Instructions for Continued Airworthiness
GDL 84/88 Part 23 AML STC

as installed in

_____

(Make and Model Airplane)

Reg. No. _____ S/N _____

Dwg. Number:
190-01310-01 Rev. 3

Garmin International, Inc.
1200 E. 151st Street
Olathe, Kansas 66062 USA

Record of Revision

Rev.	Date	Description of Change
1	11/21/2012	Initial Release
2	1/7/2015	Updated to add GDL 84
3	10/22/2015	Update to add Flight Stream

Company Proprietary Information

Garmin International, Inc.
1200 E. 151st Street
Olathe, Kansas 66062 U.S.A.

Table of Contents

Table of Figures

Table of Tables

1. INTRODUCTION

1.1 Purpose

This document is designed for use by the installing agency of the Garmin GDL 84/88 as Instructions for Continued Airworthiness in response to 14 CFR §23.1529, and Part 23 Appendix G. This ICA includes information required by the operator to adequately maintain the Garmin GDL 84/88 with optional Flight Stream 110/210 installed under Approved Model List (AML) STC.

1.2 Scope

This document provides the Instructions for Continued Airworthiness for aircraft modified by the installation of the Garmin GDL 84/88 with optional Flight Stream 110/210 under AML STC.

1.3 Document Control

This document shall be released, archived, and controlled in accordance with the Garmin document control system. When this document is revised, refer to Section 2.15 for information on how to gain FAA acceptance or approval and how to notify customers of changes.

1.4 Permission to Use Certain Documents

Permission is granted to any corporation or person applying for approval of a Garmin GDL 84/88 with optional Flight Stream 110/210 to use and reference appropriate STC documents to accomplish the Instructions for Continued Airworthiness and show compliance with STC engineering data. It is the responsibility of the applicant to determine the suitability of the documents for the ICA.

1.5 Definitions

The following terminology is used within this document:

1) **ADS-B:** Automatic Dependent Surveillance-Broadcast
2) **AML:** Approved Model List
3) **BIT:** Built-In Test
4) **CDTI:** Cockpit Display of Traffic Information
5) **CFR:** Code of Federal Regulations
6) **CPU:** Central Processing Unit
7) **FAA:** Federal Aviation Administration
8) **GDL:** Garmin Datalink Transceiver
9) **GPS:** Global Positioning System
10) **ICA:** Instructions for Continued Airworthiness
11) **IM:** Installation Manual
12) **I/O:** Input/Output
13) **LRU:** Line Replaceable Unit
14) **MHz:** Mega Hertz
15) **PMI:** Principal Maintenance Inspector
16) **RX:** Receive
17) **SBAS:** Satellite-Based Augmentation System
18) **STC:** Supplemental Type Certificate
19) **TAS:** Traffic Awareness System
20) **TCAS:** Traffic Collision Avoidance System
21) **TSO:** Technical Standard Order
22) **TX:** Transmit
23) **UAT:** Universal Access Transceiver

1.6 Terminology

The GDL 84 is a remote-mounted unit available in one variant that does not support diversity (TSO-C154c Class A1S) and contains an internal GPS/SBAS receiver.

The GDL 88 is a remote-mounted unit available in four variants. The variants support diversity (TSO-C154c Class A1H) or do not support diversity (TSO-C154c Class A1S) and contain internal GPS/SBAS receiver or utilizes external GPS/SBAS source.

Except where specifically noted, references made to the 'GDL 84/88' apply equally to all units: GDL 84, GDL 88, GDL 88D, GDL 88 with GPS/SBAS, and GDL 88D with GPS/SBAS.

The Flight Stream 110 and Flight Stream 210 bring Bluetooth® connectivity to the cockpit, allowing portable electronics to stream data to and from the installed avionics. Specific to the interface to the GDL 84/88, the Flight Stream 110 and Flight Stream 210 provide FIS-B weather, ADS-B traffic, and GPS position from the GDL 84/88 to portable electronics.

Except where specifically noted, references made to the 'Flight Stream 110/210' applies equally to the Flight Stream 110 and Flight Stream 210.

2. INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

2.1 Introduction

Content, Scope, Purpose and Arrangement:	This document identifies the Instructions for Continued Airworthiness for the modification of the aircraft by installation of the Garmin GDL 84/88 and optional Flight Stream 110/210.
Applicability:	Applies to aircraft altered by installation of the Garmin GDL 84/88 and optional Flight Stream 110/210.
Definition of Abbreviations:	See Section 1.5 and Section 1.6.
Precautions:	None
Units of measurement:	None
Referenced publications:	Garmin 190-01310-00 Rev. 6, "Installation Manual, GDL 84/88 Part 23 AML STC" or later revisions; Garmin 190-01122-03 Rev. E, "GDL 84/88 ADS-B Transceiver Pilot's Guide" or later revisions.
Retention:	This document, or the information contained within, will be included in the aircraft's permanent records.

The GDL 84/88 AML STC Installation Manual (190-01310-00) is referenced extensively throughout this document. To improve readability, references to the installation manual are abbreviated as GDL-IM.

2.2 Description of Alteration

The GDL 84/88 is a remote-mounted UAT Datalink Transceiver that provide ADS-B functionality as part of an ADS-B Out configuration, ADS-B In configuration, or ADS-B Out and In configuration. ADS-B Out transmissions are via 978 MHz UAT and ADS-B In reception is via 978 MHz UAT and 1090 MHz extended squitter. In addition, the GDL 88 correlates traffic from multiple sources and provides traffic to a cockpit display (CDTI). The Flight Stream 110/210 interfaces with the GDL 84/88 through RS-422. Installation configuration is dependent on desired functionality and access to required sensors and

equipment and also antenna inputs. The GDL 84/88 System Block Diagram in Figure 1 shows the various interfaces for the GDL 84/88.

