



**Thomas J. Carter, P.E.**

Consulting Mechanical Engineer

Curriculum Vitae of

THOMAS J. CARTER

May 2022

**EXPERIENCE:**

1984 - Present

Carter Engineering  
Franklin, Tennessee  
(Part-time: 1984 - 1987)  
(Full-time: 1987 - Present)

Consulting Mechanical Engineer

Vehicle accident reconstruction. Inspection of vehicles and components with regard to malfunction, failure, and/or accident causation. Evaluation of vehicle and component design, function, and performance. Testing of vehicles and components (both instrumented and non-instrumented) and analysis of test results. Specialized in motorcycle engineering and accident reconstruction.

1990 – 2000 - Development and sales of vehicle data acquisition systems, associated components, and services.

1992 – 2010 - U.S. & Canadian motorcycle brake system compliance testing (FMVSS/CMVSS 122).

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1982 - 1987

Air Force Flight Dynamics Laboratory  
Wright-Patterson AFB, Ohio

Project Engineer/Manager

Responsible for development of new technology programs in aircraft landing gear, brakes, wheels, and tires. Responsible for the technical development, testing of pre-prototype equipment, and on-aircraft tests of an electrically actuated prototype aircraft braking system. Research of air/oil mixing phenomena in aircraft landing gear during rough field operations. Principal investigator for study of aircraft tire traction on various surfaces. Responsible for laboratory testing and evaluation of a prototype high sink rate landing gear and a rough field landing gear. Supervised testing of candidate brake component improvements for the B-52 aircraft. Designed test fixtures and supervised fabrication. Determined instrumentation requirements. Dynamometer testing of aircraft wheels, tires, and brakes. Drop and shaker testing of aircraft landing gear components. Technical manager for development of a closed cycle liquid helium temperature cryogenic cooling system for aircraft and spacecraft applications. Conceptualized and directed the development of a computer software package for simulation of spacecraft thermal management systems. Investigation of aircraft accidents. Instructed motorcycle safety classes.



1978 - 1981                      Air Force Flight Test Center  
Edwards AFB, California

### Flight Test Engineer

Responsible for environmental control systems testing and evaluation during the developmental flight testing of the B-1 bomber. Responsible for development of test requirements, methodology, and analysis methods for the air launched cruise missile and B-52 carrier aircraft mechanical, hydraulic, and environmental systems during developmental flight tests. Determined instrumentation requirements. Reduced and analyzed in-flight performance data. Coordinated resolution of maintenance problems. Investigated aircraft failures and/or anomalies. Planned and conducted static proof loading of missile ground handling equipment. Planned and participated in wind tunnel testing. Planned and conducted in-flight icing tests utilizing the NKC-135 water spray aircraft. Authored the final report on environmental, hydraulic, and mechanical systems for the cruise missile contractor selection fly-off. Senior on-board flight test engineer during test launches of cruise missiles from B-52 bomber aircraft. Authored flight test engineers training manual for the cruise missile program. Trained new flight test engineers in operation of flight test instrumentation. Responsible for controlling cruise missile remotely from EC-135N aircraft. Participated in F-16 braking tests. Selected by base commander to establish and conduct motorcycle safety training.

1970 - 1974                      5010 Civil Engr'g Sq - Eielson AFB, Alaska  
3550 Air Base Grp    - Moody AFB, GA  
6510 Civil Engr'g Sq - Edwards AFB, CA

### Civil Engineering Technician/Surveyor

Plan, accomplish, and/or supervise: Engineering surveys, drafting for civil engineering projects, and inspection of construction projects. Surveying of aircraft accidents.

PART TIME: land surveying, motorcycle mechanic.

1966 - 1970                      6515 Fld Maint Sq                      - Edwards AFB, CA  
20th Special Operations Sq    - South East Asia  
3550 Field Maint Sq                      - Moody AFB, GA

### Aircraft Mechanic

Maintenance, repair, and modification of aircraft and helicopter mechanical and structural components. Flight crew member on CH-3E and UH-1F helicopters while assigned to the South East Asia Theater (Vietnam, Laos, & Thailand).

1960 - 1965                      Les Reinke Honda    - Jackson, Tennessee  
Eddie's Cycle Shop    - South Fulton, Kentucky  
Joe's Motor Sales      - Jackson, Tennessee

### Motorcycle Mechanic

Responsible for repairs, tune-ups, diagnostics, modifications, and major overhaul of motorcycles. New motorcycle setup.

## EDUCATION:

1982 M.S., Aeronautical Engineering  
Air Force Institute of Technology  
Wright-Patterson AFB, Ohio

Primary areas of study: Fluid Dynamics and Heat Transfer. Requirements for a B.S. in aeronautical engineering were completed concurrently. Thesis: "Dynamic Characteristics of Aerial Refueling Systems".

