



# Training 2018

**Rockwell  
Collins**

Building trust every day

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# Training Center

Rockwell Collins 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.

Rockwell Collins France relies 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.

At Rockwell Collins France, we listen to our customers. 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 the Avionics and Defense Electronics business units, including those manufactured by Rockwell Collins France.

Our four full-time instructors have dedicated training facilities and are supported by the Services Business Unit and a whole team of highly qualified technicians and engineers. The success of our training Center grows out of this close cooperation, for what Rockwell Collins France has 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 Rockwell Collins 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 13-14, 2018

December 18-19, 2018

## 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



# RADIO COMMUNICATION

Dates

March 5-9, 2018

Duration

5 days

## OBJECTIVES

- Acquire knowledge of various radio communications devices (HF, VHF, UHF)
- Acquire familiarity with technical and technological aspects of transmission-reception

## 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
  - Exiter
  - 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 Rockwell Collins equipment



# RADIO COMMUNICATION CONCEPTS

Dates

Upon request

Duration

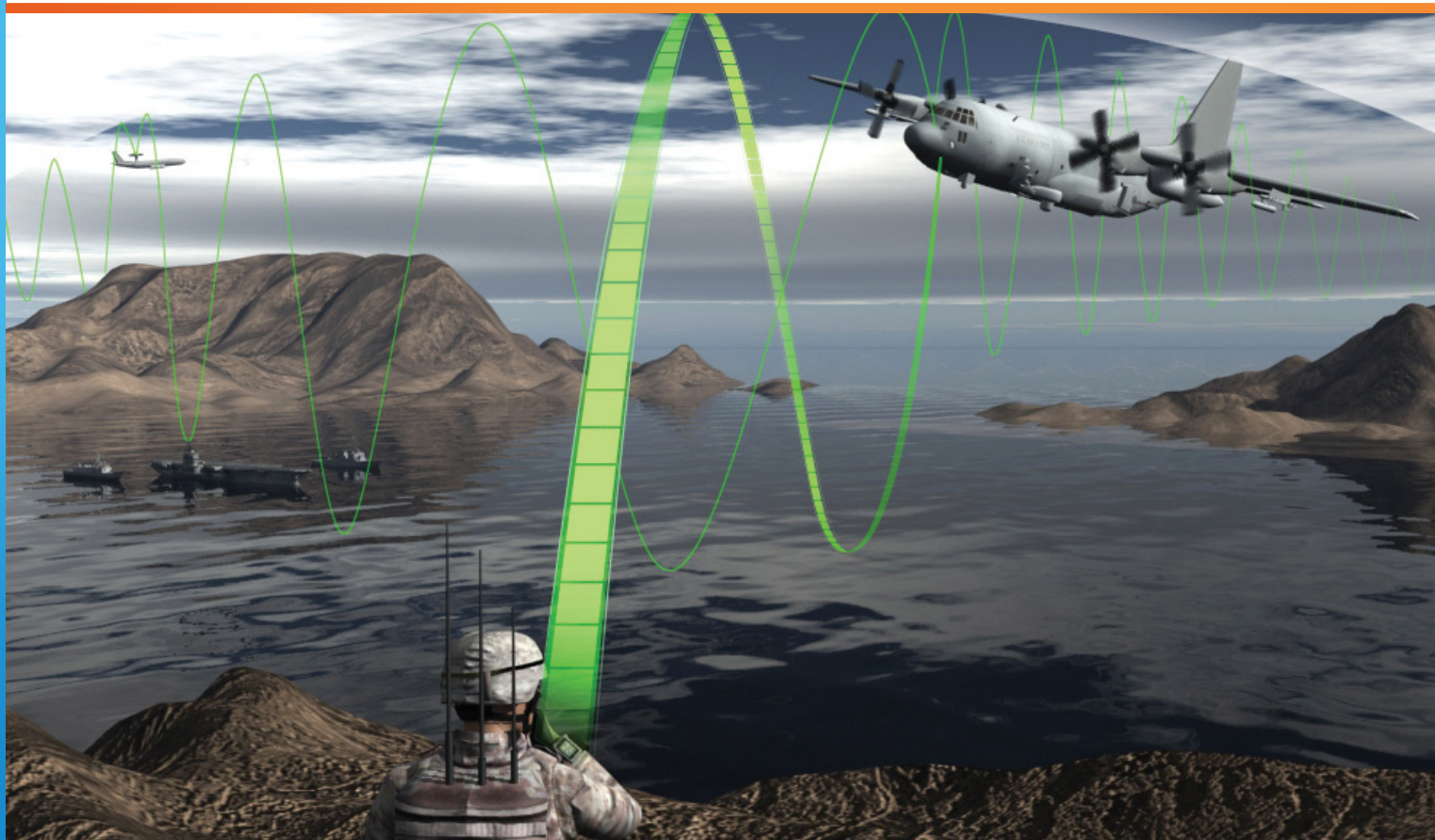
5 days

## 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	Duration
April 4-6, 2018	3 days
September 4-6, 2018	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 Rockwell equipment
  - Aircraft practice at customer facility according to availability and assistance



