TRAINING CATALOG

2026 EDITING

Vitaminate

the career of your Engineers, Managers and Technicians

COME AND TALK US ABOUT YOUR PASSIONS

Qualiopi processus certifié

RÉPUBLIQUE FRANÇAISE

DATADOCKÉ

September 2025 V2R0

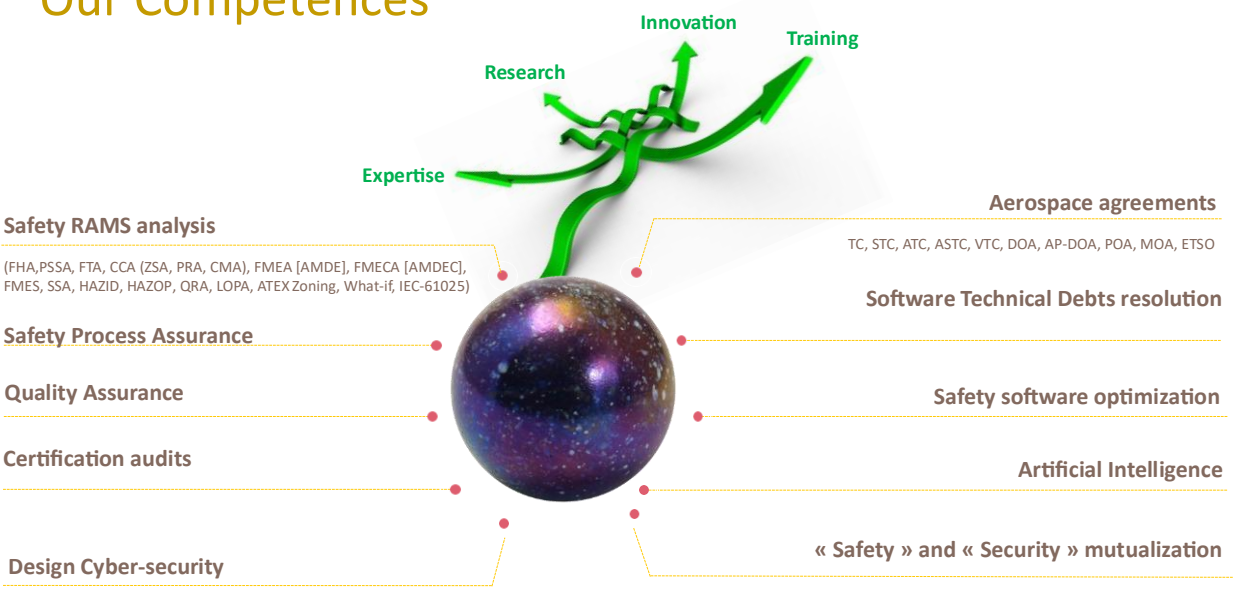
OLGHAM is a Simplified Joint Stock Company created on October 1st, 2018 by two shareholders from the world of on-board aeronautical certification, but also benefiting from very significant experiences in air traffic, on-board space, ground, industry and the automotive domain.

Our values

- Integrity – *« I say what I do and I do what I say »*
- Transparency – *« Key element of mutual and reciprocal trust »*

Our Domains

Our Competences



Continuing training

Declaration of activity registered under n°: 76 31 09735 31
This registration shall not be considered as an approval of the State

Off-site Training

Off-site trainings are short duration (1 to 5 days), focuses on business skills or associated methods and techniques. They take place at the OLGHAM premises in Toulouse (France) on the dates set in our schedule. We can nevertheless create additional sessions as soon as a sufficient number of participants is reached. We welcome you from 9:30 am to 5:30 pm for 7 hours of training per day. The registration fee covers educational costs as well as lunches and breaks. The trainings are carried out for a minimum of 4 trainees.

These training courses are offered on fixed dates. Nonetheless, we collect your needs all year round. Once a sufficient number of participants is reached, an additional off-site session may be scheduled.

On-site Training

On-site training is our effective solution for tailor-made projects. It allows more flexibility since it is set up regardless of the dates appearing in our schedule. For this, we operate throughout France and internationally.

Several formats are available:

- Reproduction of a module presented in the catalog,
- Creation of career paths by combining several modules,
- Creation of a tailor-made training course whose theme does not appear in our current catalog

Our Engagements

Welcome

Ms. Sandrine CHOUZIOU is your single point of contact for all administrative (financing, contractual documents) and logistics (means of access, timetables, etc.) questions. At the start of the course, the objectives and the training program are reminded to the participants. A course material is provided to you in digital format.

For training conducted by videoconference, a preliminary test of the tool will be carried out with each participant to ensure the correct installation and operation of the tool before the training. Individual appointments will be made.

Mrs Sandrine CHOUZIOU
Training Manager
Phone: 06.49.31.30.23
Email: formation@olgham.com

Accessibility

Any person with a disability wishing to register for our training courses is kindly requested to contact the Training Manager (Sandrine CHOUZIOU) by email formation@olgham.com in order to study the methods of adapting our training within the framework of a personal interview.

Educational Engineering

The educational engineering of these training courses is carried out by our trainers, in consultation with your teams since we send you prerequisite questionnaires and organize for on-site training, a phone qualification of your need.

Benefit from a 12-month support in the form of videoconference at the end of any training.

Educational Quality

Our training courses are all led by recognized professionals who work in their area of expertise. Depending on the themes, case studies and / or practical work will enable the concepts taught to be applied. A MCQ is systematically proposed at the end of the session, which correction of is made with the trainer during the session. This allows us to be able to come back to any misunderstandings. This way we make sure that the learning objectives are met.

Satisfaction

At the end of the training, a round table is organized and a hot evaluation is distributed in order to collect the opinions and comments of the participants. We analyse and consolidate these assessments as part of our continuous improvement process.

Based on our evaluation surveys collected at the end of training over the last 2 years:

100 % *of our trainees are satisfied to very satisfied with our management training,*

100 % *of our trainees are satisfied to very satisfied with our training in security development processes,*

100 % *of our trainees are satisfied to very satisfied with our GNSS training,*

We got 97 % *feedback from hot satisfaction surveys concerning the* 99 *participants trained since 2018.*

We provided 171 *hours of training.*

Video-Conference

OLGHAM has chosen to work with the **TIXEO** tool; a French provider of secure videoconferencing solutions guaranteeing strict confidentiality organizations of their communications.

This system also used by the French government is certified for its reliability as regards of its cybersecurity.

The advantages of the solution:

End-to-end encryption (video, audio, data) in a multi-point situation

Sharing of applications and screens

High-definition image: ultra-HD / 4K

Smart multi-screen display

Work in conference or collaborative mode

Possibility to create working groups

Interoperability (computer, tablet, smartphone).

SUMMARY

Planning

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DO-330 / ED-215: Software Tool Qualification	28	Aerospace				2-3					12-13		
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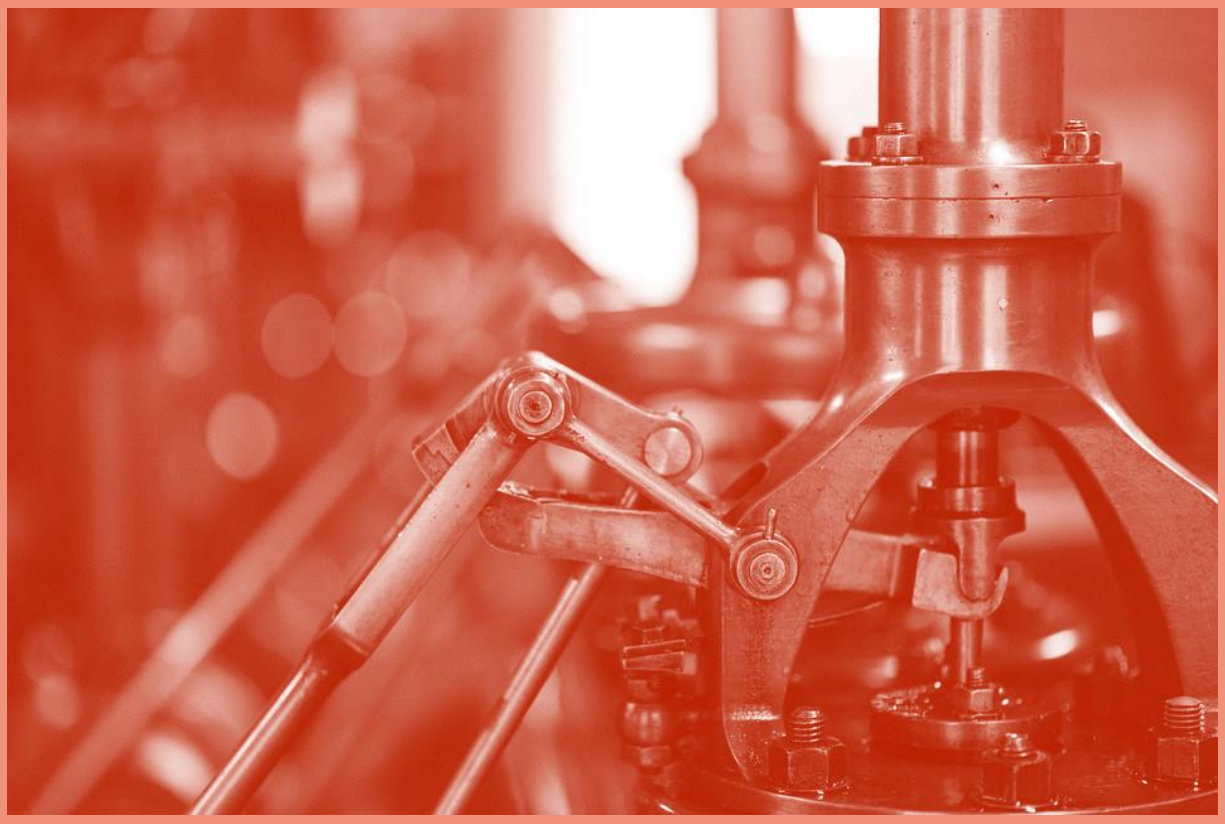
Introduction to GNSS systems, GNSS receiver technology, and SBAS augmentation systems	59	Space							20-21			18-19	

MANAGEMENT



Advanced Project Management

While mastery of basic project management techniques is absolutely necessary, these techniques are rarely sufficient since they often do not take into account the main component of a project: the individuals who carry it out, and especially in the contexts of change.

Time: 2 days

Price on demand

AUDIENCE

This training is intended for anyone involved in critical systems and / or software development projects applying the ARP-4754A, DO-178C or equivalent standards.
It is mainly aimed at project managers and batch managers.
Knowledge of basic project management techniques is required.
A first experience in project management or team management would be a plus.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Present fundamental techniques of project management
- Present difficulties and change management techniques
- Present specificities and give practical methods of human management within the framework of a project

PROGRAM

Reminder of the fundamentals
Organization of activities (OBS, PBS, WBS, RAM, CBS, Project plans, etc.)
Development approach (Life cycles, phases, milestones, ...) based on the ARP-4754A
Estimates (costs, deadlines, etc.)
Planning
Monitoring (costs, deadlines, progress, etc.)
Hypothesis management
Risk & opportunity management
Training
Communication (internal, external)
Subcontracting management
Continuous improvement
Agile development

Change management
Changes
Brakes, levers, losses
Manage changes and impacts
Action plan

Human management
Identify personalities and types of associated management
Communicate
Motivate an employee
Support - coach
Feedback
Remote team management

EDUCATIONAL RESOURCES

Animation around a presentation.
Case study and applied exercises

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

ECSS-Q-ST-10C and ECSS-Q-ST-20C

Product Assurance management

This training presents the quality assurance requirements for the establishment and implementation of quality assurance programs for projects covering design, development, production and operation of space systems, including their disposal.

