

THEORY AND
HANDS-ON
TRAINING
IN AVIONICS

Develop your skills on our
avionics products and systems



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TRAINING CENTER

Collins Aerospace has had a presence in France since 1959 and is based in Blagnac, close to Toulouse, to benefit from the local growth of the aerospace industry in this area.

Our highly qualified engineers and technicians are working on Airbus projects as well as the development, integration and maintenance of military and commercial solutions for other aircraft manufacturers, airlines, ministries of defense, integrators and other companies in France, in Europe and worldwide. Our key capabilities are: avionics for military transport aircraft, helicopters and UAV systems; commercial avionics; and data.

We rely on a flexible structure, advanced methodologies and an inside line on cutting-edge technologies. ISO 9001, ISO 14001, Far 145, Part 145, Part 21G, EN AS-9100, the Production approval Certificate for Manufacturers of Aeronautical Equipment and, more recently, CCAR 145 certification testify to our commitment to a high level of quality.

For over 20 years, we have maintained a team of instructors entirely devoted to serving you.

This training center is part of the Services Business Unit, whose mission is to provide after-sales service on equipment manufactured by Avionics, including those manufactured in France.

Our four full-time instructors have dedicated training facilities and are supported by a whole team of highly qualified technicians and engineers. The success of our training center grows out of this close cooperation, for what we have to offer is not just the skills of individual instructors, but the industrial expertise of an entire company.

The training department constitutes an entry point into our company and showcases our technical capabilities.

Through general courses, our know-how – recognized by cutting-edge businesses the world over – is made available to all areas of activity requiring a high level of technological skills: Aeronautics, electronics, radio communication, GPS, radio navigation, radio direction finding, automatic testing, communications networks, computer hardware repair, strategic communications, data transmission, automatic HF connectivity.

Please feel free to contact our training department directly:

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PRESENTATION OF COURSES

GENERAL COURSES

Basic Principles in avionics is especially designed for people wishing to be sensitized in the aeronautical field, while Initial Avionics is adapted for technical staff to acquire the concepts necessary to progress in the aeronautical field.

Radio Navigation, Radio Communication and Airborne Systems courses provide an opportunity for technical staff to boost their theoretical training quickly with solid fundamentals and through the experience of industry professionals.

These courses are also appropriate for more experienced technicians who wish to keep up with the latest developments in modern avionics.

More specific training courses, such as Radar and Microwave Frequency are designed for specialists.

SYSTEM COURSES

Based on Collins Aerospace equipment, these courses provide you with a comprehensive study of the architecture and maintenance of avionics systems:

Pro Line II, Pro Line 4™, Pro Line 21™, Pro Line Fusion®, 900 Series, FMS, ACARS, IPC-A-610, TCAS, SATCOM, HF ALE, HF E-Mail, Data Link System AIRBUS Environment, Automatic Dependent Surveillance (ADS-B).

EQUIPMENT COURSES

These courses let you study specifics of our products in detail.

These courses are designed for technicians familiar with the principles of radio communication, radio navigation and troubleshooting microprocessor cards.

Courses can be provided at:

- LRU level (Line Replaceable Unit)
- SRU level (Shop Replaceable Unit)
- Component level
- « On-Job Training »

Note: all courses can take place at the customer location and can be customized as required.

BASIC PRINCIPLES IN AVIONICS

DATES

March 19-20, 2019

December 10-11, 2019

DURATION

2 days

2 days

OBJECTIVES

- Present architecture of radio communication and radio navigation equipment available to the pilot.
- This course is open to personnel in contact with the aeronautics sector wishing to learn some avionics. Established electronics knowledge is not necessarily a prerequisite.

PROGRAM

- The Pilot and his Aircraft
 - All the necessary pilot functions to proceed with a safe flight
 - Presentation of an airplane cockpit, the automatic pilot function, flight data display
- Radio communication: Why and with whom?
 - Communications with Air Traffic Control (while in flight or during long range navigation).
- How is navigation accomplished?
 - Short range (beacon, radar, management of aircraft in flight)
 - Long range (GPS, gyro references)



Photo courtesy of Airbus

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RADIO COMMUNICATION

DATES

March 11-15, 2019

DURATION

5 days

OBJECTIVES

- Acquire knowledge of various radio communications devices (HF, VHF, UHF)
- Acquire familiarity with technical and technological aspects of transmission-reception
- This training is dedicated to repair shop technicians familiar with electronics

PROGRAM

- Review of HF, VHF and UHF radio waves
- Review of different modulating signals : AM, FM, USB, LSB
- Description of the various technical characteristics of transceivers (sensitivity, selectivity, distortion)
- Review of how the different types of VHF (AM / FM) and UHF transceivers work
- Review of how the three parts of an HF transceiver (AME, SSB) work
 - Exciter
 - Power amplifier
 - Coupler
- Technologies related to transceivers
 - Phase locked loop (PLL)
 - Frequency synthesizer
 - Automatic gain control (AGC)
 - Automatic frequency control (AFC)
 - Modulator, demodulator (FM, synchronous)
- Practice making primary measurements on Collins Aerospace equipment



RADIO COMMUNICATION CONCEPTS

DATES

Upon request

DURATION

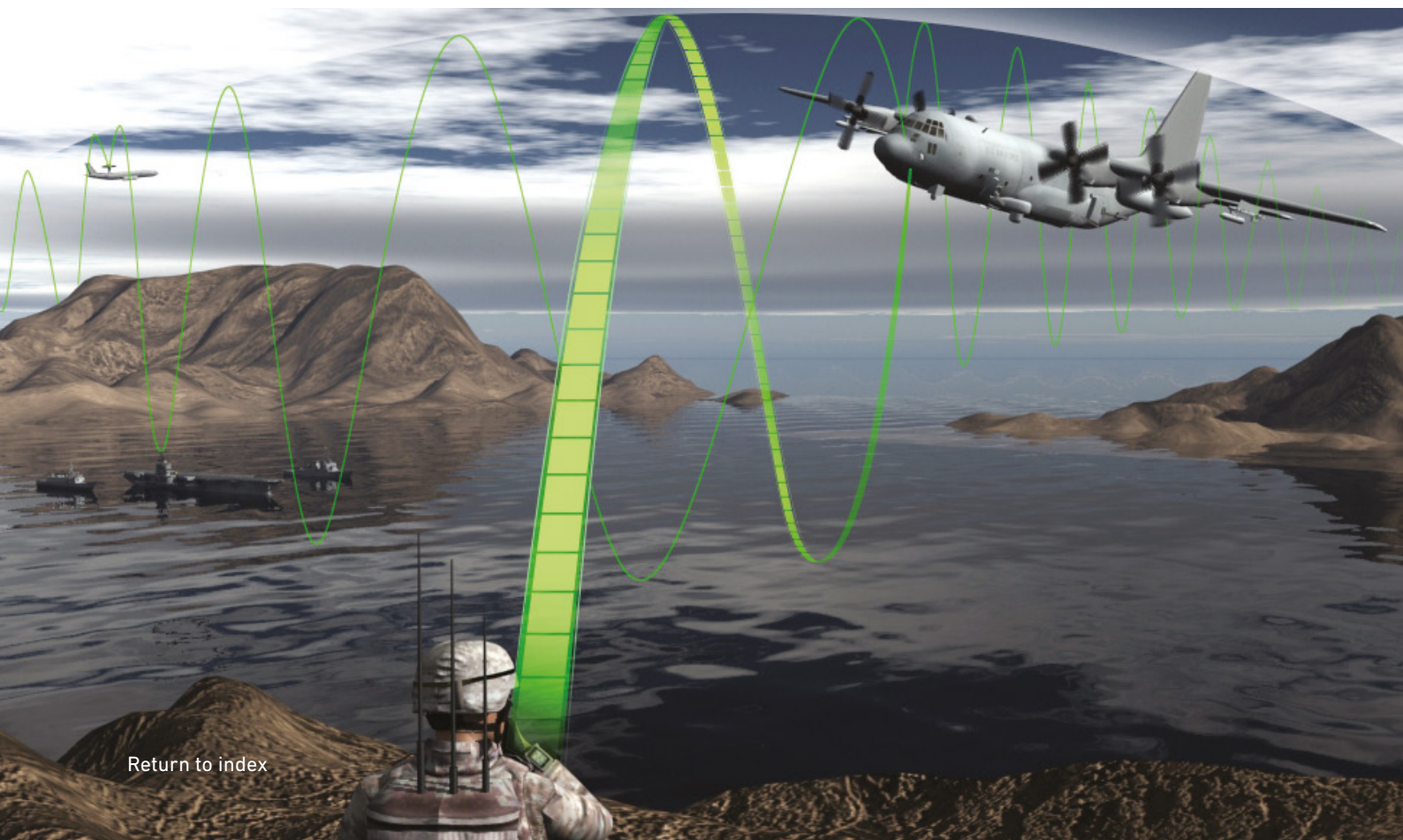
5 days

OBJECTIVES

- This general training course present to the trainee the different type of modulation in use in aeronautics communications
- Data links systems in HF, VHF SATCOM will be studied, as well as the military radio communication (Frequencies jump, HF automatic link)

PROGRAM

- Radio Basics
- Propagation and Electromagnetic waves
- Modulation types
 - AM, FM, various phase modulations including: DPSK, QPSK and 8PSK and QAM
- Communication VHF Data Link
 - ACARS, VDL mode 2, introduction VDL mode 3
- SATCOM Communications
 - Services, network, channel (P, R, C, T)
 - SWIFT 64
- VHF Anti jamming
 - HAVEQUICK Function
 - WOD, TOD, Net ID
- Long Distance HF Communications
 - Single Side Band principle
 - HF/AM and HF/SSB Comparison
 - SELCAL Function
 - Automatic link
 - HF ALE, HF DL
- Data link HF
 - Presentation of HF data link system
 - HF Messenger



AIRBORNE RADIO COMMUNICATION

DATES

April 2-4, 2019

September 2-4, 2019

DURATION

3 days

3 days

OBJECTIVE

- Acquire knowledge on radio communication principles used on aeronautic platforms. Acquire knowledge of HF, VHF and SATCOM systems operation with technical overview of transmit and receive principles and basics on troubleshooting and test procedures.

