

Ellis Atkinson

☎ (256) 555-4182 ✉ ellis.atkinson@example.com 💼 linkedin.com/example/ellisatkinson 📍 Huntsville, AL 35801

SUMMARY

Advanced Packaging Engineer with 10 years of **mechanical engineering** experience supporting defense electronics, ruggedized hardware, **missile system hardware**, and microelectronics packaging from requirements through production readiness. Applies FEA, ANSYS, MATLAB modeling, thermal fatigue assessment, shock analysis, vibration analysis, and experimental validation to guide defensible design decisions. Evaluates BGA, CGA, Flip Chip, and J lead interconnect technologies through solder fatigue studies, material characterization, simulation, and test correlation. Connects systems engineering practices with **requirements development**, verification, validation, risk documentation, and lifecycle decisions. Prepares evidence for SRR, PDR, CDR, and PRR milestones while communicating findings across engineering, manufacturing, program, customer, and nontechnical audiences. U.S. citizen with active Interim Secret eligibility, prepared to support demanding **mechanical design** and qualification work.

EXPERIENCE

Lead Mechanical Packaging Engineer

February 2023 - Present

Redstone Microsystems

Huntsville, AL

Leads mechanical packaging analysis for ruggedized defense electronics, guiding simulation, testing, review evidence, and multidisciplinary design decisions through production readiness.

- Established **ANSYS** simulation and test strategies for defense assemblies facing thermal, shock, and **vibration** environments.
- Built FEA models identifying high strain regions before **qualification testing**, guiding circuit card design revisions.
- Evaluated BGA, CGA, **Flip Chip**, and J lead behavior during thermal cycling and **solder fatigue** studies.
- Created **MATLAB** models for test data reduction, response comparison, and verification evidence supporting design decisions.
- Coordinated SRR, PDR, CDR, and PRR evidence, documenting requirements, risks, assumptions, and recommended actions.
- Mentored engineers on model quality, test correlation, and communication across engineering and manufacturing teams.

Senior Mechanical Engineer

June 2020 - January 2023

Vector Forge Defense Systems

Birmingham, AL

Owned **mechanical analysis** for missile borne electronic hardware, connecting packaging constraints, structural loads, thermal environments, testing, and **systems engineering** evidence.

- Integrated packaging constraints, structural loads, thermal environments, and interfaces into missile hardware evaluations.
- Compared ANSYS **shock** and vibration predictions with component test data, resolving concerns before qualification.
- Prioritized solder fatigue testing through temperature profiles, package geometry, and material behavior assessments.
- Planned material property and **solder interconnect** tests with laboratory staff, converting measurements into model inputs.
- Linked mechanical analyses with requirements and produced **verification** artifacts for major design review packages.
- Facilitated **technical interchange** discussions across mechanical, electrical, reliability, manufacturing, and systems disciplines.

Mechanical Analysis Engineer

August 2018 - May 2020

Pinnacle Avionics Engineering

Mobile, AL

Analyzed rugged aerospace electronics, translating FEA, MATLAB data processing, thermal cycling results, and design findings into review ready verification evidence.

- Analyzed electronic enclosures and circuit card assemblies using **FEA** under **vibration** and shock loading.
- Created MATLAB scripts processing accelerometer and thermal datasets for repeatable analytical comparisons.
- Investigated solder joint and component interface concerns using geometry, **material properties**, and **thermal cycling** data.
- Prepared analysis reports covering assumptions, mesh strategy, load cases, results, margins, and limitations.
- Contributed verification evidence to **PDR** and **CDR** packages, resolving reviewer questions through additional analysis.
- Coordinated drawing and assembly updates with designers while protecting electrical and manufacturing requirements.

Mechanical Engineer

October 2016 - July 2018

Southern Research Integration

Montgomery, AL

Developed **mechanical modeling** capability for aerospace and defense electronics through supervised analysis, test preparation, requirements traceability, and technical reporting.

- Constructed finite element models for brackets, housings, and support structures, checking results against hand calculations.
- Supported **vibration** and shock test preparation through instrumentation, configuration, and acceptance criteria reviews.
- Evaluated thermal expansion and material property effects, documenting interface risks for design teams.
- Maintained requirements and analysis traceability for assigned verification tasks and internal technical reviews.
- Presented analysis methods and results to senior engineers, incorporating peer review feedback into reports.

PROJECTS

Advanced Microelectronics Packaging Validation 2024

Connected ANSYS models, MATLAB data reduction, solder fatigue testing, and material characterization for ruggedized electronic assemblies. Results supported package selection and verification decisions.

Missile Hardware Mechanical Verification 2022

Integrated shock, vibration, thermal fatigue, and structural analysis into review evidence for missile borne electronic hardware. Findings supported design maturation and qualification planning.

LEADERSHIP & AWARDS

- Led cross functional preparation of SRR, PDR, CDR, and PRR technical evidence for defense hardware milestones.
- Mentored mechanical engineers in ANSYS model quality, test correlation, solder fatigue evaluation, and technical communication.
- Guided multidisciplinary decisions linking requirements, analytical results, laboratory evidence, risks, and production readiness actions.

EDUCATION

Bachelor's Degree in Mechanical Engineering

2016

University of Alabama in Huntsville GPA: 0

Huntsville, AL

Coursework: Finite Element Analysis, Materials Science, Thermal Systems, Aerospace Structures

CERTIFICATIONS

- ANSYS Mechanical Advanced Topics Certificate 2021
- Interim Secret Clearance Eligibility 2026

TECHNICAL SKILLS

- Finite Element Analysis: FEA, ANSYS Mechanical, mesh strategy
- MATLAB Modeling: MATLAB, data reduction, response comparison
- Dynamic Testing: shock testing, vibration testing, fixture testing
- Thermal Analysis: thermal fatigue, thermal cycling, temperature profiles
- Package Technologies: BGA, CGA, Flip Chip
- Interconnect Analysis: J lead, solder fatigue, solder joints
- Material Evaluation: material properties, material characterization, test data
- Systems Engineering: requirements development, design maturation, product lifecycle
- Verification Reviews: SRR, PDR, CDR
- Production Readiness: PRR, qualification testing, readiness evidence
- Technical Documentation: analysis reports, risk documentation, verification artifacts

SKILLS

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|-----------------------|----------------------|-----------------------------|-----------------------|
| • Mechanical Modeling | • Thermal Fatigue | • Material Characterization | • J Lead Packaging |
| • FEA | • Shock Analysis | • BGA Packaging | • Systems Engineering |
| • ANSYS | • Vibration Analysis | • CGA Packaging | • Test Evaluation |
| • MATLAB | • Solder Fatigue | • Flip Chip Packaging | |

PROFESSIONAL AFFILIATIONS

- Systems engineering review contributor across requirements, verification, validation, and product lifecycle activities.
- Cross functional technical interchange participant with mechanical, electrical, reliability, manufacturing, program, and customer teams.

LANGUAGES

- English (Native)
- Spanish (Beginner)

ADDITIONAL INFORMATION

Work Status : Authorized to work in United States. No sponsorship required.

REFERENCES

AVAILABLE ON REQUEST