

# AEROSPACE

## SHORT COURSES

### **Introduction to Electromagnetic Effects (EME) and Aircraft Engineering Requirements – ONLINE (AERO0375)**

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

#### **Course Description**

This course will provide participants with an understanding of electromagnetic effects related to aircraft engineering requirements, FAA certification requirements, testing requirements for both DO-160 bench testing and aircraft level testing related to EMC, P-Static, ESD, TPED's, HIRF, EWIS and lightning.

Students will work in teams to gain hands-on experience building a new STC Electrical/Avionics System Installation to meet Direct Effects of Lightning certification requirements and the internal EME certification requirements. They will also prepare Electromagnetic Effects CFR compliance statements incorporating the information they learn as they progress through the course.

#### **Course Highlights**

- EME best practices
- Team EME compliance project
- DER/UM EME requirements
- EME examples and practical applications
- Review of the Advisory Circulars related to EME
- Daily real examples of problems and solutions related to EME certification

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

The course is designed for all aircraft design areas including certification engineers and managers, electrical, avionics, HIRF & lightning engineers, DO-160 laboratory and aircraft technicians. Aircraft managers, project engineers, and all other system engineers working in electrical/avionics/HIRF/lightning/EWIS-related areas should also attend.

#### **Learning Objectives**

- Overview of FAA EME CFR related to aircraft protection
- How EME requirements relate to the different areas of the aircraft
- EME bench testing and aircraft level testing requirements

- Safety aspects of EME
- Design requirements related to EME
- How EME relates to other engineering requirements
- How to find and demonstrate/document compliance for EME requirements

### **Course Outline**

- Electrical Bonding Electromagnetic Effects Overview
- Electrical Bonding and Protection Against Static Electricity
  - Advisory Circulars 25.899-1 and 25.1715
- Electrostatic Discharge Sensitive (ESDS) Device
- Electrostatic Discharge
  - RTCA/DO-160G Section 25
- Precipitation Static (P-Static)
- Transmitting Portable Electronic Devices (T-PEDs)
- Introduction to Electrical Wiring Interconnection System (EWIS)
- Introduction to EMC/EMI
- Emission of Radio Frequency Energy
  - RTCA/DO-160G Section 21
- HIRF Safety and Security
- High Intensity Radiated Fields (HIRF)
- HIRF Requirements
- Radio Frequency Susceptibility
  - RTCA/DO-160G Section 20
- The Lightning Environment
- Direct Effects Protection and Indirect Effects of Lightning
- Levels for Direct Effects Testing
  - RTCA/DO-160G Section 23
- Introduction to Indirect Effects
- Lightning Indirect Effects
  - RTCA/DO-160G Section 22
- Aircraft Electrical and Electronic System Lightning Protection
  - Advisory Circular 20-136B
- Protection of Aircraft Fuel Systems Against Fuel Vapor Ignition Caused by Lightning
  - Advisory Circular 20-53C
- EME final exam
- EME team report-out
- EME course evaluation

### **Classroom hours / CEUs**

31.50 classroom hours

3.15 CEUs

## **Certificate Track**

Aircraft Maintenance and Safety  
Avionics and Avionic Components  
Electromagnetic Effects

## **Course Fees**

Early Online Registration fee: \$2,195\*

Regular Online Registration fee: \$2,395

*\*Early registration fee is available if you register and pay at least 7 days prior to the course start*

Registration is open until the first day of the course; however, early registration is encouraged. The online course fee includes individual access to the Zoom course meetings and to course materials, readings, videos, and resources in Blackboard, the University of Kansas Learning Management System. No additional textbook purchases are required outside the course fee.

## **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.

## **Instructor Bios**

**C. Bruce Stephens** is an FAA DER/EUM in the areas of EME, HIRF, Lightning, Fuel Systems, Structures and EWIS. His aircraft certification experience includes Beechcraft Starship, King Air, Bonanza, Baron, Hawker 4000, Hawker 800XP, Premier 1, JPATS, Learjet Model 45/75, Cessna Citation Latitude, and military projects related to Boeing 707, 737, 747, 767 KC-46A Tanker, and 777. Stephens continues to work on Part 27 and 29 rotorcrafts (MH139 Grey Wolf), and space vehicle certification projects. He has assisted several smaller companies with FAA EME certification projects and is interested in the certification requirements related to new EVOL Aircraft. Stephens enjoys mentoring new FAA delegates and instructing several courses he has developed for The University of Kansas Aerospace Short Course program. These courses include HIRF, Lightning, EWIS, EZAP, DO-160, Fuel Systems, Introduction to EME, and EME Aircraft Testing/Certification. Stephens has been a Six-Sigma/Lean Master Black Belt consultant with experience in both aircraft and copper mining process improvement. He has instructed over 25 college courses, most being MBA level, including MBA Statistics, MBA Business Management, MBA Operations Management, MBA Six Sigma/Lean Production Management, Supply Chain Management, Six Sigma/Lean Black Belt and Green Belt. Universities Stephens has instructed at include Webster University, Friends University, Embry Riddle University, Southwestern College, Newman University and The University of Phoenix. 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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**CONTACT US:**

KU Jayhawk Global  
Aerospace Short Course Program  
1515 St. Andrews Dr.  
Lawrence, KS 66047  
Email: [jayhawkglobal@ku.edu](mailto:jayhawkglobal@ku.edu)  
Phone: 785-864-6779 (Registration)