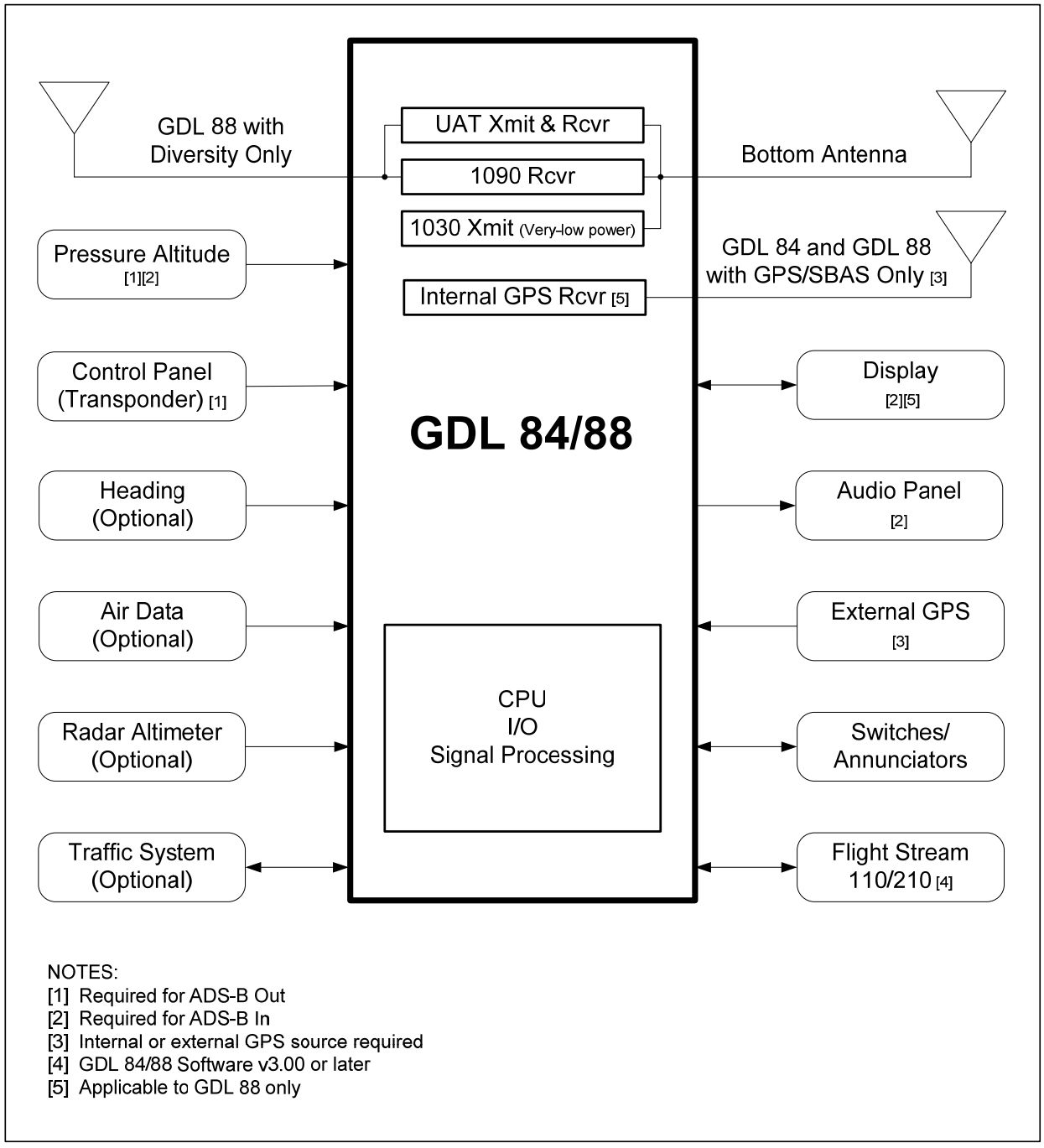


Figure 1. GDL 84/88 System Block Diagram

2.3 Control, Operating, and Testing Information

See the *GDL 84/88 Pilot's Guide* for system operating information. See Section 2.1 for document part numbers. See *GDL-IM* for a system description and system limitations.

See *GDL-IM*, Section 5 for system configuration and checkout information. See *GDL-IM,* Sections 5.7 and 5.8 for general ground checks and system test procedures.

2.4 Servicing Information

The GDL 84/88 and optional Flight Stream 110/210 do not require servicing.

2.5 Periodic Maintenance

All maintenance associated with the GDL 84/88 AML STC installation is on condition. The GDL 84/88 is designed to detect internal failures. A thorough self-test is executed automatically upon application of power to the unit, and built-in tests (BIT) are continuously executed. Detected errors are indicated as failure annunciations, system messages, or a combination of the two.

Operation of the GDL 84/88 is not permitted unless the inspections described in this section have been completed within time intervals prescribed in Table 1. All antennas connected to the GDL 84/88 should be maintained in accordance with appropriate inspection data for the antenna installation.

Table 1. Maintenance Intervals

Item	Description/Procedure	Interval
Equipment Removal & Replacement	Removal and replacement instructions for the GDL 84/88 are contained in Section 2.7 of this document and in *GDL-IM* Section 4.1.7.	**On Condition**
Equipment Visual Check (Metallic Aircraft)	Conduct a visual check of the GDL 84/88 unit, optional Flight Stream 110/210, and associated wire harness to ensure continued installation integrity. 1. Inspect the GDL 84/88 unit for security of attachment, including visual inspection of mounting rack and other supporting structure attaching the rack to aircraft structure. For installations using countersunk fasteners, verify the fastener heads are in full contact with unit mounting rack holes. Re-torque mounting fasteners to 12-15 in-lbs if required. If the Flight Stream 110/210 is installed and screws are not securely attached, tighten any loose Flight Stream 110/210 mounting screws as necessary to snug plus one-quarter turn. If required, re-torque bonding strap hardware to 12-15 in-lbs. Note: Care should be taken when tightening the mounting screws of the Flight Stream 110/210. Excessive tightening may damage the mounting flange. 2. Inspect for signs of corrosion. 3. Inspect condition of wiring, shield terminations, routing, and attachment/clamping. 4. Inspect any bonding straps for corrosion, loose connections, or signs of lightning damage. Rework as needed.	**12 Calendar Months**

Item	Description/Procedure	Interval
Equipment Visual Check (Non-metallic Aircraft)	Conduct a visual check of the GDL 84/88 unit, optional Flight Stream 110/210, and associated wire harness to ensure continued installation integrity. 1. Inspect the GDL 84/88 unit for security of attachment, including visual inspection of mounting rack and other supporting structure attaching the rack to aircraft structure. For installations using countersunk fasteners, verify the fastener heads are in full contact with unit mounting rack holes. Re-torque mounting fasteners to 12-15 in-lbs if required. If the Flight Stream 110/210 is installed and screws are not securely attached, tighten any loose Flight Stream 110/210 mounting screws as necessary to snug plus one-quarter turn. If required, re-torque bonding strap hardware to 12-15 in-lbs. Note: Care should be taken when tightening the mounting screws of the Flight Stream 110/210. Excessive tightening may damage the mounting flange. 2. Inspect for signs of corrosion. 3. Inspect condition of wiring, shield terminations, routing, and attachment/clamping. 4. For composite aircraft, inspect any aluminum foil tape used to ground the GDL 84/88 and verify that it is not torn, damaged or showing signs of corrosion. If any of these occurs then the tape must be replaced. 5. Inspect any bonding straps for corrosion, loose connections, or signs of lightning damage. Rework or replace as needed. Bonding straps must be replaced after a known or suspected lightning strike.	**12 Calendar Months**

