

MIL-STD-461G Training

EMI/EMC Testing of Military Equipment

TRAINING PROGRAM DESCRIPTION

Two and a half days of
focused, **Online or On-Site Training**
on **MIL-STD-461G**

Instructors:

Dr Ismail Cicek
and

An Avionics Chief Engineer, a Certified Verification Engineer
(FAA/EASA)

Global Dynamic Systems, Inc.

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Foreword

This training is an important step for testing your military equipment for Electromagnetic Interference (EMI) and Electromagnetic Compatibility (EMC) for the targeted test requirements described in MIL-STD-461G and platform requirements described in MIL-STD-464D. The training focuses on the test sections described in these standard documents:


"MIL-STD-461G
Requirements for the Control of Electromagnetic Interference
Characteristics of Subsystems and Equipment"

and


"MIL-STD-464D
Electromagnetic Environmental Effects, Requirements for
Systems"

The instructors share their experience and knowledge gained by designing products for many years and performing tests such as MIL-STD-810H, RTCA-DO-160, and MIL-STD-461G. The slides are supported by many graphics and test videos for the efficiency and clarity of the information, and each session is planned per the tests described in MIL-STD-461G. Sessions include presentations on platform-level requirements, guides, and lessons learned items based on MIL-STD-464D. The training also consists of a test process and an overview of requirements given by DOD Systems Engineering Processes. Dr. Ismail Cicek is the lead instructor of this training, and several experienced test personnel and design engineers helped complete the training sessions. The following link describes Dr. Cicek's experiences on the topic in more detail:

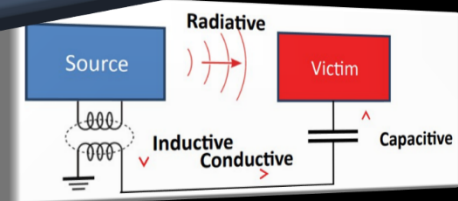
<https://www.globaldynamicsystems.com/dr-i-cicek/>



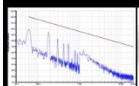


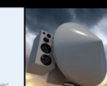






Training on MIL-STD-461G Testing



- MIL-STD-810
- RTCA-DO-160
- Systems Engineering
- MIL-STD-461
- MIL-STD-704



Equipment and Subsystems Installed In, On, or Launched From the Following Platforms or Installations	Requirement Applicability																		
	CE101	CE102	CS101	CS102	CS104	CS105	CS109	CS114	CS115	CS116	CS117	CS118	RE101	RE102	RS101	RS103	RS105		
Surface Ships	A	A	L	A	S	L	S	L	A	S	A	L	S	A	A	L	L	A	L
Submarines	A	A	L	A	S	L	S	L	A	S	L	S	A	A	L	L	A	L	A
Aircraft, Army, Including Flight Line	A	A	L	A	S	S	S	S	A	A	L	A	A	A	L	L	A	L	A
Aircraft, Navy	L	A	L	A	S	S	S	S	A	A	L	A	L	A	L	L	A	L	A
Aircraft, Air Force	A	L	A	S	S	S	S	S	A	A	L	A			A	L	L	A	A
Space Systems, Including Launch Vehicles	A	L	A	S	S	S	S	S	A	A	L	L			A	L	L	A	A
Ground, Army	A	L	A	S	S	S	S	S	A	A	L	A			A	L	L	A	A
Ground, Navy	A	L	A	S	S	S	S	S	A	A	L	A			A	L	L	A	A
Ground, Air Force	A	L	A	S	S	S	S	S	A	A	L	A			A	L	L	A	L

Purpose of the Training

The main goal of this training is to provide a good understanding of equipment testing in accordance with the MIL-STD-464 G standard document.

The attendees completing this training are expected to know the following areas:

- Understand MIL-STD-461G Standard Test Sections and Test Procedures
- Understand the MIL-STD-464D platform level requirements and additional material provided
- Be able to write a list of susceptibilities
- Understand the test process goals and activities
- Develop test plans and schedule tests
- Execute tests
- Understand test results
- Create test reports
- Be able to resolve issues in the test results by utilizing change recommendations or accepting anomalies with risk assessment.

Training Scope

The training sessions cover the following topics with annotated slides, test photos, videos, and additional reference material from standards, specifications, and FAA/EASA guides and documents:

- Systems Engineering Process Overview and Test & Evaluation (T&E): Important Concepts, such as Product Development and V&V Processes, Test Requirements, Requirements Management, Environmental Profile, and Mission Profile.
- Part 21 and FAA/EASA Regulations
- Understanding the Purpose of the Tests
- Test Category Selections - Be able to Select Tests in MIL-STD-461G based on the Targeted Platform
- Develop a Susceptibilities List for Use in Test Plan and Tests
- Understand Test Equipment, Chambers, and other Devices Use in Testing and Their Specifics
- Test Procedures and Other Technical Details for Running Tests
- Demonstrations of the test setup and procedures using videos.
- Scheduling and Implementation of the Tests
- Review of Test Reports for all Test Procedures
- Design Issues, Discussion of Test Failures, and Recommendations
- Design inputs with generalized design items to pass the tests through experiences and lessons learned
- Risk Management Process based on MIL-STD-882E
- Additional discussions with Other Standards and Test Recommendations

Read more details about this training content and schedule at the [GDS Website:](http://www.GlobalDynamicSystems.com)
<http://www.GlobalDynamicSystems.com>

Instructors

Training is provided by Dr. Ismail Cicek, an Avionics Chief Engineer (EE) and Certified Verification Engineer (FAA/EASA) with over 20 years of experience working in a highly recognized aviation company. Our personnel, experienced in the design and environmental testing of military and aerospace equipment, also assist in training.

Dr Ismail Cicek has over 20 years of experience in environmental qualification testing products per the MIL-STD-810H, RTCA-DO-160G, and MIL-STD-461G test standards. Dr Cicek led various engineering programs and projects and managed the US Air Force test projects for many years. Dr Cicek worked as the lab chief engineer for five years at the US Air Force Aeromedical Test Lab at WPAFB, OH. Training is also assisted by our personnel, who are experienced in designing and environmental testing military and aerospace equipment.

Since 2009, the GDS Team has provided MIL-STD-810, RTCA-DO-160, and MIL-STD-461 training courses to more than five hundred students and over one hundred organizations worldwide. Read more details about the instructors at <https://www.GlobalDynamicSystems.com>.

Training Schedule and Execution Type

- Online training using ZOOM.
- Led by two live instructors experienced in the field by testing and lecturing.
- Two and a half days of focused online training schedule is typically as follows
 - 1st Day: 08:30 – 16:30 (Lunch Break between 12:30 and 13:30)
 - 2nd Day: 08:30 – 16:30 (Lunch Break between 12:30 and 13:30)
 - 3rd Day: 08:30 – 12:30
 - Time zone: Central European Time (CET) or US Central Daytime (CDT)
- Attendees will receive a Training Certificate.
- Training includes knowledge check quizzes, a competition type, fun way of learning with prizes.

Visit the GDS Website to check the calendar of scheduled training classes and for registration information. Or, email us with your registration request at info@GlobalDynamicSystems.com.

[Our training calendar](#) includes all open training classes, including RTCA-DO-160, MIL-STD-810, and MIL-STD-461.

Training Material

The instructors present the topics using the presentation slides referencing MIL-STD-461G and MIL-STD-461D sections and contents with information from relevant regulations, standards, and specifications. The lecturers provide slides to share their experiences and knowledge gained by working long years in the field and performing tests following RTCA-DO-160, MIL-STD-810, and MIL-STD-461. Many graphics and test videos for the efficiency and clarity of the information support the slides.

The slides and other sharable course material will be shared with the registered students before the class using GOOGLE DRIVE.

- Registration includes all presentations and additional material shared before the class.

Training Contents (Detail)

2.5 days of training covers the following topics:

- EMI/EMC Training, Opening Session
 - General understanding of EMI and EMC.
 - Introductory Design Considerations: Grounding, Bonding, and Shielding.
- MIL-STD-461G Standard General Overview
 - Introduction & History
 - MIL-STD-461: General overview, definitions, nomenclature, purposes, language, and scope
 - MIL-STD-461 Contents Overview
 - General and detailed requirements
 - Selection of test methods and procedures based on the platform and equipment type
 - General EMI test setup
- MIL-STD-461G – CE Tests (Part I)
 - Conducted Emissions Test Methods CE101, CE102, CE106
 - Test setups, procedures, and equipment used for testing
 - Example Test Results and Report Reviews / Q&As
- MIL-STD-461-G – CE Tests (Part II)
 - Conducted Emissions Test Methods CE101, CE102, CE106
 - Test setups, procedures, and equipment used for testing
 - Example Test Results and Report Reviews / Q&As
- MIL STD 461G – CS Tests (Part I)
 - Conducted Susceptibility Test Methods CS101, CS103, CS104, CS105, CS109
 - Test setups, procedures, and equipment used for testing
 - Example Test Results and Report Reviews / Q&As
- MIL STD 461G – CS Tests (Part II)

- Conducted Susceptibility Test Methods CS114, CS115, CS116, CS 117, CS 118
- Test setups, procedures, and equipment used for testing
- Example Test Results and Report Reviews /Q&As
- Product Development and Certification Process
 - US DOD Systems Engineering V&V Processes, R&D Project vs. End Product
 - Certification Process (MIL-STD-461, MIL-STD-464, MIL-HDBK 516, US DOD SE)
 - US Air Force and US Army EMI/EMC Test and Certification Process
 - FAA/EASA Part 21 and Certification Process
- Documentation, Test Plans, and Test Reports
 - Test Plan Examples
 - Test Results and Risk Assessment / Test Reports
 - US DOD Data Items (DI) Forms and Data Item Descriptions (DID), governmental and non-governmental documentation
- MIL-STD-464 Standard
 - MIL-STD-461 vs MIL-STD-464
 - EMI/EMC Platform Level Requirements Review
 - MIL-STD-464 Guides: Requirements Rationale and Lessons Learnt Items
- MIL-STD-461G RS Tests
 - Radiated Susceptibility Test Methods RS101, RS103, RS105
 - Test setups, procedures, and equipment used for testing
 - Example Test Results and Report Reviews / Q&As
- MIL-STD-461G RE Tests
 - Radiated Emissions Test Methods RE101, RE102, RE103
 - Test setups, procedures, and equipment used for testing
 - Example Test Results and Report Reviews / Q&As
- EMI/EMC & Equipment Design
 - EMI/EMC and Equipment Design
 - EMI/EMC Analysis Software Programs and Application Examples
 - EMI/EMC Analysis Test Programs
- Additional Tests (RTCA-DO-160)
 - Power Input, RTCA-DO-160G Section 16
 - Magnetic Effect, RTCA-DO-160G Section 15
 - Lightning Direct Effects, RTCA-DO-160G Section 23
 - Test setups, procedures, and equipment used for testing
 - Example Test Results and Report Reviews / Q&As
- Relevant Test Standards Summary Session
 - MIL-STD-464D Electromagnetic Environmental Effects, Requirements for Systems
 - MIL-STD-704F Aircraft Electric Power Characteristics
 - MIL-STD-1275E Interface Standard, Characteristics of 28 Volt DC Input Power to Utilization Equipment in

Military
Vehicles

- MIL-STD-1399 Interface Standard, Section 300, Part 1 Low Voltage Electric Power, Alternating Current
- MIL-STD-1399 Interface Standard, Section 300, Part 2 Medium Voltage Electric Power, Alternating Current

All MIL-STD-461G test sections are discussed and explained in detail, including:

- The Purpose of the Test
- Test Configurations and General Requirements
- Test Requirements and Procedures
- EMI Test Chamber / Test Equipment, Cabins, or Devices Test Environment
- Test Pass/Fail Criteria Test Procedures
- Test Setup: Test Setup (Tabletop) / Test Setup (Free Standing)
- Measurement Tolerances
- Evaluation of Results and Example Test Report Reviews
- Potential Failures and Design Recommendations Additional Discussions and Recommendations



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Global Dynamic Systems is an official member of **RTCA** Organization.

Our References

We have provided training courses to more than 120 companies and organizations and over 1000 individual trainees so far.

