ADS-B Technologies, LLC
900 Merrill Field Drive
Anchorage, Alaska 99501, U.S.A

FAA APPROVED

AIRPLANE FLIGHT MANUAL SUPPLEMENT

or

SUPPLEMENTAL FLIGHT MANUAL

For The

L-3 Aviation Products
Lynx Multilink Surveillance System
Model NGT-9000
L-3 Part Number 9029000-20000

This Airplane Flight Manual Supplement or Supplemental Flight Manual must be carried on board the aircraft when the NGT-9000 Multilink Surveillance System is installed in accordance with the AML Supplemental Type Certificate SA02444AK.

The information contained herein supplements the FAA approved Airplane Flight Manual or the type design data only in those areas listed herein. For limitations, procedures and performance information not contained in this document, refer to the FAA approved Airplane Flight Manual, manual material, markings, placards, or other information that was required by the applicable regulations under which the aircraft was type certificated.

Make and Model Airplane: Cessna 182T

Airplane Serial Number: 18280975

Airplane Registration Number: N3524F

FAA Approved:

August A. Asay
Manager, Anchorage Aircraft Certification Office
Federal Aviation Administration
Anchorage, Alaska

Date: JUN 19 2015

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AIRPLANE FLIGHT MANUAL SUPPLEMENT
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Models NGT-9000
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RECORD OF REVISIONS

Revision	Date of Revision	Description
Original	3/31/2015	Original Issue
1	6/19/2015	Typographical error corrections Corrections to Table 3-1 in section 3.2.1

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SECTION 1. GENERAL

1.1 Functional Description

The Lynx MultiLink Surveillance System (also referred to in this manual as the Lynx NGT-9000) is a Mode S Level 2 dens Class 1 Transponder with an integrated GPS receiver providing Automatic Dependent Surveillance-Broadcast (ADS-B) output using a 1090ES (Extended Squitter). The unit also receives ADS-B data via 1090ES and UAT (978 MHz Universal Access Transceiver). Figure 1-1 is a depiction of the NGT-9000.

The unit replies to Mode A, Mode C and Mode S interrogations receiving interrogations at 1030 MHz and transmitting responses at 1090 MHz. The unit is equipped with IDENT capability that activates the Special Identification (SPI) pulse for 18 seconds.

Ground stations can interrogate Mode S Transponders individually using a 24-bit ICAO Mode S address, which is unique to the particular aircraft. In addition, ground stations may interrogate the unit for its transponder data capability and the aircraft's Flight ID.

The ADS-B provides own aircraft data with Enhanced Visual Acquisition (EVAcq) traffic information that improves situational awareness and flight safety by providing aircraft position, velocity, and heading information that is automatically transmitted to other aircraft and ground stations providing immediate surveillance of air-to-air traffic.

The 1090ES and UAT ADS-B datalink have the following capabilities:

- 1030MHz/1090 MHz In - Receive ADS-R and TIS-B
- 1090ES Out - Transmit ADS-B
- UAT In - Receives ADS-B, ADS-R and TIS-B, FIS-B, NOTAMS, and TFR's

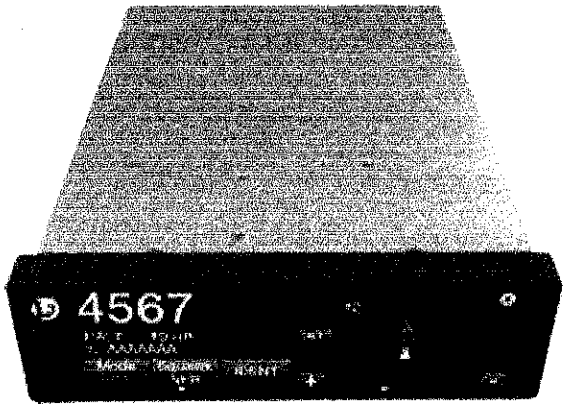


Figure 1-1: Lynx NGT-9000

1.2 NGT-9000+ Traffic Awareness Overview [Optional]

The NGT-9000+ ("9000 Plus") supports optional active Traffic Awareness System (TAS).

The TAS option is an active system that operates as an aircraft-to-aircraft interrogation device. The unit interrogates transponders in the surrounding airspace similar to ground based radar. When replies to these active interrogations are received, the responding aircraft's range, altitude, and closure rates are computed to plot traffic location and predict collision threats. The unit alerts the flight crew to nearby transponder equipped aircraft and assists the pilot in the visual acquisition of aircraft that may represent a danger. Traffic information, out to a selected range, is graphically displayed on the unit or alternate display.

- The system display shows the relative position of traffic using text, shapes (i.e., Traffic Advisory = solid circle; Other Traffic = open diamond) and colors.
- The effective active-mode surveillance range is 35 nm and the system is capable of tracking 35 Intruders simultaneously with the target bearing relative to the nose of own aircraft.
- The tracking of targets is in a cylindrical volume centered on own aircraft that has, at a minimum, a radius of 35 nm and extends 10,000 ft above and 10,000 ft below own aircraft.
- The system uses a voice audio output that announces Traffic Advisory and relative altitude.

1.3 NGT-9000D Antenna Diversity Overview [Optional]

The NGT-9000D has the same hardware and firmware/software as the basic NGT-9000, but is capable of supporting dual L-band antennas (one bottom and one top) to enhance system performance and prevent fuselage blanking of a single bottom antenna in tight turns into a ground station or UAT target. The upper L-band antenna may be a single blade antenna.

1.4 Capabilities

The NGT-9000 transceiver can be software configured as either an NGT-9000, 9000+, or 9000D. It can also be installed with, or without peripheral ARINC-429 or RS-422 panel mounted traffic and weather displays.

1.5 L-Band UAT Antenna

The L-Band antenna is used by the Lynx NGT-9000 to transmit and receive 1090 MHz ADS-B and receive 978MHz ADS-B (UAT). At least one L-band antenna must be located on the bottom of the aircraft.

1.6 GPS Antenna and the MSS Internal GPS Receiver

The GPS utilizes signals from Global Positioning System (GPS) satellite constellation and Satellite-Based Augmentation Systems (SBAS). The MSS has an internal GPS function that provides position, velocity, time and integrity (NIC, NAC, etc.) information to the ADS-B functions. It is located on the top of the aircraft.

NOTE
The NGT-9000's built-in GPS does not provide ownship position for external moving map displays

1.7 Configuring the NGT-9000

The unit's configuration is preserved within the Data Configuration Module (DCM), which is permanently attached to the aircraft and communicates with the NGT-9000 via a serial connection. The configuration options are set up during installation and cannot be changed except by a licensed installer.

NOTE
The NGT-9000's configuration parameters can only be changed by a licensed installer

1.8 Personal Electronic Devices

The Lynx NGT-9000 supports the use of personal electronic devices (e.g., iPad) via a Wi-Fi connection. The PED must use approved applications that support the ADS-B broadcast services (i.e., ADS-B In, TIS-B, ADS-R, and FIS-B). Check with an L-3 approved avionics dealer or contact L-3 Avionics Systems for a current list of approved applications.

1.9 Weather Displays

NEXRAD, METARS, TAFS, PIREPS, NOTAMS and temperatures and winds aloft are displayed on the NGT-9000 provided that the aircraft is within the service volume of a ground station. Additionally, the same information can be displayed on approved weather displays can interface with the NGT-9000 to provide FIS-B weather information using the ADS-B IN link. Screen information and controls may be different for each of the approved displays.

Refer to your Installed Display operations manual for details on operation and a description of how the weather is depicted. Check with an L-3 approved avionics dealer or contact L-3 Avionics Systems for a current list of approved weather displays.

1.10 Traffic Displays

The NGT-9000 will provide, at a minimum, UAT, TIS-B and ADS-R traffic on the unit's built-in display and can repeat this traffic information on any approved ARINC-429 or RS-422 display. The NGT-9000+ can also display active Traffic Awareness System (TAS) targets on the unit's built-in display and can repeat this traffic information on any approved ARINC-429 or RS-422 display. Figure 1-1 Illustrates a typical traffic display

Refer to the displays operations manual for details on operation and a description of how the information is depicted. Check with an L-3 approves avionics dealer or contact L-3 Avionics Systems for a current list of approved traffic displays.

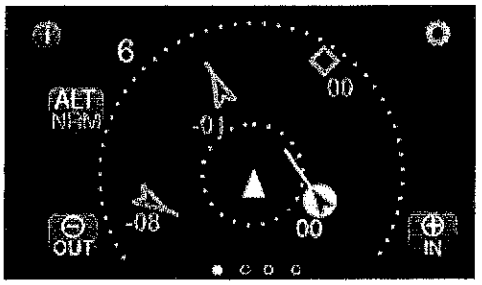


Figure 1-2: Typical NGT-9000 Traffic Screen

1.11 Interaction of Major Components

Figure 1-3 shows how the major components of the NGT-9000 connect to other aircraft systems.

