

# AEROSPACE

## SHORT COURSES

### **MIL-STD Qualification: Purpose, Testing and Design Considerations (AERO0396) - ONLINE**

**Instructor: Tom Cash and Kevin Renew**

#### **Course Description**

This class is designed to educate program managers, system engineers, design engineers and test engineers/technicians about United States military standard-oriented component level environmental, electromagnetic interference, power quality, and system level testing, with the goal of obtaining an Airworthiness certification. The course will acquaint personnel involved in new military aircraft efforts or the modifications of existing military aircraft with information about the required testing. It will assist system and design engineers to develop equipment designs that are robust enough to pass the Military Standard testing, and test engineers to properly design test plans for their equipment. Program managers will become aware of the time necessary to accomplish this testing.

#### **Who Should Attend?**

This course is designed to benefit any program manager, systems engineer, design engineer and/or test personnel who are or may become involved in the design and manufacturing of any items for which an airworthiness certification is desired.

#### **Course Highlights**

- Top level overview of the U.S. military airworthiness process
- Comparison of the military versus civilian airworthiness process
- Introduction and overview of the documents defining military testing
- An introduction to the environmental tests, their purpose, and a typical setup for performing each test
- An introduction to the electromagnetic Interference tests, their purpose, and a typical setup for performing each test
- An introduction to the power quality tests, their purpose, and a typical setup for performing each test
- A brief introduction to various “System” (aircraft) level analyses/tests and their purpose

#### **Learning Objectives**

- The purpose of each test, and the adverse effects the test is intended to identify;
- The ability to properly select test thresholds;
- A basic understanding of each test procedure;

- And a correlation of these U.S. military tests with the corresponding DO-160 test.

### Course Outline

- Instructor, class, and course introduction
- Comparison of the civilian versus military qualification processes
- Overview of the various documents pertaining to military qualification
- Introduction of the areas covered by each document
- Introduction of terminology used in those documents
- MIL-STD-810H introduction
- MIL-STD-810H: Method 500 (Low Pressure); Method 501 (High Temp); Method 502 (Low Temp); Method 503 (Temp Shock); Method 504 (Contamination by Fluids); Method 505 (Solar Radiation); Method 506 (Rain); Method 507 (Humidity); Method 508 (Fungus); Method 509 (Salt Fog); Method 510 (Sand & Dust); MIL-STD-810: Method 511 (Explosive Atmosphere); Method 512 (Immersion); Method 513 (Acceleration)
- Method 514 (Vibration); Comparing the MIL-STD Vibration to the DO-160 Vibration; Method 515 (Acoustic Noise); Method 516 (Shock); Method 517 (Pyroshock); Method 518 (Acidic Atmosphere); Method 519 (Gunfire Shock); Method 520 (Temp, Humidity, Vib, Altitude); Method 521 (Icing/Freezing Rain); Method 522 (Ballistic Shock); MIL-STD-810G: Method 523 (Vibro-Acoustic/Temp); Method 524 (Freeze/Thaw); Method 525 (Time Waveform Replication); Method 526 (Rail Impact); Method 527 (Multi-Exciter); Method 528 (Mechanical Vibration of Shipboard Eqpt)
- MIL-STD-461G Introduction
- MIL-STD-461: CE101, CE102, CE106, RE101, RE102, RE103, Compare the MIL-STD RE102 to the DO-160 Section 21 Radiated Emissions test, CS101, CS103, CS104, CS105, CS109, CS114, CS115, CS116, CS117, CS118, RS101, RS103 (ADS-37A-PRF), RS105.
- MIL-HDBK-704-1: Introduction
- MIL-HDBK-701-2: Single Phase, 400 Hz, 115 volts
- MIL-HDBK-701-3: Three Phase, 400 Hz, 115 volts
- MIL-HDBK-701-5: Three Phase, Variable Frequency, 115 volts
- MIL-HDBK-701-6: Single Phase, 60 Hz, 115 volts
- MIL-HDBK-704-7: 270 VDC
- MIL-HDBK-701-8: 28 VDC
- MIL-HDBK-701-4: Single Phase, Variable Frequency, 115 volts
- System Level Testing and how it's tailored based on the Component testing results
- Class Exercise
- Wrap-up
- MIL-STD-464C: Electromagnetic Environmental Effects Requirements for Systems
- ANSI/ASA S3.2-2009: Speech Intelligibility
- IEEE C95.1-2005 and AR 40-10: Human Health Hazards
- MIL-STD-1472G: Human Engineering
- NATICK TR-89/044: Anthropomorphic Measurements
- MIL-STD-3009: Lighting, Aircraft, NVIS Compatible
- TOP 7-2-513: Daylight Readability
- MIL-STD-1787: Aircraft Display Symbolology

