Simulation and Training Solutions
Course Syllabus: 523-0825765

COURSE TITLE: **AUTOMATIC DEPENDENT SURVEILLANCE-BROADCAST (ADS-B)**
Level 1 Operations and 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 engineering and maintenance personnel with training to understand TCAS and Transponder major installation points for ADS-B certification. This course also provides overview of ACAS, FANS 1/A [ADS-C, CPDLC] and Transponder operation and maintenance review.

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

1. Have an overall understanding of TCAS and Transponder major installation points for ADS-B certification.
2. Identify ADS-B Out and ADS-B In functions interface/system architecture.
3. Verify ADS-B Operation & Installation.

COURSE LENGTH: 2 Days

TRAINING DEVICES:

1. N/A

TRAINING MATERIALS:

1. PowerPoint Presentation with LCD/Box Light projector
2. Student Guide – Flash drive (pdf) – Training Presentation
   Appendix A - D

REFERENCES:

1. ADS-B Out Installation Guide 523-0821779
2. TSS-4100 Integrated TCAS, Transponder & ADS-B Traffic Surveillance System Installation Manual 523-0809018
3. Elementary Surveillance (Flight ID) SIL 1-02, Rev 1 523-0790073
4. Enhanced Surveillance General Interconnect Guidelines SIL 1-04, Rev 2 523-0807214

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COURSE OUTLINE

0. Welcome & Introductions

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

1. Airspace Surveillance

- A. Surveillance Principles – Brief Overview
- B. Elementary Surveillance – Brief Overview
- C. Enhanced Surveillance – Brief Overview

2. Transponder

- A. System Architecture
- B. Mode A, C and S Functions
- C. Mode S Uplink / Downlink Messages
- D. Squitters

3. ELS - EHS

- A. Brief Overview
- B. Elementary Surveillance – Required Data
- C. Enhanced Surveillance – Required Data
- D. ELS & EHS Wiring Diagram

4. ACAS/TCAS

- A. Architecture
- B. History
- C. Principle
  - i. Tau, Altitude, Bearing, Range, TA, RA
- D. Displays
- E. Version 7.1
- F. Hybrid Surveillance

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5. **ADS-B OUT**
    A. Overview
    B. Mandate Schedules
        i. European Commission Mandate Summary
        ii. FAA Mandate Summary
    C. OUT Functions
    D. Required Labels: GNSS and Non-GNSS Data
    E. Strapping Required (Transponder)
    F. Appendix B – 1090ES / ADS-B Messages
    G. ADS Summary
6. **ADS-B IN**
    A. Overview
    B. Required Avionics
    C. Appendix D – Glossary of Terms
    D. Applications
        i. Airborne (AIRB)
        ii. In Trail Procedure (ITP)
        iii. Surface (SURF)
        iv. Visual Separation on Approach (VSA)
    E. Examples
    F. Ground / Flight Testing Requirements
    G. Required Parameters / Data Inputs
7. **ADS-B Broadcast Services**
    A. Flight Information Services-Broadcast (FIS-B)
        i. UAT 978 MHz – U.S. Only
    B. Traffic Information Services- Broadcast (TIS-B)
    C. TIS-B / ADS-Rebroadcast (ADS-R) Client Requirements

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8. FANS 1/A

A. Overview

B. Data Link Applications

C. FANS Over Iridium (FOI)

D. Long Range Communications System - Current

E. Performance Based Navigation (PBN) - Long Term

9. ADS-C

A. Overview

B. Contract Types

C. Examples

D. ADS-C vs ADS-B

10. CPDLC

A. Overview

B. Link 2000+

i. PM-CPDLC

C. North Atlantic Data Link Mandates

D. MCDU Access of CPDLC

E. Equipment

11. MCDU DLINK Operation

i. Status Messages

ii. Message Responses

iii. Uplink / Downlink Message Status

iv. ATN Link Status Annunciations

12. MAINTENANCE

A. Installation – Common Issues

B. Verifying Installation – FAA

C. GPS Requirements

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D. Required Annunciations

E. Appendix A – TDR-94D Diagnostics & ARINC Labels

F. Self-Test

i. ACAS

ii. TCAS

iii. Transponder

13. INFORMATION SOURCES

14. Summary

A. Test

B. Critiques

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EQUIPMENT TYPE:

EQUIPMENT	NOMENCLATURE	PART NUMBER
Multi-Mode Receiver (MMR)	GLU-920	822-1152-xxx
Multi-Mode Receiver (MMR)	GLU-925	822-1821-730
Transponder	TPR-901	822-1338-2X5
Transponder (Fixed Wing)	TDR-94D	622-9210-50X
Transponder (Helicopter)	TDR-94D	622-9210-55X
Integrated Surveillance System (ISS)	ISS-2100	822-2120-102
Traffic Surveillance System (TSS)	TSS-4100	822-2132-002
Global Positioning System (GPS)	GPS-4000S	822-2189-xxx
External Compensation Unit	ECU-3000	822-1200-803

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