# RADIO NAVIGATION

Dates	Duration
April 23-27, 2018	5 days
September 10-14, 2018	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 Rockwell Collins 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
- **Conventionnal 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 GPS, SBAS/GBAS
- **Air Traffic ATC**
  - Transponder, ADS-B
- **Performance Based Navigation**
  - RNAV, RNP, RNP Containment
  - FMS
- **Navigation in TMA**
  - STAR and SID
  - Approach Type: Non Precision, APV, Precision

# AIRCRAFT SYSTEMS

Dates

September 24-28, 2018

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



## Dates

## Duration

## OBJECTIVE

## PROGRAM

## ➤ Operation

- ### ➤ Basic weather radar

-



# AVIONICS ARCHITECTURE

Dates	Duration
June 18-22, 2018	5 days
October 8-12, 2018	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
  - FMGS, FMGEC, FADEC, FDS, EIGMU, EEC, FMS/FMC, MCDU, FCU
  - ACARS, SIU, GLU/GNLU, CMCS, CFDS, FWC, ACMS
  - 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) HFDDL HFDR, VHFDDL/VDR, DMU
- › The future
  - Free Flight,
  - CNS/ATM, FANS, WAAS, LAAS
  - ADS-B, GNSS/GLS/LDGPS

# HELICOPTER ARCHITECTURE

Dates	Duration
March 19-23, 2018	5 days
June 11-15, 2018	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:
  - 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
- 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, HFDDL/HFDR, VHFDL/VDR
- The future
  - Free Flight
  - CPDLC, CNS/ATM, FANS, WAAS, LAAS
  - ADS-B, GNSS/GLS/LDGPS



# NEW CONCEPTS IN AVIONICS

Dates

Upon request

Duration

4 days

## OBJECTIVE

- Gain basic knowledge of the features of current and future on-board systems equipment for flight management and navigation

## PROGRAM

### ➤ Aircraft systems

- CNS/ATM
- FANS – Free Flight
- ADS, RNP, CPDLC
- Airport survey

### ➤ Aircraft systems

- Cockpit
- Flight data display, SVS
- TCAS principle and growth
- TAWS, EGPWS

### ➤ Radio Communication

- Data transmission VHF and HF
- VDL mode 2,3,4, UAT, HFDL
- ACARS, ATSU, ADS
- SATCOM, High Speed & Swift64
- Data link HF Messenger (STANAG 5066)

### ➤ Radio Navigation

- GPS, LAAS, WAAS, LDGPS, GALILEO
- Multimode receivers MMR, MLS
- Multiscan weather radar
- Windshear





# GPS POSITIONING

Dates

Duration

Upon request

## 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 Rockwell 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/.cbt/...)
- 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	Duration
Upon request	