- DO-178 & MIL-STD-498: Software Testing Requirements
- MIL-STD-100: Engineering Drawings
- MIL-STD-882: System Safety
- TM 55-1500-342-23: Weight & Balance
- MIL-STD-1474: Noise Limits
- MIL-STD-1474: Corrosion Prevention
- MIL-STD-1629 or DI-ILSS-81495: Failure Modes Effects and Criticality Analysis
- MIL-E-7016: Electrical Loads Analysis
- SRD SOP EF2002-111: Structural Analyses
- DoD AIMS Testing
- And others

### **Classroom hours / CEUs**

21.00 classroom hours

2.1 CEUs

### **Certificate Track**

Aerospace Compliance, Avionics and Avionic Components

### **Course Fees**

Early registration course fee: \$1,795 if you register and pay by the early registration deadline (45 days out).

Regular registration course fee: \$1,895 if you register and pay after the early registration deadline.

### **U.S. Federal Employee Discount**

This course is available to U.S. federal employees at 10% off the registration fee. To receive the federal employee discount, you must enter the code **FGVT116** during the checkout process. Please note that you must validate your eligibility to receive this discount by entering your U.S. government email address (ending in .gov or .mil) when creating your online registration profile. This discount is available for both the early registration and regular registration fees.

### **Canada Department of National Defence Discount**

This course is available to Canada DND employees at 10% off the registration fee. Please contact the DND Procurement Authority (DAP 2-3) for details. Please note that you cannot register using our online system when requesting this discount. This discount is available for both the early registration and regular registration fees.

### **Instructor Bios**

**Tom Cash** has been involved in the test and evaluation world since graduating from college. He has supported all levels of testing, ranging from laboratory workbench technical testing through

major system operational testing for the U.S. Army, Air Force, and Navy. He has written specification documents for distributed simulation systems, authored and conducted various system validation and verification plans and conducted those tests, and co-authored Test and Evaluation Master Plan (TEMP) documents. He has supported the operational testing of various seeker, radar, and low observable systems. He spent almost 13 years as the Senior Test Lead for the Army's Utility Helicopters Program Office and provided airworthiness testing and analysis support for the many items to be installed on or operated from the H-60 family of aircraft. He has also been a Principal Systems Engineer with Sierra Nevada Corporation and the Systems Engineer for the Army's AMRDEC Degraded Visual Environment Aviation Systems Integration Facility (ASIF) working on various aspects of the Army's Degraded Visual Environment (DVE) system.

**Kevin Renew** has over 20 years of military aviation experience. He served eight years in the Army as a Black Hawk helicopter maintainer and technical inspector. He has supported and executed all levels of testing, ranging from bench-level laboratory testing through major system operational testing for the Army, as well as other U.S. government agencies. As a government contractor, he supported the Redstone Technical Test Center (RTTC) and the Army's Aviation Technical Test Center (ATTC), executing system-level testing of multiple aircraft platforms. He has worked as a Senior Test Lead and Project Manager supporting the U.S. Army's Utility Helicopters Program Office for over 10 years, where he provided airworthiness test and evaluation support for numerous components and systems to be installed on various H-60 helicopter platforms. He is currently a Lead Test Engineer with PeopleTec Corporation supporting the Utility Helicopters Program Office Modifications and Other Government Agencies (OGA) Division.

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