Time: 2 days

Price on demand

AUDIENCE

This training is intended for anyone involved in critical systems and / or software development projects applying ECSS standards or equivalent.
It is mainly aimed at product assurance engineers, quality assurance engineers and project managers who want to have a better understanding of the content of the ECSS-Q-ST-10C and ECSS-Q-ST-20C standards.
A first experience in quality, quality assurance, process assurance or product assurance would be a plus.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Develop the quality approach to be implemented at project management and product assurance level
- Understand the main ECSS quality standards applied in the space domain

PROGRAM

ECSS-Q-ST-10C
Introduction
Link between Q series

Programming of Product Assurance
Planning: organization, responsibilities, resources, interfaces
Implementation: management, reporting, audits, risk management, documentation, registration
Configuration Management
Non-compliance management
Alert management

Documentation
Registers
Forms

ECSS-Q-ST-20C
Introduction
Principles of Quality Assurance

Requirements
Management requirements
General requirements: control, traceability, metrology and calibration, quality control analysis
Design and verification requirements
Procurement requirements
Production, assembly and integration requirements
Test, acceptance & delivery requirements
Ground support equipment requirements

Documentation
Registers
Forms

EDUCATIONAL RESOURCES

Animation around a presentation.
Case study and applied exercises

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

SAFETY DEVELOPMENT PROCESS

IEC 61508

Functional safety of control systems

The standard IEC 61508 defines requirements to ensure that systems are designed, implemented, operated and maintained to provide an accurate level of integrity and safety (SIL).
This standard can be applied to all levels of the supply chain through a common terminology.

Time: 1 day

Price on demand

AUDIENCE

This training is intended for anyone involved in critical systems and / or software development projects applying IEC 61508 standard.

It is mainly aimed at department managers, project managers and engineers involved in the development of critical systems, software and hardware according to standard IEC 61508.

Knowledge of Safety is a plus.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Understand the requirements of IEC 61508
- Be able to apply the requirements of IEC 61508 within a system project development to satisfy this standard

PROGRAM

Introduction to IEC 61508 standard
History of the standard
Vocabulary, principles and issues.
Link between the seven components of this standard

Standard organization
Structure
General principles

SIL determination

Application areas
System
Software
Hardware

Overview of standards associated with IEC 61508
Industrial processes: IEC 61511
Nuclear domain: IEC 61513
Automotive domain: ISO 26262
Aeronautical domain: DO-178

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

ECSS-M-ST-80C: 2008

Risk management

This training presents concepts related to risk management in general and the more specific requirements for space projects from the ECSS-M-ST-80C standard.

Time: 1 day

Price on demand

AUDIENCE

This training is intended for anyone involved in critical systems and / or software projects development applying ECSS standards or equivalent.

It is mainly aimed at project managers, batch managers and product assurance engineers who want to have a better understanding of the content of the ECSS-M-ST-80C standard.

A first experience in project management would be a plus.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Understand ECSS-M-ST-80C standard
- Understand processes, management and integration of requirements
- Implement risk management

PROGRAM

Introduction
Terminology and definitions
Concept and process
Responsibilities

Process
Description of process and tasks

Implementation
Identification of requirements
Process requirements
Implementation requirements

Documentation
Registers
Forms

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

AGILE METHOD (SCRUM)

Economic alternative methods

Agile methods are, since their democratization, strongly used in the world of software development. These methods, including SCRUM, aim to be more pragmatic and reactive than traditional methods such as the V-cycle. In this context, the aim of this training is to provide both a detailed view of the advantages and constraints of using SCRUM.

Time: 1 day

Price on demand

AUDIENCE

This training is intended for any person or team involved in critical software, hardware and system projects development applying or wishing to prepare the integration of SCRUM method. It is mainly aimed at project managers and batch managers but also concerns team members. Knowledge of basic conventional and / or Agile lifecycle project management techniques is required.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Introduction to the iterative cycles of Agile methods and particularly the SCRUM method
- Presentation of the benefits applying SCRUM method to a project
- Analysis of the side effects generated by SCRUM method and the means to protect against them

PROGRAM

Basis

The context of Agile-Scrum management
Roles, artifacts and ceremonies
Lifecycle and incremental approach
Differences between traditional and Agile approaches

Issues

Integration
Non-regression
Anomalies and impact analysis management
Design
Verifications (Duality of cases and procedures)
Traceability
Quality expectations
Technical debt
Status documents
Team consistency
COTS

Case study

SCALP project: applicability of the Agile methodology on a concrete case

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

SAFETY ANALYSES

ARP4754B ED-79B and ARP4761A ED-135A

The ARP4754A ED-79 and ARP4761 ED-135 standards deal with the development methods of on-board systems for aeronautical applications. Since a civil aircraft can only fly if it has obtained a certificate of airworthiness from the authorities, compliance with ARP standards is a requirement.

This training will also introduce differences between aeronautical, space and Air Traffic Management safety.

Time: 2 days

Price on demand

AUDIENCE

This training is intended for project managers, quality engineers, systems development engineers, safety engineers involved in design and obtention of certification applicable to avionics software or electronic avionics equipment.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Acquire contextual knowledge of aircraft certification
- Understand the roles and responsibilities of those involved in the certification process
- Position risk management when designing a system
- Acquisition of RAMS analysis methodology

PROGRAM

Certification
Responsibilities
Regulations
Certification

ARP 4754A ED-79 presentation
General Introduction
Essential principles reminder
Insertion of safety analysis into the system development cycle
System level process assurance

ARP4761 ED-135 presentation
RAMS Analyses:
FHA (Functional Hazard Assessment),
PSSA (Preliminary System Safety Assessment),
SSA (System Safety Assessment),
FTA (Fault Tree Analysis),
DD (Dependence Diagram),
MA (Markov Analysis),
FMEA (Failure Mode and Effects Analysis),
FMES (Failure Mode and Effects Summary),
CCA (Common Cause Analysis),
ZSA (Zonal Safety Analysis),
PRA (Particular Risks Analysis),
CMA (Common Mode Analysis)
Definition of development levels (fDAL, iDAL)
Impact of DAL and safety requirements on architectures

Presentation of differences between aeronautics and space RAMS
General introduction of differences
HA Presentation (ECSS-Q-ST-40-02C)
FMEA-FMECA Presentation (ECSS-Q-ST-30-02C)
FTA Presentation (ECSS-Q-ST-40-12C)

Presentation of differences between aeronautics & CNS/ATM RAMS
General Introduction of differences
EU 373/2017 Presentation

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

ARP4754B ED-79B, ARP4761A ED-135A, DO-178C-ED-12C, DO-254 ED-80

The development constraints associated with obtaining certification of avionics software and avionics electronic equipment are diverse. Thus, the DO-178C standard sets the safety conditions for critical avionics software and the DO-254 is its counterpart to follow the evolution of electronic equipment at the component level.

Time: 4 days

Price on demand

AUDIENCE

This training is intended for anyone involved in the certification of avionics software or electronic equipment, namely: project managers, safety engineers, embedded systems design engineers, system development engineer, software or hardware, quality engineers, maintenance and support engineers.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Present the context of certification of critical on-board systems in aeronautics
- Present the standards ARP 4761A (SAE-1996) ARP 4754B (SAE-2010), DO-178C ED-12C and DO-254 ED-80

PROGRAM

Introduction
Context of the certification
Roles and responsibilities of actors
Type Certification (TC) process
MMEL approach
Link with airworthiness monitoring (DOA, STC)

Development process
Requirements
Validation of requirements
Verification of the implementation
Configuration Management
Process assurance

Management of COTS
Integration of components
Architectural devices

Risk Management Process
System safety analysis activities and link with hardware development
Detailed presentation of analysis
Tools and methods
Link with system analysis and hardware development

Equipment level requirements analysis
Definition and allocations of fDAL and iDAL (function / item Development Assurance Level)
Description of the impacts on the architectural choices and the development process
SEU analysis, common modes, IEHA

Additional rules and standards
AMC 20-125A, CM-SWCEH-001

Relationship with the authorities

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

Safety (RAMS)

AHA, PASA, FHA, PSSA (FMEA, FTA, DD, MA, CCA (PRA, CMA, ZSA), FMES, SSA, ASA)

It should be considered that the safety is supported by a set of preliminary analyzes prior to development, but also by a set of activities to be carried out. The consistency of these approaches leads to being able to demonstrate the reliability of the software.

Time: 3 days

Price on demand

AUDIENCE

This training is intended for anyone involved in the study of software reliability or on-board hardware, namely: project managers, engineers or safety technicians, quality engineers or more generally any engineer from a design office.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Acquire the methods and tools used for conducting safety analysis (RAMS)
- Integrate safety requirements into a program or project development
- Determine preventive and protective measures

PROGRAM

Introduction
Definitions and objectives
Risk levels assessment
Levels' classification: SIL, PL, ASIL
Concept of independence
Safety requirements
RAMS concepts: Reliability, Availability, Maintainability, Safety

The different standards
ARP, IEC 61508, IEC 61511, IEC 61513, IEC 62061, ISO 26262, ISO 13849 ...
Applicability for electronic control systems
Restriction of use ...

Safety methods
Risk analysis
FMEA
Fault trees

Analyses
Functional analysis
Allocation of objectives
Reliability diagram and associated calculations
Failure analysis (FMEA)
Fault tree and associated calculations
Criticality & gravity matrices
Concepts of dangerous faults
Concepts of coverage rate
Corrective action plans
Presentation and interpretation of results

Management of COTS
Integration of components
Architectural devices

Case study

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

IEC 61508: Functional safety of control systems

System part

IEC 61508 defines requirements to ensure that systems are designed, implemented, operated and maintained to provide a precise level of integrity and safety (SIL).
Part 1 of this standard specifies the requirements for the "System" part

Time: 1 day

Price on demand

AUDIENCE

This training is intended for anyone involved in critical systems development projects to comply with the IEC 61508 standard.

It is mainly aimed at department managers, project managers and engineers involved in the development of critical systems according to IEC 61508 standard.

Knowledge in functional safety is a plus.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Understand the requirements of IEC 61508 standard for the development of critical systems.
- Be able to apply the requirements of IEC 61508 within a system development project applying this standard.

PROGRAM

Introduction to IEC 61508 standard
History of the standard
Vocabulary, principles and issues.
Link between the seven components of the standard.

Standard organization
Structure
General principles

SIL determination

Detailed study of the standard concerning the System part
Specification of system design requirements
System safety validation planning
Systems design and development
Systems integration
Systems operation and maintenance procedures
Systems changes
Systems verification

Presentation of the standards associated with IEC 61508
Industrial processes: IEC 61511
Nuclear domain: IEC 61513
Automotive domain: ISO 26262
Aeronautical domain: DO-178

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

ECSS-Q-ST-30 and 40

HA, FMEA, FMECA, FTA, HSIA

By pushing us to anticipate failures and breakdowns in our system, safety analysis allows us to increase and justify the confidence we place in the system we are developing.

Time: 1 day

Price on demand

AUDIENCE

This training is intended for anyone involved in critical systems and / or software development projects applying ECSS standards or equivalent

It is mainly aimed at safety engineers, quality assurance engineers and project managers who want to have a better understanding of the content of the ECSS-Q-ST-30 and ECSS-Q-ST-40 standards.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Develop the quality approach to be implemented at project management and product assurance level
- Understand the ECSS standards relating to safety used in the space domain

PROGRAM

Introduction to ECSS standards
Presentation of the existing standards

Integration of risk analysis into the development cycle
Benefits of a risk analysis approach
Roles of safety analysis

Presentation of ECSS-Q-ST-30 and ECSS-Q-ST-40 standards
ECSS Q-ST-30-02: FMECA
ECSS Q-ST-40-02: Hazard Analysis
ECSS Q-ST-40-03: Safety Risk Assessment
ECSS Q-ST-40-10: Common Cause/Common Mode Analysis

Introduction to Software Safety

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

System Plans development

The purpose of system level planning process is to define the means of producing a system that will meet the requirements and provide the level of confidence in line with the project 's expectations.