PROGRAM

- Generalities: Needs and operational use, The radio link
- Electromagnetic wave and propagation
 - What is an OEM, electromagnetic radiation
 - Spectrum and frequencies in use
 - Propagation modes
 - Interaction and effects on propagation
- Radio Link
 - Analog modulation (AM, FM, SSB, ...)
 - Numerical modulation (QAM, PSK, ...)
 - Software Defined Radio overview (SDR)
 - Network overview (ACARS, CPDLC)
 - Radio link efficiency, gain and loss, noises cosite
- Overview of typical radiocommunication system (schematic diagram, specification, operational modes, test)
 - Receiver, (selectivity, sensitivity, distortion, ...)
 - Transmitter (power, range, efficiency, constraints, ...)
 - RF power line (coaxial, feeder line,...)
 - Antenna (impedance, gain, directivity, range, shape, loss, SWR)
 - Coupler (function and utility)
 - Control Panel
 - Connectors, Ground plane, User interfaces
 - Test and troubleshooting basis
- Optional practice
 - Laboratory practice at RCF repair center on equipment
 - Aircraft practice at customer facility according to availability and assistance

RADIO NAVIGATION

DATES

April 15-19, 2019

September 9-13, 2019

DURATION

5 days

5 days

OBJECTIVES

- Give trainees an overview of the principles of radio navigational aids used in aeronautic
- Provide detailed information on these aids by presenting fundamentals, characteristics and performance levels achieved
- Present corresponding equipment

PROGRAM

- Review of the fundamentals of radio navigation equipment
 - Principle in Localization: Radial, terrestrial References, Track, Waypoint, Route
 - VFR/IFR rules
 - Precision, Availability, Integrity
 - Area-Rnav, Primary means navigation
- Conventional radionavigation means principles of operation
 - Description of the systems ADF VOR, ILS, DME, MLS, MMR
- Example of Symbology displayed on the cockpit.
- Principle of Satellites Navigation System
 - GNSS, SBAS/GBAS
- Performance Based Navigation
 - RNAV, RNP, RNP Containment
 - FMS
- Navigation in TMA
 - STAR and SID
 - Approach Type: Non Precision, APV, Precision

AIRCRAFT SYSTEMS

DATES

Upon request

DURATION

5 days

OBJECTIVE

- Acquire general knowledge of the various avionics systems

PROGRAM

- Mechanics of flight
 - Principle of lift
 - Relationships between angle of attack, speed and lift
 - Flight envelope: turning, climbing and descent
- The air data system
 - Pressure and atmosphere (standard pressure, baro settings, airspeed)
 - Air data system description, indications
 - Description of the use and utility of the parameters IAS, MACH, TAS, SAT, TAT, V/S, SSEC and ALT
- The heading and attitude reference system
 - Gyro's and Accelerometers basics
 - Heading determination, flux valve AHRS
 - Laser Ring Gyro, INS, IRS basics
- Automatic pilot, guidance computer
 - Theory of AutoPilot operation
 - Flight control and servo's
 - Description of the various vertical and lateral modes
- EFIS/MFD/PFD/ND
- How the various boxes work
 - Improvement in relation to FIS
 - Radar system integration
- Concepts
 - Flight Management System (FMS)
 - MCDU
- Overview of the Pro Line Fusion avionics concept



WEATHER RADAR

DATES

November 25-29, 2019

DURATION

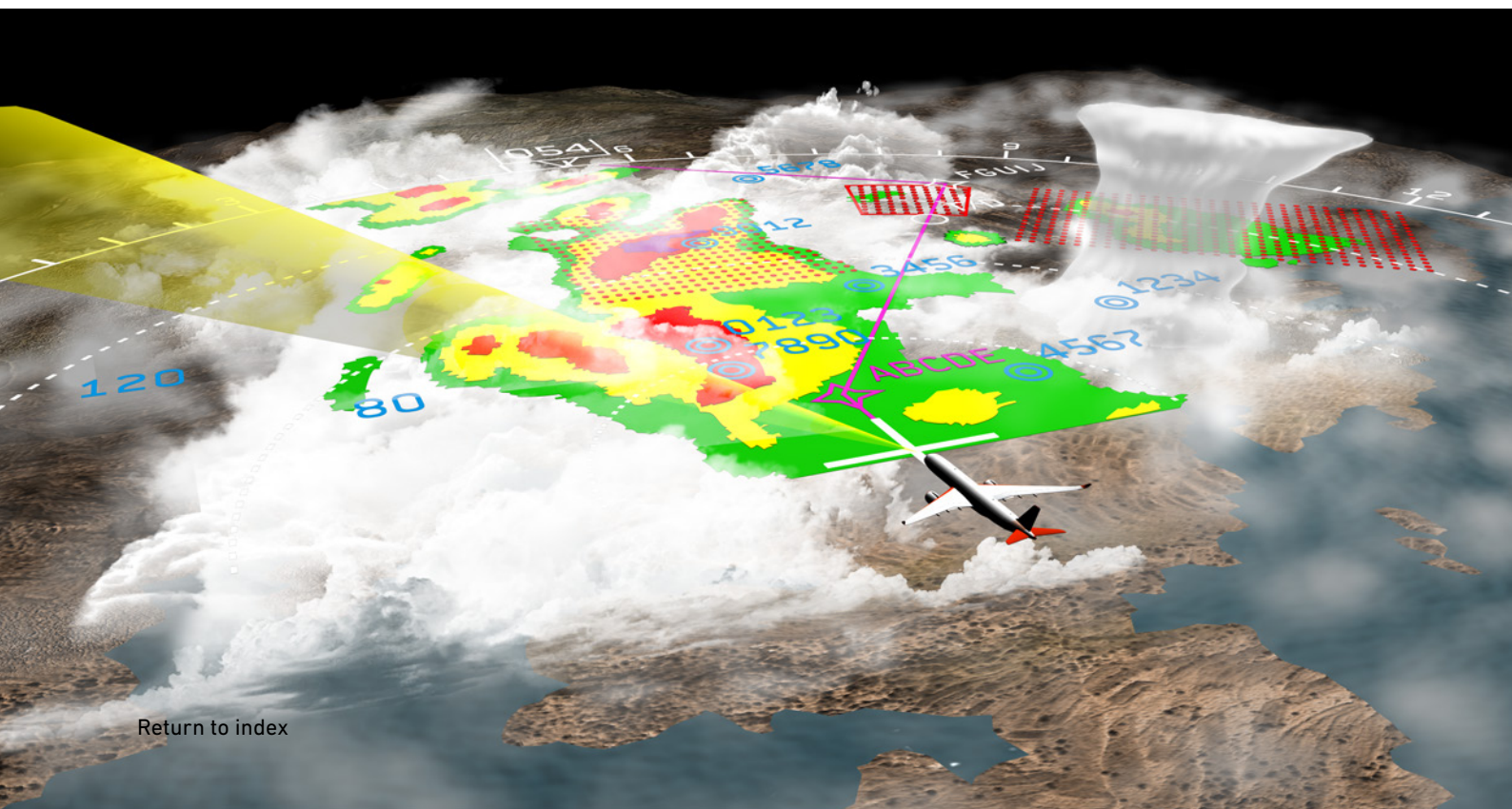
5 days

OBJECTIVE

- Acquire general knowledge of the theories of operation of the different types of aviation radar

PROGRAM

- Generalities
 - Basic electromagnetic detection
 - Transmission in frequency modulated wave (radio altimeter)
 - Distance measurement
 - Relative bearing Measurement
- Basic weather radar
 - The modulator
 - The magnetron
 - Cavities
 - Transceivers
 - Detection, AFC, STC
 - Improving circuits
 - Video processing
- Operation
 - Turbulence
 - Weather Radar Windshear
 - Multiscan
 - Ground clutter



AVIONICS ARCHITECTURE

DATES

June 24-28, 2019

September 16-20, 2019

DURATION

5 days

5 days

OBJECTIVE

- In complement to the general courses, this training based on the avionics of an aircraft class air transport presents to trainees the pilots needs: to fly the plane, to navigate, to communicate. It will be study the utilization of the avionics (radio communication, radio navigation, and flight control).

PROGRAM

- What does the pilot need to maneuver its plane?
- Parameters followed by the pilot for the control of his plane
 - Commands of flight
 - 3 axis (pitch, yaw, roll)
 - The speed and the attitude of the plane
 - The Air Data Computer and Inertial Reference System, Gyro, Ring Laser Gyro, IRS, AHRS
- The automatic navigation
 - Auto Pilot/Flight Director
 - Control of the flight plan
 - The cautions and warnings
 - Display of information to the pilot
 - FMS/FMC, MCDU, FCU
 - ACARS, FWC, CMS
 - EFIS, MFD, PFD, HSI, ADI, DMC
- General principles of radio navigation sensors
 - To navigate: radio sensors
 - To locate the aircraft on a map: FMS, VOR, ADF, GPS, MMR, DME
 - To land: MLS, GPS, MMR, ILS
 - For security: Radio altimeter, TAWS, TCAS Weather radar, Data recorder (FDRS)
- To communicate
 - The radio communication system
 - The voice: VHF, HF, SATCOM
 - The data: ACARS, ATC transponder, SATCOM, FSA (SIU/NSU/TWLU) HFDL HFDR, VHFDL/VDR, DMU
- The future
 - Free Flight,
 - CNS/ATM, FANS, WAAS, LAAS
 - ADS-B, GNSS/GLS/LDGPS

HELICOPTER ARCHITECTURE

DATES

March 25-29, 2019

May 13-17, 2019

DURATION

5 days

5 days

OBJECTIVE

- Complementary to the general courses, this training based on the avionics of a helicopter presents to trainees the pilots requirement: to fly, to navigate, to communicate. It will study the use of the avionics (radio communication, radio navigation, and flight control).

PROGRAM

- How should the pilot manage to operate his helicopter:
 - Parameters controlled by the pilot to fly its aircraft
 - Flight control
 - 4 axis (pitch, yaw, roll, collective pitch, cyclic pitch)
 - The speed and the altitude of the aircraft
 - The Air Data computer and Inertial reference system
 - Gyro, Laser Gyro Ring, IRS, AHRS
 - The automatic guidance
 - Auto Pilot Flight Director
 - Flight plan Control, flight and parameters
 - Display of information to the pilot
 - EFIS, MFD, PFD, HSI, ADI, DMC
- General principles of radio navigation sensors
 - To navigate: radio sensors
 - To locate the aircrafts on a map: FMS, VOR, ADF, GPS, DME
 - To land: GPS, ILS
 - For the security: Radio altimeter, TCAS, Weather radar Windshear
- To communicate: the radio communication systems
 - The voice: VHF, HF
 - The data: ACARS, ATC transponder, HFDL/HFDR, VHFDL/VDR
- The future
 - Free Flight
 - CPDLC, CNS/ATM, FANS, WAAS, LAAS
 - ADS-B, GNSS/GLS/LDGPS



RADIO NAVIGATION AND AREA NAVIGATION

DATES

April 9-11, 2019

October 1-3, 2019

DURATION

3 days

3 days

OBJECTIVE

- Acquisition of the Radio Navigation basics thru the use of conventional means based on NAVAIDS operation and a better understanding towards the global Area Navigation or RNAV concept using the GNSS components