1977 B.S., Mechanical Engineering  
Auburn University - Auburn, Alabama

## CONTINUING EDUCATION:

2022 Plug-in Electric Vehicles, Cont. Ed. & Development, Inc.

2022 Countermeasures for Enhancing Safety on All Kinds of Roads, Cont. Ed. & Development, Inc.

2022 Countermeasures for Intersection Crashes, Cont. Ed. & Development, Inc.

2022 Engineering Ethics Case Study: The Challenger Disaster, Cont. Ed. & Development, Inc.

2022 Determining Negligence in Engineering Failures, Cont. Ed. & Development, Inc.

2022 Accident Investigation, Cont. Ed. & Development, Inc.

2022 Guide to the Big Four Safety Hazards in Industry, Cont. Ed. & Development, Inc.

2022 AV Aviation History Symposium, American Institute of Aeronautics & Astronautics, Antelope Valley, CA Section.

2020 Driver Distraction from Electronic Devices, Society of Automotive Engineers.

2020 Brake Control and Actuation, Titan Continuing Education.

2020 Braking Dynamics, Titan Continuing Education.

2020 Friction Brakes-Theory & Design Consideration, Titan Continuing Education.

2017 When Ethics are Ignored: Lessons from Forensic Engineers, Society of Automotive Engineers.

2017 Failure Analysis of Metals, Society of Automotive Engineers.

2015 Acquiring & Analyzing Data from Sensors & In-Vehicles Networks, Society of Automotive Engineers.

2014 Introduction to Weibull Engineering, Society of Automotive Engineers.

2014 Brake Control Systems, Society of Automotive Engineers.

2013 Engine Failure Investigation and Analysis, Society of Automotive Engineers.

2012 Practical Race Car Data Acquisition: RPM and Speed Analysis, Society of Automotive Engineers.

2012 Vehicle Braking Performance: Braking Confidence and Pedal Feel, Society of Automotive Engineers.

2012 Vehicle Braking Performance: Stopping Distance, Society of Automotive Engineers.

2012 Race Engine Calibration for Optimal Performance, Society of Automotive Engineers.

2010 Premiere Pro CS4, Art=Visual.

2010 Photoshop CS4, Art=Visual.

- 2008 Fundamentals of Drivetrain Systems Certificate – Society of Automotive Engineers – comprised of the following four separate courses:  
Familiarization of Drivetrain Components.  
Fundamentals of Modern Vehicle Transmissions.  
Powertrain Selection for Fuel Economy and Acceleration Performance.  
The Basics of Internal Combustion Engines.
- 2007 High-Performance Brake Systems, Society of Automotive Engineers.  
2007 High Performance Engine Design and Development, Society of Automotive Engineers.  
2005 Mid-South SAE Chapter Symposium (Internal Combustion Engines, Composite Bearings & Incandescent Lamps), Mid-South SAE.  
2004 Motorcycle Dynamics & Suspension Seminar, Tony Foale Designs.  
2003 Digital Data Acquisition and Analysis, Sensors Expo & Conference.  
2002 Vehicle Dynamics and Data Acquisition Seminar, MoTec Australia Pty Ltd.  
2001 Technical Edge Suspension Seminar – Basic & Advanced, Race Tech, Inc.  
1998 Strain Gage Instrumentation Applications & Measurement Techniques, Measurements Group, Inc.  
1997 Threaded Fasteners and the Bolted Joint, Society of Automotive Engineers.  
1995 Tire Characteristics & Vehicle Dynamics, University Consortium for Continuing Education.  
1995 Engineering of Measurement Systems for Test and Evaluation, Stein Engineering Services.  
1993 Software License Agreements, Data-Tech Institute.  
1993 Development and Testing of Brake Friction Products, Society of Automotive Engineers.  
1993 Motor Vehicle Accident Reconstruction, Society of Automotive Engineers.  
1992 The Role of Warnings and Instructions, University of Wisconsin-Madison.  
1992 Spectral Analysis in Sound and Vibration, Bruel & Kjaer.  
1992 Vibration Measurements and Instrumentation, Bruel & Kjaer.  
1992 Overview of Vehicle Dynamics Before and After a Collision, Society of Automotive Engineers  
1992 Mechanical Dynamic Measurements, University of Wisconsin.  
1992 Anatomy & Biomechanics of Trauma, University of Louisville.  
1990 Shock and Vibration Measurement, Society of Automotive Engineers.  
1990 Anatomy & Biomechanics of Trauma, University of Louisville.  
1989 Test Data Acquisition/Processing For Instrumentation Applications, University of Wisconsin.  
1988 Brakes: Design and Safety, Society of Automotive Engineers.  
1988 Anatomy & Biomechanics of Trauma, University of Louisville.  
1986 Motorcycle Accident Reconstruction, Northwestern University.  
1985 Traffic Accident Reconstruction, Northwestern University.  
1985 Investigation of Motorcycle Accidents, University of North Florida.  
1985 Tire Forensics, University of North Florida.  
1985 Tire Mechanics, University of Akron.  
1983 Computer Aided Design of Dynamic Systems, UCLA.  
1983 Cryogenic Engineering, UCLA.