This training objective is to present the fundamentals but also to deepen to optimize and avoid the pitfalls of writing system plans.

Time: 1 days

Price on demand

AUDIENCE

This training is intended for anyone involved in critical system development or not, wishing to achieve a level of projects assurance for certification or to improve the reliability of its processes. It is mainly aimed at project managers and batch managers but also concerns team members.

A good knowledge of ARP 4754A / ED-79A standard is a plus.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Know the major subjects to anticipate and detail in the system project plans
- Reduce documentation efforts without sacrificing the provision of information
- Understand the optimization of writing plans from one project to another

PROGRAM

Fundamentals

System plans and ARP 4754A / ED-79A standard.
Major technical subjects to be covered in the plans
Granularity of the information included in the plans
Main types of plans:
- Development plan
- Safety Program
- Verification plan
- Process Assurance Plan
- Configuration Management Plan

Structure of each plan

Optimization

Reduce documentation efforts while maintaining the same level of information
Planning the subcontracting
Incremental method for writing system plans from one project to another

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

System validation and verification optimization strategy

The aim of this training is to exceed the objectives of ARP-4754A and DO-178C / ED-12C by proposing new validation and verification paradigms, and thus allowing the best possible reconciliation of certification and industrial constraints.

Several alternative solutions will be exposed.

Time: 2 days

Price on demand

AUDIENCE

This training is intended for anyone involved in the development of highly integrated or complex on-board systems. It is mainly aimed at project managers, software or system quality assurance managers, certification managers for on-board systems.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Present the validation and verification strategy applying to on-board systems
- Present classic issues inherent in a classic V&V approach
- Identify cases where a V&V approach of ARP-4754A type could lead to counterproductive side effects
- Explain how to organize a certification argument in the context of a deviation

PROGRAM

Strategy

System verification

Classic issues of the RBT approach of the DO-178C

Benefits of HLR / LLR merge for verification efforts

Distinction between SVCP and (VC; VP)

Identification of effective validation strategies.

Validation

Tool qualification

Definition of the different nominal ranges

Supervision processing

SEU / MBU and means of detection and correction

Problem of real numbers, object-oriented languages

Checking deactivated code, additional code, PDS and COTS

Verification

Non-regression

Root cause analysis of failed processes

Static verification of a MVDS (Multiple Version Dissimilar Software)

Checking FLS (Field Loadable Software)

Calculation of WCET

Levels of rigor from IEC 61508-3

Context of AI / ML / DL

Content of a SVP

EDUCATIONAL RESOURCES

Case study and applied exercises

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

Clausier Note DGA-16

issue D

(16-DGATA-P1301261003001-1P-D)

This so-called "DGA-16" or "Clausier" technical note is a reference for the development of software and hardware in a critical aeronautical environment.
It is produced by the DGA-TA to ease related developments.

Time: 1 day

Price on demand

AUDIENCE

This training is intended for people in charge of projects carried out on behalf of the DGA (Direction Générale de l'Armement) (Aeronautical techniques). It concerns project managers, software and hardware managers and also quality managers who will have to demonstrate its correct application.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Contextualization of "Clausier" in the existing regulatory environment
- Overview of software and hardware requirements
- Strengths and weaknesses identification and alternative approaches proposal to avoid DGA-16 weaknesses.

PROGRAM

Situation
Contextualization of "Clausier" in the existing regulatory environment

Principles
Criticality levels for SW and HW
System / subsystem allocation process

Milestones
Presentation of milestones
Identification of associated documents
Presentation of contributors

Levels 1, 2 and 3
Software requirements
Hardware requirements

Strengths and weaknesses
"Clausier" strengths and weaknesses identification on software aspects
Same for hardware aspects
Presentation of alternative approaches to overcome the identified weaknesses

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

MIL-STD 498

United States Military-Standard-498 Requirements for Software developments and their documentation

This standard replaced the DOD-STD-2167A, DOD-STD-7935A, and DOD-STD-1703 standards.
It is the origin of ISO and IEEE standards, and especially IEEE 12207.
It integrates software development into the system context and proposes concrete and pragmatic requirements without distinction of level of criticality. In this sense, this standard is suited to most software developments in non-critical areas, and can be proposed as an acceptable means of compliance to customers.

Time: 1 day

Price on demand

AUDIENCE

This training is intended for people in charge of non-critical software projects development who wish to apply a rational, simple and effective approach. Due to its notoriety, this standard can easily be proposed in commercial specifications as a means of compliance to guarantee quality development.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Contextualization of MIL-STD-498 in the existing regulatory environment
- Presentation of its philosophy and requirements
- Strengths and weaknesses identification and alternative approaches proposal to avoid MIL-STD-498 weaknesses

PROGRAM

Situation
MIL-STD-498 contextualization in the existing regulatory environment
Presentation of suitability for non-critical software developments

Principles
Software issues anticipation from system level
Interactions consideration between hardware and software

Generic requirements
Development of reusable software components

Process assurance
Management of safety and security aspects
SW/HW interactions

Detailed requirements
Planning, requirements, design, verification, configuration management, quality assurance
Preparation for use, for software transition, product assessment, corrective actions management, internal reviews, risk management, indicators, suppliers, interfaces
Process improvement

Strengths and weaknesses
MIL-STD 498 strengths and weaknesses identification on software aspects
Presentation of alternative approaches to overcome the identified weaknesses

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

IEC 61508: Functional Safety of Control systems

Software part

The standard IEC 61508 defines requirements to ensure that systems are designed, implemented, operated and maintained to provide an accurate level of integrity and safety (SIL).
Part 1 of this standard specifies the requirements for the "Software" part.

Time: 2 days

Price on demand

AUDIENCE

This training is intended for anyone involved in critical systems and / or software development projects applying the IEC 61508 standard. It is mainly aimed at department managers, project managers and engineers involved in the development of critical software according to standard IEC 61508. Knowledge in Safety is a plus.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Understand the requirements of IEC 61508
- Be able to apply the requirements of IEC 61508 within a software project development to satisfy this standard.

PROGRAM

Introduction to IEC 61508 standard
History of the standard
Vocabulary, principles and issues
Link between the seven components of this standard

Standard organization
Structure
General principles

SIL determination

Detailed study of the standard for the software part
Specification of software design requirements
Software Safety validation Planning
Software design and development
Systems integration
Software operating and maintenance procedures
Software modification
Software verification

Overview of standards associated with IEC 61508
Industrial processes: IEC 61511
Nuclear domain: IEC 61513
Automotive domain: ISO 26262
Aeronautical domain: DO-178

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

ISO / IEC 29110

Systems and software engineering for very small organizations (SME)

The ISO / EID 29110 standard was designed to meet the needs of small structures (project or company) with up to 25 people. System-oriented, the standard offers a set of best practices strongly anchored in the reality of the economic fabric of small organizations.

The purpose of this training is to present the standard for its application.

Time: 1 day

Price on demand

AUDIENCE

This training is intended for any person or team (less than 25 members) involved in non-critical system development projects and wishing to improve the reliability of its processes. It is aimed for project managers and batch managers.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Introduce system level requirement writing as part of this standard
- Present the managerial methods introduced in this standard
- Introduce quality management and best practices for system development

PROGRAM

The fundamentals
Standard challenges
Courses associates with each level of VSE (Very Small Entities)
Document structure

Software Development
Processes
Activities
Produced documents
Assignment of roles

Systems Development
Processes
Activities
Produced documents
Assignment of roles

Deployment Kits
Purpose, advantages and disadvantages of each kit

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

DO-178C / ED-12C

Software considerations in airborne systems and equipment certification

DO-178C / ED-12C governs the development and testing of software embedded in airplanes and commercial aircraft.

It provides recommendations on engineering aspects of critical embedded software, taking a process-oriented approach

Time: 4 days

Price on demand

AUDIENCE

This training is intended for anyone involved in the development of embedded software, namely: software managers, project managers, method and quality managers, software architects, software verifiers and software coders. It can also be useful for project owners who wish to understand this standard.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Understand the approach to apply for qualification and certification of embedded software on civil aircraft
- Understand the recommendations applying to software for on-board systems
- Understand the approach to apply for each standard supplement (DO-330 / ED-215, DO-331 / ED-218, DO-332 / ED-217, DO-333 / ED-216) and DO-248C / ED-94C
- Be able to apply these standards to critical developments in on-board aeronautics

PROGRAM

30 exercises

Introduction DO-178C / ED-12C
Regulatory context
Introduction to safety approach

Overview of planning, development, verification, quality and configuration management processes
Objectives, activities, expected results, known hard points and existing workarounds

Deepening the management of COTS components
Planning, acquisition and Configuration Management
Demonstration of integrity interfaces

Overview of DO-248C / ED-94C
Additional explanations about DO-178C / ED-12C objectives

Differences between DO-178B / DO-178C
Clarification of developments

DO-330 / ED-215 – Qualification of software tools
Planning, development, verification, quality and configuration management process, points to look

DO-331 / ED-218 – Development and verification in aeronautics based on formalized models
Planning, development, verification, quality and configuration management process, points to look

DO-332 / ED-217 – Object Oriented Techniques
Planning, development, verification, quality and configuration management process, points to look

DO-333 / ED-216 – Formal Methods
Planning, development, verification, quality and configuration management process, points to look

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

DO-178C / ED-12C and DO-254 / ED-80

Overlay areas for VHDL (FPGA) coding

The separation of DO-178C and DO-254 standards presents an overlay zone when the hardware implementation of VHDL code in programmable components brings a level of complexity such that it becomes difficult to demonstrate full verification coverage by the strict application of DO-254.

The question about the DO-178C complementary application for these parts is often required by certification authorities.

Time: 3 days

Price on demand

AUDIENCE

This training is intended for anyone involved in the development of hardware and / or software for highly integrated or complex on-board systems. It is for project managers, software and hardware managers, method engineers, certification managers for embedded systems and quality assurance managers. General knowledge of hardware and/or software engineering or software and/or hardware quality assurance would be a plus.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Present DO-178C and DO-254 standards
- Present the specific impacts of VHDL coding on safety aspects
- Present the overall strategy of EASA certification authorities
- Present the V&V strategy applying to software and hardware for on-board systems
- Organize a certification argument in the context of a specific standard deviation.

PROGRAM

Context

System and software as verification object

Interdependence between error / failure and vulnerability

Verification based on Safety Assurance Level

Strategies

RBT approach of the DO-178C

HLR / LLR merge benefits

SVCP vs (VC; VP) distinction

Architecture boxes according to DAL.

Validation

Tool qualification according to DO-330 / ED-215

Definition of the different nominal ranges

Supervision processing

SEU / MBU and means of detection and correction

Problem of real numbers, object-oriented languages. Checking deactivated code, additional code, PDS and COTS

Verification

Automated verification and coverage illusion

Verification of the pseudo-code

Verification of ADIs

Checking the outputs of an UMS

Non-regression

Root cause analysis of failed processes

Static verification of a MVDS (Multiple Version Dissimilar Software)

Checking FLS (Field Loadable Software)

Calculation of WCET

Levels of rigor from IEC 61508-3

Context of AI / ML / DL

Content of an SVP

EDUCATIONAL RESOURCES

Case analysis

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

DO-200B / ED-76A

Standards for processing aeronautical data

The DO-200B / ED-76A provides minimum guidance for the processing of aeronautical data used for navigation, flight planning, terrain detection, cockpit displays or flight simulators.