## 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

Duration

Upon request

## 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

Duration

Upon request

## 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 (first two days)

- 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

Duration

Upon request

## 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 6-8, 2018

Duration

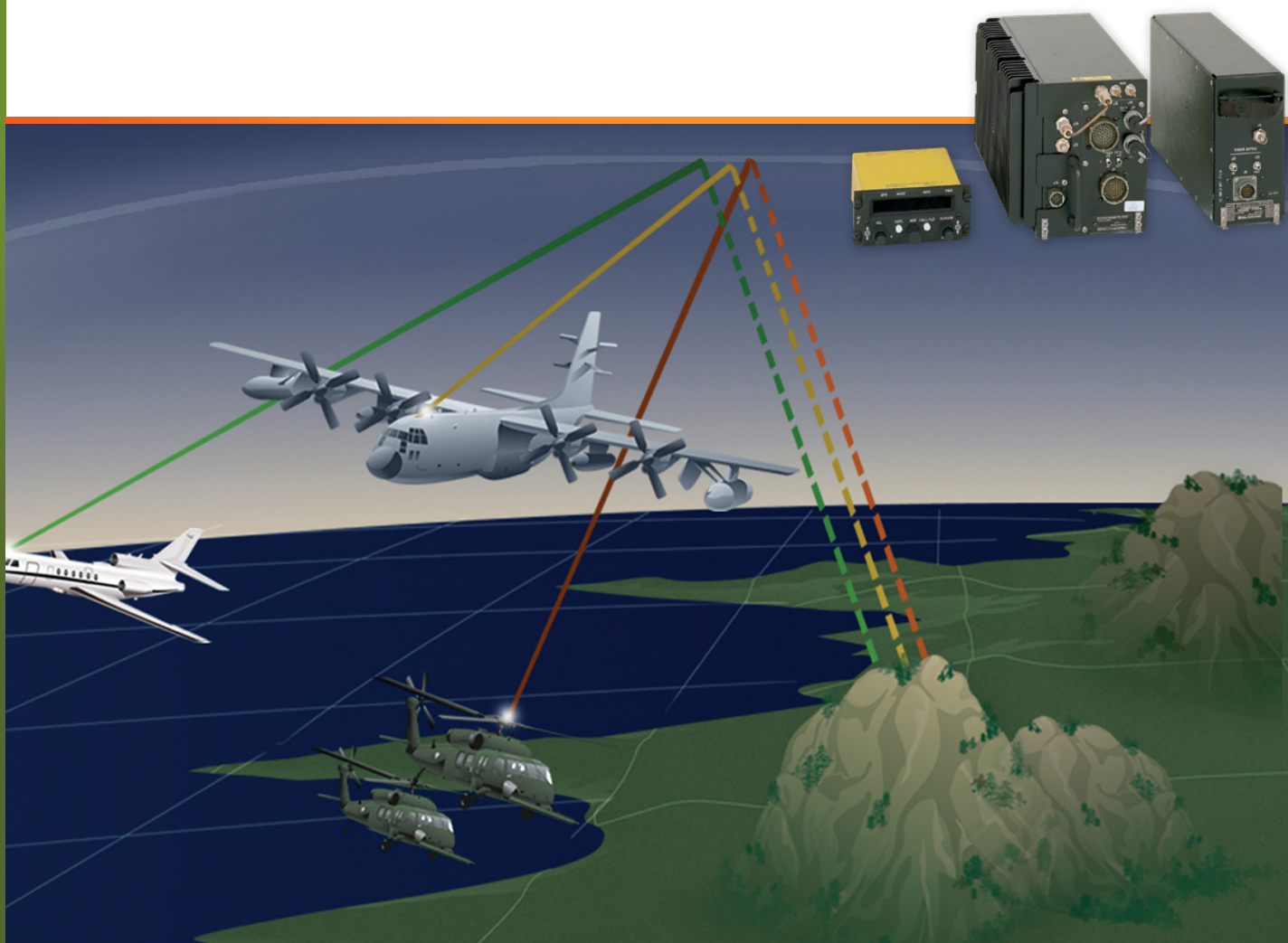
3 days

## 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
  - Bandpass filter HF-9060F
- HF-9000 Interconnection
- HF-9000 operations using a dedicated bench



# SATCOM SATELLITE COMMUNICATION SYSTEM

## Dates

November 21-23, 2018

## Duration

3 days

## OBJECTIVE

- This course provides students with the skills and background knowledge required for troubleshooting and isolating defective components in the Rockwell Collins 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

May, 14-18, 2018

## 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

Duration

upon request

## 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

November 12-16, 2018

## Duration

5 days

## OBJECTIVES

- › Familiarize trainees with the basics of radio equipment used on air transport airplanes
- › Present technical characteristics of rockwell Collins 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, Transpondeur TPR-900/901, Radio-altimeter LRA-900, MMR GLU-920) and radio communication equipment VDL (VHF-900), HF DL (HFS-900/900D)
- › Running equipment demonstrations of Rockwell Collins 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)