PROGRAM

- Aircraft systems
- Conventional CNS/ATM
 - Explain the conventional Navigation function as part of a CNS airborne system operation
 - The Air Navigation and description of flight legs
 - Definition of Radio Navigation
 - Specific resources used by a conventional airborne system
 - The functions and their use to fly the different legs: ADF, VOR, ILS, DME, TACAN, and RA
 - Limitations and drawbacks of the conventional system
 - The changeover towards the RNAV or Area Navigation
- The RNAV expectations and RNP requirements tied to the PBN concept
 - RNAV procedures and their benefits
 - Multi sensors RNAV computer function as part of the FMS operation
 - Principles of GNSS and the different ways of Augmentation
 - The standalone GNSS for positioning and MMR for additional Navigation and Landing functions
 - Multi sources positioning, flight path definition and course track
 - Classification based on RNP requirements for track keeping
 - RNP mandatory monitoring and alerting functions
- Use of Airborne RNAV means in France and abroad
 - RNAV PBN current approach procedures: LNAV, LNAV-VNAV Baro, APV-LPV, RNP AR APC.
 - RNAV Precision approaches GLS Cat1 and specific to Aircraft manufacturers
 - The benefits of RNAV concept and its roaring implementation thru new GNSS networks

GPS POSITIONING

DATES

Upon request

DURATION

2 days

OBJECTIVES

- Gain general knowledge of GPS
- Present civilian and military applications and their technical specificities

PROGRAM

- General system description
 - Ground control segment
 - Space segment
 - User segment
- GPS background
- Technical presentation and system optimization
 - Spectrum spread technique
 - PY and C/A codes
 - Structure of receiver
 - RAIM
- Features and performance of the various civil and military applications (presentation on relevant Collins products)
- Demonstration using the GPS receiver
- Introduction on GNLU/MMR



ADATE

DATES

Upon request

DURATION

5 days

OBJECTIVES

- Acquire general knowledge of ADATE software syntax in order to be able to measure and use some statements to help the troubleshooting of a unit under test
- The technician will be able to copy, modify and use in memory part of the program test in order to do some specific tests and measurements to help the detection of a faulty component
- This knowledge will be used on RFT-900, RFT-1000, CTS-2000 and ITS-700 ADATE test software

PROGRAM

- Theory: 2 days
 - ADATE menus
 - Use of functions keys
 - Use of a test program and block
 - Files needed for a complete test program (.blk/.pro/.cvt/...)
 - Program structure explanation
 - Statements explanation (variables, arithmetic operation, Boolean functions,...)
 - Example of test software with explanation of each statement
- Practical part: 3 days
 - ADATE software interface practice
 - Writing of a small software with use of statements learned (display of text, of operation result, logical functions use, ...)
 - Modification of a test software (add loops, stops, pauses,...), to help the troubleshooting of an equipment under test
- The practical part is done on computers with all the bench interfaces (simulation mode for all resources).

HUMAN FACTORS

DATES

Upon request

DURATION

1 day

OBJECTIVE

- To be aware that human factors in the form of environmental, behavioral, and ergonomic could cause inadvertent airworthiness escapes that could potentially cause aircraft safety problem. The syllabus follows the PART 145 recommendation (Guidance Material chapter 145.A.30 (e) Training syllabus for initial human factors training).

PROGRAM

- General/Introduction to human factors
- Human error
- Human performance and limitations
- Environment
- Procedures, information, tools and practices
- Communication
- Teamwork
- Professionalism and integrity
- Organization's HF program

DO-178B

DATES

Upon request

DURATION

2 days

OBJECTIVES

- The course is addressed to engineering people working on software applications installed on avionics equipment
- Acquire general knowledge of DO-178B/DO-178C (study & homologation of the systems and equipment software)

PROGRAM

- Generalities
 - Introduction to Certification and safety
 - General principles
 - DO-178B usage
 - Effect of software levels
- Overview of software life cycle processes
 - Planning
 - Development
 - Verification
 - Configuration management
 - Quality Assurance
 - Certification Liaison
- Architecture choice and additional consideration (particular cases of software, tools)
- Development and verification activities
Clarifications of DO-178B : DO-248B

DO-178C

DATES

Upon request

DURATION

2 days

OBJECTIVES

- The course is addressed to engineering personnel working on software applications embedded in avionics equipment
- Acquire general knowledge of DO-178C , understand its concepts and learn how to use it
- For already DO-178B aware trainees, familiarize with evolutions since DO-178B

PROGRAM

- Generalities
 - Introduction to Certification and safety
 - General principles
 - DO-178C usage
 - Effect of software levels
- Overview of software life cycle processes
 - Planning
 - Development
 - Verification
 - Configuration management
 - Quality Assurance
 - Certification Liaison
- Architecture choice and additional consideration (particular cases of software)
- Development and verification activities (third day)
- Changes since do-178B
- Supplements
 - Software Tool Qualification
 - Model-Based Development and Verification
 - Object-Oriented Technology
 - Formal Methods
 - DO-278A; CNS/ATM and safety
- Supporting information for DO-178C and DO-278A: DO-248C

AVIONICS CERTIFICATION

DATES

Upon request

DURATION

1 day

OBJECTIVE

- The course is addressed to personnel interested in certification process overview

PROGRAM

- Certification Basis: regulations
- Different type of certification/qualification (Part 21)
- Safety process and system qualification overview (ARP4754, ARP 4761)
- Software qualification process overview (DO-178B)
- Hardware qualification process overview (DO-254)
- Environmental qualification process overview (DO-160)



HF-9000 SYSTEM

DATES

November 5-7, 2019

DURATION

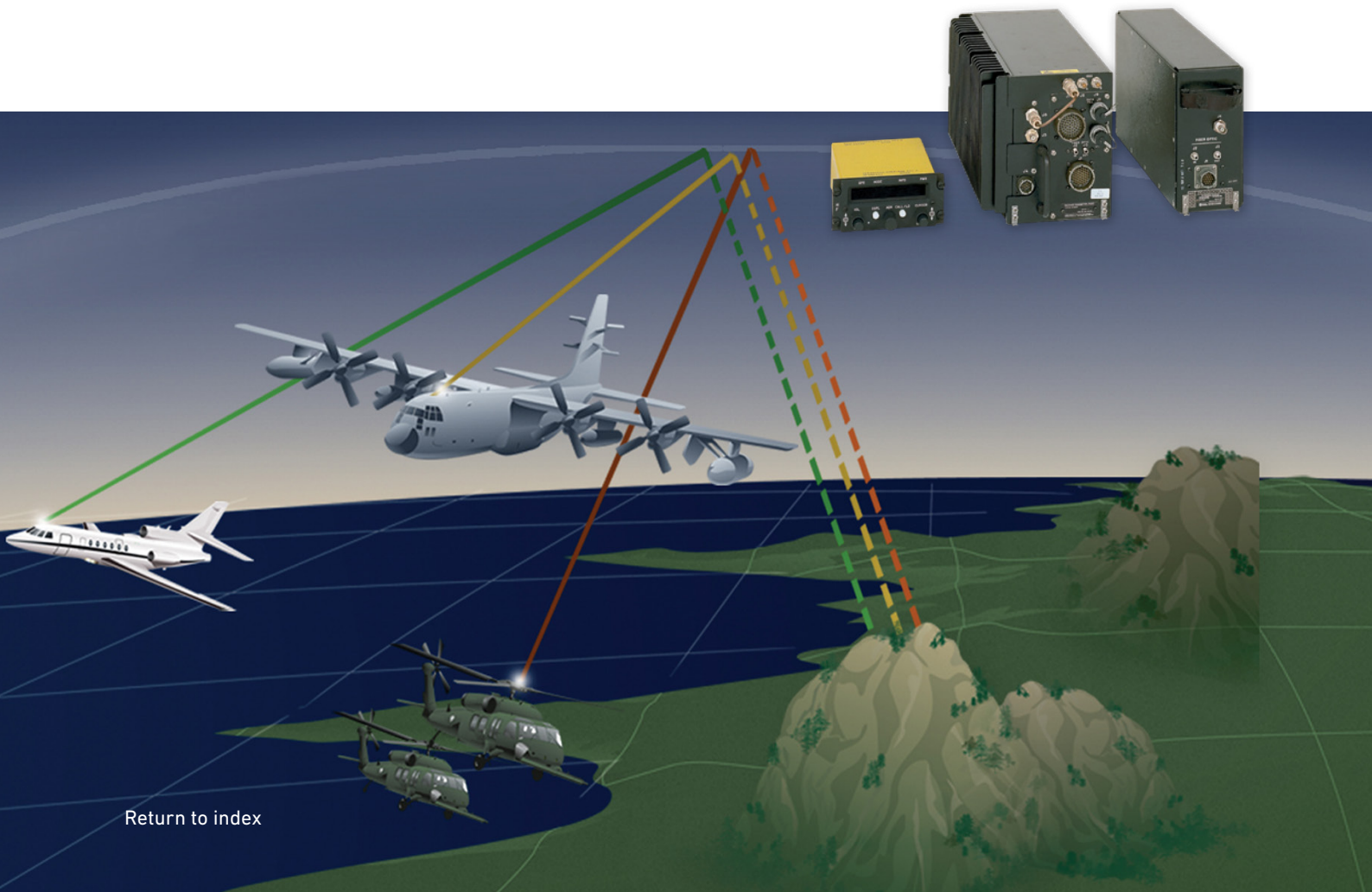
3 days

OBJECTIVE

- Acquire general knowledge of theory of operation for the HF-9000 system

PROGRAM

- Introduction of optical fibers
- Optical fiber connector installation
- Radio frequency basic
- Specification HF-9000
- HF-9000 Block diagram study including:
 - Control box HF-9010
 - Transmitter-Receiver HF-9030/9070
 - Coupler HF-9040/9042
- HF-9000 Interconnection
- HF-9000 operations using a dedicated bench



SATCOM SATELLITE COMMUNICATION SYSTEM

DATES

November 13-15, 2019

DURATION

3 days

OBJECTIVE

- This course provides students with the skills and background knowledge required for troubleshooting and isolating defective components in the Collins Aerospace SATCOM system SAT-906/B and SAT-2100/B, using tools, applicable manuals, block diagrams and maintenance guides

PROGRAM

- Introduction SATCOM System Familiarization
 - Historical background
 - Identify SATCOM System Segments (space, ground, airborne)
 - Identify services (Aero L, I, H, H+, Swift64, SBB, safety)
 - Identify AES components (SDU, RFU, HPA, SRT, HST, antenna)
 - Identify associated components (BSU, LNA, HPR, splitter, combiner)
- SATCOM operation with MCDU
- Main menu, Directory Display, Number Entry, GES Select
 - Priority, BITE Status, Directory Index
 - SDU log and HSDU log menu
- SATCOM maintenance with MCDU
 - BITE pages
 - LRU indication
 - Fault history
 - Maintenance mode
 - Test launching
- SATCOM maintenance on aircraft with SATCOM Tool
 - Owner Table Requirement (ORT)
 - Event Handler
 - Instrumentation Port



ALE AND HF CPS AUTOMATIC LINK ESTABLISHMENT CONFIGURATION USING HF-CPS SOFTWARE

DATES

November, 18-22 2019

DURATION

5 days

OBJECTIVES

This course will present the basics of long distance HF Radio Communication, the training enables students to efficiently use the HF Communication Planning System (HF-CPS) software tool to create Master and Operational databases to include frequencies, Self Addresses, Net Addresses, Channels, and Scan Lists

Upon completing this course, the student will be able to:

- Demonstrate knowledge of ALE databases by creating correct complete Master and Operational databases
- Demonstrate knowledge of database configuration and system parameters
- Output a datafill file and load it into the radio

PROGRAM

- General HF: HF Propagation
 - Principles of radio propagation, HF/SSB modulation
 - Comparison and benefit of HF against amplitude modulation
 - Propagation prediction software PropMan 2000™
 - Introduction
 - Example of frequencies determination
- Basic Automatic Link Establishment (ALE)
 - Theory – the need for Automatic Link Establishment
 - HF-CPS HF Administrator Role (Frequency Management and Network Administration)
 - Configuration parameters and System parameters
 - Other addresses, Self addresses
 - Scan Lists, Net addresses, Channels, Groups
 - Messages, Scanning, Sounding
 - Link Quality Analysis (LQA)
- Network Designer's Guide
 - Steps to successful network design
 - Identifying the stations and networks
 - Propagation and frequency selection/assignment
 - Net calls and slot times
 - Assigning ALE addresses
 - Building datafill files
- Building the Master and Operational Databases
 - Database structure, content and security
 - Frequencies and frequency designators
 - Addresses, parameters,
 - Customization – radios, reports, forms, parameters, users
 - Outputting the datafill file, loading the radio
 - Operating in ALE

COMMUNICATION HF E-MAIL HF MESSENGER AND APPLICATION

DATES

Upon request

DURATION

5 days

OBJECTIVES

- The training provides the fundamental knowledge in E-mail and modem data link communication over HF.
- The course is aimed at avionics engineers who operates and maintain the system.
- The course is designed to:
 - Operates the system
 - Reconfigure the system to change operation mode

PROGRAM

HFM Operation

- Generalities
 - HFM principle of operation and concept
 - Functional description
 - Block Diagram
 - HDG 300 Hardware study
- Operation
 - Application description
 - Presentation of operator interface (VOC, SMS, Delivery Agent)

HFM System Maintenance reconfiguration

- Technician Interface (Device Controller, SM , Delivery Agent, HF domain Map)
- Modem operation
 - Changing modem settings
- HF Radio operation
 - Changing radio settings
- Configuration files (saving, loading, editing)
 - HFM System Administration
- Installation

- Software installation
- Configuration
 - Basic setup using setup wizard
 - Communication, networks settings
- Maintenance
 - Node setup manager application
 - Email parameters
 - Radio parameters
 - Data parameters

Practice:

- Groups of two
- The instructor will give a demonstration

900 SERIES

DATES

Upon request

DURATION

5 days

OBJECTIVES

- Familiarize trainees with the basics of radio equipment used on air transport airplanes
- Present technical characteristics of Collins Aerospace equipment built to the specifications of ARINC-900

PROGRAM

- Review of the basics of radio navigation equipment (ADF-900, VOR-900, ILS-900, DME-900, Transponder TPR-900/901, Radio-altimeter LRA-900, MMR GLU-920) and radio communication equipment VDL (VHF-900), HFDL (HFS-900/900D)
- Running equipment demonstrations of Collins Aerospace equipment on the test bench
- Presentation of the ARINC-900 communication format and the CFDS (Centralized Fault Display System) philosophy
- Interpretation of the built-in self test (BIT)



TCAS AND MODE S, COLLISION AVOIDANCE SYSTEM

DATES

June 3-7, 2019

DURATION

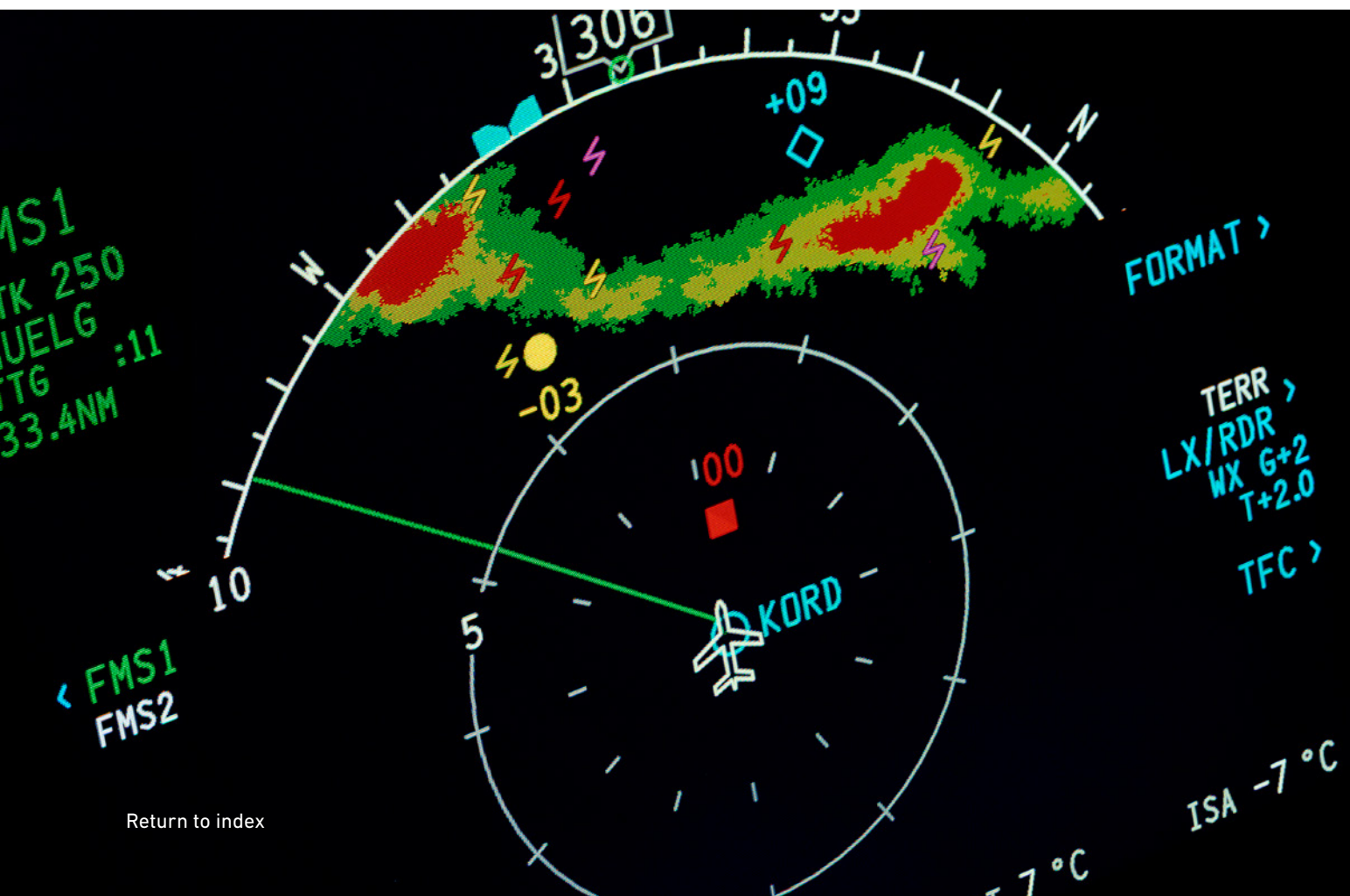
5 days

OBJECTIVES

- Acquire general knowledge of TCAS and Mode S transponder basics
- Familiarize trainees with the Collins TCAS and with aircraft maintenance procedures

PROGRAM

- Review of TCAS and Mode S transponder basics
 - Selective interrogation, Whisper-Shout sequence
 - TAU criteria, surveillance zone, level of sensitivity
 - Data link (Uplink, Downlink Formats)
- Operation, controls, instructions
- Description of the system mode S transponder, the TCAS, the antenna, the control box
 - Interconnection, input/output, cross-strapping
 - Basics of the TCAS directional antenna
- System tests
 - Self test, BITE
 - Presentation of test facilities in lab



PRO LINE II

DATES

Upon request

DURATION

5 days

OBJECTIVES

- Discover specificities of the PRO LINE II series
- Acquire general knowledge of equipment
- Learn to interpret test failure codes correctly

PROGRAM

- Review of CSDB communication protocol
- Functional survey of the following equipment
 - VHF-22/CTL-22
 - VIR-32/CTL-32
 - DME-42/IND-42
 - ADF-60/CAD-62/CTL-62
 - TDR-90/CTL-92
 - ALT-55/DRI-55/ALI-55
 - Theory of operation
 - Specifications
 - Interconnection and installation options
 - Self test
- Demonstration of new computer assisted maintenance and troubleshooting techniques
- Introduction to PRO LINE II series 400 equipment that uses ARINC-429



PRO LINE 4™

DATES

Upon request

DURATION

5 days

OBJECTIVE

- Introduce trainees to the new “Integrated Digital Avionics” concept, PRO LINE IV, installed on CRJ, SAAB, F-2000 aircrafts

PROGRAM

- Introduction to PRO LINE IV
- Primary Flight Display (PFD)
 - Presentation of attitude , altitude, air speed and navigation parameters
- Multi-Function Display (MFD)
 - Turbulence detection radar
 - TCAS display
 - Diagnostics
- Engine Indication and Crew Alerting System (EICAS)
 - Engine parameters
 - Presentation of the hydraulic circuit

The Integrated Avionics Processing System (IAPS).

This course will be based on Falcon 2000 and Regional Jet avionics.

This course may be done at customer facility in order to tailor practice and theory to customer’s aircraft.



PRO LINE 21™

DATES

June 17-21, 2019

DURATION

5 days

OBJECTIVES

- This course provides flight crews with operational training and flight line technician with level I maintenance for Pro Line 21 system
- Introduce trainees to the new “Integrated Digital Avionics” concept PRO LINE 21, installed on Bombardier Challenger 300, Hawker 800XP, Raytheon PFP-3, Cessna CJ1/CJ2, Beechcraft King Air

PROGRAM

- Data Bus
- Integrated Avionics Processing System (IAPS)
- Electronic Flight Instrument System (EFIS)
 - AFD, RSP, CCP
- Engine Indicating and Crew Alerting System (EICAS)
 - MFD, CCP, DCU, RDC
- Air Data System (ADS)
- Attitude Heading System (AHS)
- Attitude Heading Computer (AHC)
 - External Compensation Unit (ECU)
- Flight Guidance System (FGS)
 - FCC, FCP, SVO, Servo Linear Actuator
 - Autopilot and yaw damper
- Flight Management System (FMS)
 - FMC, CDU, DBU
- Flight Management
 - Data Base
 - Operations
- Radio Sensor System (RSS)
 - RIU, ACP and CPE, Radio Tuning Operation
 - VHF, VOR/ILS/MB/ADF, DME, HF, HF Antenna Coupler, RA, Mode S transponder, TCAS
- General Maintenance, Procedures for Comm/Nav/Pulse Equipment
- Weather Radar (WXR)
 - Microwave Radiation Hazards AC 20-68B
 - Weather radar theory
 - Receiver Transmitter Assembly (RTA-8XX)
- Lightning Detection System, TAWS
- Maintenance diagnostics computer (MDC)

This training can be upon request based on a specific aircraft version (call us).