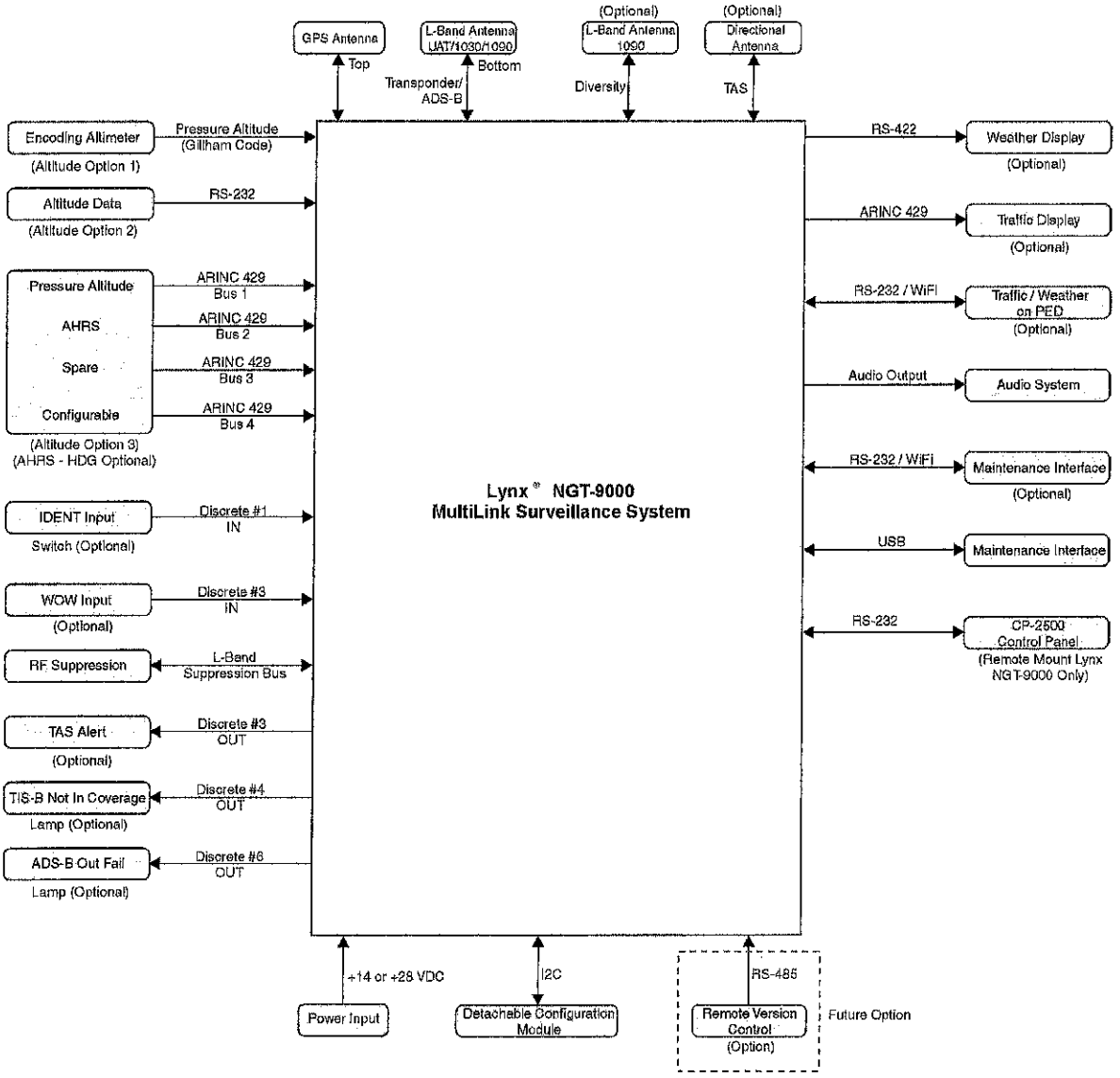


Figure 1-3: NGT-9000 Connections and Functions

1.12 Installation Configuration for This Aircraft

Figure 1-4 should be completed by a licensed installer.

This aircraft has been configured as a: ☐ NGT-9000 ☐ NGT-9000D ☐ NGT-9000+

Altitude Encoder: ☐ Serially Interfaced to MSS
☐ Interfaced via Gillham (gray code)

Interfaced Traffic Display: ☐ RS-422: _____ ☐ ARINC-429: _____

Interfaced WX Display: ☐ RS-422: _____

Heading Source: ☐ YES _____ ☐ NO

Weight On Wheels (WOW) Switch Installed: ☐ YES ☐ NO

Wi-Fi Enabled: ☐ YES _____ ☐ NO

Figure 1-4: Installation Configuration Data

SECTION 2. LIMITATIONS

2.1 Minimum Documentation

The L-3 Pilot's Guide for Models NGT-9000, NGT-9000D and NGT-9000+, Part Number 0040-17000-01 (Rev D, or later revision) must be carried on board the aircraft at all times.

2.2 Minimum Equipment

The NGT-9000 must have the following system interfaces in Table 2-1 fully functional in order to be compliant with the requirements for 14 CFR 91.225 and 91.227 ADS-B OUT operations:

Table 2-1: Required Equipment

Interfaced Equipment		Number Required	Number Installed
NGT-9000, NGT-9000D, or NGT-9000+ With operable SBAS position source		1	1
External ADS-B Annunciator: *"ASD-B FAIL"*		0	1 lamp
NGT-9000+ Equipped with TAS	Pilot's Audio (For Traffic Alerts)	1	1

2.3 ADS-B OUT Compliance

The NGT-9000 only complies with 14 CFR 91.227 when all its required functions are operational as indicated by external annunciators not being illuminated and/or interfaced display ADS-B messages not being present.

2.4 Anonymous Mode

Anonymous Mode must only be operated while operating under VFR and while squawking a VFR code. Anonymous Mode must be turned off when requested by Air Traffic Control.

2.5 IDENT Function

The system must be capable of squawking IDENT when requested by Air Traffic Control.

2.6 ALT Function

While operating within airspace requiring an ADS-B OUT compliant transmitter, Pressure Altitude Broadcast Inhibit (PABI), or "No ALT" shall only be enabled when requested by Air Traffic Control.

2.7 Traffic Awareness

Traffic Awareness and Traffic Alerting are intended as an aid to visual acquisition of conflicting traffic and may not be used as the sole basis for aircraft maneuvering.

NOTE

Information shown on the display is provided to the pilot as an aid to visually acquiring traffic. Pilots should maneuver their aircraft based only on ATC guidance or positive visual acquisition of the conflicting traffic. Maneuver should be consistent with ATC instructions. ATC should be contacted for resolution of the traffic conflict.

2.8 Applicable System Software

This AFMS/SFM is applicable to the software versions shown in Table 2-2.

Table 2-2: Software Version

Software	Part No.	Version
NGT-9000 Ops s/w	9020010-002	Rev 1.1
68DC Navigational Database North America (68.bin)	8010-22310-0201	Most current cycle*
72DC Cultural Features Database North American Extended (72.bin)	8010-12004-0001	Most current cycle*

* *There is no requirement to update this database because it is used only for informational purposes.*

SECTION 3. EMERGENCY PROCEDURES

3.1 Emergency Procedures

None.

3.2 Abnormal Procedures

3.2.1 Abnormal Indications

Table 3-1: Troubleshooting for the Panel Mount NGT-9000

Indications	Cause/Corrective Actions
The unit has manual brightness adjustment only.	Loss of light sensor data. 1. Try clearing the failure by tapping the Restart button. 2. Check light sensor (upper left corner of bezel) for dirt or obstructions. 3. If the problem continues, replacement of the Lynx NGT-9000 may be required. Contact L- 3 Field Service before removal.
• Blank display. • If installed, ADS-B Fail lamp is OFF.	Loss of power or damaged unit. 1. Check breakers and main avionics switch. 2. Verify Battery (BAT) Master switch is on. 3. Replacement of unit may be required. Contact L-3 Field Service before removal.
When touching the screen the command function seems to be slightly off from the center of the screen symbol or area.	The screen calibration is out of toler- ance. 1. A Screen Calibration may need to be performed. See Maintenance Mode. 2. If problem continues contact L-3 Field Service before removal.
Internal fan is always active.	Loss of temperature sensor data. 1. Try clearing the failure by tapping the Restart button. 2. If the problem continues, replacement of the Lynx NGT-9000 may be required. Contact L- 3 Field Service before removal.
Unit does not operate in normal mode and starts in Bootloader or maintenance mode.	Internal hardware test failures cause the unit to automatically reset. This happens without cycling power to the unit. If the hardware failure being detected does not clear a system fail message is sent. 1. Cycle power to the unit to clear the failure. 2. Replacement of unit may be required. Contact L-3 Field Service before removal.
Message page contains messages that do not indi- cate a functional failure.	Although no immediate loss of func- tion is occurring, an undesired condi- tion is taking place. At the earliest convenience, perform the following action: 1. Try clearing the failure by tapping the Restart button. 2. If the problem continues, replacement of the Lynx NGT-9000 may be required. Contact L- 3 Field Service before removal.

Indications	Cause/Corrective Actions
• No data showing. • If installed, ADS-B Fail lamp is ON. • A compatible traffic display may have the message "NO DATA" showing.	A hardware failure has been detected within the NGT-9000. • At next power cycle if symptoms persist contact L-3 Field Service before removal of the unit or other equipment.
• Compatible displays may indicate "STANDBY" or "DATA-FAIL" and Wi-Fi information is not available. • If installed, ADS-B Fail lamp begins to flash and continues to flash until GPS is acquired.	GPS-Acquiring (On Ground – no previous position fix). 1. The GPS may need up to 4 minutes to provide a position after power is applied to the Lynx NGT- 9000. 2. The GPS signal may be weak. Move the aircraft into an area where the unit can acquire the GPS signal. Make sure nothing is covering or blocking the GPS antenna. 3. At next power cycle if symptoms persist contact L-3 Field Service before removal of the unit or other equipment.
• Compatible displays may indicate "STANDBY" or "DATA-FAIL" and Wi-Fi information is not available. • If installed, ADS-B Out Fail lamp flashes (1 second On/Off) for 2 minutes, and then remains ON indefinitely until a GPS position is acquired.	GPS is Acquiring (In Air – no previ- ous position fix). 1. The GPS may need up to 4 minutes to provide a position after power is applied to the unit. 2. The GPS signal may be weak. Move the aircraft into an area where the unit can acquire the GPS signal. 3. Cycle power to the unit. 4. Contact L-3 Field Service before removal of unit.
• Display indicator MAP FAIL (red text) showing on FIS-B application screen. • Compatible displays may indicate "STANDBY" or "DATA-FAIL" and Wi-Fi information is not available. • If installed, ADS-B Fail lamp flashes for 2 minutes. After 2 minutes the lamp stays ON.	GPS-Acquiring (On Ground or In Air– previous position fix). 1. The GPS signal may be weak. Move the aircraft into an area where the unit can reacquire the GPS signal. 2. At next power cycle if symptoms persist contact L-3 Field Service before removal of the unit or other equipment.
• No targets are shown on the traffic screen. • Ownship data is displayed. • A "Traffic Unavailable" or "Traffic Failed" indication is being displayed. • If installed, ADS-B Fail lamp is OFF.	The aircraft is not in an ADS-B (UAT / 1090ES) coverage area, or the tar- gets are not transmitting ADS-B data, or the ground station is not transmit- ting ADS-B data. 1. The symptoms are expected if the target or ground station are not transmitting ADS-B. 2. The target or ground station needs to be within line-of-site range. 3. At next power cycle if symptoms persist contact L-3 Field Service before removal of the unit or other equipment.

