



WHITE EAGLE  
AEROSPACE



Aerospace Vehicle Performance

MAKE YOUR CAREER SOAR

# Welcome

Thank you very much for your interest in White Eagle Aerospace. Since our founding in 2006, we have become a trusted leader in professional technical training and education throughout the aerospace industry.

As a fellow aerospace professional with over 45 years of industry experience, I understand the critical need for ongoing technical training in the workplace. White Eagle Aerospace was established in order to meet this pressing need.

For many years, we have recognized a looming crisis in the aerospace workforce. Throughout the industry, there is an increasingly bimodal distribution of aerospace professionals. One end of that distribution contains young, well trained, highly motivated, but very inexperienced professionals. The other end of that distribution involves individuals who have been around for a long time, have a great deal of experience and are on their way out of their chosen profession. This leaves a valley between the two.

Who is going to pass the baton to the upcoming generation of aerospace professionals? Where will they get their knowledge – knowledge that goes beyond academia and even graduate degrees? Much of what they need to know is not available in today's standard university curricula. What they need is:

- Specialized knowledge over a range of disciplines
- Knowledge provided by an experienced expert in the field
- Knowledge conveyed by a master instructor

White Eagle Aerospace recognizes these issues and provides effective solutions for your workforce. We are pleased to present you with this brochure, which outlines our Aerospace Vehicle Performance (AVP) professional short course. Our team of industry experts and master instructors is dedicated to your success. Should you have any questions about our course catalog or desire more information on how we can help MAKE YOUR CAREER SOAR, please contact us today.

Best Regards,



John Terry White,  
President/CEO  
White Eagle Aerospace



## About Our Company

**Whether you are new to the aerospace industry or have years of professional experience, we are your provider-of-choice for expert technical training.**

**Acquiring key knowledge, critical lessons-learned and technical know-how are crucial ingredients for success in today's complex and highly competitive aerospace market. Our nationally-acclaimed short courses cover a wide range of highly useful technical subjects. Each course is delivered by a subject matter expert who is also an expert technical instructor.**

**We offer you comprehensive technical training in essential topics, with minimal time away from work – all at a price that fits today's tight training budgets.**





# Target Audience

**The Aerospace Vehicle Performance (AVP) short course presents a rudimentary examination of flight performance principles relative to aircraft powered by airbreathing propulsion systems. Course material provides the technical knowledge and analytical tools required to successfully perform basic aircraft flight performance estimates.**

This technical short course is intended for the aerospace professional seeking a basic knowledge of flight vehicle performance principles. This knowledge and its application are fundamental to successful flight vehicle performance estimation, mission planning and aircraft design synthesis. Participants from a wide variety of aerospace related professions will gain increased understanding and improved competency in this important discipline.

Delivered by a master instructor and subject matter expert with over 45 years of professional aerospace experience, this 4-day intensive training course will provide participants with invaluable real-world knowledge, enhanced understanding and improved competency in this key discipline.

## Who Will Benefit

- **Aerodynamics Engineers**
- **Flight Test Engineers**
- **Propulsion Engineers**
- **Performance Engineers**
- **Aircraft Systems Engineers**
- **Missile Systems Engineers**
- **Air Transport Operators**
- **Operations Research Analysts**
- **Flight Control Specialists**
- **Airline Technical Personnel**
- **Mission Planning Specialists**
- **Aircraft Flight Crew**
- **Systems Engineers**
- **Program Managers**
- **College Students**

## Group Discounts

White Eagle Aerospace is dedicated to meeting your organization's professional training needs. In order to better serve you, we offer special group discounts rates and on-site training. If you have a group of 15 or more participants, we will bring our nationally acclaimed AVP short course to your location at a discounted rate. Please contact us today to learn how we can help MAKE YOUR ORGANIZATION SOAR!