Link to all Pro Line 21 training versions:

<https://portal.rockwellcollins.com/web/publications-and-training/instructor-led-training-ilt>

PRO LINE FUSION® EDS (EMBEDDED DISPLAY SYSTEM)

DATES

April 8-12, 2019

DURATION

5 days

OBJECTIVE

- This course provides flight line technicians with level I maintenance for Collins Pro Line Fusion integrated avionics system, new concept touch-control primary flight displays installed on King Air, Challenger 604, Citation CJ3

PROGRAM

- **A. Training Core System: Displays**
 - Displays: AFD-3710 architecture, MKP, CCP
 - Multiwindows concept and format Touch screen menu's organization, Main symbology,
 - On Board Maintenance
- Training Core System: System Sensors
 - Acquire familiarity with Attitude Heading System AHC-3000 and Air Data System, ADC-3010
- Training Core System: Flight Control system
 - Acquire familiarity on APS-3000 architecture: Servo's, FGP.
 - IAPS: IOC, IEC, FGC.
 - FGC Operation: Vertical guidance, Lateral Guidance, Auto trim
- Training Core System: FMS Familiarization
 - The FMS course covers the architecture of an FMSA-6000 system and the generation of flight plans
- Training Core System: Aircraft interface
 - PM, EICAS, Applications Software (EICAS-6000) Data Concentrator Unit
- Training Core System: Onboard Maintenance System Application (OMS)
 - Built in test, fault log download
- Training Core System: Data Loading (ODLA)
 - Loading Aircraft Files and DataBase
 - Loading Configuration Tables and configuration management.
- **B. Training Surveillance: Software organization (ATF-3510)**
 - Synthetic Vision System (SVS) and ITAWS
 - Advanced Terrain
- Training Surveillance: Weather Radar (WXR)
 - MultiScan™ Weather Radar
 - Principle of MultiScan and Operation
- **C. Training CNS: Communication**
 - VHF-4000
 - RIU-4000 Acars Router
 - HF-9000
 - SATCOM Inmarsat, SATCOM Iridium
- **D. Training CNS: Navigation Sensors**
 - Acquire familiarity with technical aspects of Pro Line 21 Nav radio's.
 - Nav-4000/4500: VOR/LOC/GS , MKR, ADF
 - DME-4000
 - ALT-4000
 - GPS-4000S

PRO LINE FUSION® IPS (INTEGRATED PROCESSING SYSTEM)

DATES

September 23-27, 2019

DURATION

5 days

OBJECTIVES

- This course provides flight line technicians with level I maintenance for Collins Aerospace Pro Line Fusion
- Introduce trainees to the new “Integrated Digital Avionics” concept Pro Line Fusion installed on Bombardier Global 5000/6000

PROGRAM

- Display et Display Control System (D and DCS)
 - AFD, CTP, CCP, MKP, RSP
- Integrated Processing System (IPS)
 - IPC-6210, IPC-6220, Installed application software
- Data Concentration System (DCS)
 - DMC, APM, EICAS, Installed application software
- Data Loading
 - IMS, Aircraft data loads and Configuration Management
- Onboard Maintenance System (OMS)
 - Onboard diagnostics, Aircraft Condition Monitoring and Diagnostics download
- Enhanced Vision System (EVS)
 - EVS Infrared Sensor Unit, EVS Infrared Window, AIT
- Synthetic Vision System (SVS)
 - SVS Modules, Installed application software
- Air Data System (ADS)
- Attitude Heading System (AHS)
 - Attitude Heading Computer (AHC)
 - External Compensation Unit (ECU)
- Integrated Flight Information System (IFIS)
 - Applications: File Server, Electronic Charts, Enhanced Map, Graphical Weather
- Automatic Flight Control System (AFCS)
 - FCS Application, FCP, SERVOS, FD
 - Autopilot and yaw damper
- Flight Management System (FMS)
 - Flight Management Data Base Operations
- Communications System (COMM)
 - Digital Audio System, Radio Management, VHF-4000, HF-9000
- Navigation System (NAV)
 - NAV-4000, DME-4000, GPS-4000 ALT-4000
- Traffic and Surveillance System (TSS) and TAWS
 - TSS-4100 and the application TSSA-4100
- Terrain Awareness Warning System (TAWS)
 - CCM-6210 and TPM-6000
- Weather Radar (WXR)
 - MultiScan™ Weather Radar Receiver Transmitter Assembly
 - Weather Radar Fundamentals and MultiScan™ Theory
 - Operation



ACARS DATA LINK SYSTEM

DATES

October 22-23, 2019

DURATION

2 days

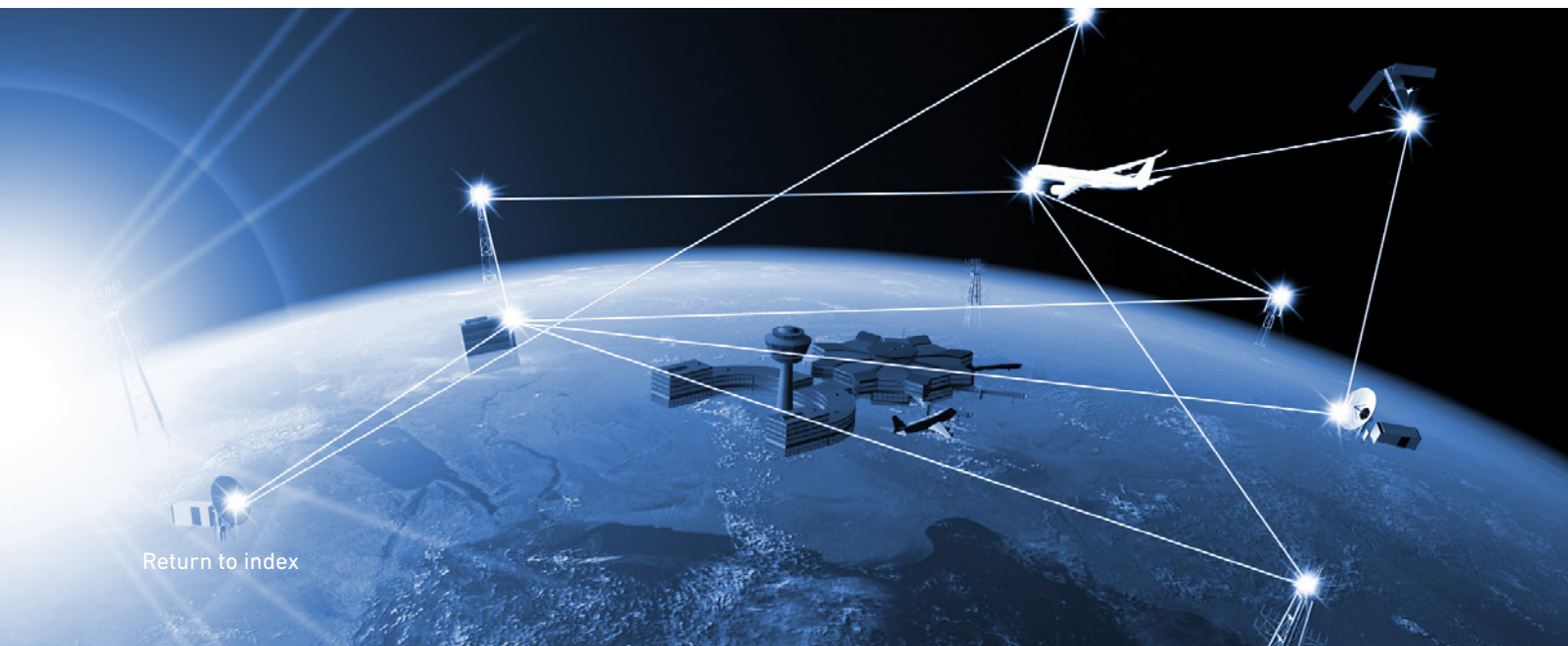
OBJECTIVES

- Provide the fundamental knowledge in datalink communication
- Overview of system operation through Control Display Unit type CDU 6100 examples

PROGRAM

The course presents the principle of Ground to Air link establishment and the data message exchange via VHF, HF et SATCOM media. Using simulation software representing a real Control Display Unit CD 6000 the different menus will be studied.

- Contents
 - What is Datalink in aeronautical
 - Datalink communication chain
- ACARS and Low Speed VHF Datalink
 - VDL mode 1, Protocol Characteristics
 - VDL mode 2, Protocol Characteristics
 - ACARS Over AVLC (AOA)
 - HFDL System Description
- SATCOM: the AMSS system
 - Constellation and Operations
- Datalink General Components
 - Airline ground processing systems
 - Datalink Service Providers (DSP)
 - Datalink airborne systems
- Basic Datalink Applications
 - OOOI (out-off-on-in), Weather
 - Free text telex, Maintenance
- Airline Operations Communication (AOC)
 - Flight initialization
 - Weather information
 - FMS position reports
 - Flight plan
 - Diversion Report
- Airline Maintenance
 - Automatically sent reports
 - Aircraft performance monitoring
 - Engine condition monitoring
 - Manually sent reports
- ATC
 - Departure Clearance
 - Oceanic Clearance
- Configuration
 - Aircraft System configuration
 - Peripheral
 - Discrete input



DATA LINK SYSTEM ON AIRBUS ENVIRONMENT

DATES

October 8-9, 2019

DURATION

2 days

OBJECTIVES

- The purpose of this training is to provide Airbus aircraft operators with basics on datalink systems and operations
- The course is based on the use of datalink for communication and surveillance in airspace management (CNS/ATM concept) applied to AIRBUS configuration

PROGRAM

The course presents the principle of Ground to Air link establishment and the data message exchange via VHF, HF et SATCOM media.

- Contents
 - What is Datalink in aeronautical
 - Datalink communication chain
- ACARS and Low Speed VHF Datalink
 - ACARS: extension to ATC, limitations
 - VDL modes: POA , AOA, VDLM2
 - Airborne components functional description VHF data radio
- SATCOM: the AMSS system
 - Constellation and Operations
- HFDL System Description
 - Principle of HF link and HF data Radio
- Datalink General Components
 - Airline ground processing systems, Datalink Service Providers (DSP),
 - Data Link airborne systems
- Typical Datalink Applications
 - OOOI (out-off-on-in), Weather, Maintenance
- Airline Operations Communication (AOC)
 - Flight initialization, FMS position reports, Flight plan
- Airline Maintenance
 - Automatically sent reports, Aircraft performance monitoring, Engine condition monitoring
- ATC applications
 - Departure Clearance, Oceanic Clearance, D-ATIS
 - FMS Waypoint Position Reporting (FMS WPR) Configuration
- Aircraft System
 - Peripheral
 - Discrete input
- ATSU environment
 - Databases definition
 - ATSU initialization and database loading
 - Datalink applications softwares (ATSU, FMS, CMS, DMU)
 - ATSU Hosted AOC software
- ATN Concept, Applications, programs and operations
 - ATN specifications
 - Context Management CM, ADS-B, CPLDC (messages, annunciation)
 - ACR environment overview

FMS, TAWS, TCAS

DATES

October 15-17, 2019

DURATION

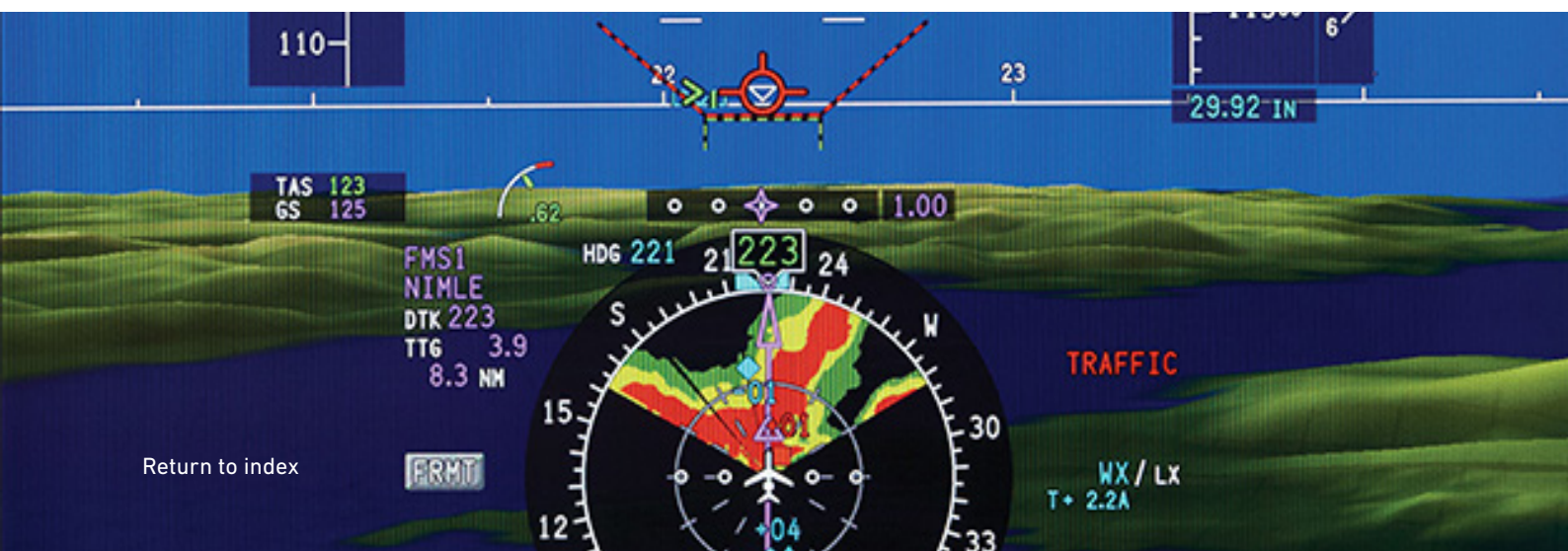
3 days

OBJECTIVES

- This training provides fundamental knowledge on FMS, TAWS and TCAS systems
- Overview of each system functions and typical architecture
- Overview of each system use by pilots

PROGRAM

- FMS
 - Theory (1.5 day) with the objective to operate the system, to study the functionalities of the system and provide basic elements on how the pilot should manage the flight
 - Participants will be guided on the procedure of loading the databases, pre-flight operation, flight plan creation, tuning, and performances menu
 - Practice will be conducted using Collins Aerospace FMS desktop simulator (½ day)
- TAWS
 - Acquire general knowledge of TAWS basics. Familiarize trainees with aircraft operation and maintenance.
 - Glossary, historical, norms and classes, database, priority alerts
 - Reactive and predictive functions; optional functions, specific functions
 - Displays and aural warning, typical architecture
 - Self Test and maintenance
- TCAS/ACAS
 - Acquire general knowledge of TCAS basics. Familiarize trainees with aircraft operation and maintenance
 - Selective Interrogation, Whisper Shout, TAU criteria, area surveyed, sensitivity, Datalink capabilities
 - Operation and displays aural warning
 - Typical Architecture
 - Self Test and maintenance



CABIN ENTERTAINMENT: ADVANCED CABIN MANAGEMENT SYSTEM (ACMS)

DATES

Upon request

DURATION

1 day

OBJECTIVES

- Maintenance personnel will be provided with in-depth knowledge and skills to efficiently and effectively troubleshoot ACMS
- Upon completing this course, the student should be able to efficiently and effectively troubleshoot the ACMS system using DIAG3K Software and system manuals

PROGRAM

- Documentation Overview
 - Installation and Maintenance Manual, Fault Isolation Manual, DIAG3K User Manual, System Software Specification, Installation drawings (examples)
- Specific System Layout
 - System Operation Review, power distribution, component locations, access, addressing, controls and indicators
- Special Tools
 - Maintenance PC and DIAG3K Software, Pronto Software Load Tool
 - System Interface/Download Cables, Switch Panel Removal Tool
 - Multi-Drop Secondary Bus (MDSB) Jumpers
- Maintenance PC installation and configuration
 - Using DIAG3K software
- Pronto Remote Control
- Loading 2050 System Software
- Troubleshooting Scenarios
- Collins Aerospace Procedures

OPTIONS

- Practice on customer aircraft (one extra day)
- Possibility to combine with other trainings from *Cabin Entertainment*



CABIN ENTERTAINMENT: ADVANCED CABIN MANAGEMENT (CMS-1)

DATES

Upon request

DURATION

1 day

OBJECTIVES

- Maintenance personnel will be provided with in-depth knowledge and skills to efficiently and effectively troubleshoot CMS-1
- Upon completing this course, the student should be able to efficiently and effectively troubleshoot the CMS-1 system using DIAG3K Software and system manuals

PROGRAM

- System Overview
 - Function
 - Primary Controller
 - Components
- Specific System Layout
 - Component
 - System Architecture
- Special Tools
 - Component addressing
- Troubleshooting
 - Maintenance PC
 - Using DIAG3K
 - CMS-1 Diagnostic Screens
- Loading System Software

OPTIONS

- Practice on customer aircraft (one extra day)
- Possibility to combine with other trainings from *Cabin Entertainment*



CABIN ENTERTAINMENT: FALCON CABIN MANAGEMENT SYSTEM (FCMS)

DATES

Upon request

DURATION

2 days

OBJECTIVES

- The student will acquire an understanding of the Falcon Cabin Management System (FCMS)
- Upon completion of this course, the student will be able to: identify FCMS LRUs, understand system operation, understand basic troubleshooting procedures to include diagnostic software tools, load system software

PROGRAM

- Introduction to the FCMS
 - Cabin system
 - Entertainment possibilities
- FCMS system operation
 - System Overview
 - MDSB, 1394b overview
 - Audio Video Sources
 - Component locations
 - Communication devices
 - Source devices
 - Switch panels
 - Monitors
- FCMS system maintenance
 - A-Type Switch Panel and Addressing
 - TSC MDSB and Addressing
 - Galley TSC Maintenance Screen
 - Maintenance Laptop setup
 - Diagnostic Client – Loading, Operation
 - Volume adjustment

OPTIONS

- Practice on customer aircraft (one extra day)
- Possibility to combine with other trainings from *Cabin Entertainment*

CABIN ENTERTAINMENT: VENUE™ (HD-CMS)

DATES

Upon request

DURATION

2 days

OBJECTIVES

- Maintenance personnel will be provided with in-depth knowledge and skills to efficiently and effectively troubleshoot VENUE (HD Cabin Management System)
- Upon completing this course, the student should be able to efficiently and effectively troubleshoot the VENUE system using TST diagnostic Software and system manuals

PROGRAM

- Introduction
 - Cabin control and entertainment
- System overview
 - System operation
 - Aircraft layout
 - MCD, HDAV, PSW, Aux and switch panels, PPC, monitors
 - Communication devices, sources devices, RS-232
- System diagnostic
 - Performing a continuity check using TST
 - Performing a system check using TST
 - Maintenance laptop setup

OPTIONS

- Practice on customer aircraft (one extra day)
- Possibility to combine with other trainings from *Cabin Entertainment*



CABIN ENTERTAINMENT: AIRSHOW® 400, 410 AND 4000

DATES

Upon request

DURATION

1 day

OBJECTIVES

- The student will acquire an understanding of the Airshow system
- Upon completion of this course, the student will be provided sufficient information that they will be confident in their ability to install, checkout and troubleshoot common issues on the Airshow 4XX(X) system

PROGRAM

- Airshow Moving Map Overview
 - Purpose, Terms
- System Description
 - AS 4XX(X) equipment, capabilities and features
 - Controls and indicators, internal and external interfaces
- Component Overview and System Communication
 - Data Communications Unit
 - Flight Deck Controller
 - ARINC, RS-232 and 485 communication
- Installation Highlights
 - Tray Installation
 - Connections to SATCOM, to FMS and ADC
 - Required tools and procedures
- Initial System Checkout
 - System settings and adjustments
 - Ground Test Procedure
- Troubleshooting
 - No video, no audio, no maps
 - Aircraft symbol pointing incorrectly
 - Maintenance screens

OPTIONS

- Practice on customer aircraft (one extra day)
- Possibility to combine with other trainings from *Cabin Entertainment*