Item	Description/Procedure	Interval
Electrical Bonding Check	Perform an electrical bonding check for the GDL 84/88: 1. Perform electrical bond check between the GDL 84/88 and nearby exposed portion of the aircraft metallic structure (or instrument panel for composite aircraft), and verify that it is less than or equal to 10 milliohms. 2. Remove GDL 84/88 unit from mounting rack. 3. Measure the resistance between the mounting rack and nearby exposed portion of aircraft metallic structure (or instrument panel for composite aircraft), and verify it is less than or equal to 10 milliohms. 4. Reinstall the GDL 84/88 unit in the mounting rack. In the event of bonding test failure, remove the GDL 84/88 rack and clean the attachment points at both the GDL 84/88 rack and the aircraft structure per Section 3.5.3 of the *GDL-IM* and reattach the rack. Re-verify the resistance between the mounting rack and nearby exposed portion of aircraft metallic structure (or instrument panel for composite aircraft), and ensure it is less than or equal to 2.5 milliohms (for metallic aircraft) or 5.0 milliohms (for composite aircraft). Perform an electrical bonding check for the Flight Stream 110/210, if installed in metallic or tube/fabric aircraft: 1. Disconnect the shield terminations from the Flight Stream connector backshell. 2. Measure the resistance between the connector and nearby exposed portion of aircraft metallic structure and check that it is less than or equal to 20 milliohms. In the event of bonding test failure, remove the Flight Stream connector bonding strap from the aircraft ground plane and clean the attachment point with a bonding brush. Re-attach the bonding strap to the aircraft ground plane, torque to 12-15 in-lbs. Re-check the resistance between the Flight Stream connector and aircraft structure, ensuring that the resistance is less than or equal to 10 milliohms. If cleaning the far side of the strap is not enough, remove, clean, and reattach on the Flight Stream 110/210 side. 3. Connect the shield terminations to the Flight Stream connector backshell.	**Every 2000 flight hours or ten (10) years, whichever is first**

Item	Description/Procedure	Interval
	Perform an electrical bonding check for the Flight Stream 110/210, if installed in composite aircraft: 1. Disconnect the shield terminations from the Flight Stream connector backshell. 2. Measure the resistance between the connector and instrument panel (or other aircraft ground) and check that it is less than or equal to 20 milliohms. In the event of bonding test failure, remove the Flight Stream connector bonding strap from the aircraft ground plane and clean the attachment point with a bonding brush. Re-attach the bonding strap to the aircraft ground plane, torque to 12-15 in-lbs. Re-check the resistance between the Flight Stream connector and aircraft ground, ensuring that the resistance is less than or equal to 10 milliohms. If cleaning the far side of the strap is not enough, remove, clean, and reattach on the Flight Stream 110/210 side. 3. Connect the shield terminations to the Flight Stream connector backshell.	

2.6 Troubleshooting Information

If error indications are displayed on the GDL 84/88 annunciator, refer to the *GDL-IM*, Section 6, Troubleshooting. Refer to the GDL 84/88 System Configuration and Checkout Log retained in the aircraft permanent records for a list of the interfaced equipment and system configuration data (example log provided in *GDL-IM*).

2.7 Removal and Replacement Information

For GDL 84/88 removal and replacement instructions, refer to *GDL-IM* Section 4.1.7.

If the GDL 84/88 is removed and reinstalled, verify that the power-up self-test sequence is successfully completed and no failure messages are annunciated. If any work has been done on the aircraft that could affect the system wiring, or any interconnected equipment, verify the GDL 84/88 system unit power-up self-test sequence is successfully completed and no failure messages are annunciated. Also, if any work has been done on the GDL 84/88 mounting rack, verify the integrity of electrical bonding is maintained in accordance with Section 2.5 of this document.