# Course Description

**The Aerospace Vehicle Performance (AVP) professional short course provides participants with a thorough training experience in the fundamentals of propeller-driven and jet-propelled aircraft flight performance.**

Course material explores the manner in which the primary driving forces of thrust, lift, drag, and weight profoundly affect aircraft flight performance. This includes the key performance factors of range, endurance, maximum climb rate and load factor capability as functions of Mach number and altitude.

Addressed and clearly explained are the topics of thrust-required and thrust-available for jet-powered aircraft and power-required and power-available for propeller-driven aircraft. Key flight states addressed include steady, level flight and climbing flight. Aircraft horizontal and vertical turning flight performance are highlighted as well. The relevance of the V-n diagram in aircraft structural design is thoroughly explained.

Participants will come to understand and apply the powerful principles of Energy Maneuverability in planning aircraft minimum time-to-climb and minimum fuel-to-climb schedules. They will also acquire the knowledge and skills to accurately estimate aircraft take-off and landing performance. With these and other simple tools, participants will be better equipped to estimate the performance of a wide variety of general aviation, commercial, military and special purpose aircraft missions.

## Key Course Topics

- The Aircraft Drag Polar
- Prop-Driven Propulsion
- Turbojet Propulsion
- Turbofan Propulsion
- Thrust-Required
- Power-Required
- Thrust-Available
- Power-Available
- Steady, Level Flight
- Rate-of-Climb
- Gliding Flight
- Horizontal Turning Flight
- Vertical Turning Flight
- V- $\eta$  Diagram
- Range
- Endurance
- Energy Management
- Take-Off Performance
- Landing Performance
- Atmospheric Properties
- Air Data Parameters
- Historical Flight Programs





# Course Outline

**The Aerospace Vehicle Performance (AVP) short course is an intensive 4-day training program that provides a maximum training experience to aerospace professionals with minimum time away from work.**

## Aerospace Vehicle Performance Module Overview

Day	Module	Lecture Title	Key Topics
1	1	Aerodynamics of the Airplane	Lift, drag, moment, aerodynamic center, aero force and moment coefficients, lift and drag build-up, drag polar.
	2	Powerplant Characteristics	Thrust efficiency, reciprocating engine/propeller combinations, turbojets, turbofans, turboprops.
2	3	Thrust-Required	Flight forces, equations of motion, steady level flight, thrust-to-weight ratio, wing loading, lift-to-drag ratio.
	4	Thrust-Available, Power-Required and Power-Available	Propeller-driven aircraft, jet-propelled aircraft, altitude effects, velocity effects, steady level flight.
3	5	Drag Divergence, Minimum Velocity and Rate-of-Climb	Critical Mach number, Mach number at Drag Divergence, absolute ceiling, gliding flight, powerplant effects.
	6	Time-to-Climb, Range and Endurance	Range, endurance, specific fuel consumption, powerplant effects, minimum horsepower, minimum thrust, winds.
	7	Turning Flight	Horizontal turning flight, minimum turn radius, maximum turn rate, vertical turning flight, pull-up, push-over.
4	8	Accelerated Flight Performance	Load factors, maneuver point, corner velocity, energy management, energy height, specific excess energy.
	9	Take-Off and Landing Performance	Ground roll distance, airborne distance, approach distance, flare distance, powerplant effects.
	10	Philosophy of Aircraft Design	Conceptual, preliminary design and detail design, weight estimation, performance estimation, constraint diagram.





# Aerospace History

**Much has transpired during the 100-plus years of powered flight. We are both the beneficiaries and stewards of the technological progress that previous generations have bequeathed to us.**

However, many professionals in today's aerospace workforce have little knowledge of the key people, events and innovations that comprise the history of their own profession. While we cannot live in the past, we must learn from it if we are to be successful now and in the future. Further, like our predecessors, we must protect and preserve this legacy knowledge for succeeding generations.

It is for these reasons that White Eagle Aerospace strongly emphasizes aerospace history in its technical short courses. This is done through the mediums of special presentations, videos and field trips. The Aerospace Vehicle Performance (AVP) short course features several key historical programs.

