

## Publications and Training Solutions

### Course Syllabus: 523-0779462

**COURSE TITLE:** Bombardier CRJ (200/700/900 Series) Pro Line 4  
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 4 System. This course is designed to teach troubleshooting for replacement of line replacement units (LRUs) and does not include internal maintenance of any component.

The Pro Line 4 System consists of the 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 4 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 Maintenance Diagnostics.

**COURSE LENGTH:** 5 Days

**TRAINING DEVICES:**

1. Special Test Equipment
  - a. CRJ Test Rig, Cedar Rapids (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. Canadair Regional Jet CRJ-700/705/900 ASM (Excerpt) 523-0778690
4. Canadair Regional Jet CRJ-200 ASM (Excerpt) 523-0776286
5. CRJ-200 Diagnostics Guide 523-0777349
6. CRJ-700/900 Diagnostics Guide 523-0778691

#### REFERENCES:

1. Canadair Regional Jet CRJ-700/705/900 Avionics System Manual 523-0778690
2. Canadair Regional Jet CRJ-200 Avionics System Diagnostic Guide 523-0776286
3. CRJ-200 Diagnostics Guide 523-0777349
4. CRJ-700/900 Diagnostics Guide 523-0778691
5. CRJ-700/900/1000 Pro Line 4 Operator's Guide 523-0778692

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### COURSE OUTLINE

#### **0. Welcome & Introductions**

- A. Course Overview
  - i. Welcome
  - ii. Student Registration
- B. Course Description and Objectives

#### **1. Data Bus**

- A. Why We Use Data Buses
- B. ARINC Data Buses
  - i. ARINC 429
  - ii. ARINC 453
- C. CSDB Data Buses
  - i. Commercial Standard Digital Bus

#### **2. Integrated Avionics Processing System (IAPS)**

- A. Overview
- B. System Architecture
- C. Integrated Card Cage (ICC)
- D. Lightning/HIRF Protection (LHP)
- E. Power Supply Module (PWR)
- F. IAPS Environmental Controller (IEC)
- G. Input/Output Concentrator (IOC)
- H. Maintenance Diagnostic Computer (MDC)
- I. Configuration Strapping Unit (CSU)
- J. Detailed Functional Theory
  - i. IAPS Power Distribution

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- ii. Temperature Monitoring
- iii. Overheat Reporting
- iv. Power Supply Inhibit
- v. CSU Detailed Theory

#### **K. Maintenance and Troubleshooting**

- i. PWR Fault Indications
- ii. IEC Fault Indications
- iii. Status Messages
- iv. Diagnostics

### **3. Maintenance Diagnostics**

- A. Overview
- B. Maintenance Diagnostic Computer (MDC)

### **4. Electronic Flight Instrument System (EFIS)**

- A. Overview
- B. Electronic Flight Display (EFD)
  - i. Primary Flight Display (PFD)
  - ii. Multifunction Display (MFD)
    - 1. MFD Formats
  - iii. EFD Detailed Theory of Operation
    - 1. Reversionary Mode Select
    - 2. Cooling Requirements
- C. Display Control Panel (DCP)
  - i. DCP Switch Description
  - ii. Detailed Theory of Operation

### **5. Engine Indicating Crew Alert System (EICAS)**

- A. Overview
- B. Electronic Flight Display (EFD) / EICAS Display (ED)

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- i. Primary ED
    - ii. Secondary ED
  - C. Secondary ED
    - i. Display Formats
  - D. EICAS Control Panel (ECP)
    - i. ECP Switch Description
    - ii. Detailed Theory of Operation
  - E. Data Concentrator Unit (DCU)
    - i. Description
    - ii. Integration Theory
  - F. EICAS Routing Unit (ERU)
  - G. Lamp Driver Unit (LDU)
  - H. Maintenance and Troubleshooting
    - i. Status Messages
    - ii. Diagnostics
- 6. Air Data System (ADS)**
  - A. Overview
  - B. Air Data Computer (ADC)
  - C. Air Reference Panel (ARP)
  - D. Maintenance and Troubleshooting
    - i. Status Messages
    - ii. Diagnostics
- 7. Attitude Heading System (AHS)**
  - A. Overview
  - B. Attitude Heading Computer (AHC)
  - C. Remote Compensation Panel (RCP)
  - D. Flux Detector Unit (FDU)

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- E. Maintenance and Troubleshooting
  - i. Diagnostics
  - ii. Alignment Procedure

#### **8. Flight Control System (FCS)**

- A. Overview
- B. Flight Control Computers (FCC)
- C. Flight Control Panel (FCP)
- D. Primary Servo (SVO)
- E. Servo Linear Actuator (SVL)
- F. Yaw Damper Engage Panel (YDEP)
- G. Autopilot and Yaw Damper Theory of Operation
- H. Autopilot Diagnostics
  - i. Entering and Using Flight Guidance Diagnostics
    - 1. Input Mode
    - 2. Output Mode
    - 3. Report Mode
  - ii. Servo Spin Test
  - iii. Linear Actuator Test