Indications	Cause/Corrective Actions
• No targets are shown on the traffic display. • Ownship data may or may not be displayed on the weather display. • The MSG window is showing and functions are showing as failed or degraded.	Possible hardware problem with the Lynx NGT-9000. • At next power cycle if symptoms persist contact L-3 Field Service before removal of the unit or other equipment.
• No data on the weather display. • If installed, ADS-B Fail lamp is OFF.	The FIS-B data is not being transmit- ted to the weather display. 1. No ground station is in range. 2. The ground station may not provide FIS-B service. 3. At next power cycle if symptoms persist within a known FIS-B service area, then contact L-3 Field Service before removal of the unit or other equipment.
The traffic symbols on the traffic display are non-direc- tional (diamond shape)	Non-directional traffic symbols on the traffic display is due to one of the following reasons: 1. The directional information that is being received by the MSS does not have directional data. The MSS continues to transmit non-directional data to the traffic display. 2. An alternate traffic display (if installed) does not support the DTIF data format necessary to show directional data provided by ADS-B.
Traffic display is working correctly, but aircraft are not showing up on the display.	Lack of data as described below: 1. The ADS-B In requires other aircraft to be equipped with ADS- B Out. 2. The TIS-B and ADS-R services are supported when in range of ground stations providing the service. 3. If receiving the TIS-B service, Mode C and Mode S transponder equipped aircraft that do not provide altitude information are not seen on the traffic display. If receiving the TIS-B service, but aircraft not equipped with a transponder, or equipped with a Mode A transponder are not part of the TIS-B data and will not be seen on the traffic display.
No TIS-B or FIS-B Coverage Indicator is showing, but the aircraft is in coverage area. 	The Lynx NGT-9000 or a system component may have failed or de- graded. • At next power cycle if symptoms persist contact L-3 Field Service before removal of the unit or other equipment.

3.2.2 Loss Of Aircraft Electrical Power Generation (Loss of Generator)

Loss of electrical power generation .....REMOVE POWER FROM NGT-9000

If the NGT-9000 is shut down in order to shed load from the aircraft's electrical system, ADS-B OUT and ADS-B IN will no longer be available. If under ATC control, notify your Controller of loss of ADS-B OUT.

NOTE
This guidance is supplementary to any procedure provided in the AFM or POH for the aircraft in Loss of Power situations

3.2.3 Loss of GPS/SBAS Position Data

Loss of GPS/SBAS indicated by a SLOW blinking ADS-B FAIL light.....PULL NGT CIRCUIT BREAKER. WAIT 5 SECONDS AND RESET. IF FAST BLINKING ADS-B FAIL LIGHT CONTINUES, OR BECOMES STEADY, ASSUME AN ADS-B OUT FAILURE.

If under ATC control, notify your Controller of loss of ADS-B OUT.

3.2.4 Visual/Aural Traffic Alert

Traffic Alert .....VISUALLY ACQUIRE TRAFFIC

SECTION 4. NORMAL PROCEDURES

The procedures described below are specific only to the NGT-9000. Reference the Pilot Operating Handbooks and AFM Supplements for operating instructions specific to any installed displays or peripheral devices.

4.1 Normal Power ON

The NGT-9000 is self-starting and self-tests once avionics power has been applied to the system

NGT Power .....ON

SELF TEST .....PASS. Audio "Self Test Pass"

NOTE
GPS alignment may take 2 – 3 minutes depending on the aircraft location and distance the aircraft has been moved since the last alignment. An ADS-B OUT OF RANGE light is normal until the aircraft is airborne and within the service volume of an ADS-B Ground Station (GBT).

SECTION 5. PERFORMANCE

No change

SECTION 6. WEIGHT AND BALANCE

See current weight and balance data

SECTION 7. SYSTEM DESCRIPTIONS

7.1 Pilot's Guide

THE L-3 LYNX, Models NGT-900 -9000D and NGT-9000+ Pilot's Guide, Document Part Number 0040-17000-01, contains additional information regarding the system's description, function and control. The Pilot should become familiar with the contents of this Guide and keep it available for reference.

7.2 Traffic Sources

The NGT-9000 is capable of receiving ADS-B IN traffic advisories and displaying them on the Main Display, PED's such as the Apple iPad and on panel mounted RS-422 capable display such as the Garmin GMX 200. Refer to the appropriate installed display manual for information on target symbology and optional alerting functions.

7.3 Weather Sources

The NGT-9000 is capable of receiving ADS-B IN Flight Information System (FIS) weather and airspace information on the Main Display, PED's such as the Apple iPad and on panel mounted RS-422 capable display such as the Garmin GMX 200. METAR, TAF, SIGMET and PIREP data is normally displayed in text format, while NEXRAD weather radar images are available graphically. Refer to the appropriate installed display manual for information on the type of information available and display options.

7.4 Power

Power for the NGT-9000 is provided through a circuit breaker labeled "NGT".

7.5 External Switches, Lights and Controls

Although no external lights are required for the NGT-9000, the optional status lights listed in Table 7-1 may be installed at the Operator's option.

Table 7-1: Light and Switch Functions

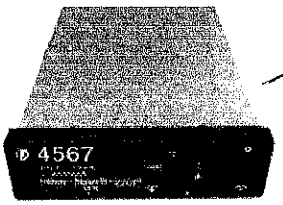
Switch or Light	Function
ADS-B FAIL Light	Out – Normal operation
	Steady – ADS-B Failure
	Slow Flashing – GPS aligning

INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

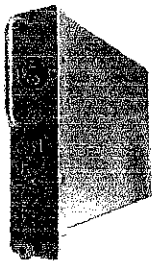
For The

L-3 Aviation Products
Lynx MultiLink Surveillance System

Model NGT-9000( )
L-3 Aviation Products Part Number 9029000-20000
and
Model NGT-9000R( )
L-3 Aviation Products Part Number 9029000-40000
And
CP-2500 Control Panel
L-3 Aviation Products Part Number 9080-17250-01



Lynx Panel Mount NGT-9000( )



Lynx Remote Mount NGT-9000R( )

CP-2500 Control Panel

AS INSTALLED IN

Cessna 182T
(Make & Model Airplane)

Serial Number: 18280975 Registration Number N3524F

Document Number:
L3-76-ICA1

RECORD OF REVISIONS

Revision	Date of Revision	Description
0	2/16/2015	Initial Release
1	5/22/2015	Corrected document number. Corrected NGT-9000 Troubleshooting Table 2-2 Incorporated NGT-9000R (Remote Mount Version) into ICA
2	7/13/2015	Corrected document number

If further technical information is required, please contact:

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Grand Rapids, MI USA 49512-9704
Telephone: (800) 453-0288 or (616) 949-6600
Fax: (616) 977-6898

We welcome your comments concerning this manual. Although every effort has been made to keep it free of errors, some may occur. When reporting a specific problem, please describe it briefly and include the manual part number, the paragraph/figure/table number, and the page number. Send your comments to the STC Holder at:

ADS-B Technologies
Attn: Technical Publications
900 Merrill Field Drive
Anchorage, AK 99501
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SECTION 1 INTRODUCTION

1.1 Purpose

This document is designed for use by vendors and licensed installers of an L-3 LYNX® NGT-9000. It contains instructions for continued airworthiness as prescribed by 14 CFR 23.1529 and part 23 Appendix G.

This ICA also contains information required by the operator to correctly maintain the NGT-9000, which have been installed under AML STC SA02444AK.

NOTE: Unless otherwise stated, references to NGT-9000 is inclusive of NGT-9000, NGT-9000D, NGT-9000D+, NGT-9000R, NGT-9000RD, and NGT-9000RD+

1.2 Scope

This document contains the instructions for Continued Airworthiness for aircraft modified by the installation of an NGT-9000 under AML SA02444AK.

1.3 Document Control

This document is part of the ADS-B TECHNOLOGIES, LLC document control system. There are no superseded documents to the original. Refer to paragraph 2.15 for information on how to obtain FAA approval and how to notify customers of changes.

1.4 Permission to Use Certain Documents

Permission is granted to any entity applying for approval to install a LYNX NGT-9000 system to use AML STC SA02444AK documents to accomplish the Instructions for Continued Airworthiness and show compliance with the AML STC engineering data. It is the responsibility of the applicant to determine the suitability of the documents for the ICA.

1.5 Acronyms and Definitions

Acronym	Definition
AC	Advisory Circular
ACSS	Aviation Communication and Surveillance Systems
ADS-B	Automatic Dependent Surveillance-Broadcast
ADS-R	ADS-B Rebroadcast
AIRB	Basic Airborne Situation Awareness
AML	Approved Model List
APP	Application
ARINC	Aeronautical Radio, Incorporated
ASA	Aircraft Surveillance Applications
ASSAP	Airborne Surveillance and Separation Assurance Processing
ATCRBS	Air Traffic Control Radar Beacon System
BIT	Built-In test
CDTI	Cockpit Display of Traffic Information
DCM	Detachable Configuration Module
DL	Data Loading
DME	Distance Measuring Equipment
ETX	End of Transmission
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FIS-B	Flight Information Services - Broadcast
FPGA	Field Programmable Gate-Array
FSS	Flight Service Station
LRU	Line Replaceable Unit
MHZ	Mega Hertz
MSS	Multilink Surveillance System
NAS	National Airspace System
NGT MAT	NGT Maintenance Tool
NOTAM	Notice to Airman
PED	Personal Electronic Device
RAIM	Receiver Autonomous Integrity Monitoring
RF	Radio Frequency
RTCA	Radio Technical Commission for Aeronautics
RTS	Request to Send
RX	Receive
SBAS	Satellite-Based Augmentation System
STB	Standby
STC	Supplemental Type Certificate
TIS-B	Traffic Information Service – Broadcast
TSO	Technical Standard Order
TX	Transmit
UAT	Universal Access Transceiver
USB	Universal Serial Bus
WAAS	Wide Area Augmentation System

1.6 Terminology

The NGT-9000 is offered as either a Panel mounted or Remote mounted unit available in three software configurations, which differ only by the added capabilities of Diversity and active TAS functionality. The unit contains a Mode S Level 2 dens Class 1 Transponder with an integrated GPS receiver providing Automatic Dependent Surveillance-Broadcast (ADS-B) output using 1090ES (Extended Squitter). The unit also receives ADS-B data via 1090ES and UAT (978 MHz Universal Access Transceiver). Some models support optional Active Traffic Awareness System (TAS) or antenna Diversity functionality.

References made to the "MSS" (Multilink Surveillance system), or "NGT" apply equally to the NGT-9000 in any mounting or software configuration.

