Electromagnetic Effects Aircraft Level Testing and FAA Requirements (AERO0250)
Instructor: C. Bruce Stephens

Course Description
This course discusses the concepts of aircraft ground and flight testing that may be required to ensure that aircraft level systems are safe for operation when exposed to the effects of electromagnetic effects (EME), high intensity radiated fields (HIRF), lightning, precipitation static (P-static), and transmitting personal electronic devices (TPEDs).

Students will work in teams to gain hands-on experience building a new STC Electrical/Avionics System Installation for EME Aircraft Testing. They will create a report showing how the installation meets Direct Effects of Lightning certification requirements and prepare sample compliance statements. This project will provide students a unique opportunity to incorporate the information they learn as they progress through the course.

Course Highlights
- Aircraft testing fundamentals
- Coordination of aircraft testing activities
- Documentation of test procedures and results
- FAA aircraft-level certification requirements
- Problem and solution discussions
- EME testing team workshops

Who Should Attend?
The course is designed for all aircraft design and testing areas including electrical, avionics, communications, engineers and technicians. Aircraft managers and project engineers who coordinate airplane testing and/or certification related areas are also recommended to attend.

Learning Objectives
- Understanding of the fundamentals of aircraft testing for EME, HIRF, lightning, p-static, and TPEDs
- Understanding how to coordinate aircraft testing
- Data that is beneficial before, during, and after performing aircraft testing
- Understanding how to identify problems during certain aircraft testing
- Ground testing versus flight testing
• Documentation of test results to show compliance
• Showing and finding compliance for EME, HIRF, lightning, p-static, and TPEDs

Course Outline

Day One
- Introduction to the electromagnetic environment of aircraft—metallic and composite aircraft requirements
- 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)
- Ground and Flight Test Procedure Examples
- Developing an Aircraft Test Procedure for P-Static and TPED’s

Day Two
- DER/UM Requirements
- Introduction to Electrical Wiring Interconnection System (EWIS)
- Introduction to Electromagnetic Compatibility EMC/EMI
- Ground and Flight Test Procedure Examples
- Developing an Aircraft Test Procedure for EMC

Day Three
- HIRF Safety and Security
- High Intensity Radiated Fields (HIRF)
- HIRF Aircraft Level Tests
- HIRF Test Levels Comparison – bench test data and aircraft data
- FAA AC 20-158A and SAE ARP5583A
- HIRF Test Lessons Learned
- Developing an aircraft test procedure for HIRF and TPEDs

Day Four
- Lightning Effects on Aircraft
- Introduction to Indirect Effects
- Lightning Aircraft Level Testing
- Aircraft Electrical and Electronic System Lightning Protection
- Aircraft Lightning Test Methods
- FAA AC 20-136B and SAE ARP5416A
- Developing an aircraft test procedure for lightning and P-Static

Day Five
- EME team aircraft testing summary
- Final discussion and questions
Final EME aircraft testing exam

Classroom hours / CEUs
31.5 classroom hours
3.15 CEUs

Certificate Tracks
Aerospace Compliance
Aircraft Maintenance and Safety
Avionics and Avionic Components
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.

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.

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 Bio
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.

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