Publications and Training Solutions
Course Syllabus: 523-0806999

COURSE TITLE: Gulfstream G150 Pro Line 21
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.

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 21 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 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 Maintenance Diagnostics.

COURSE LENGTH: 5 Days

TRAINING DEVICES:

1. Special Test Equipment
    a. Gulfstream G150 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. Gulfstream G150 Avionics System Manual (excerpt) 523-0807130
4. Gulfstream G150 Avionics Diagnostic Guide 523-0807224
5. Video “The Next Generation Weather Radar” 523-0778191
6. Video “TCAS II Operations CHANGE 7.0” 523-0779512

REFERENCES:

1. Gulfstream G150 Avionics System Manual 523-0807130
2. Gulfstream G150 Avionics System Diagnostic Guide 523-0807224
3. Gulfstream G150 Operator’s Guide 523-0808247

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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

2. Integrated Avionics Processing System (IAPS)

- A. Overview
- B. System Architecture
- C. Integrated Card Cage (ICC)
- D. Power Supply Module (PWR)
- E. IAPS Environmental Controller (IEC)
- F. Input/Output Concentrator (IOC)
- G. Maintenance Diagnostic Computer (MDC)
- H. Configuration Strapping Unit (CSU)
- 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

3. Maintenance Diagnostics

A. Overview
B. Maintenance Diagnostic Computer (MDC)

4. Electronic Flight Instrument System (EFIS)

A. Overview
B. Adaptive Flight Display
    i. Primary Flight Display (PFD)
    ii. Multifunction Display (MFD)
C. Reversion Switch Panel (RSP)
D. Display Control Panel (DCP)
E. Cursor Control Panel (CCP)
F. Display Dimming Panel (DDP)

5. Integrated Flight Information System (IFIS)

A. Overview
B. File Server Unit (FSU)
    i. File Server Applications
    ii. Enhanced Map Functions
    iii. Electronic Charts
    iv. Graphical Weather
C. External Compensation Unit (ECU)
D. Encrypted Application Key (EAK)
E. Electronic Charts Region Access Keys

F. Maintenance and Troubleshooting
    i. Database Effective Dates

6. Engine Indicating and Crew Alerting System (EICAS)

A. Overview
B. MFD Indications
    i. Normal
    ii. Transient
    iii. Redline
    iv. Compressed
    v. Comparators
C. Cursor Control Panel (CCP)
D. Data Concentrator Unit (DCU)
E. Maintenance and Troubleshooting
    i. Status Messages
    ii. Diagnostics

7. Air Data System (ADS)

A. Overview
B. Air Data Computer (ADC)
C. Air Data Configuration Table (ADT)
D. Maintenance and Troubleshooting
    i. PFD Red Flags
    ii. PFD Source Reversion
    iii. Diagnostics

8. Attitude Heading System (AHS)

A. Overview
B. Attitude Heading Computer (AHC)
C. External Compensation Unit (ECU)

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

9. Flight Guidance System (FGS)

A. Overview
B. Flight Guidance Computers (FGC)
C. Flight Control Panel (FCP)
D. Primary Servos (SVO)
E. Autopilot and Yaw Damper Detailed Theory of Operation
    i. Description of Fail Passive System
    ii. Description of Null Seeking Servo Loops
F. Autopilot Diagnostics
    i. Entering and Using Autopilot Diagnostics
        1. Input Mode
        2. Output Mode
        3. Report Mode

10. Flight Management System (FMS)

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

F. PCD-3000 Operations

i. 28 Day Database Load Procedure

11. Radio Sensor System (RSS)

A. Overview

B. Radio Interface Unit (RIU) and External Compensation Unit (ECU)

C. Audio Control Panel (ACP) and Audio Options Panel (AOP)

D. Radio Tuning Operations

E. VHF Comm Receiver/Transmitter (VHF)

i. Datalink/CPDLC/Link 2000+

F. VOR/ILS/MB/ADF Receiver (NAV)

G. Distance Measuring Equipment (DME)

H. High Frequency Receiver/Transmitter (HF)

I. HF Antenna Coupler (CPL)

J. Radio Altimeter (ALT)

K. Mode S Transponder (TDR-94D) with TCAS

i. Video – TCAS II Operations CHANGE 7.0 523-0779512

L. Maintenance and Troubleshooting

i. Flight Line Diagnostic Procedures

ii. Antenna Maintenance Considerations

12. Database Loading Operations

A. Overview

B. Field Loading of Databases

13. Turbulence Weather Radar (TWR)

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)

