## Aftermarket Service Solutions

## Course Syllabus: 523-0823773

**Course Title:** Pro Line 21 Advanced Bombardier Challenger 300/350 Combo; Level I – Operations & Flight Line Maintenance

**Prerequisites:**

1. Students should have basic knowledge of aircraft avionics systems and a working command of the English language (interpreters are available for special cases).

**Purpose:**

This course provides line maintenance personnel with training to operate and perform flightline maintenance for the Pro Line 21 system.

**Objectives:** Upon completing this course, the student should be able to:

1. Provide an overall understanding of Pro Line 21 avionics principles and operation.
2. Identify system components and the functional/operational characteristics of each Line Replaceable Unit (LRU).
3. Identify typical aircraft system interface/system architecture.
4. Perform fault isolation to a faulty LRU using Built-In Test (BIT) diagnostics.

**Course Length:** 5 Days

**Training Devices:**

1. Challenger 300 M-184 Test Rig (If available).

**Training Materials:**

1. PowerPoint presentation with LCD projector
2. Information sheets
3. Student material
4. Bombardier Challenger 300/350 Pro Line ™ Advanced Avionics System Diagnostic Guide; 523-0820895
5. Collins Aerospace ADS-B Out PowerPoint , February 2020, 523-0825765

## Aftermarket Service Solutions

Course Syllabus: 523-0823773

**References:**

| Title and Type | Part Number |
|---|---|
| Bombardier Challenger 300/350 Pro Line 21™ Advanced Avionics System; Avionics System Manual | 523-0820908 |
| Bombardier Challenger 300/350 Pro Line 21™ Advanced Avionics System; Operator's Guide | 523-0820887 |
| Bombardier Aerospace Challenger 300 with IFIS Avionics System ; Diagnostic Guide | 523-0807947 |
| Bombardier Challenger 300/350 Pro Line 21™ Advanced Flight Management System; Operator's Guide | 523-0820888 |

# Aftermarket Service Solutions

## Course Syllabus: 523-0823773

**Course Outline:**

0. Level 1 – Operations & Flight Line Maintenance Introduction
    - A. Overview
    - B. Introductions
    - C. Course Registration
    - D. Course Description
    - E. Course Objectives
    - F. Course Evaluation &Critique
    - G. Publications
    - H. Publications Order
    - I. Publications &Training
    - J. Training Schedule
    - K. Service Solutions & Training
    - L. Summary
1. Data Buses
    - A. Overview
        - i. Theory and usage
    - B. Data Buses
    - C. ARINC 429
    - D. Display
    - E. Decoding
    - F. ARINC 453
    - G. Summary
2. Integrated Avionics Processing System (IAPS)
    - A. Overview
        - i. Resident Line Replaceable Modules (LRMs)
        - ii. Theory of operation
        - iii. Troubleshooting
    - B. IAPS

i. Integrated Card Cage (ICC); ICC-3111
ii. IAPS Environment Control Module (IEC); IEC-3000
iii. Power Supply; PWR-3000
iv. Input / Output Concentrator (IOC); IOC-4100
v. Configuration Strapping Unit (CSU); CSU-3100
vi. Options Control Module (OCM)
vii. Power Distribution
viii. Overheat Reporting
ix. Power Supply Shutdown
x. IEC Fault
xi. Flight Maintenance Computer (FMC); FMC-6200
xii. Maintenance Diagnostic Computer (MDC); MDC-4110
xiii. Flight Guidance Computer (FGC); FGC-3002

C. Summary

3. Electronic Flight Instrument System (EFIS)

A. Overview

i. Line Replaceable Units (LRUs)
ii. Operation
iii. Theory of operation

B. EFIS LRUs

i. Adaptive Flight Display (AFD); AFD-5220E
ii. Display Control Panel (DCP); DCP-5020
iii. Cursor Control Panel (CCP); CCP-5220
iv. Reversion Switch Panel (RSP); RSP-5020
v. Primary Flight Display (PFD) Flags and Annunciations
vi. Liquid Crystal Display (LCD) Defects
vii. Display Cleaning

