Publications and Training Solutions
Course Syllabus: 523-0779586

COURSE TITLE: Pro Line 21 Bombardier Challenger 300
Level I Operations & Flight Line Maintenance

PREREQUISITES: 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.
The Pro Line 21 System consists of the line replaceable units (LRUs) identified in the section titled EQUIPMENT TYPE by nomenclature and part number, including associated peripheral equipment identified as deliverable hardware.

OBJECTIVES: Upon completing this course, the student will 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 LRU.
3. Identify Typical Aircraft System Interface/System Architecture.
4. Perform Fault Isolation to a faulty LRU using Built-In Test Diagnostics.

COURSE LENGTH: 5 Days

TRAINING DEVICES:

1. Special Test Equipment
    a. Challenger 300 Test Rig (if available)

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TRAINING MATERIALS:

1. PowerPoint Presentation with LCD/Box Light projector
2. Student Guide – Flash drive (pdf) – Training Presentation Information Sheets
3. Bombardier Aerospace Challenger 300 ASM with IFIS 523-0807946
4. Bombardier Aerospace Challenger 300 DG with IFIS 523-0807947

REFERENCES:

1. Bombardier Aerospace Challenger 300 Avionics System Manual w/IFIS 523-0807946
2. Bombardier Aerospace Challenger 300 Avionics Diagnostic Guide 523-0780462
3. Bombardier Aerospace Challenger 300 Operator's Guide 523-0780455
4. Bombardier Aerospace Challenger 300 Operator's Guide w/IFIS 523-0807945
5. Bombardier Aerospace Challenger 300 Avionics Diagnostic Guide w/IFIS 523-0807947

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COURSE OUTLINE

0. Welcome & Introductions

- A. Course Overview
  - i. Welcome
  - ii. Student Registration

1. Introduction to Materials and Handouts

- A. System Manual Introduction and Use 523-0777290
- B. Test and Troubleshooting Guide Introduction 523-0780462
- C. Equipment Description
  - i. Business & Regional Systems Equipment – Leading Particulars

2. Data Bus

- A. Why We Use Data Buses
- B. ARINC Data Buses
  - i. ARINC 429
  - ii. ARINC 453

3. Integrated Avionics Processing System (IAPS)

- A. Overview
- B. System Architecture
- C. Integrated Card Cage (ICC)
  - i. Description
  - ii. Theory of Operation
- D. Power Supply Module (PWR)
  - i. Description
  - ii. Theory of Operation
- E. IAPS Environmental Controller (IEC)
  - i. Description
  - ii. Theory of Operation

F. Input/Output Concentrator (IOC)
    i. Description
    ii. Theory of Operation
G. Maintenance Diagnostic Computer (MDC)
    i. Description
    ii. Theory of Operation
H. Configuration Strapping Unit (CSU)
    i. Description
    ii. Theory of Operation
I. Detailed Functional Theory
    i. IAPS Power Distribution
    ii. Temperature Monitoring
    iii. Overheat Reporting
    iv. Power Supply Inhibit
    v. CSU Detailed Theory
J. Maintenance and Troubleshooting
    i. PWR Fault Indications
    ii. IEC Fault Indications
    iii. Status Messages
    iv. Diagnostics

4. Maintenance Diagnostics

A. Overview
B. Maintenance Diagnostic Computer (MDC)
    i. Description
    ii. Theory of Operation
    iii. Operation

5. **Electronic Flight Instrument System (EFIS)**
    A. Overview
    B. Adaptive Flight Display (AFD)
        i. Primary Flight Display (PFD)
            1. Description
            2. Theory of Operation
            3. Reversionary Mode Select
        ii. Multifunction Display (MFD)
            1. Description
            2. Theory of Operation
            3. Reversionary Mode Select
        iii. Reversion Switch Panel (RSP)
            1. RSP Switcho Description
            2. Operation
            3. Detailed Theory of Operation
        iv. Cursor Control Panel (CCP)
            1. CCP Switch Description
            2. Operation
            3. Detailed Theory of Operation
6. **Engine Indicating and Crew Alerting System (EICAS)**
    A. Overview
    B. MFD
        i. Display Synoptics
    C. Cursor Control Panel (CCP)
        i. CCP Switch Description
        ii. Operation
        iii. Detailed Theory of Operation

D. Data Concentrator Unit (CCU)
    i. Description
    ii. Integration Theory
    iii. Theory of Operation
E. Remote Data Concentrator Unit (RDC)
    i. Description
    ii. Integration Theory
    iii. Theory of Operation
F. Lamp Driver Unit
    i. Description
    ii. Theory of Operation
G. Maintenance and Troubleshooting
    i. Status Messages
    ii. Diagnostics

7. Integrated Flight Information System (IFIS)

A. Overview
    i. System Description
B. File Server Unit (FSU)
    i. Description
    ii. Theory of Operation
    iii. Operation
        1. Enhanced Map Function
        2. Electronic Charts
        3. Graphical Weather
C. External Compensation Unit (ECU)
    i. Description
    ii. Theory of Operation

D. File Server Application Software (FSA)
    i. Description
    ii. Theory of Operation
E. Encrypted Application Key (EAK)
    i. Programming EAK's
F. Electronic Charts Region Access Keys
    i. Programming Region Access Keys
G. Maintenance and Troubleshooting
H. Database Effective Dates

8. Air Data System (ADS)

A. Overview
B. Air Data Computer (ADC)
    i. Description
    ii. Theory of Operation
C. Maintenance and Troubleshooting
    i. Status Message
    ii. Diagnostics

9. Attitude Heading System (AHS)

A. Overview
B. Attitude Heading Computer (AHC)
    i. Description
    ii. Theory of Operation
C. External Compensation Unit (ECU)
    i. Description
    ii. Theory of Operation

D. Maintenance and Troubleshooting
    i. Diagnostics
    ii. Post Installation Check
    iii. Compass Compensation Procedure
    iv. Automatic Leveling Procedure

10. Radio Sensor System (RSS)

A. Overview
B. Radio Interface Unit (RIU)
    i. Description
    ii. Operation
    iii. Theory of Operation
C. Audio Control Panel (ACP) and Control Panel Electronics (CPE)
    i. Description
    ii. Operation
    iii. Theory of Operation
D. Radio Tuning Operations
    i. Description
    ii. Operations
    iii. Theory of Operation
E. VHF Comm Receiver/Transmitter (VHF)
    i. Description
    ii. Theory of Operation
    iii. Datalink/CPDLC/Link200+
F. VOR/ILS/MB/ADF Receiver (NAV)
    i. Description
    ii. Theory of Operation

G. Distance Measuring Equipment (DME)
    i. Description
    ii. Theory of Operation
H. High Frequency Receiver/Transmitter (HF)
    i. Description
    ii. Theory of Operation
I. HF Antenna Coupler
    i. Description
    ii. Theory of Operation
J. Radio Altimeter
    i. Description
    ii. Theory of Operation
K. Mode S Transponder (TDR-94D) with Traffic Alert & Collision Avoidance System (TCAS)
    i. Description
    ii. Theory of Operation
    iii. Video – TCAS II Operations Change 7.0 (523-0779512)
L. General Maintenance Procedures for Comm/Nav/Pulse Equipment
    i. Flight Line Diagnostic Procedures
    ii. Antenna Maintenance Considerations

11. Flight Guidance System (FGS)

A. Overview
B. Flight Guidance Computers (FGC)
    i. Description
    ii. Theory of Operation

C. Flight Guidance Panel (FGP)
    i. Description
    ii. FCP Switch Description
    iii. Operation
    iv. Theory of Operation
D. Primary Servos (SVO)
    i. Description
    ii. Theory of Operation
E. Servo Linear Actuator
    i. Description
    ii. Theory of Operation
F. Autopilot and Yaw Damp Detailed Theory of Operation
    i. Description of Fail Passive System
    ii. Description of Null Seeking Servo Loops
    iii. Description of Yaw Damp System
G. Autopilot Diagnostics
    i. Entering and Using Autopilot Diagnostics
        1. Input Mode
        2. Output Mode
        3. Report Mode
    ii. Servo Spin Test
    iii. Linear Actuator Test

12. Flight Management System (FMS)

A. Overview
B. Flight Management Computer (FMC)
    i. Description
    ii. Theory of Operation

C. Control Display Unit (CDU)
    i. Description
    ii. Theory of Operation
D. Data Base Unit (DBU)
    i. Description
    ii. Theory of Operation
E. Flight Management Data Base Operations
    i. 28 Day Database Load Procedure
    ii. Fault History Download Procedure

13. Database Loading Operations

A. Overview
    i. Description
B. Data Base Unit (DBU)
    i. Description
    ii. Theory of Operation
    iii. Operation
        1. Uploading Databases
        2. Downloading Data
C. Personal Computer Dataloader (PCD)
    i. Description
    ii. Theory of Operation
    iii. Operation
        1. Uploading Databuses
        2. Downloading Data
D. Collins Portable Access Software (CPAS)
    i. Description
    ii. Theory of Operation

iii. Operation

1. Importing Databases
2. Uploading Databases
3. Downloading Data

14. Weather Radar (WXR)

A. Overview

B. Microwave Radiation Hazards

i. AC 20-68B

C. Weather Radar Theory

i. Video – The Next Generation Weather Radar (523-0778191)

D. Receiver-Transmitter Assembly (RTA-8xx)

i. Description

ii. Operation

iii. Theory of Operation

E. Maintenance

i. Radome Maintenance (AC 43-13)

ii. Flight Line Diagnostic Procedures

15. Summary – Review - Critique

A. Test

B. Critiques

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EQUIPMENT TYPE:

EQUIPMENT	NOMENCLATURE	PART NUMBER
IAPS Card Cage	ICC–3001	822-1459-002
IAPS Environmental Controller	IEC-3000	822-1131-001
IAPS Power Supply	PWR–3000	822-1137-001
I/O Concentrator	IOC–3100	822-1361-301
Options Control Module	OCM-3100	822-1484-201, -205
Configuration Strapping Unit	CSU–4000	822–1363-002
Maintenance Diagnostic Computer	MDC–4100	822-1343-101
Adaptive Flight Display (PFD, MFD)	AFD-5220	822-1577-003
Adaptive Flight Display MFD)	AFD-5220E	822-1917-303
Cursor Control Panel	CCP-5020	822–1573-003, -013
Display Control Panel	DCP-5020	822–1561-001
Reversion Switch Panel	RSP-5020	822–1569-001
Data Concentrator Unit	DCU-5000	822–1578-001
Lamp Driver Unit	LDU–4000	622–9822–001
Remote Data Concentrator	RDC-5000	822-1581-001
Air Data Computer	ADC–3000	822–1109-005
Attitude Heading Computer	AHC-3000	822-1110-002
External Compensation Unit	ECU-3000	822-1200-002
Flux Detector Unit	FDU-3000	822-1193-001
Flight Guidance Computer	FGC-3002	822-1592-026
Flight Guidance Panel	FGP-5020	822-1574-001
Aileron Servo	SVO-3000	822-1168-022
Elevator Servo	SVO-3000	822-1168-023
Servo Mount	SMT-65	622-5735-104

EQUIPMENT	NOMENCLATURE	PART NUMBER
Rudder Linear Actuator	SVL-4000	622-9968-003
Flight Management Computer	FMC-5000	822-0891-010, -011
Control Display Unit	CDU–5200	822-1560-003
Data Base Unit	DBU–4000	622-9865-002
Audio Control Panel	ACP-4100	822-1558-020
Radio Altimeter	ALT-4000	822-0615-002
Control Panel Electronics	CPE-4100	822-1583-001
Distance Measuring Equipment	DME-4000	822-1466-001
Global Positioning System	GPS-4000A	822-1377-001
HF Receiver-Transmitter	HF-9031A	822-0101-002
HF Antenna Coupler	HF-9041	685-0350-002
VHF Navigation Receiver	NAV-4000	822-1465-001
VHF Navigation Receiver	NAV-4500	822-1579-001
Radio Interface Unit	RIU-4100	822-1590-101, -151
Radio Interface Unit	RIU-4000	822-1469-101, -151
Transponder	TDR-94D	622-9210-004
TCAS II Transmitter Receiver	TTR-4000	822-1294-001
VHF Communication Transceiver	VHF–4000	822-1468-101, -301
Receiver/Transmitter/Antenna (14 inch with turbulence detection)	RTA-854	622-8440-004
Receiver/Transmitter/Antenna (14 inch)	RTA–844	622–9302-004
Lightning Detection System Processor	WX-1000E	270-2687-010
TAWS configuration module	TAC-5000	822-1791-001
Terrain Awareness Warning System Computer	TAS-5000	822-1575-001

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EQUIPMENT	NOMENCLATURE	PART NUMBER
File Server Unit	FSU-5010	822-1543-101
External Compensation Unit	ECU-3000	822-1200-998
File Server Application	FSA-5000	810-0001-006 Universal Weather 810-0001-106 XM Weather
Graphical Weather Software (XM Weather)	GWX-3000	810-0007-001
Graphical Weather Software (Universal Weather)	GWX-5000	810-0004-001
XM Receiver	XMWR-1000	822-2031-002
XM Antenna	XMA-1000	822-2030-001