For ADS-B annunciator removal and replacement instructions, refer to *GDL-IM*, Section 4.1.8.

For Flight Stream 110/210 removal and replacement instructions, refer to *GDL-IM* Section 4.1.9.

Refer to Appendix A of this document or the GDL 84/88 System Configuration and Checkout Log retained in the aircraft permanent records for GDL 84/88 and Flight Stream 110/210 (if installed) equipment locations.

Refer to the *GDL-IM* for removal/installation procedures and special handling precautions.

2.8 Diagrams

The installing agency should document aircraft specific locations for all LRUs, optional equipment, and antennas installed by this STC. The installing agency should also provide wire routing diagram sketches for all GDL 84/88 system wiring and cables installed by this STC.

GDL-IM Section 4 provides diagrams showing sample installation for LRU locations. Appendix B provides point-to-point wiring diagrams for the GDL 84/88 and interfaced equipment.

Refer to the GDL 84/88 System Configuration and Checkout Log retained in the aircraft permanent records for a list of the interfaced equipment and unit configuration data (example log provided in *GDL-IM*).

2.9 Special Inspection Requirements

After a suspected lightning strike, the following actions must be performed (if applicable):

- Verify proper operation of ADS-B equipment and Traffic annunciators (if installed) following procedures in accordance with *GDL-IM* Section 5.7.9.2 Discrete Outputs.
- Inspect any aluminum foil used for grounding (if installed) in accordance with *GDL-IM* Sections 3.5.1, 3.5.2, or Appendix G.
- Inspect any GDL 84/88 bonding strap (if installed) in accordance with *GDL-IM* Sections 3.5 or Appendix G.

2.10 Application of Protective Treatments

The GDL 84/88 installation does not require the application of protective treatments.

2.11 Data Relative to Structural Fasteners

Refer to the *GDL-IM*, Appendix E, for structural fastener information.

2.12 Special Tools

A milliohm meter is required for electrical bonding checks.

2.13 Additional Instructions

Refer to the *GDL-IM*, Section 3.6, for electrical load information.

2.14 Overhaul Period

The system does not require overhaul at a specific time period. Power on self-test and continuous BIT will monitor the health of the GDL 84/88 system. If an internal failure is detected, the unit may be removed and replaced. Reference the *GDL-IM*, Section 6, for troubleshooting information.

2.15 ICA Revision and Distribution

To revise this ICA, Garmin will follow the Garmin *ODA Procedures Manual* SOP-0055/ACP-0016 for Instructions for Continued Airworthiness. The latest revision of this ICA document is available on the Garmin website (www.flyGarmin.com). A Garmin Service Bulletin describing ICA revision will be sent to Garmin dealers if a revision is determined to be significant.

2.16 Assistance

Flight Standards Inspectors or the certificate holder's PMI have the required resources to respond to questions regarding this ICA. In addition, the customer may contact Garmin with questions regarding this equipment and its installation. Garmin Customer Support may be contacted during normal business hours via telephone 913-397-8200 or from the Garmin web site at www.flyGarmin.com.

2.17 Implementation and Record Keeping

Modification of an aircraft by this Supplemental Type Certificate obligates the aircraft operator to include the maintenance information provided by this document in the operator's aircraft maintenance manual and/or the operator's aircraft scheduled maintenance program.

3. AIRWORTHINESS LIMITATIONS SECTION

There are no additional Airworthiness Limitations as defined in 14 CFR § 23, Appendix G, G23.4 that result from this modification.

The Airworthiness Limitations section is FAA approved and specifies maintenance required under §§43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