C. Summary

4. Maintenance Diagnostic Computer (MDC)

A. Overview
    i. Maintenance Diagnostic System theory and operation
B. Maintenance Diagnostic Computer (MDC); MDC-4110
    i. Functions
    ii. Controls and indicators
    iii. Menu navigation
C. Summary

5. Synthetic Vision System (SVS)
    A. Overview
        i. System components description, theory of operation and functional operation
        ii. Avionics interface
        iii. Malfunction troubleshooting
    B. Synthetic Vision System
        i. Synthetic Vision Computer (SVC); SVC-3000
        ii. Video Interface Unit (VIU)
        iii. Synthetic Vision Configuration Module (SVCM); SVCM-3000
    C. Summary
6. Engine Indicating Crew Alerting System (EICAS)
    A. Overview
        i. Data concentrators theory and operation
    B. EICAS Line Replaceable Units (LRUs)
        i. Data Concentrator Unit (DCU); DCU-5000
        ii. Remote Data Concentrator (RDC); RDC-5000
        iii. Lamp Driver Unit (LDU); LDU-4000
        iv. Aural Warning Control Panel
        v. Cursor Control Panel (CCP); CCP-5220
    C. Summary
7. Integrated Flight Information System (IFIS)
    A. Overview

i. Theory and operation

ii. Items covered:

1. File Server Unit (FSU)
2. Graphical weather
3. Jeppesen chart
4. Enhanced map overlays

B. File Server Unit (FSU); FSU-5010

i. Description

ii. Theory of operation

iii. Operation

C. External Compensation Unit (ECU); ECU-3000

i. Description

ii. Theory of operation

D. Equipment required for Graphical Weather Support

E. Cursor Control Panel (CCP); CCP-5220

i. Menu selections

F. Summary

8. Air Data System (ADS) & Attitude Heading System (AHS)

A. Overview

i. Theory and operation

ii. Topics covered:

1. Air Data Computers (ADCs) and function
2. Controls and indicators
3. Attitude Heading System (AHS) indicators and interfaces

B. Air Data Computer (ADC); ADC-3000

i. Description

ii. Theory of operation

iii. Diagnostics

C. Attitude Heading System (AHS)

i. Components and functions

ii. Controls and indicators

D. Summary

9. Flight Guidance System (FGS)

A. Overview

i. Theory and operation

ii. Items covered:

1. Flight guidance computers
2. Flight guidance controls and indicators
3. Flight guidance diagnostics
4. Autopilot component theory

B. Flight Guidance System (FGS) Components

i. Flight Guidance Computer (FGC); FGC-3002

ii. Primary servos; SVO-3000

iii. Yaw damper linear actuator; SVL-4000

iv. Flight Guidance Panel (FGP); FGP-5020

C. Flight guidance diagnostics

D. Summary

10. Flight Management System (FMS)

A. Overview

i. Theory

ii. Items covered:

1. Flight management computers
2. Controls and indicators

B. Purpose of Flight Management System (FMS); FMS-6000

C. Control Display Unit (CDU); CDU-5200

D. Flight Management Computer (FMC); FMC-6200

E. Summary

11. Data Load

A. Overview
    i. Description
B. Data Base Unit (DBU); DBU-5010E
    i. Description
    ii. Theory of operation
    iii. Operation
C. Information Management Server (IMS); IMS-3500
D. Aircraft Information Management (AIM) System
E. Data loading
F. Summary

12. Radio Sensor System (RSS)
    A. Overview
        i. Theory and operation
        ii. Items covered:
            1. RSS components and function
            2. Controls and indicators
            3. Selection box method
            4. Tuning sources and reversion capability
            5. Troubleshooting
    B. Radio Interface Unit (RIU)
    C. Audio Control Panel (ACP) and Control Panel Electronics (CPE)
    D. Radio tuning operations
    E. VHF communications Receiver/Transmitter (R/T)
    F. VOR/ILS/MB/ADF receiver (NAV)
    G. Distance Measuring Equipment (DME)
    H. High Frequency (HF) Receiver/Transmitter (R/T)
    I. HF antenna coupler
    J. SATCOM
    K. Controller-Pilot Data Link Communications (CPDLC)

