Design Skills and Experience Summary

MSE Systems Mark Stangl, P.E.
350 27th St, Boulder, CO 80305
Phone 303.499.3163, Jfax 909.498.8072

Business Description
Large and small firms need engineering and design skills that are unavailable from their employees due to high workload or lack of experience. Sometimes the company cannot justify hiring the individual and cannot afford the services of a large, high overhead-consulting firm. My customers want someone who can define a task, manage it, and then complete the entire project. At times additional talent and manpower is needed and I have a group of other consultants and businesses that can come to task quickly. I have minimized my operating expenses by operating my business in my home office and lab. This savings is passed on to clients. As much time as required is spent at customer locations or at fabrication facilities to get the job done. My goal is to have a mutually satisfactory long term working relationship with all my clients.

Operations
No job is too short or small to discuss. I bring a large range of experience in the design engineering field. My professional interest range from project management to detailed design efforts.

Services
Development of electronic, mechanical, and instrumentation based products.
System integration of mechanical, optical, electronic, and computer systems.
Detailed electro mechanical engineering using state of the art CAD, sketches, and models.
Product testing, technology assessment, and evaluation.
Technical marketing studies in areas of experience .
Fabrication of mechanical, electronic, and optical systems.
Functional industrial design of electronic and mechanical systems.

Procedure
Most jobs are done on a proposal and bid cycle. A meeting takes place and the requirements are outlined. A proposal includes a task description, schedule, and fabrication cost.
In some cases engineering, design, and fabrication can be billed at an hourly rate. In many cases it is more cost effective to work on a fixed price contract.

My industry experience includes these technologies:
- Computer disk drives
- Consumer products
- Fax and page scanner
- Optical systems
- Optical instrumentation
- Biomedical instrument design
- Fiber Optics
- NASA Space Shuttle
- Industrial sensors
- Atmospheric instrumentation
- Catalytic Combustion Gas Burning
- Industrial Process Instrumentation

Design and Analysis Skill Summary

Mechanical Engineering and Design

Design of structures for test and manufacturing equipment
Structural steel design in amusement park rides.
Pneumatics and fluid handling.
NEMA industrial packaging.

Molded plastic part design.
Bearing spindles system design and installation.
Etched or stamped metal and formed part design and production.
Design of mechanisms and material handling for high-speed production and QA.
Paper handling mechanisms.
Tool design of test fixtures and equipment.
Gear selection and design.
Motor selection.
Machine shop practices training.
Geometric tolerancing and analysis.
Thermal analysis and modeling from PCBs to structures.
Human factors design and modeling

Materials Analysis

Knowledge of laboratory material analysis techniques as applied to optical components and films, disk drive technology, and biomedical products.
Systematic selection of materials through literature searches and industry standard references.

Applied Mathematics

Fast Fourier Transform as applied to image analysis, filtering, and mechanical vibration analysis. Monte-carlo techniques applied to many problems. Dynamic system modeling.

Computer Applications

AutoCAD, LabVIEW and most common word processors and desktop publishing.
DOS and windows applications.
Image processing hardware and software.
Programming and integration of motion control systems.
GPIB (IEEE-488), Firewire, USB, and RS-232 hardware interfacing.
PC Bus control and instrumentation
Finite element modeling of mechanical systems.
Spreadsheets analysis:
Mechanical systems for first order stress analysis and design.
Stress and fatigue analysis of dynamically loaded components.
Thermal analysis of electronic packages, components and optical systems.
Geometric variable models.
Statistical analysis of large data sets.

CAD/CAM/CAE applications:

Analytix (Kinematics), AutoCAD, Circuitmaker, Zemax, and more.
Computer Language Skills:
Visual Basic, LabVIEW, FORTRAN, HP Basic, Microsoft Basic, Pascal, and Turbo C.
Computer system: Wintel PCs; Power PC & MAC; setup, operation, and applications
Electronic Design
Selection and application of industrial sensors for position detection and motion analysis.
Digital logic design using current standard logic families for interfacing sensors and systems. Analog circuit design of low power consumer products and high speed photo detector circuits.
Mil-217 electronic component reliability modeling.
Printed and flexible circuit design.

Test and Measurement Equipment Operation

Spectrum analyzers Digital and analog scopes.
Modal analyzers, Voltmeters, Force transducers, load cells, capacitance gaging.
Mechanical gauging, height stands, micrometers, surface plates. Laser interferometers. Solid state temperature sensors and thermocouples

Laser diode parametric and optical characterization.

Optical Design

Thermal analysis of optical mounts of mechanical stability.
Optical system design an component selection for imaging sensors.
Arc, strobe, and other light source selection for wavelength dependent applications.
Application of measurement interferometers.
Application selection of LED, IRED, and photo sensors for fiber optics, optical recording, and industrial applications.
Thin film design and measurement. Ion milling, plasma, and wet etching of thin films.
Optical bread boarding of optical paths and components.
Anamorphic optics system design.
Mechanical design of optical mounts.
Comparison and delta-psi ellipsometry measurements of optical constants.

Magnetic Recording

Flying head air bearing dynamics modeling and measurement.
Head and disk friction assessment.
Modeling and experimental verification of head and disk paramedics vs. magnetic design of head and disk magnetics.
Disk drive HDA design and manufacturing.

Equipment:

Computers: Desktop &V portable Wintel PCs, printer,
Faxmodem, Flatbed scanner, Laptop PC, Complete software , GPIB, DAQ, etc.
Light Machining and fabrication.
Electronic prototype assembly.

Test Equipment:

Digital voltmeters, Oscilloscopes, Signal generators, Data logging to PCs, Thermal, Infrared, and Photometric sensors.
Optical test rail and mounts, visible light collimator, current sources, lenses video cameras, frame grabber, etc.

MSE Systems
MSE specializes in systems integration of vision, laser diode, electro-optic, and instrumentation system design. We design, consult and manufacture in these markets. We use LabVIEW, Visual Basic, AutoCAD, and other computer tools for the design process.