



# Global Avionics Training Specialists, LLC

## **BOMBARDIER CANADAIR CHALLENGER**

### **SPZ-8000/CL-601-3A AVIONICS SUITE**

## **LINE MAINTENANCE FAMILIARIZATION COURSE**

### **SYLLABUS**

#### **I. INTRODUCTION**

##### **A. SYSTEM DESCRIPTION**

The SPZ-8000 digital automatic flight control system (AFCS) installed on the Bombardier Canadair Challenger CL601-3A aircraft provides fail-passive execution of flight director guidance, autopilot stabilization, yaw damper and trim functions. The flight director and autopilot commands are generated by the FZ-800 flight guidance computer, which integrates the attitude and heading reference, air data and Electronic Flight Instrument System (EFIS) functions into a complete aircraft control system that provides the stabilization and control required to ensure optimum performance throughout the aircraft flight envelope.

A central serial communications network provides inter-subsystem communications within the system. The network is denoted by the nomenclature "Avionics Standard Communications Bus" (ASCB). This bus structure uses advanced communications techniques and safety design features to provide high through put, fail operational data exchange within the system. The ASCB consists of two serial synchronous digital communications buses. Each bus is electrically isolated from the other bus. In addition, each bus can communicate bi-directionally on the same wires.

The ASCB interfaces the automatic flight control system with the inertial reference system, the digital air data system, the EFIS and the MFD system. System data communications is split between the main system bus and private line paths provided for specific sensitive data for which fault isolation is required.

Also, NAV data is input directly to the AFCS and flight instruments to ensure both subsystems may independently assess ILS and MLS data during approaches.

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The system displays heading, course, radio bearing, pitch and roll attitude, barometric altitude, alert altitude, radio altitude, rate of turn, course deviation, glideslope deviation, TO/FROM and DME indications. Lighted annunciators denote selected flight modes. Pitch and roll computed steering commands developed by the flight guidance computer are displayed on the EADI to allow the pilot to reach and/or maintain the desired flight path or attitude reference.

### **B. COURSE OBJECTIVES**

This course of instruction is designed to familiarize and prepare line maintenance avionics specialists to operate, maintain, troubleshoot and test the SPZ-8000 DAFCS to the LRU level.

Equipment interface, theory of operation and flight operations are thoroughly discussed. Mode logic, interlocks, power distribution and ground maintenance testing procedures are covered in detail.

### **C. ARRANGEMENT**

Based upon past experience, Global Avionics Training Specialists, LLC has arranged the course material in an order of presentation best suited to continuity and ease of comprehension.

### **D. DURATION**

The course is 5 days in length, 8 hours a day, for a total of 40 class hours.

### **E. STUDENT PREREQUISITES**

Students attending this course should be avionics specialists with a working knowledge of:

- Digital logic
- Digital bus structures
- Basic flight deck displays
- Radio communications and navigation
- Air pressure relationships
- Servo loop theory

SPZ-8000/CL-601-31 LINE MAINTENANCE COURSE SYLLABUS

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## II. COURSE CURRICULUM

### A. ORIENTATION

1. Welcome
2. Student registration
3. Course description
4. Class policies
5. Distribution of training materials
6. Location of facilities
7. Security

### B. SYSTEM DESCRIPTION

1. What is an autopilot?
2. What is a flight director?
3. System Flow Diagram
  - a. Electronic Flight Instrument System (EFIS)
  - b. Multifunction Display System (MFD)
  - c. Inertial Reference System (IRS)
  - d. Air Data System (ADS)
  - e. Radio Altimeter System
  - f. Automatic Flight Control System (AFCS)
  - g. Weather Radar System
  - h. Flight Management System (FMS)
4. ASCB Description
5. Component Locations

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## **C. SUBSYSTEM DESCRIPTION**

### **1. LASEREF® II/LASEREF® III INERTIAL REFERENCE SYSTEM**

- a) Inertial Reference Unit
- b) Mode Select Unit

### **2. ADZ-810 Air Data System**

- a) AZ-810 Digital Air Data Computer
- b) SI-225A Mach Airspeed Indicator
- c) VS-200 Vertical Speed Indicator
- d) BA-141 Barometric Altimeter

### **3. AA-300 Radio Altimeter System**

- a) RT-300 Receiver Transmitter
- b) AT-300 Antenna

### **4. EDZ-815 Electronic Flight Instrument System and MDZ-815 Multifunction Display System**

- a) ED-800 Electronic Display
  - 1) EADI Displays and Annunciators
  - 2) EADI Warning Flags
  - 3) EADI Comparison Monitoring
  - 4) EADI Excessive Attitude Display
  - 5) EHSI Displays and Annunciators
  - 6) EHSI Weather Radar Displays
  - 7) EHSI NAV Mode Displays
  - 8) EHSI Warning Flags
  - 9) EHSI Comparison Monitoring
  - 10) Composite Display
  - 11) EFIS Reversionary Switching
  - 12) EFIS Self-Test

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- b) MFD Display
  - 1) Weather Radar Display
  - 2) Map Mode Display
  - 3) Plan Mode Display
  - 4) Electronic Checklist
  - 5) EFIS Reversionary Backup
- c) ED-800 Functional Operation
- d) SG-815 Symbol Generator
- e) MG-815 Symbol Generator
- f) DC-810 Display Controller
- g) RI-815 Remote Instrument Controller
- h) MC-800 MFD Controller

### **5. DIGITAL AUTOMATIC FLIGHT CONTROL SYSTEM**

- a) FZ-800 Flight Guidance Computer
- b) GC-880 Flight Guidance Controller
- c) ID-802 Advisory Display
- d) PC-880 Turn Pitch Controller
- e) SM-600 Dual Servo
- f) SM-725 Linear Actuator

### **6. PRIMUS® 650/870 WEATHER RADAR SYSTEM**

- a) Receiver/Transmitter/Antenna
- b) Weather Radar Controller

### **7. FLIGHT MANAGEMENT SYSTEM**

- a) NZ-820 Navigation Computer
- b) CD-810 Control Display Unit
- c) DL-800/900 Data Loader

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### **D. SPZ-8000 Flight Guidance Modes of Operation**

1. System Performance/Operating Limits
2. Glossary of Terms
3. Autopilot/Yaw Damper Engage/Disengage Logic
4. Roll Channel Functional Operation
  - a) Roll Hold
  - b) Heading Hold (Wings Level)
  - c) Heading Select
  - d) VOR Navigation
  - e) Localizer/Localizer Approach/Back Course
  - f) Preselected Course Approach
  - g) Roll Autopilot Servo Loop
5. Pitch Channel Functional Operation
  - a) Pitch Hold
  - b) Vertical Speed Hold
  - c) Flight Level Change (FLCH)
  - d) Altitude Preselect (ASEL)
  - e) Altitude Hold
  - f) ILS Approach
  - g) Vertical Navigation (VNAV)
  - h) Go Around and Wings Level
  - i) Pitch Autopilot Servo Loop
6. Yaw Damper Functional Operation
7. Ground Test Procedures