SECTION 2 INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

2.1 Introduction

Content, Scope, Purpose:		This document identifies the Instructions for Continued Airworthiness for the modification of an aircraft by the installation of a LYNX NGT-9000.
Applicability:		Applies to all AML aircraft altered by the installation of a LYNX NGT-9000
Acronyms and Definition & Terminology:		See Section 1.5 and 1.6
Precautions:		None
Units of Measurement:		None
Referenced Publications:		ADS-B Technologies: L3-76AK-IM1 Installation Manual (Approved Model List Supplemental Type Certificate) NGT-9000 P/N 9029000-20000 and NGT-9000R P/N 9029000-40000 Rev. 1 or later versions. L-3 Aviation Products Manuals (For reference only): 0040-17000-01 Pilot's Guide for the NGT-9000 (provided by L-3 Avionics Systems), Rev. D or later revision 0040-17001-01 Installation Manual for the NGT-9000 (provided by L-3 Avionics Systems), Rev. D or later revision
Retention:		This document, or the information contained herein, will be included with the aircraft's permanent records.

2.2 Description of Alteration

The NGT-9000 is a panel or remote mount device capable of transmitting 1090ES ADS-B OUT and receiving both 1090ES and 978 MHz UAT ADS-B IN. In addition to ADS-B surveillance, some models of the NGT-9000 include an Active Traffic Awareness System (TAS) (optional) as well as support for antenna diversity (optional). When the NGT-9000R (Remote Mount) version is used, the installation must include a CP-2500 Control Panel as well.

The NGT-9000 replies to Mode A, Mode C and Mode S interrogations receiving interrogations at 1030 MHz (ground-to-air data uplink, Comm-A) and transmitting responses at 1090 MHz (air initiated and directed air-to-ground data downlink, Comm-B). The unit is equipped with IDENT capability that activates the Special Position Identification (SPI) pulse for 18 seconds.

Ground stations can interrogate Mode S Transponders individually using a 24-bit ICAO Mode S address, which is unique to the particular aircraft. In addition, ground stations may interrogate a NGT-9000 for its transponder data capability and the aircraft's Flight ID.

The ADS-B function improves situational awareness and flight safety by providing aircraft position, velocity, and heading information that is automatically transmitted to other aircraft and ground stations, providing immediate surveillance of air-to-air traffic. The 1090ES and UAT ADS-B datalink have the following capabilities:

- 1090ES IN - Receive ADS-B, ADS-R and TIS-B
- 1090ES OUT - Transmit ADS-B
- 978 IN – FIS-B, TIS-B, UAT, NOTAMS, and TFR's

The NGT-9000 also provides derived altitude data and TAS traffic advisories. A voice audio output announces altitude and traffic alerts. The unit provides the transponder code, reply symbol and mode of operation to the display of the NGT-9000.

The NGT-9000 has multiple transmit/receive ARINC 429, RS-422 and RS-232 data ports used to transmit data to traffic, weather, and PED displays. The System Block Diagram in Figure 2-1 shows the various interfaces for the NGT-9000.

Models are available that provide Active Traffic Awareness System (TAS) function and antenna Diversity. Both models require additional equipment to be installed.

Software and hardware configuration data is stored in a solid-state Detachable Configuration Module (DCM), which is permanently attached to the aircraft via a wiring harness that communicates with the NGT-9000. Configuration options are set up during installation.

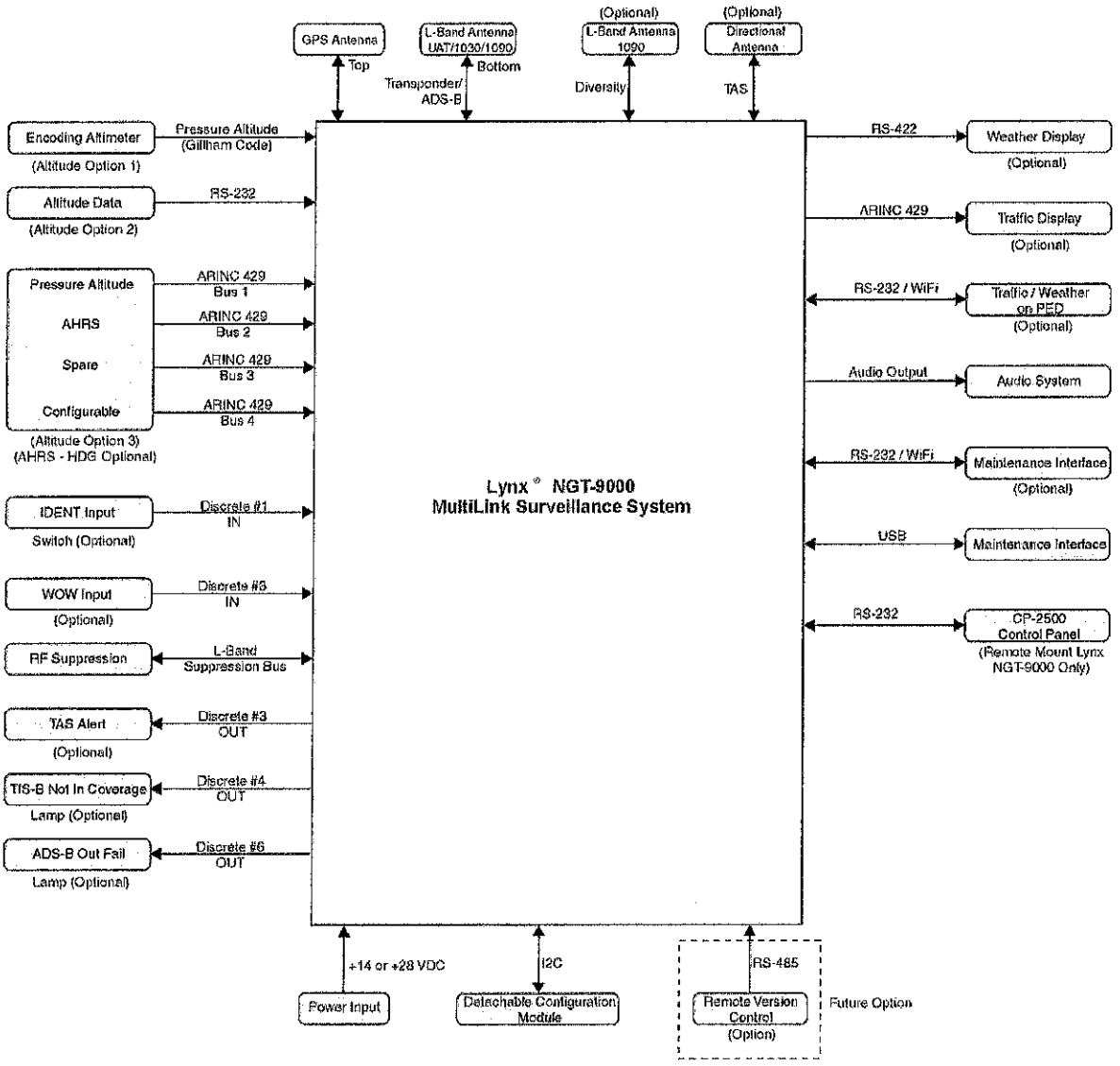

Figure 2-1: NGT-9000 System Block Diagram

2.3 Control, Operating and Testing Information

See Reference Publications in paragraph 2.1 for document part numbers.

- See the L-3 Aviation Products "Pilot's Guide for Models NGT-9000" for operation of the system. A copy of the Pilot's Guide should be carried in the aircraft at all times.
- See the ADS-B Technologies "Installation Manual (Approved Model List Supplemental Type Certificate) NGT-9000 Document Number L3-76AK-IM1 for operational checks and system test procedures

2.4 Servicing Information

The NGT-9000 and CP-2500 requires no servicing.

2.5 Periodic Maintenance

The unit is subject to the following requirements:

- Title 14 CFR Part 91.411 (Altimeter)
- Title 14 CFR Part 91.413 (Transponder)
- Title 14 CFR Part 43 Appendix E & F

All maintenance associated with the NGT-9000 is on a "Condition Monitored" basis. Condition monitoring is based upon the following:

- Visual observation by the user.
- All units have unlimited service life, therefore service life is defined as that point in time when repair is no longer economical

The NGT-9000 is designed to detect internal failures and announce them. A comprehensive 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 NGT-9000 is not permitted unless the inspections described in this section have been completed within time intervals prescribed in Table 2-1.

Table 2-1: Periodic Maintenance

Item	Procedure	Interval
Equipment Inspection (Metallic Aircraft)	Conduct a complete inspection of the system and associated wiring harness and connectors to ensure continued installation integrity: 1. Visually inspect for signs of corrosion. 2. Visually inspect for condition of wiring, shield terminations for proper grounding, routing, and attachment. 3. It is recommended that an electrical bond check be performed between the unit and nearby exposed portion of the aircraft metallic structure and verify that the measured value is less than or equal to 2.5 milliohms with the wiring connectors disconnected. 4. In the event of bonding check failure, remove the unit and clean it and its mounting holes at both the unit and the aircraft structure and reattach the unit. Re-verify the resistance between the unit and nearby exposed portion of aircraft metallic structure, and ensure it Is less than or equal to 2.5 milliohms 5. Visually inspect the unit mounting to the aircraft, verify visually that the screw heads are in full contact with the mounting holes etc. Re-torque the screws if required.	NGT-9000 and CP-2500 (if installed): At regular aircraft inspection intervals or 12 months – which ever comes earliest

Table 2-1: Periodic Maintenance

Equipment Inspection (Non-Metallic Aircraft)	Conduct a complete inspection of the system and associated wiring harness and connectors to ensure continued installation integrity: 1. Visually inspect for signs of corrosion. 2. Visually inspect for condition of wiring, shield terminations for proper grounding, routing, and attachment. 3. It is recommended that an electrical bond check be performed between the unit and nearby exposed portion of the aircraft metallic structure and verify that the measured value is less than or equal to 2.5 milliohms. 4. In the event of bonding check failure, remove the unit and clean it and its mounting holes at both the unit and the aircraft structure and reattach the unit. Re-verify the resistance between the unit and nearby exposed portion of aircraft metallic structure, and ensure it is less than or equal to 2.5 milliohms 5. Visually inspect the unit mounting to the aircraft, verify visually that the screw heads are in full contact with the mounting holes etc. Re-torque the screws if required. 6. For composite aircraft, inspect any aluminum foil tape used to ground the unit and verify that it is not torn or corroded. Replace the tape if necessary. 7. Inspect all bonding straps for corrosion, loose connections or signs of lightning damage. Replace as necessary. **NOTE** All bonding straps must be replaced after a known or suspected lightning strike.	NGT-9000 and CP-2500 (if installed): At regular aircraft inspection intervals or 12 months – which ever comes earliest
Equipment Removal and Replacement	If the NGT-9000 or CP-2500 (if installed) is removed and reinstalled, ensure that the Return To Service procedures in the Installation Manual are completed. Ensure that the DCM configuration is updated from an archive copy, or re-configured, if required. Refer to Appendix A of this document for the NGT-9000 Configuration and Checkout Log. NOTE: A new Log should be completed and dated upon re-installation.	On Condition

2.6 Troubleshooting Information

Use the troubleshooting help provided in Table 2-2 for the NGT-9000, Table 2-3 for the Remote Mount NGT-9000R and Table 2-4 for the CP-2500 Control Panel for initial installations and debugging issues that may appear during operation.