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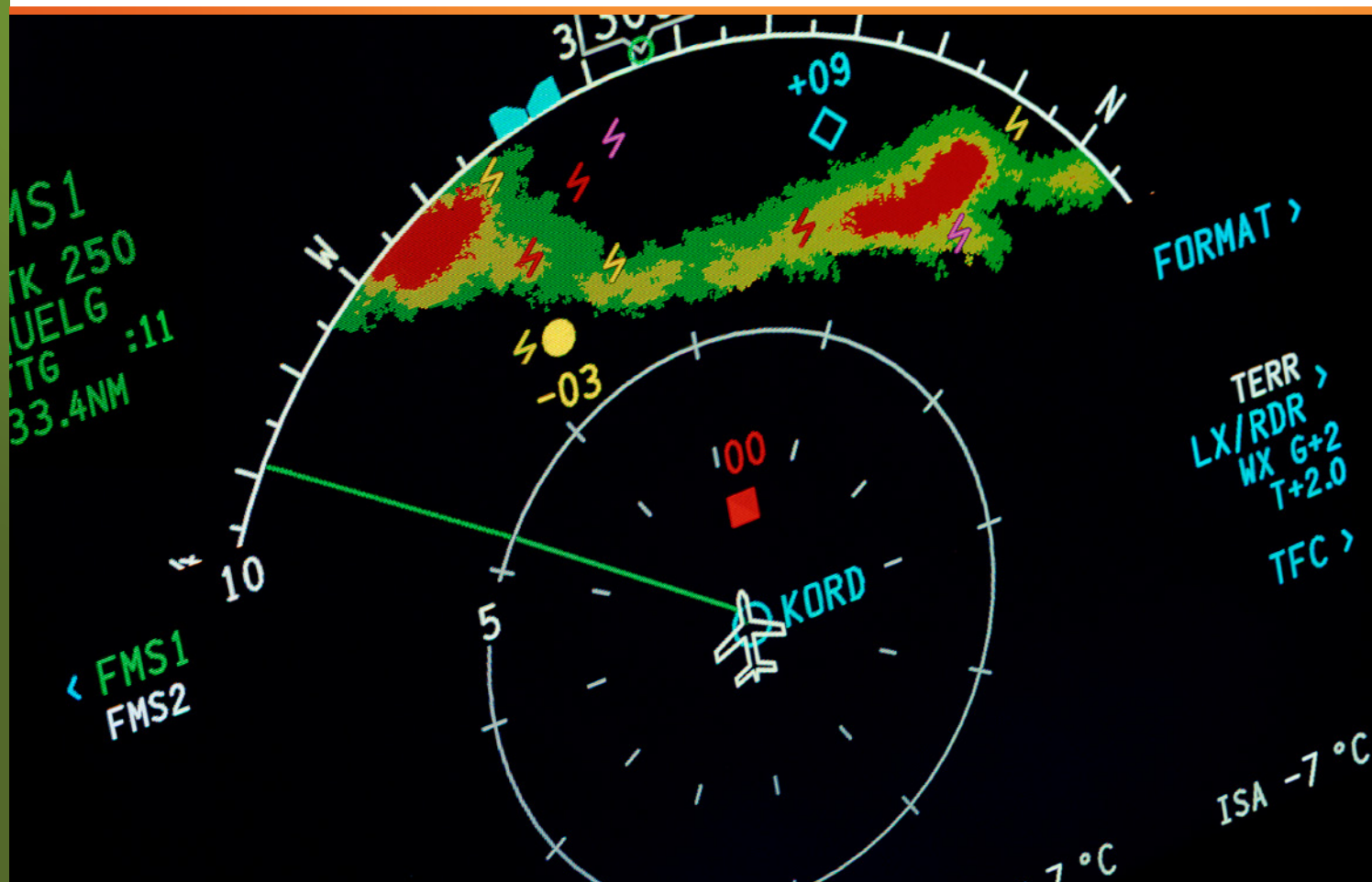
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## PRO LINE II

Dates

Duration

Upon request

### 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

Duration

Upon request

## 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	Duration
June 25-29, 2018	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 damp
- 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 9-13, 2018

## 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 Familiarisation

- 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 17-21, 2018

## Duration

5 days

## OBJECTIVES

- This course provides flight line technicians with level I maintenance for Rockwell Collins Pro Line Fusion.
- Introduce trainees to the new “Integrated Digital Avionics” concept PROLINE 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	Duration
April 10-11, 2018	2 days
October 23-24, 2018	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 menu's 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)
- HF DL 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 2-3, 2018

## 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

### ➤ HF DL 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

# AERONAUTICAL TELECOMMUNICATION NETWORK (ATN)

Dates

Upon request

Duration

2 days

## OBJECTIVES

- › Provide an overall understanding of ATN principles and operation
- › Analyze ATN communications issues
- › Identify the ground deployment impacts to the overall ATN network

## PROGRAM

- › Introduction to the ATN network with History, deployment, applications.
- › ATN network architecture, addressing plan, routing mechanisms
- › Description of the communication protocols
- › Different examples in order to illustrate the benefits of the ATN network:
  - ATN initial connection establishment example
  - CPDLC communication example
  - Hand-off example
- › Presentation of the documentation baseline
- › ATN trial done on real avionics equipment test bench



# FMS, TAWS, TCAS

Dates

October 16-18, 2018

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 Rockwell Collins 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	Duration
Upon request	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**
- › **Rockwell Collins 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

Duration

Upon request

## 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

Duration

Upon request

## 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	Duration
Upon request	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 22, 2018

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 500 system

## PROGRAM

### › Introduction to Airshow 500

- Mechanical Design : Tray Mount, Flange Mount
- Functional Description : 2D mapsn, 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

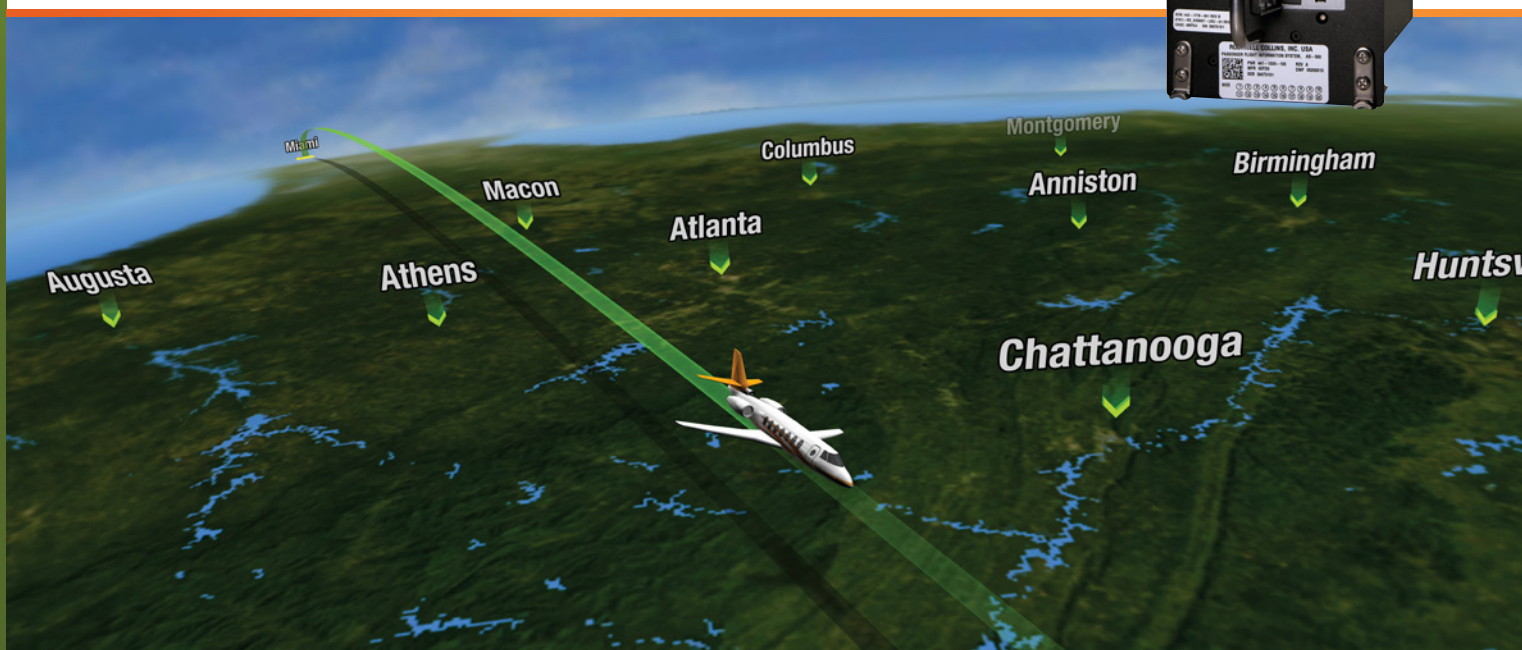
- GUI Settings Editor: Select Language, Basic Settings Tab, Advanced Settings Tab

### › Airshow 500 Checkout and Troubleshooting

- System Access Maintenance Mode
- 429 Troubleshooting

## OPTIONS

- › Practice on customer's aircraft on site (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	Duration
Upon request	2 Days (1.5 days classroom, 0.5 day hands on as available)

## 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 Environnemental 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	Duration
Upon request	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-B (ADS-B)

## Dates

June 7-8, 2018

## Duration

2 days

## OBJECTIVES

- 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 GNNS 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)



# ROCKWELL COLLINS EQUIPMENT COURSES

## Dates

Upon request

## Duration

To be defined  
with customers

## 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)
- › Control box
- › Interpreting failure codes
- › Test bench performance check
- › Settings and adjustments

## EQUIPMENT COVERED

- › Any equipment (old or new generation) upon customer request
- › See summary board of unscheduled courses already available, page 50



## CUSTOMIZED TRAINING

**Rockwell Collins France** places 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.

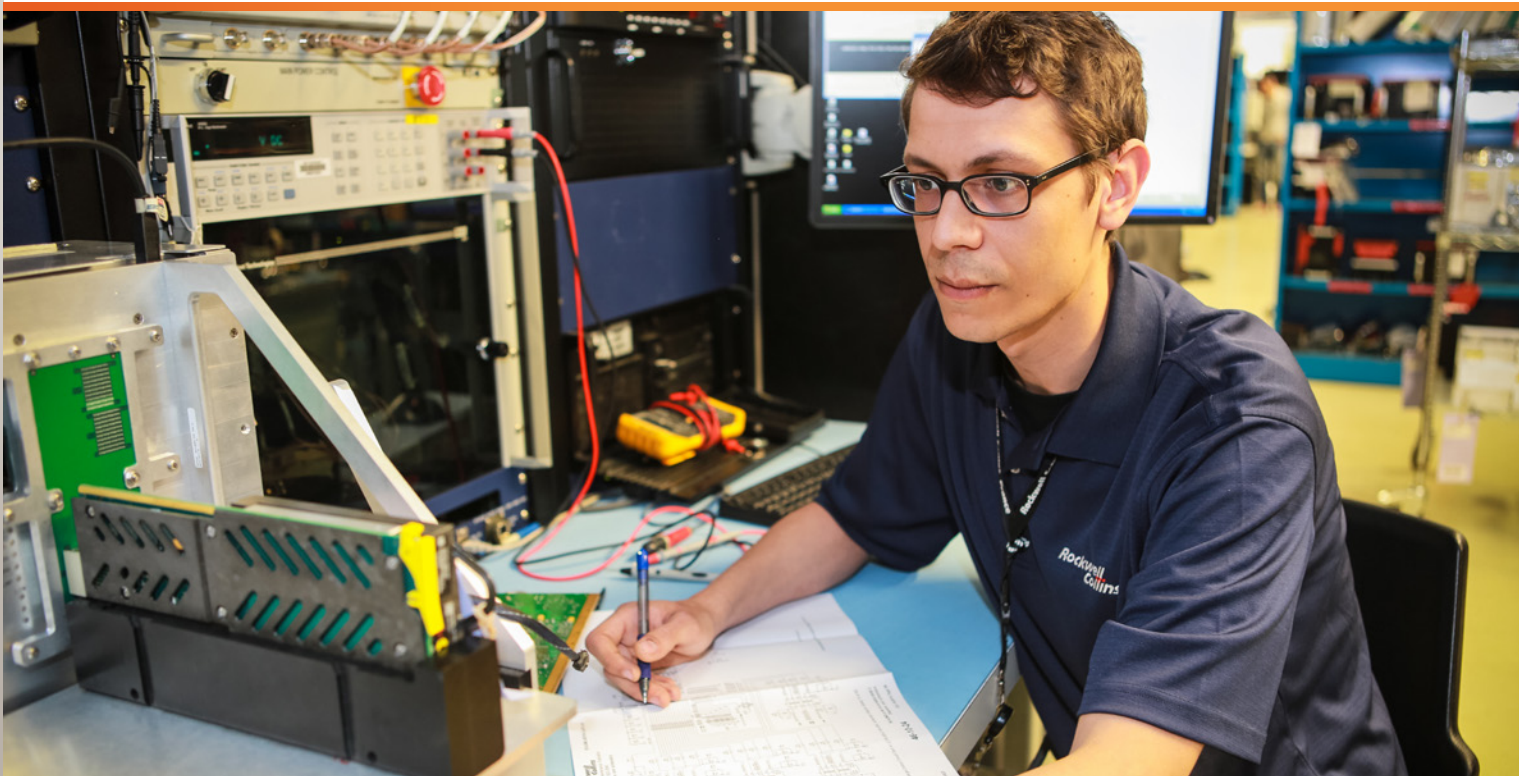
From this perspective, our first concern is to pinpoint your expectations and constraints so that we may offer you training that is closely suited to the needs of trainees.

Rockwell Collins 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 47).

We have defined three levels of maintenance training courses:

- › RC Level I (A to D)
- › RC Level II (A to G)
- › RC 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.