L. Radio Altimeter (ALT)

M. Mode S transponder (TDR-94D) with Traffic Surveillance System (TSS)

N. General maintenance procedures for Comm/Nav/Pulse equipment

O. Summary

13. Weather Radar (WXR)

A. Overview

i. Theory and operation

ii. Items covered:

1. Radar unit operation and theory
2. Controls and indications
3. Multiscan radar principles and theory
4. Multiscan radar controls and indications
5. Radar troubleshooting and maintenance

B. Capabilities

C. Modes of operation

D. Radomes

E. Fault indications

F. Radiation hazards

G. Summary

14. Automatic Dependent Surveillance – Broadcast Out (ADS-B OUT)

15. Summary

A. Overview

B. Objectives

C. End of course written exam

D. End of course critique

Collins Aerospace

# Aftermarket Service Solutions

## Course Syllabus: 523-0823773

**Equipment Type:**

| Equipment | Nomenclature | Part Number |
|---|---|---|
| FGP-5020 | Flight Guidance Panel | 822-1574-001 |
| SVO-3000 | Aileron Servo | 822-1168-032 |
| SVO-3000 | Elevator Servo | 822-1168-033 |
| SVL-4000 | Rudder Linear Actuator | 622-9968-003 |
| FMC-6200 | Flight Management Computer | 822-2488-100 |
| CDU–5200 | Control Display Unit | 822-1560-106 |
| DBU–5010E | Data Base Unit | 822-3000-203 |
| ACP-5200 | Audio Control Panel | 822-2171-020 |
| ALT-4000 | Radio Altimeter | 822-0615-206 |
| CPE-5200 | Control Panel Electronics | 822-2172-010 |
| DME-4000 | Distance Measuring Equipment | 822-1466-001 |
| GPS-4000S | Global Positioning System | 822-2198-010 |
| HF-9031A | HF Receiver-Transmitter | 822-0101-002 |
| HF-9041 | HF Antenna Coupler | 685-0350-002 |
| NAV-4000 | VHF Navigation Receiver | 822-1465-001 |
| NAV-4500 | VHF Navigation Receiver | 822-1579-001 |
| RIU-4100 | Radio Interface Unit | 822-1590-102,152 |
| TDR-94D | Transponder | 622-9210-409 |
| TSS-4100 | Traffic Surveillance Transmitter Receiver | 822-2132-001 |
| VHF–4000 | VHF Communication Transceiver | 822-1468-110 |
| RTA-4114 | Receiver/Transmitter/Antenna (14 inch with turbulence detection) | 822-2255-001 |
| RTA–4114 | Receiver/Transmitter/Antenna (14 inch) | 822-2255-001 |
| WX-1000E | Lightning Detection System | 270-2687-010 |

| | Processor | |
|---|---|---|
| TAC-5000 | TAWS configuration module | 822-1791-001 |
| TAS-5000 | Terrain Awareness Warning System Computer | 822-1575-001 |
| FSU-5010 | File Server Unit | 822-1543-201 |
| ECU-3000 | External Compensation Unit | 822-1200-998,803 |
| SCM-2200 | SDU Configuration Module | 822-2558-001 |
| FSA-5000 | File Server Application<br>-006: Universal Weather<br>-106: XM Weather | 810-0001-320 |
| GWX-3000 | Graphical Weather Software (XM Weather) | 810-0007-001 |
| GWX-5000 | Graphical Weather Software (Universal Weather) | 810-0004-001 |
| XMWR-1000 | XM Receiver | 822-2031-002 |
| XMA-1000 | XM Antenna | 822-2030-001 |
| SVC-3000 | Synthetic Vision Computer | 866-0232-010 |
| SVC-3000 VIU | SVC Video Interface Unit | 866-0232-060 |
| SVCM-3000 | Synthetic Vision Configuration Module | 822-3095-109 |