CABIN ENTERTAINMENT: AIRSHOW® 500

DATES

May 11, 2019
December 3, 2019

DURATION

1 day
1 day

OBJECTIVES

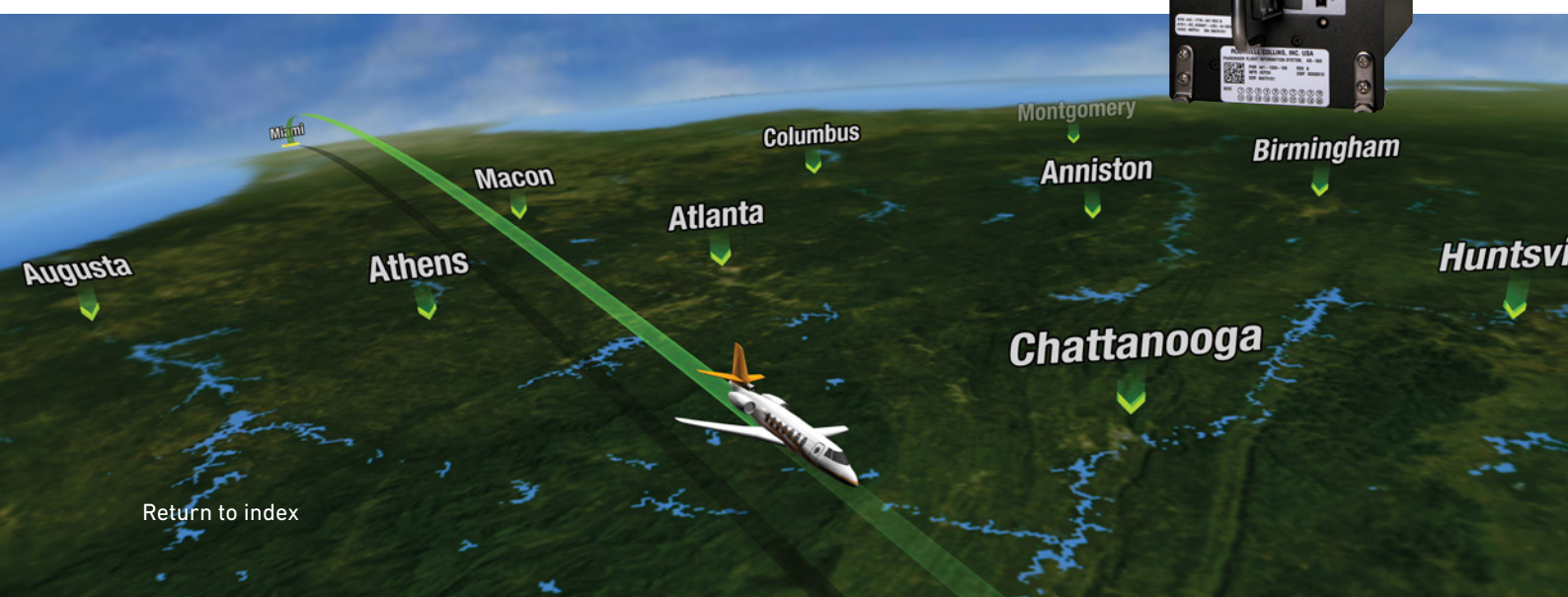
- The student will acquire an understanding of the Airshow system
- Upon completion of this course, the student will be provided sufficient information that they will be confident in their ability to install, checkout and troubleshoot common issues on the Airshow 500 system

PROGRAM

- Introduction to Airshow 500
 - Mechanical Design : Tray Mount, Flange Mount
 - Functional Description : 2D maps, 3D maps, Relative Location Indicator, Flight Instrument Panel View, Heads Up Display, Time Zone Globe, World Clock View, On-board Settings Editor
 - System External Interfaces: Front Panel, Back of Unit, Block Diagram
- Airshow 500 Installation/Removal
 - Installation: Kits, Tray and Flange Mount, Interactive Controller, Flight Deck controller (FDC) Installation, Time to Destination (TTD) Controller Installation
 - System Setup
 - Data Loading procedures
- Airshow 500 Operations
 - GUI Settings Editor: Select Language, Basic Settings Tab, Advanced Settings Tab
- Airshow 500 Checkout and Troubleshooting
 - System Access Maintenance Mode
 - 429 Troubleshooting

OPTIONS

- Practice on customer aircraft (one extra day)
- Possibility to combine with other trainings from *Cabin Entertainment*



CABIN ENTERTAINMENT: VENUE™ HD CABIN SYSTEMS COMMONALITIES AND DIFFERENCES ON AFTERMARKET, FALCONS AND GLOBALS

DATES

Upon request

DURATION

2 days

OBJECTIVES

- This course provides line maintenance personnel with training on system components, concept of operation, and operation of the diagnostic tools
- Identify Venue Aftermarket, Falcon and Global Line Replaceable Units (LRUs), identify optional and third-party Venue HD products, Explain the baseline system operation, Perform conformity checks using the Galley Touchscreen (GTS) and Test and Simulation Tool (TST) Perform System Status checks using the GTS and TST

PROGRAM

- Venue Systems Overview
 - Cabin control, Entertainment
- Venue system components/operation
 - Media Center Device (MCD), Dual Blu-ray Player (BDP)
 - 2052-1-xx Cabin Environmental Controller (CMM, RDE)
 - High Definition Audio Video controllers (HDAV) 300x and 600x
 - Personnel Switch (PSW), Touchscreen Controller (TC6000)
 - LCD High Definition Monitors (HDM), High Definition Monitors (Smart) LAM
 - High Definition Touchscreen Monitors (HTSE, GTS)
 - Smart Remote Electronics Box (SRMEB), Electronic Control Module (ECM)
 - Aux Panels, Cabin Remote, Tailwind 500/550
 - 2033 Radio Frequency (RF) and Infrared (IR) controller
 - 2501 "A" Type Switch Panels, 3rd Party Communication devices
 - 1Flight Deck Controller (FDC), Wireless Access Point (WAP) 3000 & 4000
 - Application Media Server Unit (AMSU), Power Distribution Equipment (PDE)
 - Test and Simulation Tool (TST) and GTS
 - Venue Software Loading : Loadable Software Package (LSP), Loadable Configuration Package (LCP), Airshow Software Loading
 - Maintenance Operations
- Venue HD system diagnostics
 - Software and Maintenance Laptop setup
 - Performing a conformity check using GTSE and TST
 - Performing system checks using GTSE and TST

OPTIONS

- Possibility to combine with other trainings from *Cabin Entertainment*

CABIN ENTERTAINMENT: TAILWIND® 5XX

DATES

Upon request

DURATION

2 days

OBJECTIVES

- The student will acquire an understanding of the Tailwind 5xx system
- Upon completion of this course, the student will be provided sufficient information that they will be confident in their ability to install, checkout and troubleshoot common issues on the Tailwind 5xx system

PROGRAM

- Satellite Television Overview
 - Terms, Providers, Satellite,
 - Transponders Antenna polarization, Receiver
- System Overview
 - What is Tailwind 5xx? Where does it work?
 - Airborne considerations, Factors affecting Performance
- Component Overview
 - Tailwind 5xx sub systems
 - FMU, TMU, SSP, CPIF, RDU, IMU, CDM
- System Software
 - Software types, CPIF & RDUS Application
 - Databases, Maintenance software
- System Operation
 - System modes, Antenna subsystem mode
 - Calibration, System initialization
 - Normal operation
- Maintenance Practices
 - Tools, Maintenance Ports
 - Maintenance menus, Software downloading
 - TAIT demo

OPTIONS

- Practice on customer aircraft (one extra day)
- Possibility to combine with other trainings from *Cabin Entertainment*

AUTOMATIC DEPENDENT SURVEILLANCE (ADS-B)

DATES

May 27-28, 2019
December 12-13, 2019

DURATION

2 days
2 days

OBJECTIVE

- This course provides engineering and maintenance personnel with training to understand TCAS and transponder major installation points needed for ADS-B certification. This course also provides overview of Transponder and ACAS operation and maintenance review.

PROGRAM

Introduction: airspace surveillance goals and means

- XPDR Theory
 - System Architecture
 - Mode A, C and S functions
 - Mode S uplink downlink
 - Elementary Enhanced surveillance
 - Squitters
- TCAS/ACAS
 - History
 - Principle (Tau, range, altitude, bearing, TA, RA)
 - Displays
 - Architecture
 - Modification 7.1
 - Antenna performance
- ADS-B
 - Overview
 - Mandatory/regulation information
 - OUT functions
 - IN functions
 - Architecture overview
 - Strapping required (TCAS/XPDR)
 - Required labels: Non GNSS and GNSS data
 - Ground Flight testing requirements
 - BDS 0,5 0,6 0,8 0,9 6,1 6,2 6,5
 - Non transponder aircraft system test
- Test of transpondeur et TCAS/ACAS
 - Self-Test/Built-In Test Equipment
 - LRU Front Panel Self-Test Button
 - BITE Testing using Control Head
 - ADS-B failure annunciations
 - Recommended maintenance data update for ADS-B (labels 35x)

COLLINS AEROSPACE EQUIPMENT COURSES

OBJECTIVES

- Training personnel in charge of equipment maintenance and troubleshooting
- The purpose of this theoretical and practical training is to familiarize participants with the functional string of the equipment's circuits
- During training, the operator will be able to perform maintenance, repair and troubleshooting tasks based on hands-on example
- After completing training, trainees should be able to carry out equipment performance evaluation procedures. In the context of hands-on sessions, in case of failure, the trainees should be able to apply a logical technical approach leading to diagnosing and correcting the problem by replacing the appropriate component.

PROGRAM

- Review of equipment basics
- Presentation of the system
- Characteristics and performance levels
- General operation
- Interconnection
- Comprehensive study of the equipment (diagrams, flowcharts)

EQUIPMENT COVERED

- Any equipment (old or new generation) upon customer request
- See summary board of unscheduled courses already available, page 49

DATES/DURATION

- Upon request/to be defined with customers
 - Control box
 - Interpreting failure codes
 - Test bench performance check
 - Settings and adjustments



CUSTOMIZED TRAINING

We place particular importance on providing customers with training adapted to expressed needs: thus, you have the assurance of our technical skills but also a guarantee of success founded on the cooperative effort that goes into defining course content.

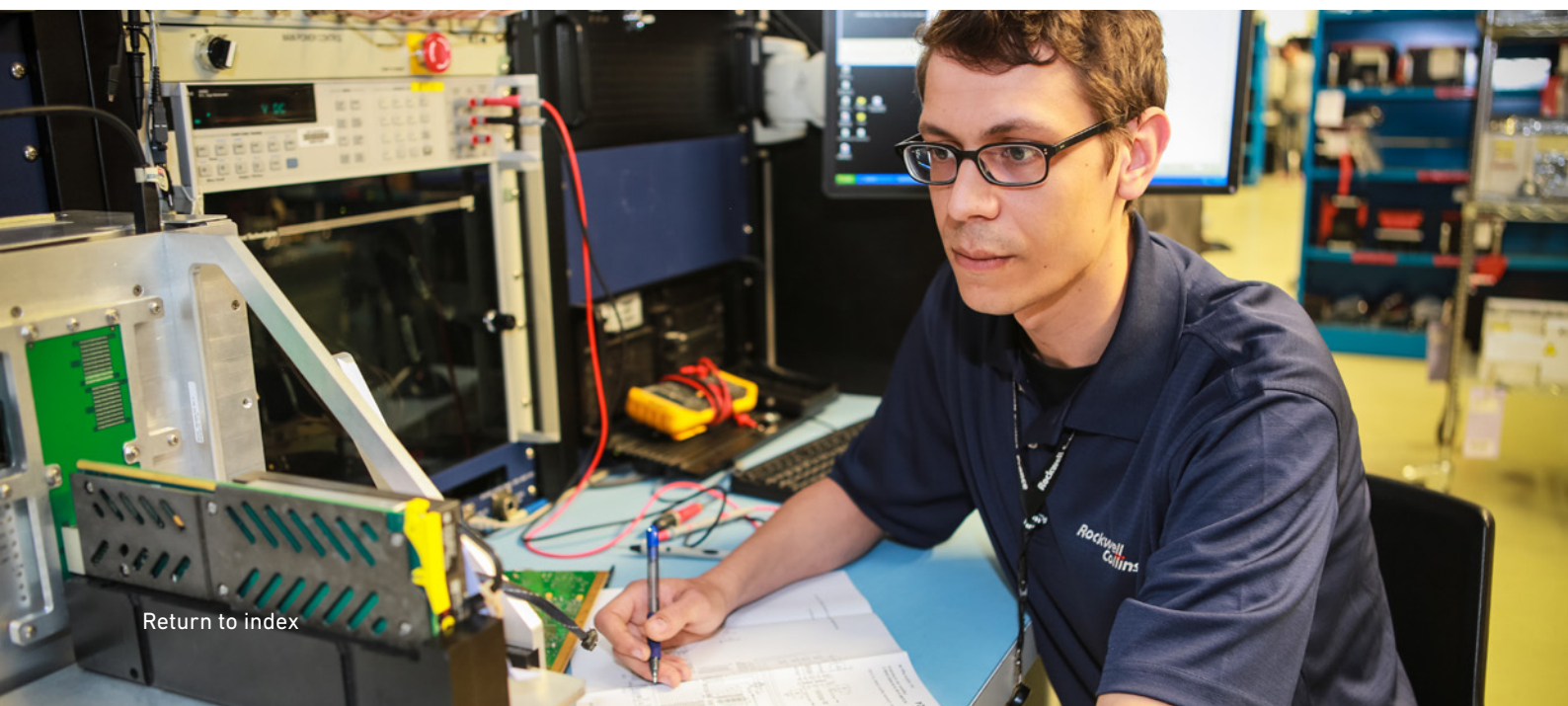
From this perspective, our first concern is to pinpoint your expectations and constraints so that we may offer you training that is closely suited to the needs of trainees.