E. Display Control Panel (DCP)

F. Weather Radar Fundamentals

G. Maintenance and Troubleshooting

i. Radome Maintenance (AC 43-13)

ii. Flight Line Diagnostic Procedures

14. Summary – Review - Critique

A. Test

B. Critiques

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EQUIPMENT TYPE:

EQUIPMENT	NOMENCLATURE	PART NUMBER
Audio Control Panel	ACP-4120	822-1950-010
Air Data Computer	ADC-3010	822-2083-001
Aircraft Configuration Memory	ACT-3010	810-0044-005
Adaptive Flight Display	AFD-5220	822-1577-104
Attitude Heading Computer	AHC-3000	822-1110-002
Radio Altimeter	ALT-4000	822-0615-111
ADF Antenna	ANT-462B	622-7384-001
Audio Options Panel	AOP-4120	822-1947-010
Cursor Control Panel	CCP-5040	822-1965-102
Control Display Unit	CDU-6200	822-1485-204
Central Strapping Unit Module	CSU-3100	822-1363-002
Data Base Unit	DBU-4100	822-0014-008
Display Control Panel	DCP-5040	822-1966-002
Data Concentrator Unit	DCU-5010	822-1538-002
Display Dimmer Panel	DDP-5040	822-1984-002
Distance Measuring Equipment	DME-4000	822-1466-001
External Compensation Unit (AHRS)	ECU-3000	822-1200-998
External Compensation Unit (RSS)	ECU-3000	822-1200-997
Flux Detector Unit	FDU-3000	822-1193-001
Flight Guidance Computer Module	FGC-3000	822-1108-135
Flight Guidance Panel	FGP-3000	822-1107-106
HF Feed Line	FL-9006	988-8095-001
Flight Management Computer Module	FMC-6000	822-0868-081
Global Positioning System	GPS-4000A	822-1377-001
HF R/T	HF-9031A	822-0101-002
HF Antenna Coupler	HF-9041	622-8114-002
Integrated Card Cage	ICC-3010	822-2018-001
IAPS Environmental Control Module	IEC-3001	822-1167-001
Input/Output Concentrator Module	IOC-3110	822-2064-001
IOC Data Map	IOT-3110	810-0043-701
Maintenance Diagnostic Computer	MDC-3110	822-1987-005
Maintenance Diagnostic Tables	MDT-3110	810-0042-041
VOR/ILS/MKR/ADF Receiver	NAV-4000	822-1465-001

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EQUIPMENT	NOMENCLATURE	PART NUMBER
VOR/ILS/MKR Receiver	NAV-4500	822-1579-001
Options Control Module	OCM-3100	822-1484-XXX
PC Database Unit	PCD-3000	822-1631-003
Power Supply Module	PWR-3000	822-1137-001
Radio Interface Unit	RIU-4110	822-1864-151
Reversion Switch Panel	RSP-5040	822-1964-004
Receive Transmitter Antenna	RTA-854	622-8440-004
Servo Mount	SMT-86B	622-6509-103
Servo Mount	SMT-86C	622-6719-103
Primary Servo	SVO-85B	622-5027-102
Primary Servo	SVO-85C	622-6717-104
Mode S Diversity Transponder with Flight ID	TDR-94D	622-9210-008
TCAS Directional Antenna	TRE-920	622-8973-001
TCAS Transmitter/Receiver	TTR-4000	822-1294-002
VHF Transceiver, Ext Frequency, 8.33 kHz	VHF-4000E	822-1872-301
OPTIONS		
Radio Integration Unit, (Datalink Option)	RIU-4010	822-1863-151
Adaptive Flight Display (File Server Option)	AFD-5220E	822-1917-102
File Server Unit	FSU-5010	822-1543-101
File Server Application Software	FSA-5000	810-0001-XXX
External Compensation Unit	ECU-3000	822-1200-998
Collins Portable Access Software	CPAS-3000	810-0032-003
Electronic Charts	ECH-5000	810-0002-001
Map Overlays	OVL-5000	810-0003-001
Graphical Weather	GWX-5000	810-0004-001
Options Control Module	OCM-3100	822-1484-2XX
HF Receiver/Transmitter	HF-9031A	822-0101-002
HF Antenna Coupler	HF-9041	622-8114-002
VOR/ILS/MKR/ADF Receiver	NAV-4000	822-1465-001
VHF Transceiver, Std Freq, 8.33 Khz	VHF-4000	822-1468-102
VHF Transceiver, Std Freq, Datalink	VHF-4000	822-1468-302
VHF Transceiver, Ext Freq, 8.33 Khz	VHF-4000E	822-1872-101
VHF Transceiver, Ext Freq, Datalink	VHF-4000E	822-1872-301