10/22/2015

FAA APPROVED

Michael Warren
ODA STC Unit Administrator
ODA-240087-CE

Date

APPENDIX A EQUIPMENT LOCATIONS AND WIRE ROUTING

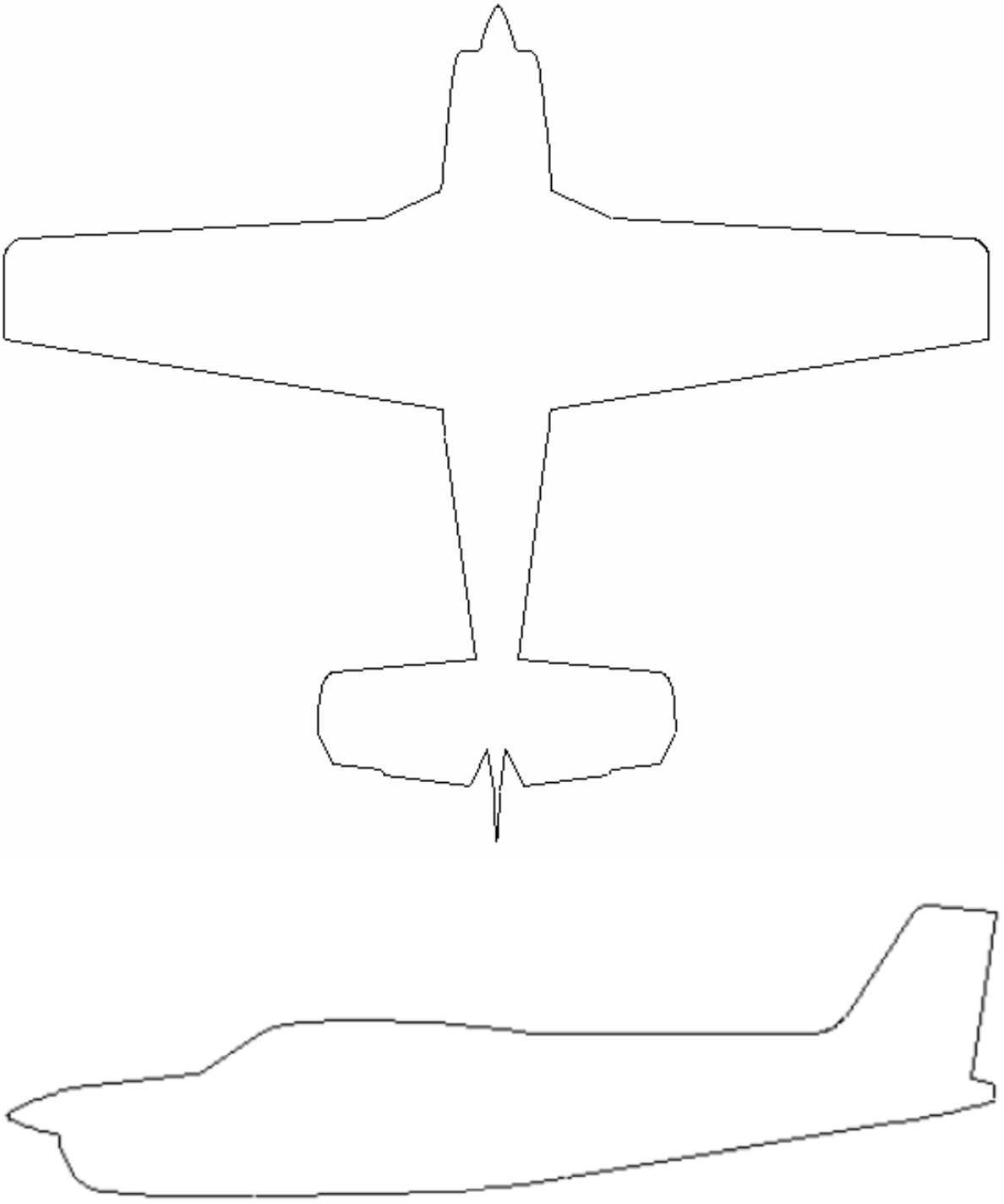
A.1 Equipment Locations

The table below describes the location of the GDL 84/88, antennas, and interfaced equipment. Document all interfaced equipment (model/part number) and installed locations in the following table. Also sketch equipment locations and wire routing on the diagrams in A.2 or A.3 as appropriate.

LRU	Installed Location (F.S.)	Description of Location
GDL 84/88		

A.2 GDL 84/88 Installation – Single Engine

The following diagram depicts approximate location of all LRUs and antenna(s) along with the wire routing for the GDL 84/88 and Flight Stream 110/210 (if installed) throughout the aircraft structure for a single-engine aircraft.



A.3 GDL 84/88 Installation – Twin Engine

The following diagram depicts approximate location of all LRUs and antenna(s) along with the wire routing for the GDL 84/88 and Flight Stream 110/210 (if installed) throughout the aircraft structure for a twin-engine aircraft: