- Project thoroughly developed through analysis-driven design.
  - In-process prototype models developed.
  - Six-sigma analysis used to isolate and optimize what matters most.

- PROTOTYPING**
- In-house prototyping facilities utilized for mechanical prototype builds.
  - Appearance model construction.
  - Selective machined parts supplied by strategic partners.
  - In-house Z Corporation rapid prototyping.

- MANUFACTURING SUPPORT**
- Tool and fixture designed for product manufacturing.