

JACK STRANDQUIST, P.E.
Mechanical Engineer
Product Development

P.O. Box 66
Berthoud, CO 80513
designs@strand3d.com

Solid engineering credentials with experience in commercial, military, and aviation telecom and both general purpose and embedded computing applications, including sheet metal chassis construction, thermal and structural analysis and testing, shock and vibration isolation, and vendor oversight.

QUALIFICATION SUMMARY

Proven track record for developing mechanical parts, assemblies, and complete products from initial concept through verification testing and production release. Work closely with all technical disciplines and program management to implement tightly-integrated, cost-effective designs.

Product development skills include over 20,000 hours of computer-aided design including ME10[®], AutoCAD[®], and SolidWorks[®]. Create 3D models and 2D production drawings compliant with the dimensioning & tolerancing (GD&T) requirements of ASME Y14.5M, and interface with Agile[®] PLM.

Familiar with various fabrication, joining and prototyping processes and their impact on product cost and performance: machining, sand casting, sheet metal stamping and forming, dip-brazing, welding, injection-molding, thermoforming, water-jet and laser cutting, and stereolithography (SLA).

Analyze tolerances to minimize part costs and assembly problems. Specify fabrication processes to optimize product functionality and survivability in the end user's environment. Establish product fragility levels, drop testing standards, and package cushioning guidelines for shipping containers.

Work history includes design verification based on radiated emissions troubleshooting, accelerated life mechanical vibration testing (sine, sine-on-random, random-on-random), thermal and structural engineering analysis, tracked/wheeled vehicle dynamics, and environmental stress screening (ESS).

Strong analytical proficiency. Excellent failure investigation, technical writing, test protocol development, and both oral and written communication. Demonstrated skill with computer-aided engineering tools and PC office applications including FEA, CFD, and Microsoft[®] Office.

Experience with various regulatory environments and associated design standards: MIL-STD-810, MIL-S-901, FAA AC 43.13-1B, RTCA DO-160, ARINC 404A & 600, IPC-2221 & 2223, EIA-310, UL94, RoHS, IEEE 1101-series, PICMG 2.0, ISTA 1A / 1B, AWS A2.4, and GR-63-CORE (NEBS).

EDUCATION (Dec. 1984)

Master of Science in Mechanical Engineering (ABET), Naval Postgraduate School, Monterey, CA
Bachelor of Arts (Naval Science), Villanova University, Villanova, PA

PROFESSIONAL TRAINING

Computer-aided Design (Autodesk; Co Create; SolidWorks)	Engineer Licensure (Drexel Univ.)
Geometric Dimensioning & Tolerancing (Krulikowski)	Finite Element Analysis (COSMOS)
Acoustics/Sound Measurement (Brüel & Kjær)	Computational Fluid Dynamics (Flomerics)
Injection-Molded Plastic Part Design (ICMD)	Dynamic Design & Shock Analysis (SAVIAC)
Designing with Adhesives (Loctite)	Physics of Electronic Failures (Univ. of Maryland)
Welded Joint Design (AWS)	Vibration Analysis & Cooling of Electronics (Steinberg)

PERSONAL DATA

Former DoD Secret security clearance
Licensed professional engineer in Colorado
Home office with AutoCAD[®] and SolidWorks[®]
Veteran U.S. Navy salvage diver (Honorable Discharge)

EMPLOYMENT HISTORY

2004–Present: Sr. Mechanical Engineer, Aircell Business Aviation, Broomfield, Colorado

Mechanical design of business aviation telecom avionics. Convection cooling of up to 200 watts of power dissipation. Specified military-grade circular, D-subminiature, and RF connectors & cabling, including custom connector shell -to- chassis grounding solutions. Designed sheet metal chassis components and shielded cable assemblies for signals, hi-speed data, and input DC power using both discrete wire and flexible printed circuit technology. Implemented injection-molded plastic part modifications to phone handsets, including the addition of low-friction additives and associated tooling changes. Prepared and managed product documentation to support LRU assembly, electrical and structural integration with host aircraft, and FAA certification, including physical provisioning and system-level wiring plans, interface control drawings, and pinout instructions.

2002–2004: Sr. Mechanical Engineer, Strand 3D Designs, Berthoud, Colorado

Analyzed the dynamic response of a ½-ton marine electronics cabinet to an underwater explosion and provided the customer with accurate predictions of Navy medium-weight shock hammer tests. Integrated liquid heat transfer with thermoelectric cooling of charge-coupled devices in a pharmaceutical photo-imager; specified a single-phase heat-exchanger and a custom plumbing solution. Technical expert in a lawsuit involving allegations of intellectual property theft; reverse engineered both parties' rugged computer product line to identify virtual fingerprints common to similar models. Electronic packaging for a network storage company, including conversion of their flagship product to an off-the-shelf chassis solution requiring a custom branded injection-molded plastic front bezel.

1996–2002: Mechanical Engineer, Hewlett-Packard Company, Ft. Collins, Colorado

Independent development of a custom enclosure used to promote bundled sales of high-performance graphics workstations. (This product eventually earned the only customer “A” grade HP received for workstation-related business in 2001.) Invented BGA test fixtures to screen marginal-yield ICs during production runs. Developed thermal solutions to deal with Intel CPU speed upgrades across the entire HP Windows® workstation product line. Specified backplanes, bus bars, and cable assemblies. Developed a custom thermal test die to support temperature testing of a 3-kilowatt graphics engine enclosure. Industrial design of the cosmetic front panel to optimize airflow and minimize audible noise. Established an EMC audit program to ensure compliance with FCC emission limits for all HP computer workstations and technical graphics products.

1990–1996: Mechanical Engineer, Codar Technology, Inc., Longmont, Colorado

Principal mechanical engineer for VME, Q-bus, and custom military computer products required to meet extreme temperature and vibration qualification criteria. Supervised environmental qualification tests and production stress screening, including temperature, humidity, acoustic noise, altitude, sine-and-random vibration, and Navy high-impact shock tests. Personally operated electrodynamic shakers and spectrum analyzers to find natural frequencies of printed circuit boards and critical acceleration levels for operating disk drives and printers. Designed mechanical isolation for commercial off-the-shelf (COTS) equipment to avoid in-service resonance and shock damage. Used classical and finite element analysis to define root cause of problems identified during product testing. Designed both forced convection- and conduction-cooled packaging concepts.

1985–1990: Marine Salvage Engineer, Philadelphia Shipyard, Philadelphia, Pennsylvania

Supervised evaluations of underwater life support equipment at a hyperbaric test facility, including experiments to measure respiratory work in divers and Navy combat swimmers. Carried out buoyancy and structural calculations necessary to successfully direct several hundred riggers, shipwrights, and other trades during the dry-docking of ships as large as 70,000 tons. Field engineer for a major ship salvage project—conducted on-site damage assessment surveys and performed stability and ground reaction calculations necessary to plan the recovery operation. Managed mechanical repairs on a 200-megawatt power plant during a \$500 million marine facility renovation. Engaged in direct customer contact on schedule, scope-of-work, and technical issues.