

# AEROSPACE

## SHORT COURSES

### High Intensity Radiated Fields (HIRF) Certification and Compliance (AERO0381)

**Instructor:** C. Bruce Stephens, Darren L. Stout *(This course may be taught by either instructor.)*

#### Course Description

This course will discuss the design concepts required to ensure all aspects of aircraft HIRF electrical wiring, installations, and aircraft-level systems are safe for operation. This course will discuss the typical certification process for HIRF from a very practical, step-by-step perspective and examine all steps used by aircraft OEMs to show compliance to HIRF regulations. The 14 CFR 25.1317 for transport category airplanes will be used as the baseline regulation. A review of FAA Advisory Circulars and practical applications of the information will be presented, and teams will be selected to simulate the HIRF certification process. HIRF requirements for aircraft maintenance and inspection will also be discussed. The course will also include a high-level overview for electromagnetic effects areas; topics discussed include electromagnetic compatibility (EMC), precipitation static (P-static), lightning, ESD and electrical bonding requirements. An overview of the new requirements for electrical wiring interconnection system (EWIS) will also be addressed.

Students will work in teams to gain hands-on experience building a project incorporating the information they learn as they progress through the course.

#### Learning Objectives

- Understanding of the HIRF CFR related to aircraft protection
- How HIRF requirements relate to the different areas of the aircraft
- HIRF bench testing and aircraft level testing requirements
- Safety aspects of HIRF
- Design requirements related to HIRF
- How HIRF relates to other engineering requirements
- Showing and finding compliance for HIRF

#### Who Should Attend?

The course is designed for all aircraft design areas including electrical and avionics, along with HIRF engineers, laboratory and aircraft technicians. Aircraft managers and project engineers working in electrical/avionics related areas should also attend.

#### Course Highlights

- HIRF best practices

- Team HIRF workshops
- DER/UM HIRF requirements
- HIRF examples and practical applications
- Review of the HIRF Advisory Circulars

## **Course Outline**

### **Day One**

- Introduction, HIRF overview and history
- The electromagnetic environment of aircraft—metallic and composite aircraft requirements
- Electrical Bonding Electromagnetic Effects Overview
- Advisory Circular 25.899-1 Electrical Bonding and Protection Against Static Electricity (P-Static)
- Electrical Wiring Interconnect System (EWIS)
- HIRF security and safety

### **Day Two**

- FAA DER/UM HIRF requirements
- Certification of HIRF systems on transport category airplanes
- Supplier requirements documents
- HIRF component classification
- Radio frequency susceptibility, RTCA DO-160 Section 20 test requirements
- Advisory Circular 20-164A
- Test witnessing requirements
- HIRF compliance statements and reports
- Transmitting Portable Electronic Devices (T-PEDs)

### **Day Three**

- HIRF certification case study design example
- Means of compliance
- QTPs, QTR's, analysis, and use of similarity
- HIRF examples and practical applications
- HIRF integrated system test rig

### **Day Four**

- FAE ARP 5583 for HIRF aircraft testing
- Comparing aircraft data to bench test data
- Testing examples and case studies
- L/HIRF maintenance

### **Day Five**

- CFR compliance statements
- Final EWIS discussion and questions
- EWIS final exam presentations

### **Classroom hours / CEUs**

31.50 classroom hours

3.15 CEUs

### **Certificate Track**

Aircraft Maintenance and Safety

Avionics and Avionic Component

Electromagnetic Effects

### **Course Fees**

Early registration course fee: \$2,595 if you register and pay by the early registration deadline (45 days out).

Regular registration course fee: \$2,795 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.

### **Netherlands Defence Academy Discount**

This course is available to Netherlands Defence Academy employees at a discounted registration fee. Please contact the NDA Procurement and Contracting department for details. Please note that you cannot register using our online system when requesting this discount.

### **Instructor Bios**

**C. Bruce Stephens** is an HIRF/Lightning/EWIS ODA UM/AR at the Boeing Company and a consultant DER at his company, Stephens Aviation, with a wealth of experience in High Intensity Radiated Fields (HIRF) and Lightning protection of Aircraft. Stephens retired from Hawker Beechcraft after 28 years of service. He has HIRF/Lightning experience on both Part 23 and Part 25 including composite aircraft. Stephens is working with the Boeing Team to develop EWIS requirements and means of compliance on several aircraft projects. Stephens is a Six-Sigma/Lean Master Black Belt consultant, developing implementation and training materials, and teaches at a number of universities, including Webster University and Southwestern College. He has an executive M.B.A. and M.S. in Management from Friends University and a B.S. in Industrial Technology from Wichita State University.

**Darren Stout** is an EME/HIRF/Lightning ODA UM/AR at the Boeing Company. Darren has a wealth of experience in Electromagnetic Effects (EME), High Intensity Radiated Fields (HIRF),

lightning effects, p-static effects, and transmitting personal electronic devices, RTCA/DO-160, MIL-STD-461, along with extensive experience in laboratory and aircraft testing. His experience is a result of over 22 combined years as an Electrical and EME engineer with Boeing, Lucent Technologies (Bell Labs), FAA, and BancTec. He also served six years in the United States Air Force as a B-52 navigator, instructor navigator, and radar navigator (bombardier), directing and performing higher headquarters missions including aircraft, systems, and munitions testing, and is a Desert Storm veteran. He has a BSEE degree in electrical engineering (lasers, fiber optics, and antenna arrays) from the University of Michigan - Ann Arbor, is an iNARTE certified EMC Engineer, and is a Level 2 Certified TEMPEST Professional.

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