Collins Aerospace in France organizes training in French, English or Spanish, at our facilities or at customer premises. How long training lasts is a function of the level required the trainees' professional background and the amount of hand-on training desired. We also offer ON-JOB TRAINING that is entirely hands on (see page 48).

We have defined three levels of maintenance training courses:

- **Level I (A to D)**
- **Level II (A to G)**
- **Level III (A to J)**
 - A. Basics/System Description**
 - B. Specifications/Interface**
 - C. Utilization**
 - D. Bite/Failure Code Analysis**
 - E. Analysis of Block Diagrams**
 - F. Acceptance Testing**
 - G. Primary Adjustments**
 - H. Comprehensive study of electronic diagrams**
 - I. Component-level troubleshooting**
 - J. Complete adjustment procedure**

We propose, then, a training plan that takes into account the number of persons to be trained and the deadline for completing training.



COLLINS AEROSPACE LEVEL DEFINITION

- **Level I = ATA-104 levels I, II, and III**

This is a Flight Line Maintenance level to LRU replacement.

Sometimes called Organizational level (OLM).

Also applicable to pilot training RC level I is FAMILIARIZATION and FLM flight line maintenance with training to troubleshooting and removing failed LRU using onboard Maintenance Diagnostic data.

The training course will train the student to isolate a failure to a Line Replaceable Unit (LRU) and remove and replace the LRU, and perform testing procedures using BIT and/or special/standard test equipment as described in the equipment's instruction book.

- **Level II = ATA-104 Level IV**

This is an Intermediate level to card replacement (ILM).

The training course will train the student to isolate a failure to a defective Shop Replaceable Unit (SRU), remove and replace the SRU, and perform testing procedures using BIT and/or special/standard test equipment as described in the equipment's instruction book.

This is bench training to remove a single LRU, repair by replacing the card.

- **Level III = ATA-104 Level V**

This is a Depot level to component replacement (DLM).

This is bench training to repair LRU by replacing a component on a card, assemble and test for return to service.

The training course will train the students to recognize and isolate malfunctions to the defective component, remove and replace the defective component and perform equipment alignment and testing procedures using BIT and/or special/standard test equipment as described in the equipment instruction manual.



FLIGHT LINE MAINTENANCE

DATES/DURATION

To be defined according to the equipment that is the subject of training and according to customer requirements.

OBJECTIVES

- Training personnel in charge of ground maintenance of Collins Aerospace equipment
- This course can be adapted to train personnel on a specific aircraft equipment type
- In this course, operators will learn about operating procedures, how the equipment works and how to interpret the built-in self test (BITE) and maintenance operations to be performed

PROGRAM

- Review of equipment basics
- Presentation of the system
- General operation
- Operating procedures
- Interpreting failure codes
- Preventive and corrective maintenance



HANDS-ON LAB TRAINING (ON-JOB TRAINING)

DATES/DURATION

To be defined according to the equipment that is the subject of training and according to customer requirements

OBJECTIVES

- Training personnel in charge of equipment maintenance and troubleshooting
- During training, the operator will be able to perform maintenance, repair and troubleshooting tasks based on hands-on examples
- In the context of this hands-on training, trainees should be able to apply a logical technical approach leading to diagnosing and correcting the problem by replacing the appropriate component

PROGRAM

- Presentation of the system
- Equipment characteristics and performance levels
- Test bench performance check
- Test run on test stand
- Removal and reinstallation
- Settings and adjustments
- Troubleshooting

NOTES:

- This course can be given at our facilities or at your premise
- See summary board of unscheduled courses already available, page 51

EQUIPMENT TRAINING CAPABILITY LIST

RADIO NAVIGATION**ADF**

ADF-60A/462
 ADF-4000
 51Y-7/A/B/C/D/AF/AB/MEF/TF
 ADF-700/900
 DF-206NFC (NRAN-28) *
 DF-206A (AN/ARN-149)*

DME/TACAN

DME-40/42/442
 DME-4000
 DME-700/900/2100
 TCN-118 (AN/ARN-118) *
 TCN-500 (AN/ARN-153) *

VOR ILS MARKER

51RV4/5/5B/4DF/5DF
 ILS-700/720/900
 NAV-4000/4500
 VIR-30/31/32/432
 VIR-4000/4500
 VOR-700/900
 GLU/GNLU-9X0
 VIR-130A (AN/ARN-147)*

RADIO ALTIMETER

860F-1/2/4
 ALT-50A/55B
 ALT-1000
 LRA-700/900/2100

DF/SAR/CSAR

DF-301/DF-430/MDF-124V1 V2
 SAR-126
 RSC-125G / DF-500

TCAS ATC

TDR-90/94/94D
 TPR-900/901
 TTR-920/921
 TPR-710A /720
 ISS-2100
 TTR-2100/4100

GPS

GPS-4000
 GLU-9XX - GNLU-9xx

RADIO COMMUNICATION**HF**

CPL-920D
 490S-1
 628T
 HF-121 (AN/ARC-230)
 HF-230
 HFS-700/700D
 HFS-900/900D/2200
 HF-9000
 HF-9000D*
 HF-9500 *

VHF

618M-3/4/5
 VHF-20/21/22/422
 VHF-2100/2200
 VHF-4000
 VHF-700/700A/700B
 VHF-900/900B/920
 RT-1000 (AN/ARC-186) *

V/UHF

AN/ARC-182 *
 AN/ARC-210 *
 TALON (RT-8XXX)*

MODEM/DATALINK

HF-MESSENGER
 MDM-2001/2201/2401
 MDM-2002/2202/2402
 MDM-3001

COMM INTERFACE UNIT

CIU-906
 CIU-600X
 DLM-7XX/9XX

AVIONICS SYSTEM/OTHER**AIR DATA**

ADS-80
 ADC-85/86/87
 ADC-850
 ADC-3000

ATTITUDE HEADING SYSTEM

AHC-3000
 AHC-85

DISPLAYS

AFD-2000/3010/2100
 DU-7000
 EFD-74
 EFIS-85/86/87
 EDU-766D/776D
 EFD-4076/4077
 EAP-701/703
 MFD-255
 ETC-4xxx
 TCP-2100
 DCP-2100
 CCP-2100
 MKP-2100
 AFDX-2XXX

ISC-2200

AUTO PILOT/FMS/FCS

APS-65
 APS-80/85
 FCC-400x/70x//85/86

IAPS Pro Line IV

WEATHER RADAR

WXR-2100
 WXR-700/701

CABIN ENTERTAINMENT

ACMS
 AIRSHOW 4xx(x)/500
 CMS-1
 FCMS
 TAILWIND 5XX

OTHER

Workmanship Standards

REGISTRATION FORM

To be returned by mail or email at:

Collins Aerospace, France – Training Center
 Ms. Ourihya Guerdane
 6 avenue Didier Daurat 31701 Blagnac, France
 trainingfrance@rockwellcollins.com
 ourihya.guerdane@collins.com
 Phone: +33 5 61 71 78 10
 Fax: +33 5 61 71 78 87

COURSE REGISTRATION AND AUTHORIZATION REQUEST FOR TRAINING

Customer: First and last name _____

Job Title _____

Company Name _____

Company Address _____

Street or PO Box _____

City _____ State _____ Country _____

Phone _____

e-mail _____

Course Title
Date
Signature

Language French English

Trainee's list

Surname, Forename	Job Title	Date and place of birth	Passport Number	Nationality

Your purchase order number _____

Invoice address _____

VAT number _____

Total cost _____ Euros

Convention: N° 73.31.00170.31 Yes No Company Stamp Date _____

PRICE

Training duration per day	Price per person	Group rate
5 days	3 250 €	15 000 €
4 days	2 600 €	12 000 €
3 days	1 950 €	9 000 €
2 days	1 300 €	6 000 €
1 day	650 €	3 000 €

CONDITIONS: COMPANY GROUP RATE

A five person minimum is required to apply the group rate and is limited to 10 person maximum.

CONDITIONS: PRICES PER PERSON

Training course is confirmed with minimum four attendees, all companies included.

The prices are applicable only at Collins Aerospace France Training Center.

These courses can be delivered in French or English at our facilities or customer premises with associated material supplied in English or French where applicable.

- Any training cost referenced "upon request" is not subject to stated pricing
- For training at customer premises, Collins Aerospace will quote accordingly

GENERAL TERMS AND CONDITIONS

All scheduled courses are governed by a bilateral occupational training agreement.

Our registration number is 73 31 00170 31 Training is carried out in French or in English language at our Blagnac facility, located at the following address:

Collins Aerospace
6 Avenue Didier Daurat
31700 BLAGNAC

Collins Aerospace does not handle trainees' additional expenses (food, lodging, transportation) Lunch is included in the training rate.

In case of cancellation, the customer shall pay to Collins Aerospace a lump sum for compensation described as follows:

Date of cancellation's notice	Amount compensation courses' sell price
Less than 7 days	100%
From 7 to 14 days	50%
From 15 to 30 days	30%

Collins Aerospace reserves the right to cancel training if there are fewer than four participants registered.

Registration for any one of our courses implies acceptance of all terms and conditions.

PRACTICAL INFORMATION

Course schedule: 9 a.m. to 12 noon - 1:30 to 4:30 p.m.

ACCOMMODATION

Upon request, training department secretaries can book hotel reservations in participant's name.

To learn more, go to
collinsaerospace.com

COLLINS AEROSPACE FRANCE

+33 5 61 71 78 10

trainingfrance@rockwellcollins.com

collinsaerospace.com