The training objective is to ensure that the process of aeronautical data transformation for on-board or ground-based applications does not degrade data integrity.

Time: 1 day

Price on demand

AUDIENCE

This training is intended for anyone involved in critical software projects development or not, wishing to achieve an assurance level with a view to certification or to improve the reliability of its processes. It is mainly aimed at project managers and batch managers.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Introduce the specific concepts to the aeronautical data processing
- Present the process of aeronautical data transformation for on-board or ground-based applications
- Present the process for demonstrating compliance of aeronautical data to the authority

PROGRAM

The fundamentals
Aeronautical Data Chain
Data Process Assurance Level (DPAL)
General aeronautical data processing mode
Quality requirements

Implementation
Presentation of the DO-200B process
Compliance plan
Quality data processing procedures
Verification and validation activities
Qualification of tools

Demonstration of compliance
Audits and their specific features
Alternative demonstration methods

Differences between DO-200A & DO-200B
Notable changes between the two versions

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

DO-200C / ED-76B

Standards for processing aeronautical data

The DO-200C / ED-76B provides minimum guidance for the processing of aeronautical data used for navigation, flight planning, terrain detection, cockpit displays or flight simulators.

The training objective is to ensure that the process of aeronautical data transformation for on-board or ground-based applications does not degrade data integrity.

Time: 1 day

Price on demand

AUDIENCE

This training is intended for any person or team, involved in projects dealing with or using aeronautical data, wishing to achieve a level of assurance with a view to certification or to improve the reliability of their processes. It is aimed in particular at project managers and quality managers.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Introduce the specific concepts to the aeronautical data processing
- Present the process of aeronautical data transformation for on-board or ground-based applications
- Present the process for demonstrating compliance of aeronautical data to the authority

PROGRAM

The fundamentals
Concept of "Aeronautical Data Chain"
Data Quality Requirements (DQR)
Data Integrity Levels and Assurance Levels (DPALs)
General Aeronautical Data Processing Model

Implementation
Presentation of the DO-200C process
Compliance plan
Data processing procedures
Validation and verification activities
Qualification of tools

Demonstration of compliance
Audits and their specific features
Alternative demonstration methods
Compliance documentation

Differences between DO-200B & DO-200C
Notable changes between the two versions

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

DO-248B / ED-94B

Supplement for ED-12B and ED-109

The DO-248C / ED-94C is a complement to the DO-178B / ED-12B and to the DO-278 / ED-109 which addresses the questions of both industry and authorities on these guidelines. The document contains Frequently Asked Questions (FAQ), discussion Papers (DPs) and rationale for sections that could be problematic.

This training is in line with DO-248B / ED-94B by offering an analysis of the questions and answers provided throughout the document.

Time: 1 day

Price on demand

AUDIENCE

This training is intended for anyone involved in the development of systems and / or software for highly integrated or complex on-board systems. It is aimed, in particular, at project managers, software managers, method engineers, certification managers for on-board systems and CNS / ATM as well as quality assurance managers.

Preliminary knowledge or experience of the DO-178B / ED-12B and DO-278 / ED-109 standards is strongly recommended for this training.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Introduction to the DO-248B / ED-94S supplement
- Provide a better understanding of the objectives of DO-178B / ED-12B and DO-278 / ED-109
- Understand the challenges of certification and the functioning of the authorities and entities in charge of the process

PROGRAM

Fundamentals
Reminders on standards
Origin of clarification document
Overview of the complement structure

FAQ
System level issues
The parallels and commonalities of the DO-178B / ED-12B and the DO-278 / ED-109
Main issues specific to a standard

Discussion Paper
Context
Main clarifications on DO-178B / ED-12B
Main clarifications on DO-278 / ED-109

Justifications
Concerned chapters
Clarifications in terms of Process

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

DO-248C / ED-94C

Supplement to ED-12C and ED-109A

DO-248C / ED-94C is a complement to the DO-178C / ED-12C and to the DO-278A / ED-109A which addresses the questions of both industry and authorities on these guidelines. The document contains Frequently Asked Questions (FAQ), Discussion Papers (DP) and rationale for the sections that could raise a problem.

This training is in line with the aim of DO-248C / ED-94C by offering an analysis of the questions and answers delivered throughout the document.

Time: 1 day

Price on demand

AUDIENCE

This training is intended for anyone involved in the development of systems and / or software for highly integrated or complex on-board systems. It is mainly aimed at project managers, software managers, method engineers, certification managers for on-board systems CNS / ATM as well as quality assurance managers.

Preliminary knowledge or experience of DO-178C / ED-12C and DO-278A / ED-109A standards is strongly recommended for this training.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Introduction to DO-248C / ED-94C supplement
- Provide a better understanding of DO-178C / ED-12C and DO-278A / ED-109A objectives
- Understand the challenges of certification and the functioning of the authorities and entities in charge of the process

PROGRAM

Fundamentals
Reminders on standards
Origin of clarification document
Overview of the complement structure

FAQ
System level issues
The parallels and commonalities of DO-178C / ED-12C and DO-278A / ED-109A
Main issues specific to a standard

Discussion Paper
Context
Main clarifications on DO-178C / ED-12C
Main clarifications on DO-278A / ED-109A

Justifications
Concerned chapters
Clarifications in terms of Process

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

DO-297 ED-124

Integrated Modular Avionics (IMA)

The IMA consists in reducing the software functions to the level of identical modular computers. The Integrated Modular Avionics (IMA) integrates the power of computers to handle several functions in order to reduce consumption and costs related to on-board computing and facilitate its maintenance.

Time: 1 day

Price on demand

AUDIENCE

This training is intended for people involved in the approval and continuing airworthiness circuit of IMA systems working on civil certification projects as well as any person, engineer or project manager, involved in the certification process, or in the systems integration and to developers, integrators, certification applicants.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Understand the development and certification phases of architectural systems
- Study safety and security of components
- Understand the quality assurance process related to the design of IMA systems

PROGRAM

IMA in certification process
Planning
System Development
Safety analysis
IMA integration and Original Equipment Manufacturers (OEM)
Responsibility of suppliers
Partitioning and Health Monitoring
V&V

Link with other standards
ARP4764A
DO-178C and DO-254
ETSO-2C153
ARINC 653

EDUCATIONAL RESOURCES

Case analysis

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

DO-330 / ED-215

Software tools qualification

DO-330 / ED-215 Software tool qualification considerations is a supplement to DO-178C / ED-12C and DO-278A / ED-109A. Software tools are widely used in multiple aeras, to help develop, verify, or control other software.

The aim of this training is to provide an overall understanding of the DO-330 / ED-215 expectations and to articulate alternative methods that reconcile certification and industrial reality.

Time: 2 days

Price on demand

AUDIENCE

This training is intended for anyone involved in the development of on-board software such as: software managers, project managers, method and quality managers, software architects, software testers and software coders. It can also be useful for project supervisors who want to understand this standard.

A good knowledge of DO-178C / ED-12C and/or DO-278A / ED-109A is required.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Understand the approach to qualify software tools
- Have a clear and succinct vision of other supplements (DO-331 / ED-218, DO-332 / ED-217, DO-333 / ED-216)
- Be able to apply this standard to critical developments in on-board aeronautics and CNS/ATM aeras.

PROGRAM

DO-330 / ED-215 Introduction
Standards history
Tool definition
Qualification objectives
Characteristics and qualification levels of tools

Overview of planning, development, verification, quality and configuration management processes
Objectives, activities, expected results, known hard points and existing workarounds

Presentation of additional considerations and alternative methods
Multifunctional tools
COTS and the use of in-service experience
Reuse of qualified tools
Impact of the environment on qualified tools

Introduction to supplements
DO-331 / ED-218 - development and verification in aeronautics formalized models
DO-332 / ED-217 - Object Oriented Technology
DO-333 / ED-216 - Formal Methods

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

DO-331 / ED-218

Development and verification in aeronautics based on formalized models

DO-331 / ED-218, Model-Based Development and Verification considerations is a supplement to DO-178C / ED-12C and DO-278A / ED-109A. It is a guideline leading the use of formalized models in on-board and ground software.

The use of MBD in software development offers many advantages but also many pitfalls. This training purpose is to provide an overview of the best practices and methods for the DO-331 application.

Time: 2 days

Price on demand

AUDIENCE

This training is intended for anyone involved in the development of on-board software such as: software managers, project managers, method and quality managers, software architects, software testers and software coders. It can also be useful for project supervisors who want to understand this standard.

A good knowledge of DO-178C / ED-12C and/or DO-278A / ED-109A is required to use formalized models.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Understand the development and verification approach based on formalized models
- Have a clear and succinct view of other supplements (DO-330 / ED-215, DO-332 / ED-217, DO-333 / ED-216)
- Be able to apply this standard to critical developments in on-board aeronautics and CNS/ATM aeras.

PROGRAM

DO-331 / ED-218 introduction
Standard history,
Presentation of specification and design models
Presentation of formal specifications

Presentation of impacts on development from models
Modification of life cycle, requirements validation and verification

Overview of planning, development, verification, quality and configuration management processes
Objectives, activities, expected results, known hard points and existing workarounds

Introduction to supplements
DO-330 / ED-215–Software Tools Qualifications
DO-332 / ED-217–Object Oriented Technology
DO-333 / ED-216–Formal Methods

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

DO-332 / ED-217

Object-Oriented Technology

DO-332 / ED-217 Object-Oriented Technology (OOT) is a supplement to DO-178C/ED-12C et DO-278A/ED-109A . It gives the main orientation of objects-oriented technology in critical software as well as an introduction to OOT.

The aim of this training is to provide an overview of best practices and methods for DO-332 application.

Time: 2 days

Price on demand

AUDIENCE

This training is intended for anyone involved in critical or non-critical software development or wishing to achieve a level of assurance for certification or to improve reliability of its processes. It is mainly aimed at project managers and batch managers, but also at team members.

A good knowledge of DO-178C / ED-12C and/or DO-278A / ED-109A is required to orientate themselves in the use of Object-Oriented Technology.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Understand the approach to use object-oriented technology
- Have a clear and succinct vision of other supplements (DO-330 / ED-215, DO-331 / ED-218, DO-333 / ED-216)
- Be able to apply this standard to critical developments in on-board aeronautics and CNS/ATM areas

PROGRAM

DO-332 / ED-217 Introduction
Standards history
Presentation of object development and its safety issues

Overview of planning, development, verification, quality and configuration management processes
Objectives, activities, expected results, known hard points and existing workarounds

Introduction to supplement
DO-330 / ED-215– Software Tools Qualifications
DO-331 / ED-218– Development and verification in aeronautics based on formalized models
DO-333 / ED-216–Formal Methods

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

DO-333 / ED-216

Formal methods verification

DO-333 / ED-216 Formal Methods is a supplement to DO-178 / ED-12C and DO-278 / ED-109A. It deals with Formal Methods which to date no avionics certification project has been recognized for its use of the formal evidence. However, there are formal technologies that would facilitate the development of avionics software.

The purpose of this training is to provide an overview of this uncommon but advantageous method as described by DO-333.

Time: 2 days

Price on demand

AUDIENCE

This training is intended for anyone involved in critical or non-critical software projects development or wishing to achieve a level of assurance for certification or to improve reliability of its processes. It is mainly aimed at project managers and batch managers, but also at team members.