Table 2-2: Troubleshooting The Panel Mount Lynx NGT-9000

Symptom	Screen	Cause/Corrective Actions
• Blank display. • ADS-B Fail lamp is OFF	All	Loss of power or damaged unit. 1. Check power connections, breakers, and main avionics switch. 2. Verify Battery (BAT) Master switch is on. 3. Check the Lynx MAT fault log. 4. Contact L-3 Field Service before removal of unit.
The unit has manual brightness adjustment only.	All	Loss of light sensor data. 1. Try clearing the failure by restarting the unit by tapping the Restart button. 2. Check System Status Messages. 3. Check the Lynx MAT fault log. 4. Contact L-3 Field Service before removal of unit.
When touching the screen the command function seems to be slightly off from the center of the screen symbol or area.	All	The screen calibration is out of tolerance. 1. Perform the Screen Calibration has described in the Installation Manual (L3-76AK-IM1). 2. Contact L-3 Field Service before removal of unit.
Internal fan is always active. MSG button on screen.	N/A	Loss of temperature sensor data. The message seen is "Unit Over Temp Service Soon". 1. Try clearing the failure by restarting the unit by tapping the Restart button. 2. If in maintenance mode the fan remains active. This is normal. 3. Check System Status Messages. 4. Check the Lynx MAT fault log. 5. Contact L-3 Field Service before removal of unit.
Message page contains messages that do not indicate a functional failure on the system status page.	N/A	The following internal tests do not create a fail message in the system status page. • Configuration Module Test • Configuration Module Configuration Validity • Mutual Suppression Bus Self-Test • Over-Temperature Monitor (in air) • Power Fail Monitor Although no immediate loss of function is occurring, an undesired condition is taking place. At the earliest convenience, perform the following action: 1. Try clearing the failure by restarting the unit by tapping the Restart button (or cycling power). 2. Contact L-3 Field Service before removal of unit.

Table 2-2: Troubleshooting The Panel Mount Lynx NGT-9000

Symptom	Screen	Cause/Corrective Actions
Unit does not operate in normal mode and starts in Bootloader or maintenance mode. MSG button on screen.	N/A	The following internal hardware test failures cause the unit to automatically reset. This happens without cycling power to the unit. If the hardware failure being detected does not clear, a system fail message is sent. • ARINC 429 Receiver Loop Back Self-Test • Panel Mount Refresh Display Test • Panel Mount Frozen Display Test • SDRAM Self-Test • Persistent Memory Self-Test • FPGA CBIT Test/Monitor • System Clock Test/Monitor • RAM Continuous Monitor • NVM Copy Test • Flash Copy OPS Test • Flash Copy Airport DB Test • Flash Copy Map DB Test • SW Exception Interrupt Monitor 1. Cycle power to the unit. 2. Contact L-3 Field Service before removal of unit.
Display indicator CALIBRATING ANTENNA	Traffic	This indication is shown on the traffic map and all other screen information is not shown. • A Calibration Complete indicator is shown after calibration is finished. • A CALIBRATION FAILED indicator is shown after calibration is complete, but it did not work. Perform calibration again. Check antenna installation. • Contact L-3 Field Service before removal of unit.
Display indicator GROUND TEST	Traffic	This indication is shown where the Flight ID location on the traffic screen. It is shown when the unit is connected to the MPC and the Lynx MAT is active with the ground test function started.
Display indicator TRK (Track)	Traffic	Indicates that the traffic display orientation is true track. 1. This is a normal condition used for pilot information.
• Display indicator ADS ONLY (Models with TAS only) showing on traffic screen. • MSG button on screen.	Traffic	A traffic mode indicator that is shown when TAS is failed (or not available) and ADS-B is operating. 1. Possible problem with directional antenna or internal hardware. 2. Cycle power to the unit. 3. Check System Status Messages. 4. Check the Lynx MAT fault log. 5. Contact L-3 Field Service before removal of unit.

Table 2-2: Troubleshooting The Panel Mount Lynx NGT-9000

Symptom	Screen	Cause/Corrective Actions
• Display indicator TAS ONLY (Models with TAS only) showing on traffic screen. • MSG button on screen.	Traffic	A traffic mode indicator that is shown when TAS is in operation but ADS-B traffic information is not available 1. The TAS is operational on the ground but there is no heading input and ground speed is < 7kts. 2. The GPS is failed (GPS has not acquired). 3. Possible problem with L-Band antenna or internal hardware. 4. Cycle power to the unit. 5. Check System Status Messages. 6. Check the Lynx MAT fault log. 7. Contact L-3 Field Service before removal of unit.
Display indicator TAS STBY (Models with TAS only) showing on traffic screen.	Traffic	A traffic mode indicator that is shown when the Traffic Awareness (TAS) system is in standby. 1. This is a normal condition when the aircraft is on ground. 2. If the indication is seen during flight. Contact L-3 Field Service before removal of unit.
• Display indicator TRAFFIC FAILED (Amber text) showing on traffic screen. • MSG button on screen.	Traffic	Displayed if both ADS-B and TAS (optional) have failed. Cycle power to the unit. 1. Check the secondary equipment (antenna) for problems. 2. Check System Status Messages. 3. Check the Lynx MAT fault log. 4. Contact L-3 Field Service before removal of unit.
Display indicator TRAFFIC UNAVAILABLE (Amber text) showing on traffic screen. • Indicates both TAS and ADS-B traffic sources are not available for a variety of reasons: However, both are not failed. If all available traffic sources are unavailable due to failure, 'Traffic Failed' will be indicated. This will be the normal indication for units on the ground with no heading input. (TAS in standby).	Traffic	ADS-B is operational but heading and track are invalid or GPS is failed. TAS is in Standby. Transponder Mode Control is "ON" which inhibits the display of relative altitude so traffic is unavailable. 1. View the GPS page under the information button and verify GPS is operational. If not, check the GPS antenna location and ensure that the aircraft is not inside the hangar or repeater is on if inside the hangar, GPS antenna is exposed to clear sky. 2. Cycle power to the unit. 3. Check the GPS antenna for problems. 4. Check System Status Messages. 5. Check the Lynx MAT fault log. 6. Contact L-3 Field Service before removal of unit.

Table 2-2: Troubleshooting The Panel Mount Lynx NGT-9000

Symptom	Screen	Cause/Corrective Actions
• Other aircraft are not shown on the traffic screen. • Ownship data is displayed. • Alternate display shows normal operation. • ADS-B Out Fail lamp is OFF. • No Coverage Indicator is showing on the display.	Traffic	The aircraft is not in an ADS-B (UAT / 1090ES) coverage area, or the targets are not transmitting ADS-B data, or the ground station is not transmitting TIS-B data. 1. The symptoms are normal if the target or ground station is not transmitting TIS-B data. 2. The target or ground station needs to be within line-of-site range. 3. Contact L-3 Field Service before removal of unit.
• Other aircraft are not shown on the traffic screen. • Ownship data may or may not be displayed on the weather screen. • MSG button on screen.	Traffic	Possible hardware problem with the unit. 1. Cycle power to the unit. 2. Check System Status Messages. 3. Check the Lynx MAT fault log. 4. Contact L-3 Field Service before removal of unit.
• Ownship is shown, but no traffic is being displayed. • ADS-B Out Fail lamp is OFF.	Traffic	Possible problem with the UAT/1090 antenna or RF cables. 1. Cycle power to the unit. 2. Check cable connections. 3. Check System Status Messages. 4. Check the Lynx MAT fault log. 5. Contact L-3 Field Service before removal of unit.
The traffic symbols on the traffic display are non-directional (diamond shape).	Traffic	Non-directional traffic symbols on the traffic display is due to one of the following reasons: 1. The traffic information that is being received by the unit does not have directional data. The unit continues to transmit non-directional data to the traffic display. 2. Note - TAS traffic is not displayed as directional. A TAS / ADS-B correlated target will use the ADS-B/TIS-B directional information. 3. An alternate (secondary) traffic display does not support the STIF data format necessary to show directional data provided by ADS-B.

Table 2-2: Troubleshooting The Panel Mount Lynx NGT-9000

Symptom	Screen	Cause/Corrective Actions
Traffic display is working correctly, but some aircraft are not showing up on the display.	Traffic	Lack of data as described below: 1. The ADS-B In requires other aircraft to be equipped with ADS-B Out. 2. The TIS-B and ADS-R services are supported when in range of ground stations and are providing the service. 3. If receiving the TIS-B service, but the Mode C and Mode S transponder equipped aircraft that do not provide altitude information are not seen on the traffic display. 4. If receiving the TIS-B service, but aircraft not equipped with a transponder, or equipped with a Mode A transponder are not part of the TISB data and will not be seen on the traffic display. Refer to the NGT-9000 Pilot guide for more information regarding what traffic can be displayed.
Traffic display is working correctly, but TAS aircraft are not showing up on the display.	Traffic	Lack of data as described below: 1. The installed Lynx NGT-9000 does not have the TAS functionality. 2. The TAS Configuration option is not active. 3. The TAS requires other aircraft to be equipped with equipped with an active ATCRABS transponder.
No TIS-B Coverage Indicator  It is located on the traffic screen next to the Zoom Out button. **NOTE**: The indicator is suppressed when TAS is operational (i.e. installed, not failed, not in standby).	Traffic	The No Coverage Indicator is shown on the traffic display for the following reasons: 1. No TIS-B / ADS-R data available in the area 2. Aircraft is not within range of an ADS-B ground station. Move aircraft in location where information can be received. 3. UAT-In test fails (indicator seen after 60 seconds of test failure) 4. 1090 Receiver fails • Try clearing the failure by cycling power to the unit. • Check the L-Band antenna or cables for possible errors. • If the problem continues, replacement of the L-Band antenna or the unit may be required. Contact L-3 Field Service before removal.
Display indicator ON-GND showing on transponder screen.	Transponder	Transponder is operating in the on-ground mode. 1. This is a normal condition when the aircraft is on ground. 2. If the indication is seen during flight. Contact L-3 Field Service.