# ROCKWELL COLLINS LEVEL DEFINITION

## › RC 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.

## › RC 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.

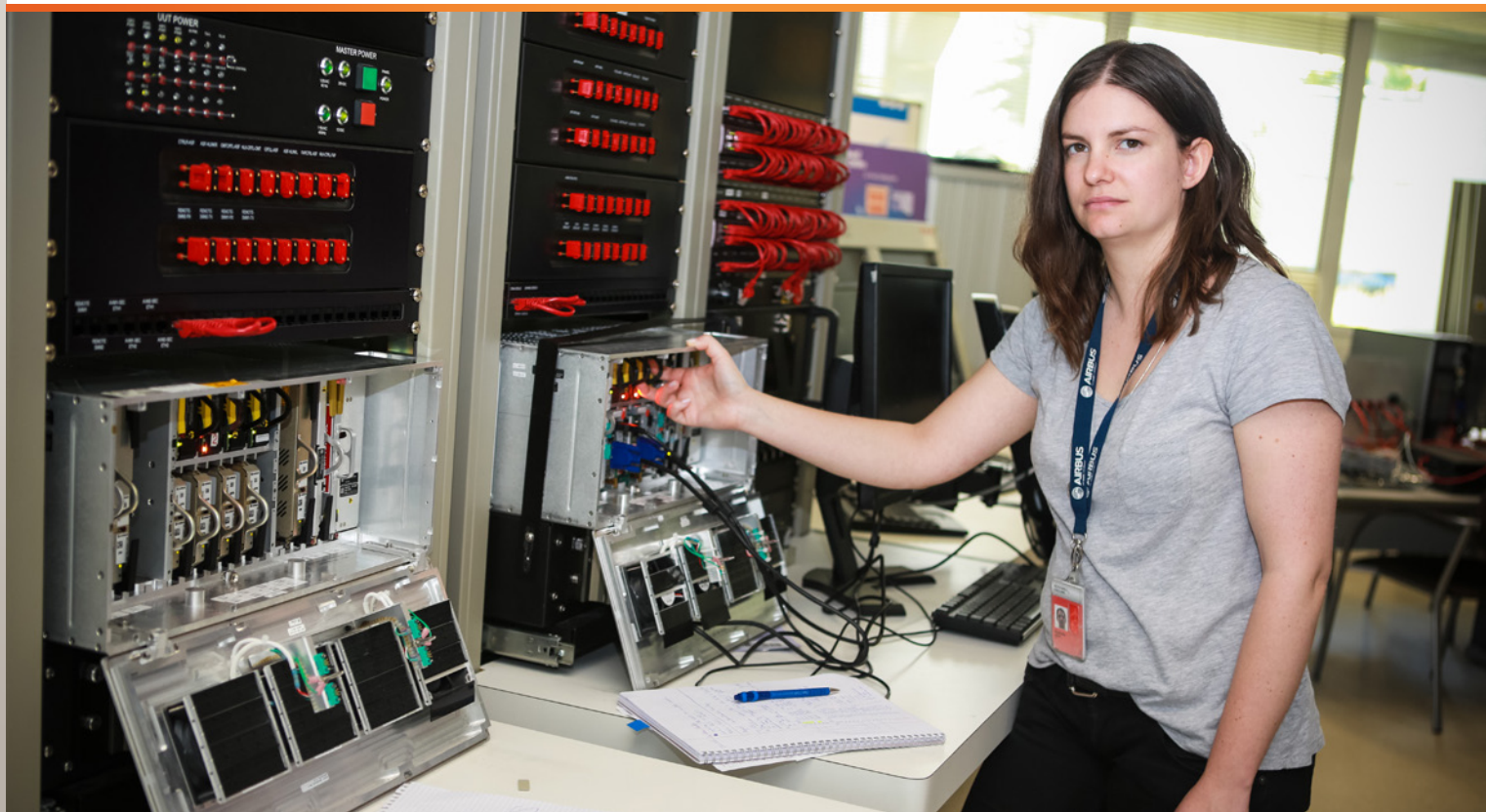
This is bench training to remove a single LRU, repair by replacing the card.

## › RC 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 and 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 Rockwell Collins 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, how 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 and 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 50

# 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

\*Subject to U.S. and French export regulation

# Registration form

To be returned by mail or email at:

## Rockwell Collins France – Training Center

Ms. Ourihya Guerdane

6 avenue Didier Daurat BP 20008 31701 Blagnac, Cedex, France

trainingfrance@rockwellcollins.com

ourihya.guerdane@rockwellcollins.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 \_\_\_\_\_