A good knowledge of DO-178C / ED-12C and/or DO-278 / ED-109A standards is required to orientate themselves in the use of formal methods.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Understand the approach to use of formal methods
- Have a clear and succinct vision of other supplements (DO-330 / ED-215, DO-331 / ED-218, DO-332 / ED-217)
- Be able to apply this standard to critical developments in on-board aeronautics and CNS/ATM areas

PROGRAM

Introduction to DO-333 / ED-216
Standards history
Presentation of formal
Verification and interaction with DO-331 / ED-218
Strengths and weaknesses of each type of formal analysis

Overview of planning, development, verification, quality and configuration management processes
Objectives, activities, expected results, known hard points and existing workarounds

Introduction to supplement
DO-330 / ED-215–Software Tools Qualifications
DO-331 / ED-218–Development and verification in aeronautics based on formalized models
DO-332 / ED-217–Object Oriented Technology

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

DO-278 ED-109 – Software Integrity Assurance

Software Integrity Assurance Considerations for Communication, Navigation, Surveillance and Air Traffic Management Systems

DO-278 / ED-109 governs the development and testing of software embedded in Communication, Navigation, Surveillance (CNS) and Air Traffic Management (ATM) critical systems.

It provides recommendations on engineering aspects of critical embedded software, taking a process-oriented approach

Time: 2 days

Price on demand

AUDIENCE

This training is intended for anyone involved in the development of embedded software, namely: software managers, project managers, method and quality managers, software architects, software verifiers and software coders. It can also be useful for project owners who wish to understand this standard.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Understand the approach to apply for qualification and approval of CNS / ATM software
- Understand the recommendations applying to software for embedded systems
- Have a clear and succinct vision of DO-248B / ED-94B
- Highlight the differences with the ED-153
- Be able to apply these standards to critical developments in ATM / CNS systems.

PROGRAM

Introduction to DO-178B / ED-12B
Regulatory context:
History of standards and other applicable standards (PHARE, DISCC etc ...),
Role and resources of the Authorities
Introduction to Safety:
Interaction between failures, breakdowns and vulnerabilities / system of systems, systems / hardware / software
Links between software safety and acceptable risks
Correlation between criticality and design effort

Overview of planning, development, verification, quality and configuration management processes
Objectives, activities, expected results, known hard points and existing workarounds

Deepening the management of COTS components
Planning, acquisition and Configuration Management
Demonstration of integrity interfaces

Overview of DO-248B / ED-94B
Additional explanations about DO-278 / ED-109 objectives

Differences from ED-153
Highlighting points of divergence

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

DO-278A ED-109A - Software integrity assurance

Considerations for Communication, Navigation, Surveillance and Air Traffic Management Systems

DO-278A / ED-109A governs the development and testing of software embedded in Communication, Navigation and Surveillance (CNS) and Air Traffic Management (ATM) critical systems.
It provides recommendations on engineering aspects of critical embedded software, taking a process-oriented approach.

Time: 2 days

Price on demand

AUDIENCE

This training is intended for anyone involved in the development of embedded software, such as: software managers, project managers, method and quality managers, software architects, software verifiers and software coders. It can also be useful for project owners who wish to understand the standard.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Understand the approach to apply for qualification and approval of CNS / ATM software
- Understand the recommendations applying to software for embedded systems
- Have a clear and succinct vision of standard supplements (DO-330 / ED-215, DO-331 / ED-218, DO-332 / ED-217, DO-333 / ED-216) and DO-248C / ED-94C
- Highlight the differences with the ED-153
- Be able to apply these standards to critical developments in ATM / CNS systems.

PROGRAM

DO-178C / ED-12C
Introduction
Regulatory context:
Standards histories
and other applicable standards (PHARE, DISCC, etc.),
Role and resources of Authorities
Introduction to Safety:
Interaction between failures, breakdowns and vulnerabilities / system of systems, systems / hardware / software
Links between software safety and acceptable risks
Correlation between criticality and design effort.

Overview of planning, development, verification, quality and configuration management processes
Objectives, activities, expected results, known hard points and existing workarounds

Deepening the management of COTS components
Planning, acquisition and Configuration Management
Demonstration of integrity interfaces

Overview of DO-248C / ED-94C
Additional explanations about DO-278A / ED-109A objectives

Differences from ED-153
Highlighting points of divergence

Introduction to supplements
DO-330 / ED-215 – software tools Qualification
DO-331 / ED-218- Development and verification in aeronautics based on formalized models
DO-332 / ED-217 – Object Oriented Techniques
DO-333 / ED-216 – Formal Methods

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

ED-153 – Software Safety Assurance

Guidelines for ANS Software Safety Assurance

EUROCAE ED-153 standard is used in software integrity verification in an ATM (air traffic management) and CNS (Communication, Navigation and Surveillance) context.

Time: 3 days

Price on demand

AUDIENCE

This training is intended for software quality engineers, software project managers, software architects, software developers, software testers involved in integrity assurance procedures.

General knowledge of software engineering and software quality assurance is required for this training.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Present the complementarity between ED-109A and ED-153
- Present the link to IEC / ISO 61508
- Know the approach for implementing the safety assurance of ATM / CNS software
- Present the limitations defined by the DSNA/DTI (MET-001)

PROGRAM

Introduction
History
Definition of software safety
Presentations of primary, support, organizational and additional life cycles
Environment definition (PHARE, DISCC, IR-ATM)

Software Safety Assurance
Safety demonstration (ADF and FMEA)
SWAL *(Software Assurance Level)* objectives and measures

Process overview
Objectives, activities, expected results, known hard points and existing workarounds
Issues related to COTS
Relationship with Authorities
Introducing the annexes: ESARR 6 traceability

Differences between ED-153 and ED-109A
Advantages and differences of the ED-153

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

EU 373/2017 Regulation

New European approaches for carrying out safety analysis

Regulation EU 373/2017 proposes a new approach for carrying out and facilitating safety analysis by taking into account existing systems already in operation. The scope of applicability of this regulation is: DSAC, ATM / ANS, ATS, MET, AIS, DAT, CNS, ATFM, ASM, ASD, NM and PERS.

Time: 1 day

Price on demand

AUDIENCE

This training is intended for anyone involved in carrying out safety analysis at a European ANSP (DSNA/DTI for France).

Knowledge of 482/2008 and 1035/2011 standards is a plus.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Present the methodology followed by the French ANSP (Air Navigation Service Provider)
- Present the issues currently encountered
- Introduce the fundamental changes for the application of EU 373/2017 regulation

PROGRAM

Safety analysis
Issues
Methodology applied by DSNA/DTI

Current regulation context
EU 482/2008, 1034/2011 and 1035/2011
Problems encountered
Shortcuts followed by other ANSP
Need for a new regulation

EU 373/2017 regulation

Distinction between ATS and non-ATS services
Distinction between "safety assessment" and "safety support assessment"
Risk acceptability
Acceptable level of robustness
Safety criteria

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

SAFETY ANALYSIS FOR ATM NETWORK

ATM Network System Security Study

EU2017-373 / MET-001 / MET-006

Description

Regulation 2017/373 proposes a new approach to carrying out safety studies, facilitating them by taking into account existing systems already in operation. A new approach for safety studies (MET-001 / MET-006) is implemented to meet the needs of EU Regulation 2017/373

Duration: 1 day

Price on demand

AUDIENCE

This training is intended for anyone involved in carrying out safety studies with a European ANSP (DSNA/DTI for France). A pre-knowledge of Regulation (EU) 2017/373 would be a plus.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Know the steps to be applied for carrying out safety studies (system and/or software) to comply with Regulation (EU) 2017/373
- Reminding of the procedure for managing a change
- Present the barrier security model

PROGRAM

Regulation (EU) 2017/373
Regulatory reminders

Change Management (PRO-002)
Change Management Process
Change lifecycle
Change Analysis
Operational commissioning
Exploitation

Barrier model
Overview of the Barrier Security Model

Introducing MET-001
Approach to a safety study (impact analysis, definition of Hazards, Safety Criteria and Means of Intervention Risk reductions; etc...).
Description of a case according to 2017/373 (MET-001 bis)

Introducing MET-006
Software Processing Methodology (Evaluation and Risk Mitigation)

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

ECSS-Q-ST-30
HSIA & FMEA SW

Software robustness to hardware failures and software design defects

Anticipating the failures of our software and ensuring that the software is properly specified to react towards hardware failures is an important step in safety process.

Time: 1 day

Price on demand

AUDIENCE

This training is intended for anyone involved in critical systems and/or software projects development applying ECSS or equivalent standards.

It is mainly aimed at safety engineers, quality assurance engineers and project managers who want to have a better understanding of ECSS-Q-ST-30 standards content and mainly the links between FMEA and HSIA.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Develop the quality approach to be implemented at project management and product assurance level
- Understand the main ECSS standards applied in space domain

PROGRAM

Introduction to ECSS Standards
Presentation of all existing standards

Integration of risk analyses into the development cycle
Advantages of a risk analysis approach
Roles of safety analysis

Overview of FMEA and HSIA processes
FMEA processes: Software failures effects analysis
HSIA: interactions between software and hardware

Safety and robustness
The FMEA as justification for the choice of design and architecture

Complementary operational safety analyses
FHA
CMA
CCA
Contingency Analysis

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

ECSS-Q-ST-80C

Software Product Assurance

This training presents quality assurance requirements for design, development, and the operational use of software in Space Systems.

Time: 2 days

Price on demand

AUDIENCE

This training is intended for anyone involved in critical systems and/or software projects development applying ECSS or equivalent standards.

It is mainly aimed at quality assurance engineers and project managers who need to have a clear vision of software certification impact on their project or system and a better understanding of the ECSS-Q-ST-80C standard.

A first experience in quality, quality assurance, process assurance or product assurance would be a plus.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Develop the quality approach to be implemented at project management and product insurance level
- Understand the main ECSS quality standards applied in space domain

PROGRAM

Introduction to ECSS standards
Presentation of all different standards

Integration of quality assurance into the development cycle
Principles of Quality Assurance
Advantage of a software quality assurance approach

ECSS-Q-ST-80C standards presentation
Standard organization
Implementation of software quality assurance
Expected documentation

Introduction to software safety

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

ECSS-E-ST-40C

Space Software Engineering

The development of an on or off-board software in space domain requires a rigor and a sufficient level of quality to ensure the people and/or product safety. The ECSS-E-ST-40C discusses the engineering processes that need to be put in place in order to achieve these goals.

Time: 2 days

Price on demand

AUDIENCE

This training is intended for anyone involved in critical systems and/or software projects development applying ECSS or equivalent standards. It is mainly aimed at project managers, system engineers and product insurance engineers who want to have a better understanding of the ECSS-E-ST-40C standard content. A first experience in system/software or space development would be a plus.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Understand ECSS-E-ST-40C standard
- Understand processes, management and requirements integration
- Implement software project management

PROGRAM

Introduction
Terminology and definitions
Concept and process
Responsibilities

Software engineering process
Link to Systems Engineering, Product assurance, Production and Operations
Link with other ECSS (ECSS-E-ST-10, ECSS-E-ST-70, ECSS-M-ST-10, ECSS-Q-ST-80, ...).

Requirements
Identifying requirements for each process:

- Software system requirements
- Software management
- Engineering of architecture and software requirements
- Software design and production
- Software Validation
- Software delivery and acceptance
- Software verification
- Software exploitation
- Software maintenance

Documentation
Expected documents presentation

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

SIA - Software Integrity Assurance for SME

Progressivity in Software Integrity Assurance for Small Organizations

*Entirely designed by **OLGHAM**, the SIA or Software Integrity Assurance is an alternative method to achieve assurance levels by partitioning and gradually introducing activities required by DO-178C, ED-109A or ED-153 standards.*

The SIA offers a gradual solution and fully anchored in the industrial context for project with difficulties to reach the objectives of applicable standard.

