



# HIRF/IEL Certification for Aircraft Critical Systems

**Date: May 2<sup>nd</sup> and 3<sup>rd</sup>, 2019**

Place: Parque Tecnológico São José dos Campos – PqTec

## SUMMARY

The purpose of this lecture is to provide in-depth discussions on the main issues regarding HIRF and Lightning processes and trends for aircraft systems certification (Level A, Level B and Level C).

Led by Allan Meyer, the training will provide insights on subjects like requirement interpretation (FAR 25.1317 & FAR 25.1316), how to deal with complex test setups, different possibility of test methodologies, etc.

The course is recommended for professionals involved in EMI/EMC certification. All topics are presented in a clear, objective way and specifically designed for aircraft application, featuring discussions about HIRF and Lightning certification approach. It represents a unique supplier/OEM experience presented together in a valuable package.

## The Instructor

### Allan Meyer

Allan Meyer is a former Rockwell Collins electrical system / avionics HIRF/IEL specialist that has recently joined LACE's team. He has helped to certify avionics systems for almost every OEM and has led an industry group at SAE lightning committees in lightning certification of systems for a lifetime.

## LOCATION

**PqTec**

**Av. Dr. Altino Bondensan, 500  
Distrito de Eugênio de Melo  
São José dos Campos, SP  
Brazil**

## DATE & TIME

**May 2<sup>nd</sup> & 3<sup>rd</sup>, 2019**

**(Thu-Fri)**

**8:00AM - 5:00PM  
(both days)**

## INVESTMENT

**R\$ 3,500.00 (Reais)**

## REGISTER & INFORMATION

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## DAY 1

### Industry Standardization

- FAR 25.1317 & FAR 25.1316
- FAA advisory material AC 20-158A & AC 20-136B
- Industry guidance; ARP5583A & ARP5415/5416

### Baseline Principles

- Factors that affect core wire voltages
- Excitation of the level A system
- Economic considerations

### Test Methods DO-160G

#### Section 20

- Radiated HIRF test methodology
  - Radiated (Anechoic chamber vs Reverb Chamber)
  - Level A System test considerations
- BCI testing methodology
  - Alternating CW and SW
  - Establishing the Env II test levels
  - Sloping or non-sloping roll off curves.
  - Windowing evaluation.
  - Intermediate disconnect implementation
  - Considerations for resonant high impedance conditions
- Frequency Step Size Considerations

#### Section 22

- Pin Injection Considerations
  - Powered vs unpowered pin injection testing;
  - Using cable bundle test method to achieve pin injection test requirement



- Cable Bundle Test Considerations
  - Injection Method
    - a) Cable bundle induction
    - b) Ground injection
    - c) Hitting a limit level rather than a test level

## Other DO-160G Considerations

- Considerations for level A system testing
- Considerations for level B/C equipment & system testing
- Use of default test levels for HIRF/lightning

## User's Guide Specific Topics for Level A System Tests

- Considerations for cable bundle tests with shields removed
  - Benefits of the lifted shields approach
  - Issues with the lifted shields approach
- Hybrid bundle considerations
  - Hybrid Bundle Definition
    - a) Relationship between Voltage measured at the coupler to Core wire voltages
    - b) Options for testing hybrid bundles
  - Current Scaling Considerations
  - Simultaneous Injection Considerations
    - a) Proposals for reasonable approach

## Day 1 Open Discussions





## DAY 2

### HIRF/IEL Certification of Electrical/Electronic Systems Topics

- HIRF/lightning safety assessment
  - Hardware/Software assurance levels vs HIRF/IEL system certification levels
- Considerations for using unit level (TSO) test results vs including level B/C equipment in a level A system test
- Modular avionics considerations
- Software considerations

### Building a Complex Level A Integrated Setup

#### ARP 5515B Guidance Review

- System simulation, representative loads
  - Duplicating the actual load vs. a representative load
  - Actual wire lengths vs shorter lengths Considerations
  - Addressing signal integrity
  - More intermediate disconnect considerations
- “Traveling LISN” approach to power line testing.
- Shield termination Considerations
  - Shield termination of “pigtailed”
  - Shield termination of test interfaces
- Breakout length for lightning coupler installation.
  - Accounting for configuration straps and ground wires.
- Harness for instrumentation/simulation systems (Adapter or Interface Harness)
  - Connections to the aircraft harness
  - Use of over braid on the adapter harness
  - Protection of support equipment and chamber interface considerations
- System evaluation/monitoring.
  - Determining test thresholds
  - Linking pass/fail to the hazard assessment



## Continued Airworthiness Considerations for Electronic Systems

- Addressing latent failure concerns
- Reliability assessments of HIRF/IEL protection
- Return to service testing

## DAY 2 Open Discussions



*LACE can tailor EMI/EMC courses to the needs of its customers, including the possibility of in-house trainings.*