Table 2-2: Troubleshooting The Panel Mount Lynx NGT-9000

Symptom	Screen	Cause/Corrective Actions
• Display indicator XPDR FAIL (Amber text) showing on transponder screen. • MSG button on screen.	Transponder	Transponder data is invalid. This indication is shown on the transponder screen and alternate traffic screen. 1. Possible problem with internal hardware. 2. Cycle power to the unit. 3. Check System Status Messages. 4. Check the Lynx MAT fault log. 5. Contact L-3 Field Service before removal of unit.
Pressure Altitude digits replaced with amber dashes.	Transponder	Invalid Pressure Altitude. Note: Some altitude encoders may not provide pressure altitude until after 1-3 minutes of operation. 1. Cycle power to the unit. 2. Check System Status Messages. 3. Check the Lynx MAT fault log. 4. Check the wiring between the unit and the secondary equipment supplying the pressure altitude. 5. Check the secondary equipment for problems. 6. Contact L-3 Field Service before removal of unit.
• No data on the weather display. • ADS-B Out Fail lamp is OFF.	Weather	The FIS-B data is not being transmitted to the weather display. Note: NEXRAD data is only transmitted every 5 minutes. CONUS data is only transmitted every 15 minutes. 1. No ground station is in range. 2. The ground station may not provide FIS-B service.
No FIS-B Coverage Indicator  It is located on the Weather screens at the bottom center.	Weather	The No Coverage Indicator is shown on the weather display for the following reasons: 1. No FIS-B data available in the area • Aircraft is not within range of an ADS-B ground station. Move aircraft in location where information can be received. 2. UAT-In test fails (indicator seen after 15 minutes of test failure) • Try clearing the failure performing a warm startup by tapping the Restart button or cycling power to the unit. • Check the L-Band antenna or cables for possible errors. • If the problem continues, replacement of the L-Band antenna or the unit may be required. • Contact L-3 Field Service before removal.

Table 2-2: Troubleshooting The Panel Mount Lynx NGT-9000

Symptom	Screen	Cause/Corrective Actions
• Display indicator INITIALIZING (white text) showing on FIS-B application screen. • ADS-B Out Fail lamp is Off for 2 minutes and then flashes (1 second On/Off) indefinitely until a GPS position is acquired. • Compatible displays may indicate "STANDBY" or "DATA-FAIL" and Wi-Fi information is not available	Weather	The indication is shown on the weather map indicating that GPS is Acquiring (On Ground – no previous position fix). 1. This is a normal condition. It continues to be shown until internal operations have completed. The GPS requires approximately 60 to 90 seconds to provide a position after power is applied to the unit. 2. The GPS signal may be weak. Move the aircraft into an area where the unit can acquire the GPS signal. 3. Make sure nothing is covering or blocking the GPS antenna. 4. Cycle power to the unit. 5. Check System Status Messages. 6. Check the Lynx MAT fault log. 7. Check that GPS Antenna Short pin doesn't get grounded. 8. Observe the GPS Receiver Information MPC (Service – GPS) for correct signal strength (C/No) of the GPS satellites. This has a range from 30 dB to 50 dB. If this is not the case, then check if the antenna cable loss is more than 10 dB. 9. Check if 12V power is available at GPS antenna port, when the unit is powered on. 10. Contact L-3 Field Service before removal of unit.
• ADS-B Out Fail lamp flashes (1 second On/Off) for 2 minutes, and then remains ON indefinitely until a GPS position is acquired. • Compatible displays may indicate "STANDBY" or "DATA-FAIL" and WI-FI information is not available.	Weather	GPS is Acquiring (In Air – no previous position fix). 1. The GPS may need up to 4 minutes to provide a position after power is applied to the unit. 2. The GPS signal may be weak. Move the aircraft into an area where the unit can acquire the GPS signal. 3. Cycle power to the unit. 4. Contact L-3 Field Service before removal of unit.

Table 2-2: Troubleshooting The Panel Mount Lynx NGT-9000

Symptom	Screen	Cause/Corrective Actions
• Display indicator MAP FAIL (red text) showing on FIS-B application screen. • ADS-B Out Fail lamp is Flashing (1 second On/Off) for 2 minutes and then remains ON. • Compatible displays may indicate "STANDBY" or "DATA-FAIL" and Wi-Fi information is not available..	Weather	GPS-Acquiring previous (position fix – On Ground or In Air) This means only GPS data is not available however, the GPS position was available once during this power ON or it is shown when a fault is detected that prevents the FIS-B data from showing on the screen. 1. The GPS signal may be weak. Move the aircraft into an area where the unit can reacquire the GPS signal. 2. Cycle power to the unit. 3. Possible problem with L-Band antenna or internal hardware. 4. Check System Status Messages. 5. Check the Lynx MAT fault log. 6. Observe the GPS Receiver Information using the Lynx MAT (Service – GPS) for correct signal strength. Verify that the signal bars are showing at least 40 -50% in the GPS Receiver Information Packet. If this is not the case, then check if the antenna cable loss is more than 10 dB. 7. Check if 12V power is available at GPS antenna port, when the unit is powered ON. 8. Contact L-3 Field Service before removal of unit.

Table 2-3: Troubleshooting The Remote Mount Lynx NGT-9000R

Symptoms	Cause / Corrective Actions
• No sign of power • CP-2500 displays "XPDR FAIL" • Cannot communicate to the unit with the MAT tool. • ADS-B Out Fail lamp is ON. • Traffic (STIF) displays indicate "DATA-FAIL" and no WI-FI information is available.	The Lynx NGT-9000R is not operating: 1. Verify that the mating connector is secure. 2. Verify the breaker is closed. Check and reset the circuit breaker. 3. Verify power and ground supplied to the unit. 4. If lamps do not illuminate, but you can connect to the unit with the MAT, then verify that the lamps have power from the aircraft dimming circuit. 5. Replacement of the unit may be required. 6. Contact L-3 Field Service before removal of the unit.
• The CP-2500 menu Initiated Self Test Fail	A fail condition is detected on the Lynx NGT-9000R. 1. Cycle power to the NGT-9000R and the CP-2500. 2. Replacement of the unit may be required. Contact L-3 Field Service before removal of the unit.
• CP-2500 displays "ADS-B SYSTEM FAIL". • ADS-B Out Fail lamp flashes for 2 minutes and then remains ON or ADS-B Out Fail lamp illuminates without flashing • Traffic (STIF) displays indicate "DATA-FAIL" and WI-FI information is not available.	The unit is operating, but has failed: If installation was previously operational: 1. Connect to MAT and view fault logs and status screens to troubleshoot cause of the failure. 2. Replacement of the Unit may be required. 3. Contact L-3 Field Service before removal of the unit. In new installation (Assuming wiring has been verified): 1. Verify DCM was configured properly, applied, and the power to the Unit was cycled to apply those settings. 2. Connect to MAT and view fault logs and status screens to troubleshoot cause of the failure. 3. Replacement of the Unit may be required. 4. Contact L-3 Field Service before removal of the unit.
• CP-2500 displays "NO ADS-B COVERAGE". • Displays – Normal operation. **NOTE** The lamp does not illuminate and the CP-2500 message is not shown if TAS is active, if so equipped.	A ground station is not being detected by the Lynx NGT-9000R. 1. Aircraft may not be within range of a local ground station. 2. Replacement of the Unit may be required. 3. Contact L-3 Field Service before removal of the unit. **NOTE** When crossing boundaries between ground station coverage areas, out of coverage indications are normal.

Table 2-3: Troubleshooting The Remote Mount Lynx NGT-9000R

Symptoms	Cause / Corrective Actions
• CP-2500 displays no message for first 2 minutes, than displays "GPS-INIT" indefinitely until a GPS position is acquired. • ADS-B Out Fail lamp is Off for 2 minutes and then flashes (1 second On/Off) indefinitely until a GPS position is acquired. • Compatible displays may indicate "STANDBY" or "DATA-FAIL" and WI-FI information is not available.	GPS is Acquiring (On Ground – no previous position fix). 1. The GPS may need up to 4 minutes to provide a position after power is applied to the unit. 2. The GPS signal may be weak. Move the aircraft into an area where the unit can acquire the GPS signal. 3. Make sure nothing is covering or blocking the GPS antenna. 4. Cycle power to the unit. 5. Check System Status Messages. 6. Check the Lynx MAT fault log. 7. Check that GPS Antenna Short pin doesn't get grounded. 8. Observe the GPS Receiver Information MPC (Service – GPS) for correct signal strength (C/No) of the GPS satellites. This has a range from 30 dB to 50 dB. If this is not the case, then check if the antenna cable loss is more than 10 dB. 9. Check if 12V power is available at GPS antenna port, when the unit is powered on. 10. Contact L-3 Field Service before removal of unit.
• CP-2500 displays "GPS-INIT" for first 2 minutes and then changes to "ADS-B System Fail" and "GPS Fail" indefinitely until a GPS position is acquired. • ADS-B Out Fail lamp flashes (1 second On/Off) for 2 minutes, and then remains ON indefinitely until a GPS position is acquired.	GPS is Acquiring (In Air – no previous position fix). 1. The GPS may need up to 4 minutes to provide a position after power is applied to the unit. 2. The GPS signal may be weak. Move the aircraft into an area where the unit can acquire the GPS signal. 3. Cycle power to the unit. 4. Contact L-3 Field Service before removal of unit.