Time: 1 day

Price on demand

AUDIENCE

This training is intended for anyone involved in critical or non-critical software projects development wishing to achieve a level of assurance for certification or to improve its process's reliability. It is particularly aimed to project managers and batch managers, but also concerns team members

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Introduce the whole Software Integrity Assurance
- Adapt the guideline in the project context and objectives

PROGRAM

Software Integrity Assurance concepts
Objectives
Document's structure
Effort levels
Rigor levels
Partitioning out goals
Definition of a roadmap
Determining a starting point
Related management strategies
Achieving the goal
The pros and cons of using SIA

Preliminary analysis
Situation
Adaptation to the project's geometry
Creating *in situ* examples
Determining a starting point
Related management strategies
Achieving the goal
The pros and cons of using SIA

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

Software plans Development

Producing software plans is the basis of a software development and verification strategy. They are addressed by DO-178C and DO-278C standards and are a prerequisite for certification.

The aim of this training is to present the fundamentals but also to optimize and avoid the potential pitfalls of writing software plans.

Time: 1 days

Price on demand

AUDIENCE

This training is intended for anyone involved in critical or non-critical software projects development wishing to achieve a level of assurance for certification or to improve the its process's reliability. It is particularly aimed at project managers and batch managers, but also concerns team members.

A good knowledge of DO-178C / ED-12C and/or DO278A / ED-109A standards is desirable.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Know the major topics to anticipate and detail in software project plans
- Reducing documentation efforts without sacrificing information
- Understand the plans writing optimization from one project to another

PROGRAM

Fundamental

DO-178C / DO-278A
Software Plans and standards
Major technical topics to be addressed in the plans
Granularity of information to be placed in plans
The main types of plans:

- Development plan
- Audit plan
- Quality Assurance Plan
- Configuration Management Plan

Other types of plans
Plan structure

Software obsolescence

Planning and obsolescence anticipation
The material necessary to manage obsolescence

Optimization

Documentation reduction efforts while maintaining the same level of information
Subcontracting planification
Incremental method for writing plans from one project to another

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

AGILE METHOD

Software development according to AGILE method

Since their democratization, Agile methods have been heavily used in the world of software development. These methods target to be more pragmatic and reactive than traditional methods such as the V-cycle. In this context, the objectives of this training are to provide a detailed view of the circumstances that justify these alternative methods use with the aim to reduce the project effort and costs.

Time: 1 day

Price on demand

AUDIENCE

This training is aimed at any person or team involved in critical software, hardware and system projects development applying or wishing to prepare for the integration of agile methods. It is particularly aimed at project managers and batch managers, but concerns also team members.

Knowledge of basic project management techniques in conventional and/or Agile lifecycles is required.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Synthetically introduce the specifics of "LEAN," "AGILE," "SCRUM," "XP", … methods.
- Analyses optimization and reduction of development efforts through alternative methods
- Analysis optimization and reduction of verification efforts through alternative methods

PROGRAM

Fundamental
The most efficient timeline for verification and development processes
The impact of life cycle choice on development
"Active multi-dissimilar" method for drastically reducing audit targets and development costs

Verification and alternative methods
Reducing verification efforts in tense environments
Optimizing existing verification processes by equivalent alternative methods

Development and alternative methods
Alternative methods without writing requirements
Optimizing existing development processes by equivalent alternative methods

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

SEU and MBU Robust software development

Single Event Upsets & Multiple Bit Upsets

The interaction of cosmic particles with our atmosphere creates a neutron flow. These charges can be deposited on a microelectronics device and disrupt them. This phenomenon is called a SEU or software error when it involves 1 bit. Beyond 1 bit, this phenomenon is called an MBU.

Time: 1 day

Price on demand

AUDIENCE

This training is intended for engineers and technicians concerned with safety or electronic design, equipment and structure. It is intended for any equipment manufacturer or system that produces electronic equipment or components

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Understanding the phenomenon of cosmic radiation and its impacts
- Know the normative environment and analysis levels to protect your equipment/system from such interactions

PROGRAM

Environments presentation

Naturally radiative environment

Space and terrestrial environment

Interaction between radiative particles and matter

Effects on electronic components

Triggering a singular event

Factors of influence

- Latitude
- Longitude
- Earth natural protection

The different analyses

Safety Assessment Process

Particular Risk Analysis (PRA)

Qualitative -quantitative analysis

Prevention solutions

Single event effects test

Designing a system

Protective barrier

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

Optimization, validation and verification software strategy

The aim of this training is to exceed the objectives of ARP-4754A and DO-178C / ED-12C by proposing new validation and verification paradigms, and thus to reconcile certification constraints and industrial constraints at best. Several alternative solutions will be on display.

Time: 2 days

Price on demand

AUDIENCE

This training is intended for anyone involved in the development of systems and/or software for high-integration or complex on-board systems. It is particularly for project managers, software managers, method engineers, on-board systems certification managers and quality assurance managers.

General knowledge of DO-178 systems and software engineering or system/software quality assurance would be a plus.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Introduce the system validation and verification strategy for on-board system software
- Presenting the inherent classic issues in a classic V&V approach
- Identify cases where an ARP-4754A and DO-178 V&V type approach could lead to counterproductive side effects
- Explain how to organize a certification argument in a deviation context

PROGRAM

Strategy

Checking at the system level based on the software level

Classic problems of DO-178C RBT approach

Benefits of HLR/LLR merge for verification efforts

Distinction between SVCP and (VC; VP)

Identification of effective validation strategies.

Validation

Tool Qualification according to DO-330

Definition of the different nominal ranges

Supervision treatment

SEU / MBU and means of detection and correction

Problem of real numbers, objects-oriented languages

Check deactivated code, additional code, PDS and COTS

Verification

Non-regression

Root cause analysis of failed processes

Static verification of a MVDS (Multiple Dissimilar Software version)

FLS Check (Field Loadable Software)

Calculation of WCET

Levels of rigor from IEC 61508-3

Context of AI /ML / DL

Content of an SVP

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

SDRA

Static detection of Residual Anomalies

The methodology aims to highlight software anomalies that have not been successfully detected by the existing verification.

It is based on several lines convergence of analysis that are chosen according to the software product observed weaknesses.

Time: 2 days

Price on demand

AUDIENCE

This training is intended for anyone involved in software development: software managers, quality managers, project managers, quality engineers, software development engineers and test engineers.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Present the SDRA method (Static Detection of Residual Anomalies
- Identify software anomalies (coding error), verification holes
- Review of development and verification processes

PROGRAM

Method presentation
Anomalies identification
Coding mistakes

Development process
Finding faulty processes
Verification
Validation

Anomalies classification

Curative and preventive solutions

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

RD³

Robustness and Defensive Driven Development

RD³ is the contraction of RDDD which is the acronym for Robustness Defensive and Driven Development.

RD³is a reverse software development method from conventional approaches. Indeed, the software architecture and development are developed as a generic structure that implements all the robustness as well as the defensive in the first place. Functional development then fits naturally into this structure with the advantage to be reusable from one project to another.

This results in an extremely robust software at a lower development and verification cost than conventional development.

Time: 1 day

Price on demand

AUDIENCE

This training is intended for anyone in charge of software development: project managers, architects, development managers, audit managers, quality managers.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Contextualization of errors, failures and interactions HW/SW and SW/SW
- Introducing the RD³ method
- Appropriate reduction in verification efforts
- Strength of these approaches for particular contexts acceptance (COTS, PDS, History in service, etc...)

PROGRAM

Situation
Contextualization of errors and failures and interactions HW/SW and SW/SW

Weaknesses of conventional verification
Introducing the different verification spaces
Net analogy
Spreading errors
Regression paths
COTS contribution to errors
Contribution of SDPs to errors

Robust and defensive development
Reliability
Availability
Maintainability
Safety- harmlessness
Safety-confidentiality

Introducing the RD³ method
"MicroSat / NanoSat" analogy
Distinction between symptoms and errors/failures
The different levels of reliability
Communication in a distributed system
Dissimilar redundancies
Built-In Tests (PBIT, CBIT, IBIT)
Memory redundancies
The confidence levels of functions
Adapting functional branches to depending on the distribution of confidence importance

Supervisors
Dynamic control of size conservation
Dynamic control of data coupling
Dynamic control of control coupling
Battery monitoring

Dynamic reconfiguration techniques
Introducing the various transparent dynamic reconfiguration techniques
Focus on non-transparent dynamic reconfigurations

Benefits
Optimizing verification
COTS acceptance
Partial reuse of previously developed software acceptance
Software without life cycle data (no specification, very few verification) acceptance
In service history file acceptance
Decoupling preparation in case of modifications

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

9 software structural covers

Highlighting the power of these software development analysis

Structural coverage of instructions
Structural coverage of decisions
Structural coverage of conditions in decisions (MC/DC)
Structural coverage of assembled branches
Structural coverage of data coupling
Structural coverage of the coupling of controls
Structural coverage of software components (CSU, CSC)
Structural coverage of the worst case of execution
Structural coverage of robustness

Time: 1 day

Price on demand

AUDIENCE

This training is intended for people in charge of the development of critical software (project managers, audit managers, quality managers).

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Know the 9 structural software covers
- Find out all the benefits from each analysis in the demonstration of verification completeness (verification of the verification)
- Discover the additional demonstrative considerations of these analyses in traditional industrial contexts (COTS, PDS/Legacy, in Service history, etc.)
- Find out how to easily perform these analyses without specific tools

PROGRAM

Situation
Contextualization of structural coverage analyses in critical contexts
Introducing adequacy for non-critical software developments
General Principles of Structural Coverage

Detailed description and presentation of how to make them without tools
Structural coverage of instructions
Structural coverage of decisions
Structural coverage of conditions in decisions (MC/DC)
Structural coverage of assembled branches
Structural coverage of data coupling
Structural coverage of control coupling Structural flow of software components (CSU, CSC)
Structural coverage of the worst case of execution
Structural coverage of robustness

Identification of contributions
Stop-checking criteria
Adjustment principle RBT
Identifying weaknesses in verification
Detection of unexpected features
Additional code detection
Validating deactivation mechanisms
Identification of the defensive code

Traps to avoid
Non-credit verification
Non-credit for logical error detection
Non-credit of completeness of all requirements
Non-credit of completeness of implementation of each requirement

Use of the dilution principle
COTS acceptance
Partial reuse of previously developed software acceptance
Software without life cycle data (no specification, very few verification) acceptance
In service history file acceptance

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

Data Coupling Analysis (DC) and Control Couplings (CC)

The efficient software architecture through the streams of data and controls

Designing software around Data and Control Couplings can effectively build barriers against the spread of errors, and ensures the software health of in real time.

This training helps to demystify all the problems related to couplings, and thus helps to guide software developments from the point of view of functional reliability and availability.

Time: 1 day

Price on demand

AUDIENCE

This training is intended for people in charge of software development: project managers, audit managers, quality managers.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Contextualization of Data and Control Coupling (DC/CC) in the existing regulatory environment (including aeronautical certification)
- Introducing all subtypes of couplings
- Strength of these approaches for the particular contexts (COTS, PDS, in service History, etc...) acceptance

PROGRAM

Situation
Contextualization of Data and Control Matching (DC/CC) in the existing regulatory environment
Power of these analyses to demonstrate reliability and availability: required in critical contexts for certification

Software design
Building a software architecture by couplings
Identifying integrity barriers that protect against the spread of errors
Operating safety lock in reliability and availability
Functional cybersecurity protection

Data coupling
Data dictionary
internal interfaces coupling
external interfaces coupling
structures (stamp) coupling
Content coupling

Weaknesses

Object-oriented techniques

Control coupling
State and sequence diagrams
State coupling
Synchronous /asynchronous coupling
Interruption coupling

Structural coverage
DC/CC Coverage
Demonstration

Measuring cohesion
Functional cohesion
Sequential cohesion
Communication cohesion
Procedural cohesion
Temporal cohesion
Logical cohesion
Coincidence cohesion

Benefits
Coupling benefits
Verification optimization
COTS acceptance
Partial reuse of previously developed software acceptance
Software without life cycle data (no specification, very few verification) acceptance
In service history file acceptance
Decoupling preparation in case of modifications

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

Non-regression impact analysis process

Most of the software errors found during test campaigns occur as a result of a change. The primary objective of this training is to present means to protect against regression during a change through further analysis.

Time: 1 day

Price on demand

AUDIENCE

This training is intended for anyone involved in software or system projects development, critical or not, and wishing to achieve a level of assurance for certification or to improve its process's reliability. It is particularly for project managers and batch managers but is highly recommended to the complete teams.

Knowledge of the fundamentals for project management in conventional lifecycle and/or Agile is a plus.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Define best practices for implementing change during development
- Present the challenges of amending a PDS (Previously Developed Software)

PROGRAM

Fundamental
The Challenges of Impact Analysis
The Issues of Non-Regression Analysis
The analyses complementarity

Impact analysis
Traceability management
Analysis by expertise
Identifying life cycle data
Impact of change on verification
Delineation of verification cases to be replayed
The case of PDS

Non-regression analysis
Traceability management
Verification
Data and Control Coupling
Real-time analysis
Margins analysis
HMI analysis
Structural analysis

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

Dynamic software integrity control

Dynamic detection of software anomalies and hardware failures and automatic reconfiguration

Designing complex software also means admitting that not all contexts could be completely verified as the combination can be gigantic. An alternative approach is to consider that anomalies can occur, as well as hardware failures, then to design the architecture and development strategy around this principle in order to avoid malfunctions and denials of service.

The integration of COTS or previously developed software components without the assurance of a full verification can also be considered favorable contexts for this approach.

Time: 1 day

Price on demand

AUDIENCE

This training is intended for people in charge of software development: project managers, architects, development managers, quality managers.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Contextualization of errors, failures and interactions HW/SW and SW/SW
- Introducing functional safety techniques
- Appropriate reduction in verification efforts
- Strength of these approaches for the particular contexts (COTS, PDS, History in service, etc...) acceptance

PROGRAM

Situation
Contextualization of errors, failures and HW/SW + SW/SW interactions
Introducing the different verification spaces
Reduced static testing efforts when dynamic anomaly detections are implemented

Dynamic detection techniques
Introducing the different dynamic detection techniques
Identifying integrity barriers that protect against the spread of errors
Operating safety lock in reliability and availability
Functional cybersecurity protection

Dynamic reconfiguration techniques
Distinction between symptoms and errors or breakdowns
Introducing the various transparent dynamic reconfiguration techniques
Focus on non-transparent dynamic reconfigurations

Differences between detection of anomalies and detection of failures
Simultaneous detection techniques for multiple anomalies and multiple failures

Impact of RAMS analysis at the architectural level
Adjusting programming techniques

Control coupling
State and sequence diagrams
State coupling
Synchronous /asynchronous coupling
Interruption coupling

Structural coverage
DC/CC Coverage Demonstration

Coupling approach
Capital gains from couplings
Introducing data couplings
Introducing control couplings
Structural coverage of couplings

Benefits
Optimizing verification
COTS acceptance
Partial reuse of previously developed software acceptance
Software without life cycle data (no specification, very few verification) acceptance
In service history file acceptance
Decoupling preparation in case of modifications

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

COTS integration in software development

The COTS exploitation has been widely adopted in software projects development for CNS/ATM systems. Many categories of COTS can be cited, including: operating systems, real-time cores, or execution libraries and data management systems.

The primary objective of this training is to provide the keys to understand the issues and alternative methods related to COTS integration in software development.

Time: 1 day

Price on demand

AUDIENCE

This training for anyone involved in the development of systems and/or software using COTS or wishing to integrate it.

It is particularly for project managers, software managers, method engineers, on-board systems certification managers and quality assurance managers. An in-depth knowledge of software engineering such as DO-178 or ED-109 would be a plus.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Introduction to COTS integration in software development under DO-278A / ED-109A
- Introduce alternative methods developed to reduce COTS integration efforts

PROGRAM

Fundamentals

COTS in a context of DO-178C / ED-12C development
COTS in DO-278A / ED-109A development context
Acquisition of COTS and configuration management
Functional software requirements met by COTS
Protection of undesired functions and Derived Requirements

Alternative Methods

COTS classification by level of complexity: CAL method (COTS Assurance Level)
COTS analysis by cylinder method
Formal method
Design COTS
COTS operating system
In-service COTS experience as a certification help

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

Reuse of in-service experience

If the safety equivalent of an in- development software can be demonstrated by the use of the in-service experience, some of the credit for certification can be removed. The purpose of this training is to present a complete view of the expectations in order to use the in-service experience as support for certification.

Time: 1 day

Price on demand

AUDIENCE

This training is intended for anyone involved in critical or non-critical software projects development wishing to achieve a level of assurance for certification. It is particularly for project managers and batch managers, but can also concerns team members.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Presenting the in-service experience for DO-278A / ED-109A and DO-178C / ED-12C
- Define this method acceptance in a certification context
- Understand development relief through the use of in-service experience

PROGRAM

Fundamentals
The in-service experience
Cases of use

In-service experience acceptance
Management configuration
Efficiency of error report
Software stability
Software maturity
Operational environment compatibility
Choosing the in-service period experience to consider
Rate and severity of errors during the in-service period
Impact of changes

Reducing development efforts
In-service experience and verification
The COTS case

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

IEC 61508: Functional Safety of control systems

Hardware Part

IEC 61508 standard defines requirements to ensure that integrated systems and software are designed, implemented, operated and maintained to provide a precise level of integrity and safety (SIL).

Time: 1 day

Price on demand

AUDIENCE

This training is intended for anyone involved in critical systems and/or software projects development to comply with IEC 61508.

It is particularly for service managers, project managers and engineers involved in the development of critical systems, software and hardware according to IEC 61508.

Knowledge of functional safety is a plus.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Understand the IEC 61508 requirements
- Be able to apply the IEC 61508 requirements within a software project development applying this standard.

PROGRAM

Introduction to IEC 61508
Standard History
Vocabular, principles and issues
Link between the standard other components: (parts 1 to 7)

Standard's organization
Structure
General Principles

Determination of the SIL

Detailed study of the hardware part standard
Lifecycle and management requirements
Hardware Safety Integrity
Calculating the probability of failures
Failure detection tools (FMECA, Failure Trees...)

Introduction to IEC 61508 standards
Industrial processes: IEC 61511
The nuclear domain: IEC 61 513
The automotive domain: ISO 26262
The aeronautic domain: DO-178

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

DO-254 ED-80

On-board electronic design assurance equipment

DO-254 / ED-80 Standard is designed to meet avionics certification requirements for the electronic development Sets (equipment, maps, programmable components)

Time: 2 days

Price on demand

AUDIENCE

This training is intended for anyone involved in electronic development such as: hardware managers, quality managers, project managers, quality engineers, electronic development engineers, test engineers and system or hardware engineers.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Introduce DO-254 / ED-80 standard for on-board electronics design assurance
- Understand certification safety for complex electronic equipment issues
- Be able to apply these standards to critical developments in on-board aeronautics

PROGRAM

On-board electronics certification
Principles of quality assurance
Systems Functional Safety
Accident risks and causes,
Link with hardware development

Processes key point
Planning
Requirements table
Development
Verification - Validation
Configuration management
Process assurance
Relationship with authorities
Tools and reusable components

Link to other standards and reference documents
AMC 20-152A, CM-SWCEH-001

COTS Component Management
COTS planning, acquisition and configuration management
Demonstration of integrity interfaces

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

ARTIFICIAL INTELLIGENCE DEVELOPMENT PROCESS

CERNA Report

Robotics research ethics

The Allistene Digital Science and Technology Research Ethics Committee (French CERNA) stated that research establishments or institutions set up ethics committees in digital sciences and technologies for projects likely to have a direct impact on society.

Time: 1 day

Price on demand

AUDIENCE

This training is intended for anyone involved in a research process: researchers, university staff, PhD students, scientists of any structure: school, institute, private company, competitiveness pole, public operator.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Introducing the research context
- Introducing the different technologies and their design
- Introducing integration characteristics into the social scheme
- Introducing the limits of robotics and ethical considerations

PROGRAM

Context
The Commission
The objectives
Ethics definition in research domain
Legal framework
Technology and social inclusion
Collective responsibility

Typology
Simple integration
Complex integration
Multi-robots

Autonomous and robotic systems classification
Robot with individuals or groups
Robots in the medical domain
Robots in defense and security

Architecture and Design
Confidence
Limits
Behaviour tracking
Autonomy and integrity
Responsibility

Skills and Interaction
Autonomy and Decision-making
Life imitation and social interaction
Humans repair by machines

Ethical recommendations
Code of ethics
Operational ethics committee
Legal monitoring
Attack prevention

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

AI: CoDANN

Software design concepts for neural networks (AI)

Certification of critical software

On 31 March 2020, EASA published the first ever report to study the challenges posed by the use of neural networks, derived from Artificial Intelligence, in the aera of aeronautics. This report is the precursor to a future European repository that will be produced in successive stages between 2021 and 2025.

This training helps to understand the problems of design and verification of AI software which, by nature, are non-deterministic, and whose automatic decisions cannot be anticipated, and therefore are unspecified. Thus, the solutions provided indicates the way the software needs to be developed and verified.

Time: 2 days

Price on demand

AUDIENCE

This training is intended for people in charge of the development of artificial intelligence-based software using neural network techniques (project managers, architects, development managers, audit managers, quality managers).

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Introducing the EASA regulatory certification schedule for AI/NR (Artificial Intelligence/Neural Network) software until 2035
- Course in AI/NR programming
- Introducing AI/NR issues
- Presentation of EASA's solutions

PROGRAM

Situation
Contextualization of critical software certification in aviation
Introducing the EASA regulatory certification schedule for AI/NR (Artificial Intelligence/Neural Network) software until 2035, with autonomous piloting application in 2035
Introducing existing standards and their applications to AI (ML/DL: Machine Learning / Deep Learning)

AI/NR issues
Non-determinism and safety
Lack of functional specification and RBT principle
Memory allowances

How to program in AI
Principles of neural networks (AI/NR)
The architecture of AI/NR
Learning AI/NR
Application of AI/NR to shape recognition (convolution approach)

Learning (ML/DL)
Learning process
Learning assurance
Advanced concepts for learning assurance
Performance evaluation
Safety evaluation

Adapted principles for certification
The W life cycle to consolidate AI learning (ML/DL)
The limits of generalization
The application of the FMEA to the AI/NR

Use cases and operational concepts
Application to learning assurance in a context of form recognition

Benefits
Application to all domains (critical or non-critical)
AI's strengths and weaknesses in the face of classic developments

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

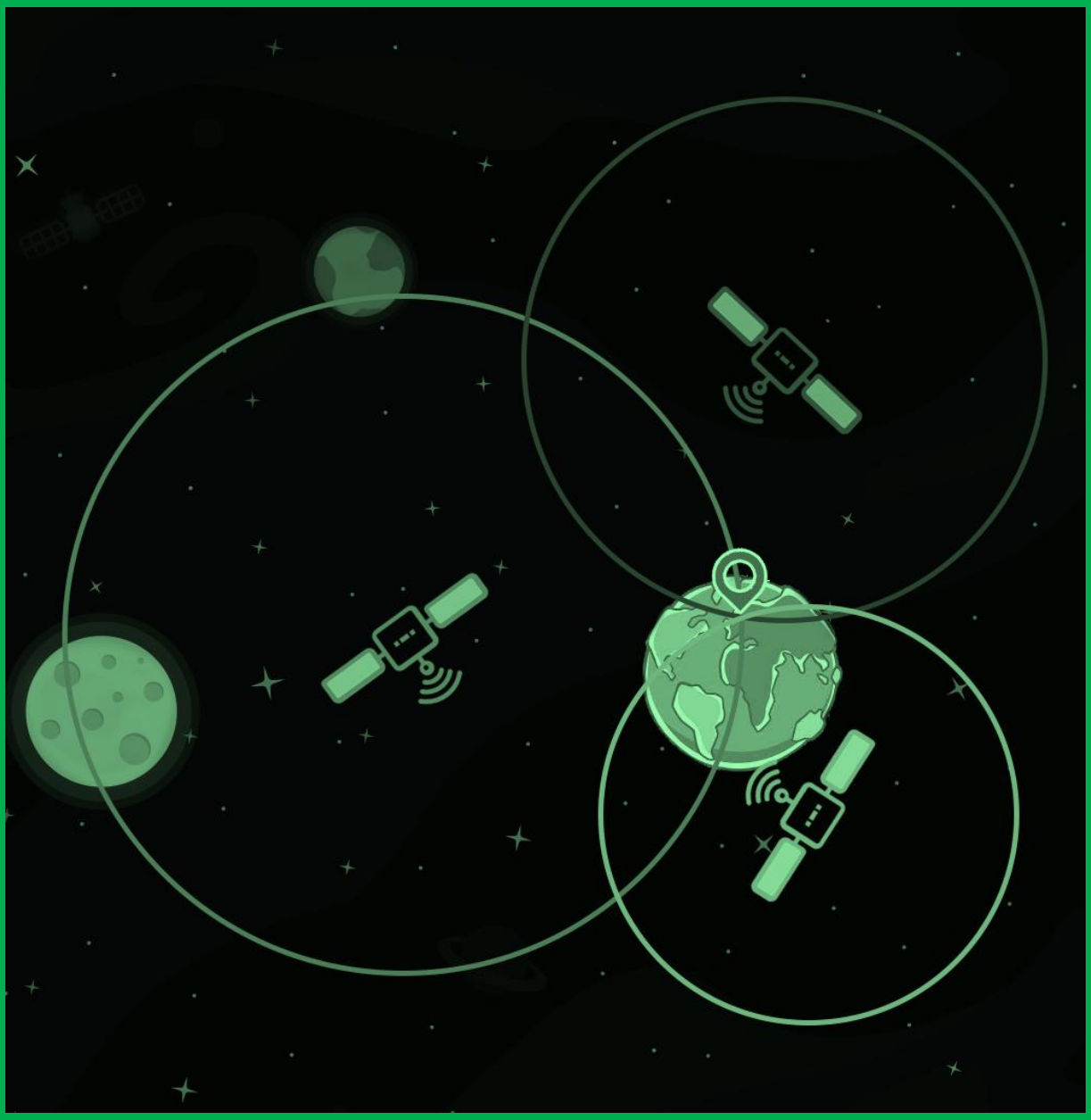
METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

GNSS

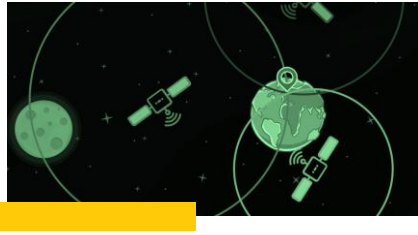


Introduction to GNSS systems, GNSS receiver technology, and SBAS augmentation systems

The purpose of this training is to provide an overview, concise, but sufficiently view of the characteristics, principles and techniques implemented by geolocation systems by processing signals transmitted by GNSS satellite navigation systems (GPS, GALILEO, etc ...) and SBAS augmentation systems (WAAS, EGNOS, etc ...).

Time: 2 days

Price on demand



AUDIENCE AND PREREQUISITES

This training is intended for professionals who need to use GNSS receivers or measurements produced by GNSS receivers in the context of their activities, and who wish to have a more precise vision of the concepts involved in order to be aware of the contributions and limits of GNSS technologies and its SBAS augmentations.

PREREQUISITES

No prerequisite

PEDAGOGICAL OBJECTIVES

- Understand and acquire the basics associated with GNSS systems and technologies and SBAS augmentation systems
- Strengthen mastery of GNSS use by understanding the system's key parameters and observables, as well as raising awareness of the vulnerabilities and limitations of GNSS.

PROGRAM

I - GNSS systems and receiver technology

Presentation and principles of GNSS
Introduction and presentation of major GNSS and augmentation systems
Physical principles implemented

GNSS signals
Signal structures and associated properties
GNSS signal processing techniques

GNSS receivers
GNSS Receiver Architectures
Key measurements produced by a GNSS receiver

Vulnerabilities and limitations of GNSS receivers
Key performance parameters of a GNSS receiver
Main vulnerabilities of a GNSS receiver
Modes of use and quality of measurements provided by a GNSS receiver

II - SBAS augmentation systems - Links with DO-229

Presentation and principles of SBAS
Context and history of SBAS
Architecture and principles of SBAS systems
Description of major SBAS augmentation systems

Services provided by SBAS
Services provided by SBAS
The concept of Integrity
The concepts of Availability and Continuity

EDUCATIONAL RESOURCES

Animation around a presentation.
Treatment of examples and feedback.

METHODS OF ASSESSING LEARNING AND SATISFACTION

The training is carried out face to face. An evaluation test as a quiz with feedback from the trainer is carried out at the end of the session. A live assessment is given to each participant.

CERTIFICATION

Certificate of completion

TERMS AND CONDITIONS

1- OBJECT

The purpose of these General Conditions of Sale is to define the general conditions for participating in our training sessions.

Any registration by the Customer is deemed to be an order deemed accepted by the latter from the receipt of the registration confirmation issued by OLGHAM and implies full and complete acceptance of these conditions which prevail over any other document of the Customer, in particular its general purchase conditions.

2- REGISTRATION AND ORDERING TERMS

Any registration for a training session will be done within 4 weeks before the start date of the session. Registration will be in electronic format. We reserve the right to accept later registrations. The number of participants per session is limited to 9, in particular for the videoconference format.

3- REGSITRATION CONFIRMATION

A training agreement governing the terms of execution will be sent no later than 3 weeks before the start of the training to the Training Manager of the signatory company. Final registration will only be taken into account after receipt of the training agreement duly signed by the Customer and the Customer Purchase Order (if applicable).

In the absence of an agreement signed by the Client 4 weeks before the start of the session, we reserve the right to freely dispose of the places selected by the Client after having informed him.

A summons for the participant(s) will be sent at the latest one week before the start of the session and will provide all the practical information relating to the session (times, location of the training, ...) and particularities.

4- CERTIFICATION OF TRAINING

A certificate of achievement mentioning the objectives, nature and duration of the action will be given to the trainee(s) at the end of the training.

5- PRICE, INVOICING AND PAYMENT

Registration fees cover educational services (teaching, practical work, computer tools, documentation provided, necessary supplies) as well as the costs of breaks and lunch. They do not include any transport and accommodation costs.

The prices indicated on the purchase order are in Euro excluding taxes, to be increased by VAT at the rate in force and all other possible taxes and / or duties withheld at source. Any session started is due in full.

The invoice is sent to the Customer at the end of the training.

Payment will be made upon receipt of the invoice by check payable to OLGHAM 56 Route de Galembrun 31480 PELLEPORT or by bank transfer.

Regarding training financed by a person with their own expense, from the date of signature of the training agreement, the Client has 10 days to withdraw. He informs us by registered letter with acknowledgment of receipt (L 6353-5 of the labour code). In this case, no sum can be demanded from the Customer.

Amounts not paid by the due date indicated on the invoice will give rise to the payment by the Customer of late penalties set at three (3) times the legal interest rate. These penalties are payable as of right and until full payment.

6- CANCELLATION AND POSTPONEMENT CONDITIONS

Any case of cancellation by the Customer must be communicated to us in writing.

For any cancellation, even in the event of force majeure, within a period exceeding thirty (30) calendar days before the start of the session, 50% of the cost of the course will be definitively invoiced to the Client, except in the event of replacement by a participant from the same establishment, confirmed by updating the training agreement. For any registration cancelled within a period of between thirty (30) days and fifteen (15) days, 70% of the cost of the course will be definitively billed to the Client. For any registration cancelled less than fourteen (14) calendar days before the start of the session, or not cancelled (in particular absenteeism or abandonment), 100% of the cost of the course will be definitively billed to the Client.

OLGHAM reserves the right to cancel or postpone a session, in particular in the event of an insufficient number of participants in order to ensure good teaching conditions. The Customer is informed at the latest 1 (one) week before the date of the session ordered. A new training date will be offered to the Customer. Payments received will be fully refunded. No compensation will be paid to the Customer due to postponement or cancellation by us.

7- DISPUTES

If a dispute cannot be settled amicably, the Toulouse Court will have sole jurisdiction to rule on the dispute.

8- COMPUTING AND FREEDOMS

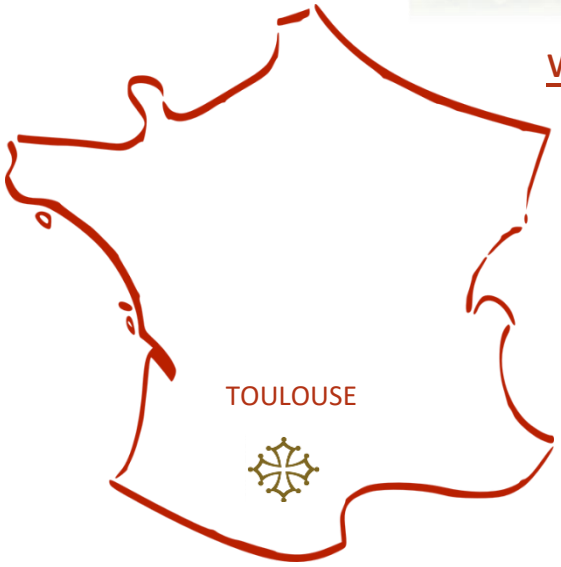
Personal information communicated to us for the execution of the session may be communicated to our contractual partners for the purposes of the training. In accordance with the Law N° 78-17 of January 6, 1978 relating to computers, files and freedoms, the Customer may at any time exercise his right of access, opposition and rectification in our file. In accordance with the obligations of the RGPD, the personal data that you communicate to us will only be used within the framework of the commercial relations between you and our education department. The data will not be used for purposes outside the scope of the requested service and in accordance with the general conditions of use of personal data.

Off-site-training

Domain “Pelleport”
54 route de galembrun,
31480 Pelleport
FRANCE

10 minutes from TOULOUSE-BLAGNAC airport, close to Airbus and AEROSCOPIA and 20 km from TOULOUSE. Direction AUCH by the RN 124.

www.olgham.com



OLGHAM

56 Route de Galembrun
Lieu-dit Thuin
31480 PELLEPORT
FRANCE
Phone : +33 (0)6 49 31 30 23
Registration : formation@olgham.com