



# Old Iron Innovation LLC

**BRIAN M. DAVIS, MSME, PE** has over 29 years of cross-functional experience in:

- Gas turbines:
  - Aircraft propulsion systems/ aircraft (jet) engines
  - Marine/ship and transportation turbine systems
  - Power generation/land-based turbine systems
- Automotive engineering
- Forensic engineering including:
  - Component failure and forensic analysis
  - Fatigue and fracture mechanics
  - TOPS8D
  - Failure investigations
- Mechanical engineering/machine design:
  - Medical device design including ultrasonics
  - Manufacturing processes
  - Composite materials
- FAA certification and FDA 510(k) approval

## **EDUCATION/TRAINING AND HONOR SOCIETIES:**

- BSME (University of Florida) cum laude
  - Pi Tau Sigma, Mechanical Engineering Honor Society
  - Tau Beta Pi, Engineering Honor Society
- MSME (University of Cincinnati)
- Certified Six Sigma Greenbelt graduate
- TOPS8D root cause investigation trained

## **PATENTS:**

- 6,076,835 "Interstage vane seal apparatus"
- 6,217,283 "Composite fan platform"
- 6,354,780 "Eccentric balanced blisk"
- 6,914,215 "Real time laser shock peening quality assurance by natural frequency analysis"
- 8,061,975 "Slipping bushing assembly for moveable turbine vane"
- 8,197,196 "Bushing and clock spring assembly for moveable turbine vane"

## **REGISTRATIONS/CERTIFICATIONS:**

- Licensed professional engineer in OH, license no. 68061 & FL, license no. 79103
- Holder of NCEES Record with Model Law Engineer designation
- NCEES International Registry member
- US Naval Engineering Duty Officer qualified
- Prior holder of three (3) DoD security clearances



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## **PROFESSIONAL ASSOCIATION MEMBERSHIP:**

- National Society of Professional Engineers (NSPE)
- American Society of Mechanical Engineers (ASME)
- American Institute of Aeronautics and Astronautics (AIAA)
- American Society for Metals (ASM)
- Society of Automotive Engineers (SAE)
- International Association of Marine Investigators (IAMI)
- National Academy of Forensic Engineers (NAFE) – affiliate

## **PUBLICATIONS:**

- Davis et al., “Performance of GenIV LSP for Thick Section Airfoil Damage Tolerance,” GE Aircraft Engines, 45th AIAA SDM Conference, April 2004.
- Above paper also presented at AeroMat 2005 conference, Orlando FL, June 2005.

## **SPEAKING/LECTURING:**

- Lecturer and course developer for 6.5hr professional engineer CE course “Introduction to Vibrations,” Halfmoon Education Inc., Cincinnati, OH March 21, 2017.
- Lecturer and course developer for 6.5hr professional engineer CE course “Introduction to Vibrations,” Halfmoon Education Inc., Indianapolis, IN August 16, 2017.
- Above course also given as two webinars for CE credit on June 14-15, 2018 to licensed professional engineers for Halfmoon Education, Inc.

## **TRAINING:**

- SEAK course, “How to be an Effective Expert Witness,” 2017.

## **CAREER HISTORY – FORENSIC ENGINEERING & CONSULTING**

### **Old Iron Innovation LLC (forensic engineering), Cincinnati, OH**

President and principal investigator in mechanical engineering forensic and design consultation with practice areas served including automotive, aviation, marine, industrial and medical devices. Wide experience encompassing over 29 years including significant intellectual property experience. Licensed professional engineer in 2 states, former USN officer and prior holder of several government clearances. Has led multiple complex field failure investigations to successful resolution.



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## **CAREER HISTORY – AVIATION (GAS TURBINES/JET ENGINES)**

### **General Electric Aviation (Aircraft Engines), Cincinnati, OH (16 years)**

Over 18 years total at GE as technical leader and manager for the following GE commercial, industrial, marine and military gas turbine/jet engine product lines: GE90, HF120, CF6, LM1600, LM6000, LM2500, F101, F110, F118, F136

As formally-recognized senior technical leader, performed and lead teams in:

- Component mechanical design
- Systems engineering
- Failure analysis/forensic engineering
- Root cause assessment
- Product quality
- Product qualification/certification
- Field investigations
- Manufacturing support and repair
- Reports to USG and certifying authorities e.g. FAA
- Compliance to USG and industry/regulator (FAA) specifications e.g. CFR FAR
- Product qualification to USAF
- Presentation before senior USAF, GE and customer representatives
- Twice recognized as “Senior” engineer (SME) in two disciplines and graduate of GE Advanced Course in Engineering
- Significant mechanical design and analysis experience with CAD/FEM tools
- USG clearance granted

### **Allison Advanced Development Company (Rolls-Royce), Indianapolis, IN (1.5 years)**

Lead Engineer, Advanced Mechanical Design

- Lead engineer for all cold section static hardware for advanced compressor
- Executed from conceptual design to issued drawings in 1 year
- Performed trade studies and mechanical analysis for design optimization using CAD/FEM
- Presentation before senior USAF and company representatives
- Compliance to USG specifications
- USG security clearance



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## **Pratt and Whitney (Aircraft Engines), West Palm Beach, FL (6 years)**

Senior Design Engineer, Government Engine Business

- Design lead for compressor vanes, seals and shrouds
- Supported Initial Flight Release for the F119/F-22 weapon system
- Introduced several redesigns for cost and durability
- One of a small team to develop a hollow, composite fan blade design
- Performed stress/modal analysis of isotropic and composite structures using CAD/FEM
- Presentation before senior USAF and company representatives
- Compliance to industry and government specifications
- USG security clearance

## **CAREER HISTORY - MEDICAL DEVICES**

### **Ethicon Endo-Surgery Inc., Blue Ash, OH (Johnson & Johnson) (4 years)**

Senior Design Engineer, Harmonic Franchise

- As Lead design engineer for 45cm length laparoscopic ultrasonic surgical instrument (ACE45E), led team to FDA 510(k) approval of longer device for use in bariatric markets (gastric bypass and laparoscopic cholecystectomy)
- Field surgical observation of ACE45E in patient use and gathered on-site surgeon feedback
- On-site test support at CSA labs, Toronto, ON as part of FDA compliance testing
- In-vivo animate testing of the device to demonstrate FDA compliance for cut and coagulation performance
- Human factors assessments
- Component lab testing for wear, heat generation, vibration and failure/forensic analysis using state-of-the-art techniques e.g. IR camera and laser vibrometry
- Significant mechanical analysis using CAD and FEM
- Compliance to FDA regulations



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## **CAREER HISTORY – US NAVY & MARINE/INDUSTRIAL APPLICATION ENGINEERING**

### **Lieutenant, US Navy (Reserve) (8 years)**

- Qualified as Engineering Duty Officer, 1445
  - Completed two (2) shipyard tours at NNSY and PHNSY
  - Completed Engineering Orientation course, Kings Point MMA, Kings Point, NY
  - Completed at-sea tour aboard USS DONALD COOK (DDG 75)
  - Completed EDO School, Port Hueneme, CA
- Completed “NAVSEA Basic Paint Inspectors Course,” Norfolk NSY, MARMC
- Presentation before senior US Navy officers
- Awards: Navy Achievement Medal, National Defense Service Medal, and Global War on Terrorism Service Medal

### **Staff Engineer, GE Marine and Industrial Systems Engineering (2 years)**

- Lead \$7M fuel efficiency improvement program for US Navy LM2500
- Model engineer for LM1600 industrial engine
- Systems leader for LM6000PF+ industrial low pressure turbine
- Lead field investigation at customer power generation installation
- Lead field investigations with 2 foreign navies, root cause analysis, failure/forensic analysis, on-site engine teardown with customer witness
- Reports to US Navy and product customers
- Presentation before senior foreign navy leadership, GE, and other external customers