Table 2-3: Troubleshooting The Remote Mount Lynx NGT-9000R

Symptoms	Cause / Corrective Actions
• CP-2500 displays "GPS-INIT" for 2 minutes, and then displays "ADS-B System Fail" and "GPS Fail". • ADS-B Out Fail lamp is Flashing (1 second On/Off) for 2 minutes and then remains ON. • Compatible displays may indicate "STANDBY" or "DATA-FAIL" and Wi-Fi information is not available.	GPS-Acquiring (previous position fix - On Ground or In Air) This means only GPS data is not available however, the GPS position was available once during this power ON or it is shown when a fault is detected that prevents the FIS-B data from showing on the screen. 1. The GPS signal may be weak. Move the aircraft into an area where the unit can reacquire the GPS signal. 2. If inside a hangar, verify GPS repeater is operational and is within line of site of the aircraft GPS antenna. 3. Verify correct wiring of the GPS antenna. Verify that the GPS and L-band antenna cables are not swapped. 4. Observe the GPS Receiver Information using the Lynx MAT (Service – GPS) for correct signal strength. Verify that the signal bars are showing at least 40 -50% in the GPS Receiver Information Packet. If this is not the case, then check if the antenna cable loss is more than 10 dB. 5. Remove the GPS antenna connector from the Unit, and verify that approx +12 VDC is available at the center pin of the GPS connector of the Unit. 6. Remove power from other broadcasting equipment and wait 2 minutes for the GPS to acquire a signal. 7. Replacement of the Unit may be required. Contact L-3 Field Service before removal of the unit.
• CP-2500 - Normal operation. • Lamps - Normal operation. • Traffic (STIF) displays continues to show "DATA-FAIL" even though no ADS-B Out Fail lamp or message is indicated.	Display is not receiving 429 STIF data. Normal operation is that "DATA-FAIL" is displayed until GPS is acquired, and then the STIF display should indicate Standby mode. 1. Verify DCM and display are configured for STIF traffic only (not set to both, i.e. not set to DTIF or Both) and the correct speed. The Unit emulates L-3 Avionics System SKY497 format. This is a high speed 429 bus. Consult display manufacturer's installation manual for proper set-up procedures. 2. Replacement of the Unit may be required. Contact L-3 Field Service before removal of the unit.
• CP-2500 - Normal operation. • Lamps - Normal operation. • Traffic symbols on the Traffic display are open diamonds and not directional traffic (arrowheads or triangles).	This is normal for all STIF displays. Directional symbology can only be displayed on a DTIF display. 1. The traffic display does not support the DTIF format necessary to show directional data provided by ADS-B. 2. The directional information that is being received by the Unit does not have directional data. The Unit continues to transmit non-directional data to the traffic display.
The four digit squawk code is missing from the "ALT" and "ON" screen of the CP-2500. NOTE: Code appears OK in "STB" mode.	This is an indication that the Lynx NGT-9000R has failed and may also be seen if the aircraft is in the hanger with no GPS signal for > 2 minutes. 1. Move the aircraft into an area with access to a GPS signal. 2. Cycle power to the Lynx MSS. 3. Replacement of the Lynx MSS or system component may be required. Contact L-3 Field Service before removal of the unit.

Table 2-3: Troubleshooting The Remote Mount Lynx NGT-9000R

Symptoms	Cause / Corrective Actions
• CP-2500 displays "XPDR FAIL". • The CP-2500 altitude page displays "INVLD PA". • Baro Altitude (Pressure altitude) is not being transmitted as indicated by the IFR-6000 in Monitor mode. • Geometric altitude is being transmitted from the Unit, and all other information is available. • Lamps - Normal operation. • Display/PED – Altitude information is shown as dashes.	Either the Unit is not receiving BARO-ALT (Pressure altitude), or the control panel is set to ON mode. 1. Verify that the CP-2500 is set to ALT Mode. 2. Verify that the Unit is receiving BARO-ALT (Pressure altitude). On the CP-2500 go to the Altitude page. The page should display the altitude for example as: 800PA (for 800 ft pressure altitude). In the case of missing altitude, it displays "INVLD PA". Pressure altitude is a required output for FAA compliance. In the event of the loss of Pressure altitude, the UAT device continues to operate by reverting to GPS altitude as a back-up. The GPS altitude can be viewed with the MAT device. **NOTE** Some altitude encoders can take 1-3 minutes to output data after initial power on.
• CP-2500 - Normal operation. • Lamps - Normal operation. • No traffic or weather information is being displayed on the PED over WI-FI.	1. Verify WI-FI module is receiving data from the Unit. For example, on the RN-370M models, this is indicated from visually seeing the blue flashing light on the unit. If indicator light is not flashing, verify WI-FI is configured properly in the DCM settings. Also verify the device has power (batteries) and that the connections between the WI-FI module and the Unit are correct. 2. If WI-FI module is indicating it is receiving data, verify that the PED WI-FI connection is configured to receive the correct device name. (I.E. "WI-FLY-100"). 3. Verify PED App is compatible with the Unit. 4. Verify the configuration setting for the PED App being used. 5. Replacement of the Unit may be required. Contact L-3 Field Service before removal of the unit.
• CP-2500 - Normal operation. • Lamps - Normal operation. • FIS-B weather (such as METARS, NEXRAD, CONUS Data) is not being seen on the weather displays.	Ground testing with the IFR-6000 can only simulate textural data such as METARS. 1. When used in flight, the aircraft must be within range of a ground station NEXRAD information is only transmitted every 5 minutes, and CONUS information is only available from certain ground stations, and is only transmitted every 15 minutes.
• Cannot connect to the Unit with the MPC/MAT tool. • Lamps - Normal operation. • CP-2500 - Normal operation. • Displays - Normal operation.	1. Verify that the Lynx NGT-9000R is on ground. It is only possible to connect to the maintenance mode for the first 2 minutes after power on if the unit is "in-air". 2. The USB connection to the unit requires special drivers that must be installed on the MPC being used (see the general information section for details). If that has been successfully accomplished, replacement of the Unit may be required. Contact L-3 Field Service before removal of the unit. 3. Verify that the MAT being used is compatible with the software in the Unit being serviced. Contact L-3 Field service for more information.

Table 2-3: Troubleshooting The Remote Mount Lynx NGT-9000R

Symptoms	Cause / Corrective Actions
CP-2500 displays "XPDR FAIL". If installed, ADS-B Fail lamp is OFF.	The transponder function of the Lynx NGT-9000R has failed or is not communicating with the CP-2500. 1. At next power cycle if symptoms persist, contact L-3 Field Service before removal of the unit or other equipment.

Table 2-4: Troubleshooting The CP-2500 Control Panel

SYMPTOM	CAUSE / CORRECTIVE ACTION
Blank display	1. Press the small knob button to apply unit power. 2. Check power connections, breakers, and main avionics switch. 3. Cycle power to observe if symptom continues. 4. Replacement of the CP-2500 may be required. Contact L-3 Field Service before removal of the unit.
Power ON Self Test Fails	An internal problem with the CP-2500 is detected. 1. Cycle power to the CP-2500. 2. Replacement of the CP-2500 may be required. Contact L-3 Field Service before removal of the unit.
Menu Initiated Self Test Fail (NGT-9000R, RD, or R+ only)	A function of the Lynx MSS or a system component has failed. 1. Cycle power to the Lynx MSS. 2. If "TAS FAIL" message is shown check the directional antenna cables and connections for problems. 3. If "XPDR FAIL" message is shown replacement of the Lynx MSS may be required. Contact L-3 Field Service before removal of the unit. 4. If "ADIN FAIL" or "ADOU FAIL" message is shown check the L-band antenna cables and connections for problems. Refer to the Lynx MSS Installation Manual for more information. 5. If "FISB FAIL" message is shown then the aircraft is not within range of an ADS-B ground station. 6. If "GPS FAIL" message is shown the GPS derived position input is not functioning. Check the GPS antenna cables and connections. Replacement of the Lynx MSS or GPS antenna may be required. Refer to the Lynx MSS Installation Manual for more information.
The four digit squawk code is missing from the "ALT" and "ON" screen of the CP-2500. Note: Code appears OK in "STB" mode.	This is an indication that the Lynx MSS has failed and may also be seen if the aircraft is in the hanger with no GPS signal for > 2 minutes. 1. Move the aircraft into an area with access to a GPS signal. 2. Cycle power to the Lynx MSS. 3. Replacement of the Lynx MSS or system component may be required. Refer to the Lynx MSS Installation Manual for more information. Contact L-3 Field Service before removal of the unit.

Table 2-4: Troubleshooting The CP-2500 Control Panel

SYMPTOM	CAUSE / CORRECTIVE ACTION
Display Message: ADS-B SYSTEM FAIL	The Lynx MSS has failed. 1. Verify that the CP-2500 is not set to SBY. 2. Cycle power to the Lynx MSS. 3. Check the GPS antenna cables and connections for problems. 4. Replacement of the Lynx MSS or GPS antenna may be required. Refer to the Lynx MSS Installation Manual for more information. Contact L-3 Field Service before removal of the unit.
Display Message: NO ADS-B COVERAGE	The aircraft is not within range of an ADS-B ground station. 1. This message is removed when the aircraft is within coverage area range of an ADS-B ground station.
Display Message: GPS INIT	The GPS contained within the Lynx MSS is not ready. This is a normal while the GPS is acquiring. This message is typically removed after 60-90 seconds. 1. Move the aircraft to an area that does not block the GPS signal. 2. Wait for signal to connect. 3. Try clearing the failure by cycling power to the Lynx MSS. 4. Verify that the GPS and UAT antenna cables are not swapped 5. If the problem continues, replacement of the GPS antenna or Lynx MSS may be required. Refer to the Lynx MSS Installation Manual for more information. Contact L-3 Field Service before removal.
Display Message: GPS FAIL	The GPS derived position input is not functioning. 1. Cycle power to the Lynx MSS. 2. Check the GPS antenna cables and connections for problems. Refer to the Lynx MSS Installation Manual for more information. 3. If the problem continues check the GPS cables and connections for problems. 4. Replacement of the GPS antenna may be required. Contact L-3 Field Service before removal.
Display Message: XPDR	The transponder function of the NGT-9000R, RD, or R+ has failed. 1. Cycle power to the Lynx MSS. 2. Replacement of the unit may be required. Refer to the Lynx MSS Installation Manual for more information. Contact L-3 Field Service before removal.
INVLD PA shown when viewing pressure altitude.	No pressure altitude source is available from the aircraft. In some installations, it may take 2-3 minutes after power on to receive valid pressure altitude from the encoder. 1. Verify transponder/encoder is powered on. 2. If problem continues contact service center or L-3 Field Service for corrective action.

2.7 Removal and Replacement Information

Use the original packing when shipping the NGT-9000 to the Factory.

If the NGT-9000 is removed and reinstalled, verify that the power-up self-tests are completed with no failure messages noted.

If the NGT-9000 unit is removed for repair and then reinstalled, or if the NGT-9000 unit is removed and then replaced with a different NGT-9000 unit, then follow the *'Installation Checkout'* procedures contained in Section 3.10 of the *NGT-9000 Installation Manual*, ADS-B Technologies Document No. L-3-76AK-IM1 and verify that the installation, calibration, and configuration setup of the NGT-9000 and secondary equipment has been performed correctly and that no failure messages are announced.