#### **9. Flight Management System (FMS)**

- A. Overview
- B. Flight Management Computer (FMC)
- C. Control Display Unit (CDU)
- D. Data Base Unit (DBU)
- E. Flight Management Data Base Operations
  - i. 28 Day Database Load Procedure
  - ii. Fault History Download Procedure

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#### **10. Radio Sensor System (RSS)**

- A. Overview
- B. Radio Tuning Unit (RTU)
- C. VHF Comm Receiver/Transmitter (VHF)
  - i. Datalink/CPDLC/Link 2000+
- D. VOR/ILS/MB Receiver (VIR)
- E. Distance Measuring Equipment (DME)
- F. Automatic Direction Finder Receiver (ADF)
- G. High Frequency Receiver/Transmitter (HF)
- H. HF Antenna Coupler
- I. Radio Altimeter (ALT) and Radio Altimeter Convertor (RAC)
- J. Mode S Transponder (TDR-94D) with TCAS
- K. Maintenance and Troubleshooting
  - i. Flight Line Diagnostic Procedures
  - ii. Antenna Maintenance Considerations

#### **11. Weather Radar (WXR)**

- A. Overview
- B. Microwave Radiation Hazards
  - i. AC 20-68B
- C. Weather Radar Theory
  - i. Mediums that Reflect
  - ii. Turbulence Detection and Ground Clutter Suppression
- D. Receiver/Transmitter Assembly (RTA-8xx)
- E. Maintenance and Troubleshooting
  - i. Radome Maintenance (AC 43-13)
  - ii. Flight Line Diagnostic Procedures

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### **12. Data Loading**

- A. Data Loading Procedures
  - i. PCD-3000
  - ii. DBU-5000

### **13. Summary – Review - Critique**

- A. Test
- B. Critiques



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#### EQUIPMENT TYPE:

EQUIPMENT	NOMENCLATURE	PART NUMBER
IAPS Card Cage	ICC-4004	822-0198-001
IAPS Environmental Controller	IEC-4000	822-0288-001
IAPS I/O Concentrator	IOC-4000	622-9814-00X
IAPS Power Supply	PWR-4000	622-9945-003
Configuration Strapping Unit	CSU-4000	822-0049-001
Lightning/HIRF Protection (Left)	LHP-4000	822-0287-701, -702
Lightning/HIRF Protection (Right)	LHP-4001	822-0332-701, -702
Maintenance Diagnostic Computer	MDC-4000	622-9818-00X
Display Control Panel	DCP-4000	622-9812-002
Electronic Flight Display (PFD, MFD)	EFD-4076	622-9810-00X
Cursor Control Panel	CCP-3310	822-2389-001
EICAS Data Concentration Unit	DCU-4002	822-0179-00X
EICAS Control Panel	ECP-4003	622-9821-002
Lamp Driver Unit	LDU-4000	622-9822-001
Air Data Computer	ADC-850A	822-0372-145
Air Data Reference Panel	ARP-4000	622-9819-004, -104
Attitude Heading Computer	AHC-85E	622-9336-400
Remote Compensation Panel	RCP-65	622-6174-001
Flux Detector Unit	FDU-70	622-5812-006
Control Display Unit	CDU-4100	822-0021-002
Flight Management Computer (in IAPS)	FMC-4100	822-0021-001
Data Base Unit (DSDD Disk Drive)	DBU-4000	622-9865-002
Flight Control Computer (in IAPS)	FCC-4000	622-9815-704
Flight Control Panel	FCP-4002	822-0044-001
Primary Servo (Aileron)	SVO-85A	622-4404-001, -101

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EQUIPMENT	NOMENCLATURE	PART NUMBER
Primary Servo (elevator)	SVO-85B	622-5027-001, -101
Linear Actuator (rudder)	SVL-4000	622-9968-002
Radio Tune Unit	RTU-4000	622-9852-108
VHF Comm Transceiver	VHF-422C	822-1115-001
VHF Navigation Receiver	VIR-432	622-7194-101
DME Transceiver	DME-442	622-7309-101
Radio Altimeter	ALT-55B	622-2855-011
Radio Altitude Converter	RAC-870	622-7209-002
Mode S Transponder	TDR-94D	622-9210-003
HF Receiver/Transmitter	HF-9031A	822-0101-001
HF Antenna Coupler	HF-9041	685-0350-002
GPS Navigation Receiver	GPS-4000	822-0931-002
Receiver/Transmitter/Antenna (14 inch)	RTA-854	622-8440-003
Weather Radar Control Panel	WXP-4220	622-9932-002