## REGISTRATIONS:

- 1991 - Present Registered Professional Engineer - Tennessee - By Comity.  
1984 – 2019 Registered Professional Engineer - Ohio - By Examination - Inactive.  
1991 – 2019 Registered Professional Engineer - Alabama - By Comity - Inactive.  
1991 – 1994 National Council of Examiners for Engineering and Surveying Council Record.

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## ORGANIZATIONS AND SOCIETIES:

2020 - Present	Society of Flight Test Engineers (SFTE).
1977 - Present	Society of Automotive Engineers (SAE).
1972 - Present	American Motorcyclist Association (AMA) - Charter Life Member.
1975 - Present	Tau Beta Pi (National engineering honor society).
2007 - 2019	American Society of Mechanical Engineers (ASME) - Inactive.
2007 - 2019	American Society for Testing and Materials (ASTM) - Inactive.
1990 - 2019	Tennessee Society of Professional Engineers (TSPE) - Inactive.
1982 - 2019	National Society of Professional Engineers (NSPE) - Inactive.

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## MILITARY SERVICE:

United States Air Force

- Enlisted Service - April 1966 to August 1977.
- Officer Training School - Sept 1977 to December 1977 (Distinguished Graduate).
- Commissioned Service - January 1978 to December 1987.

South East Asia Theater (Vietnam, Laos, Thailand): 2 tours (1967 - 1969).

Retired December 1987 - Rank of Captain(O-3) Highest Enlisted rank held - Technical Sergeant(E-6).

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## PUBLICATIONS:

Safety Compliance Testing For FMVSS 122: Motorcycle Brake Systems - 2002 Honda FSC600 Silverwing, T. Carter, DOT/NHTSA - 2003.

Safety Compliance Testing For FMVSS 122: Motorcycle Brake Systems - 2002 Suzuki DR-Z400SK2, T. Carter, DOT/NHTSA - 2003.

Motorscooter Braking Control Response Study, T. Carter, Society of Automotive Engineers - 2000.

Safety Compliance Testing For FMVSS 122: Motorcycle Brake Systems - 1997 Ural Tourist with Sidecar, T. Carter, DOT/NHTSA, Sept 1998 and Sept 1999.

Electric TUK-TUK Demonstration Program - Phase 1 Test Documentation Report, Dec 1994, prepared for Core International, Inc./USAID.

Measurement of Motorcycle Slide Coefficients, T. Carter, B. Enderle, C.B. Gambardella, and R. Trester, Society of Automotive Engineers - 1996.

Safety Compliance Testing For FMVSS 122: Motorcycle Brake Systems - 1993 Kawasaki KLR 650, T. Carter, DOT/NHTSA.

Safety Compliance Testing For FMVSS 122: Motorcycle Brake Systems - 1993 Honda CBR 600F2, T. Carter, DOT/NHTSA.

Safety Compliance Testing For FMVSS 122: Motorcycle Brake Systems - 1993 Suzuki GSXR 1100W, T. Carter, DOT/NHTSA.

Safety Compliance Testing For FMVSS 122: Motorcycle Brake Systems - 1993 Yamaha FZR 600RE, T. Carter, DOT/NHTSA.

Safety Compliance Testing For FMVSS 122: Motorcycle Brake Systems - 1992 BMW K75S, T. Carter, DOT/NHTSA.

Safety Compliance Testing For FMVSS 122: Motorcycle Brake Systems - 1992 Yamaha Seca II, T. Carter, DOT/NHTSA.

Safety Compliance Testing For FMVSS 122: Motorcycle Brake Systems - 1992 Honda GL1500, T. Carter, DOT/NHTSA.

Safety Compliance Testing For FMVSS 122: Motorcycle Brake Systems - 1992 Kawasaki EN500 Vulcan, T. Carter, DOT/NHTSA.

An On-Board Data Acquisition System for Motorcycle Brake Testing, T. Carter and W. Perry, Society of Automotive Engineers - 1992.

Performance Testing of an Electrically Actuated Aircraft Braking System, T. Carter and D. Mosley, Society of Automotive Engineers. (Featured in Aerospace Engineering, January 1989).

Alternate Launch and Recovery Surface Friction Tests, USAF Flight Dynamics Lab, ESL-TR-85-71, 1986.

Alternate Launch and Recovery Surface Traction Characteristics, T. Carter and D. Treanor, Society of Automotive Engineers - 1986.

Pressure Transients in Aerial Refueling Systems, T. Carter and M. Franke, Society of Automotive Engineers - 1983.

Flight Test Engineer Procedures/Responsibilities for B-52/ALCM Flight Tests, USAF Flight Test Center - 1981.

AGM-86 Air Vehicle Mechanical Systems Evaluation, USAF Flight Test Center, AFFTC-TER-AV-09B, 1980.

AGM-86/B-52G Mechanical Systems Evaluation, USAF Flight Test Center, AFFTC-TER-AV-10B, 1980.

AGM-86 Rain/Icing Demonstration, USAF Flight Test Center, AFFTC-TER-AV-15B, Co-Author - 1980.

Applied Torque, Cycle World magazine, 1980.

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### ADDITIONAL MOTORCYCLE EXPERIENCE (1959 - Present):

- Current personal vehicles: 900 cc on-road; 690 cc on-road; 200cc off-road; 450cc Side-by-Side; 250, 165cc & 50cc vintage motorcycles.
- Five years as a dealer service mechanic. Primary brands serviced: Triumph, Honda, Zundapp, Parilla, Norton, Ducati, Bridgestone, and Sachs.
- Over 55 years of competition including all related maintenance, modifications, and tuning.
- Held American Motorcyclist Association (AMA) professional racing license (for Motocross).
- Competed in Motocross, ISDE Qualifiers, Drag racing, Enduros, Scrambles, Road racing, Hare Scrambles, and Desert Racing - 1960 through 1981.
- Continued to compete in Hare Scrambles and Enduros from 1981 through 2015.
- Most recent racing accomplishments:
  - Finished 3<sup>rd</sup> Overall in the Grand National Cross Country Series for 2007 season - Master's class (Age 55+).
  - Finished 2<sup>nd</sup> Overall in the Grand National Cross Country Series for 2008 season - Golden Master's class (Age 58+).
  - Finished 5<sup>nd</sup> Overall in the AMA National Enduro Championship Series for 2011 season - 60+ A/B class (Age 60+).
- Organized and promoted motocross and off-road events as president of the Edwards AFB motorcycle club - served two terms 1980 & 1981.
- Sponsor of local off-road events - Mid-South Cross Country Racing Series (hare scrambles).
- Vic Eastwood Motocross School - Bay Mare MX Track 1969.
- John Desoto Motocross School - Indian Dunes MX Park 1971 & 1972.
- Rolf Tibblin Motocross School - Edwards AFB MX Track 1980.
- California Superbike School - Basic Course: 1986, Advanced Course: 1987 & 1988.

- International Six Days Enduro – Club Team Sponsor 2007 (Chile), 2008 (Greece), 2009 (Portugal), and 2011 (Finland) – Club Team Manager 2007 & 2011.
- Instructor, Motorcycle Safety Foundation (MSF) "Better Biking Program" and "Motorcycle Rider Course" at Edwards AFB, CA and Wright-Patterson AFB, OH (1980 - 1987).
- Member, Society of Automotive Engineers (SAE) Motorcycle Technical Committee (1978 - Present).
- SAE Motorcycle Technical Committee Activity:
  - Definitions Task Force
  - Parking Stand Task Force (Past Chairman)
  - Sound Level Subcommittee
  - Operator Controls Task Force
  - Fuel Tank Task Force (Past Chairman)
  - Electrical Systems Sub-committee
- FMVSS 122 Brake Tests:
  - DOT/NHTSA contract testing (Audit Tests):
    - 1992 Yamaha Seca II
    - 1992 Kawasaki EN500 Vulcan
    - 1992 Honda GL1500 Interstate
    - 1992 BMW K75S
    - 1993 Suzuki GSXR 1100W
    - 1993 Honda CBR600F2
    - 1993 Kawasaki KLR650
    - 1993 Yamaha FZR600RE
    - 1997 Ural Tourist w/Sidecar
    - 2002 Honda FSC600 Silverwing
    - 2002 Suzuki DR-Z400SK2
  - Independent laboratory facility brake testing for numerous manufacturers and importers such as Triumph, Yamaha(Canada), Kawasaki(Canada), Excelsior-Henderson, Victory, Italjet, Aprilia, Lehman Trikes, Big Dog Motorcycles, Boss Hoss Motorcycles, Indian, and others.