## Featured Programs

- F-86 Sabre
- A-5 Vigilante
- F-80 Shooting Star
- F-84 Thunderjet
- F-105 Thunderchief
- BD-5J Acrostar
- B-52 Stratofortress
- B-47 Stratojet
- P-51 Mustang
- B-29 Superfortress
- B-17 Flying Fortress





# Information at a Glance

**The Aerospace Vehicle Performance (AVP) short course presents a rudimentary examination of flight performance principles relative to aircraft powered by airbreathing propulsion systems.**

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Delivered by a master instructor and subject matter expert with over 45 years of professional aerospace experience, this 4-day intensive training course will provide participants with invaluable real-world knowledge, enhanced understanding and improved competency in this key discipline.

## Contact White Eagle Aerospace

**White Eagle Aerospace**  
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[training@whiteeagleaerospace.com](mailto:training@whiteeagleaerospace.com)  
**520-219-0526**

## Key Course Information

- **Instructor:** J. Terry White
- **Duration:** 4 instructional days; 32 instructional hours.
- **Materials:** 1) Comprehensive set of course lecture slides in bound form and 2) DVD containing course lecture slides, images, videos, reference documents and homework solutions.
- **Cost:** \$2,000 for single seat.
- **Registration:** Please visit our website to view the most current Course Calendar. To register for a scheduled course, simply complete and submit the online registration form.
- **Group Discounts:** In order to better serve your organization, we offer special group discount rates and on-site training. For information, please contact Phyllis White at [pjwhite@whiteeagleaerospace.com](mailto:pjwhite@whiteeagleaerospace.com).





# J. Terry White

## Aerosciences Instructor

**John Terry White is president and CEO of White Eagle Aerospace. With headquarters in Oro Valley, Arizona, White Eagle Aerospace is a leading provider of engineering consulting, professional training, history of flight lectures and technical publication services to the aerospace community.**

White's over 45 years of professional aerospace experience includes the NASA Space Shuttle Program, NASA X-43A Flight Project, and United States Navy STANDARD Missile Program. During his extensive career, he has served on the engineering technical staff of Rockwell International, General Dynamics Corporation, Hughes Missile Systems Company, NASA Dryden Flight Research Center and Raytheon Missile Systems.

In 2009, White completed a 2-year assignment as manager of the Aerodynamics Department in the Guidance, Navigation, and Control Center at Raytheon Missile Systems in Tucson, Arizona. In this capacity, he was responsible for all aerodynamics work performed at the world's largest tactical missile producer. White resigned from Raytheon in 2010 as an Engineering Senior Fellow in Aerodynamics.

White has authored more than 180 technical papers on a wide variety of aerospace and aerospace subjects. His teaching credentials include 15 years as an instructor in the Aerospace Engineering Department of the California State Polytechnic University, Pomona, 10 years as an instructor in the professional development program at Raytheon and 6 years developing and teaching courses at White Eagle Aerospace. Those who have taken his courses say that White brings an uncommon passion and extensive technical knowledge to the training environment.

White is particularly well known for his inspiring aerospace history lectures and presentations. These "techno-histories" are intense, fast-paced reviews of historically-significant events in United States aerospace history. He has lectured extensively on aerospace history topics at the USAF Test Pilot School, the Society of Experimental Test Pilots, the National Aeronautics and Space Administration, the American Institute of Aeronautics and Astronautics, academia, and industry. White also serves as a motivational keynote speaker for aerospace conferences, business functions, commemorative events, public service organizations, special interest groups, and private business.

### Courses Offered

- **Aerodynamics for Engineers**
- **Aerospace Lessons-Learned**
- **Advanced Missile Aerodynamics**
- **Aerospace Vehicle Performance**
- **Basic Missile Aerodynamics**
- **Fundamentals of Earth Reentry**
- **Fundamentals of Gas Dynamics**
- **Fundamentals of Hypersonics**

### Contact Information

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