<b>Course Title</b>
<b>Date</b>
<b>Signature</b>

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 \_\_\_\_\_



# Planning

	January	February	March	April	May	June
1	New Year					TCAS
2						
3				AIRBORNE RADIOCOM		
4				AIRBORNE RADIOCOM		
5			RADIOCOM	AIRBORNE RADIOCOM		
6			RADIOCOM			
7			RADIOCOM			ADS-B
8			RADIOCOM			ADS-B
9			RADIOCOM	PRO LINE FUSION EDS		
10				PRO LINE FUSION EDS		
11				PRO LINE FUSION EDS		HELICOPTER ARCHI
12				PRO LINE FUSION EDS		HELICOPTER ARCHI
13			BASIC AVIONICS	PRO LINE FUSION EDS		HELICOPTER ARCHI
14			BASIC AVIONICS		HF-CPS ALE	HELICOPTER ARCHI
15					HF-CPS ALE	HELICOPTER ARCHI
16					HF-CPS ALE	
17					HF-CPS ALE	
18					HF-CPS ALE	AVIONICS ARCHI
19			HELICOPTER ARCHI			AVIONICS ARCHI
20			HELICOPTER ARCHI			AVIONICS ARCHI
21			HELICOPTER ARCHI			AVIONICS ARCHI
22			HELICOPTER ARCHI		AIRSHOW 500	AVIONICS ARCHI
23			HELICOPTER ARCHI	RADIONAV	VENUE Falcon Global	
24				RADIONAV	VENUE Falcon Global	
25				RADIONAV		PRO LINE 21
26				RADIONAV		PRO LINE 21
27				RADIONAV		PRO LINE 21
28					TCAS	PRO LINE 21
29					TCAS	PRO LINE 21
30					TCAS	
31					TCAS	

# Planning

	July	August	September	October	November	December
1						
2				DATALINK ENV.		
3				DATALINK ENV.		WEATHER RADAR
4			AIRCRAFT RADIOCOM			WEATHER RADAR
5			AIRCRAFT RADIOCOM			WEATHER RADAR
6			AIRCRAFT RADIOCOM		HF-9000	WEATHER RADAR
7					HF-9000	WEATHER RADAR
8				AVIONICS ARCHI	HF-9000	
9				AVIONICS ARCHI		
10			RADIONAV	AVIONICS ARCHI		
11			RADIONAV	AVIONICS ARCHI		AIRSHOW 500
12			RADIONAV	AVIONICS ARCHI	900 SERIE	VENUE Falcon Global
13			RADIONAV		900 SERIE	VENUE Falcon Global
14			RADIONAV		900 SERIE	
15					900 SERIE	
16				FMS TAWS TCAS	900 SERIE	
17			PRO LINE FUSION IPS	FMS TAWS TCAS		
18			PRO LINE FUSION IPS	FMS TAWS TCAS		BASIC AVIONICS
19			PRO LINE FUSION IPS			BASIC AVIONICS
20			PRO LINE FUSION IPS		SATCOM	
21			PRO LINE FUSION IPS		SATCOM	
22					SATCOM	
23				ACARS		
24			AIRCRAFT SYSTEM	ACARS		
25			AIRCRAFT SYSTEM			
26			AIRCRAFT SYSTEM		HF-CPS ALE	
27			AIRCRAFT SYSTEM		HF-CPS ALE	
28			AIRCRAFT SYSTEM		HF-CPS ALE	
29					HF-CPS ALE	
30					HF-CPS ALE	
31						

## Price

Training duration per day	Price per person	Group rate
5 Days	3 125 €	15 000 €
4 Days	2 600 €	12 000 €
3 Days	1 875 €	9 000 €
2 Days	1 250 €	6 000 €
1 Day	625 €	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 Rockwell Collins France Training Center

These courses can be delivered in French, 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, Rockwell Collins 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.

**Rockwell Collins France**  
**6 Avenue Didier Daurat**  
**31700 BLAGNAC**

Rockwell Collins France 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 Rockwell Collins France 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%

Rockwell Collins France 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.

## *ACCOMODATION*

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



Building trust every day.

Rockwell Collins delivers innovative aviation and high-integrity solutions that transform commercial and government customers' futures worldwide. Backed by a global network of service and support, we are deeply committed to putting our solutions to work for you, whenever and wherever you need us. In this way, working together, we build trust. Every day.

For more information, contact:

Rockwell Collins France  
6 avenue Didier Daurat BP 20008  
31701 Blagnac Cedex  
+33 5 61 71 78 10  
[trainingfrance@rockwellcollins.com](mailto:trainingfrance@rockwellcollins.com)  
[www.rockwellcollinstraining.com](http://www.rockwellcollinstraining.com)  
[www.rockwellcollins.com](http://www.rockwellcollins.com)

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Collins**

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