Ensure that the DCM configuration is updated from an archive copy, or re-configured if required.

Refer to Appendix A of this document for the NGT-9000 Configuration and Checkout Log. NOTE: A new Log should be completed and dated upon re-installation.

2.8 Diagrams

The Installer should carefully document the type, serial number and location of all components in the installation. Additionally, a formal schematic should be prepared noting the system architecture and connections between all components. This schematic, together with the Configuration and Checkout Log, should become a part of the aircraft permanent records.

2.9 Special Inspection Requirements

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

- Verify the proper operation of all NGT-9000 functions
- Follow the Suspected Lightning Strike procedures in Table 2-1 of this document

2.10 Application of Protective Treatments

The NGT-9000 requires no protective treatments.

2.11 Data Relative To Structural Fasteners

There are no structural fasteners required for the installation of the NGT-9000 panel mount.

2.12 Special Tools & Test Equipment

There are no Special Tools required for the maintenance of the NGT-9000. An IFR-6000 Ramp test Set with ADS-B options #5 (1090ES) and #3 (UAT) is recommended for post-installation functional testing. A standard milliohm meter should be used to check electrical bonding.

2.13 Additional Instructions

There are no Additional Instructions.

2.14 Overhaul Period

The NGT-9000 does not require overhaul at a specific time period. All components are "On Condition" and monitored by self-test and BIT functions.

2.15 ICA Revision and Distribution

To revise this ICA, ADS-B Technologies and L-3 Avionics will follow authorized company procedures. The latest revision of this ICA is available from L-3 Avionics Systems at the contact information in paragraph 2.16. An L-3 Avionics Systems service bulletin will be sent to all LYNX NGT-9000 dealers if a revision is determined to be significant.

2.16 Assistance

For questions regarding this equipment or its use, contact:

L-3 Avionics Systems
Attn: Field Service Engineering
5353 52nd Street, S.E.
Grand Rapids, MI USA 49512-9704
Telephone: (800) 453-0288 or (616) 949-6600 (Mon-Fri 9AM-5PM CST)
Fax: (616) 977-6898

Or

ADS-B Technologies
Attn: Technical Publications
900 Merrill Field Drive
Anchorage, AK 99501
Telephone: (907) 258-2372 (Mon-Fri 9AM-5PM AST)
Fax: (888) 499-2584

Your local FSDO, or certificate holder's PMI are also capable of responding to most questions regarding this ICA.

2.17 Implementation and Record Keeping

Modification of an aircraft by this AML STC 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. Backup copies are recommended.

SECTION 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

APPENDIX A AIRCRAFT CONFIGURATION RECORD

Table A-1 and Figure A-1 or Figure A-2 will be filled out by the Installing Agency and must remain a part of the aircraft's permanent records. An Interconnect Wiring Diagram (Figure A-3) is highly recommended for more complex installations.

Table A - 1: Log Sheet for Configuration and Checkout (1 of 2 Sheets)

Date: 3/11/16 By: Windstar Aviation

Installation Information

(More than one of the model features below may apply)

- ☐ Model NGT-9000 P/N 9029000-20000
- ☐ Model NGT-9000D P/N 9029000-20000
- ☒ Model NGT-9000+ P/N 9029000-20000
- ☐ Model NGT-9000R P/N 9029000-40000
- ☐ Model NGT-9000R+ P/N 9029000-40000
- ☐ Model NGT-9000RD P/N 9029000-40000

Unit S/N: LXE00684 Mod Level:

Aircraft Model: 182T Composite S/W:

Aircraft S/N: 18280925 Firmware S/W:

Unlock Code: NA TAS

Unlock Code: NA Diversity

Configuration

Aircraft Specific

Tail Number: N3524F

Mode S Identifier (Octal): 50767445

Transponder Diversity: ☒ Disabled ☐ Enabled

TAS Enable: ☒ Disabled ☐ Enabled

TAS Extended Callout Enable: ☒ Disabled ☐ Enabled

TAS Directional Antenna Type: ☒ Disabled ☐ Enabled

Antenna Installation: ☒ Bottom Omnidirectional Only

☐ Bottom Omnidirectional/ Top Omnidirectional ☐ Bottom Omnidirectional/ Bottom Directional

Broadcast Category:

Pilot Entry of Flight ID: ☒ Disabled ☐ Enabled

Aircraft Length and Width (ft): 46

Max Airspeed (knots): 140

GPS Antenna Offset Lateral (ft): 0

GPS Antenna Offset Longitudinal (ft): 0

Normal Traffic Color: ☐ Cyan ☒ White

Table A - 1: Log Sheet for Configuration and Checkout (2 of 2 Sheets)

AHRS and Altitude

AHRS Source: [X] None [ ] ARINC 429

AHRS ARINC 429 Bus Speed: [X] Low [ ] High

Altitude Source: [ ] ARINC 429 [ ] RS-232 Altitude Encoder Port
[X] Gilham Interface [ ] RS-232 Control Panel Port

Altitude Protocol: [X] None [ ] UPS AT LORAN 618
[ ] Trimble/Garmin/Icarus [ ] Magellan
[ ] Northstar [ ] Shadin
[ ] UPS AT [ ] ARNAV

Altitude RS-232 Baud Rate: [X] Defined by Protocol [ ] 1200 [ ] 2400 [ ] 4800 [ ] 9600

Altitude ARINC 429 Bus Speed: [X] Low [ ] High

Altitude Resolution (ft): [ ] > 25 [X] < = 25

Misc

ARINC 429 Input 1: [X] None (not available)

ARINC 429 Input 2: [X] None [ ] Combo Bus (not available)

ARINC 429 Output 1: [X] None [ ] CDTI

RS-422 Baud Rate: [ ] 38400 [ ] 57600 [X] 115200

RS-422 ADS-B Output: [ ] Disabled [X] Enabled

RS-422 Weather Output: [ ] Disabled [X] Enabled

CDTI Output: [ ] TIF [ ] DTIF [ ] Both

Control Panel: [X] Touch Screen Control Panel: [ ] CP-2500 (remote mount)

On Ground Discrete Installed: [X] Not Installed [ ] Open – In Air [ ] Open – On Ground

Ground Speed Threshold (knots): Max Ground Speed: 35

Discrete Override Speed: —

Altitude Threshold (feet): GPS Altitude: 25'

Pressure Altitude: —

Calibration

Audio Volume Level %: 50%

TAS Antenna Calibration

Calibration Angle (degrees): N/A

Calibration LRU Serial number: N/A

Wi-Fi Serial Adapter Configuration

Wi-Fi Module SSID: Wifly-GSX- GSX

WiFi Module (PIM-9000) SSID: Lynx- _____

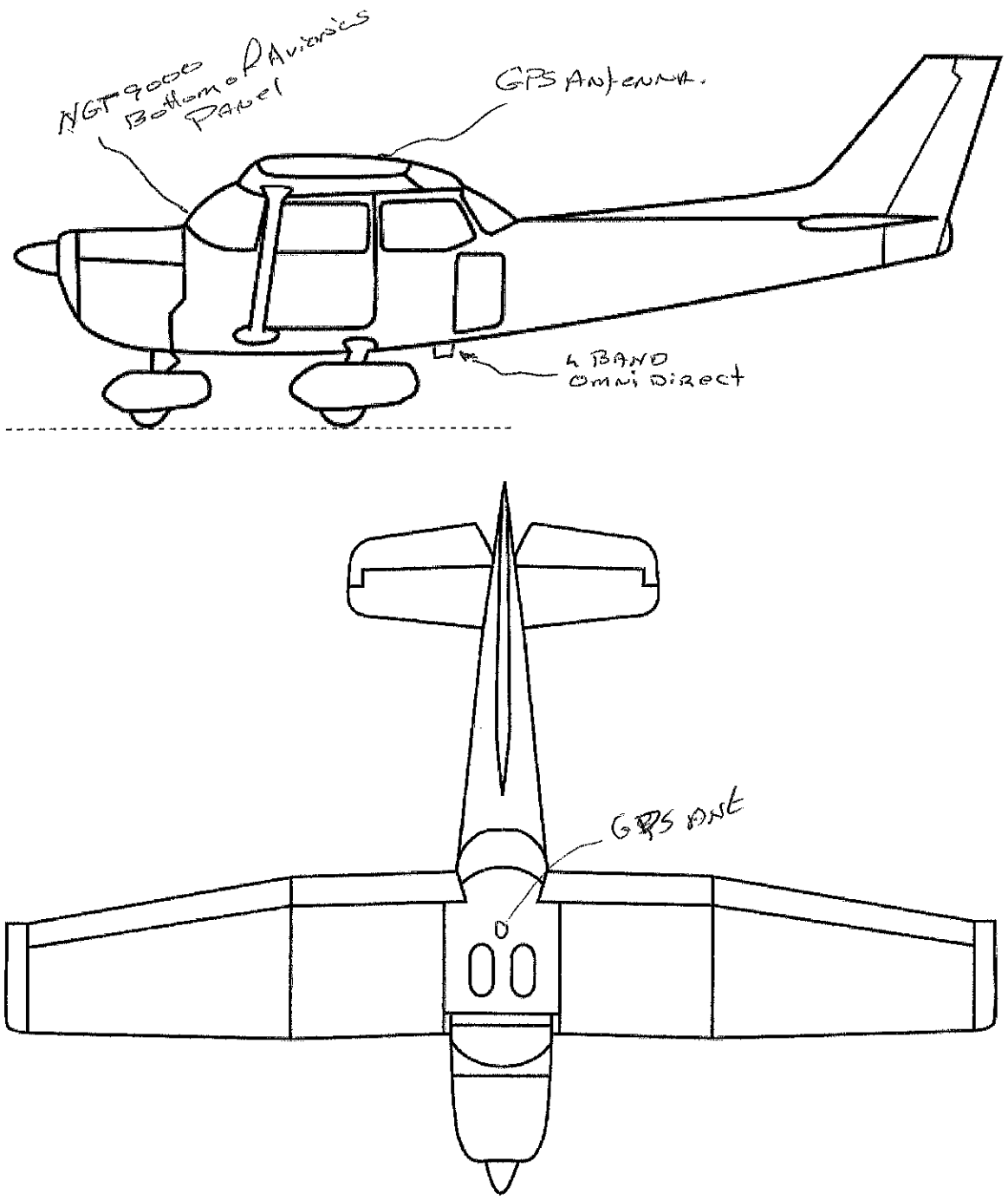

Figure A-1: Aircraft Installation Graphic (Single Engine)

(Installer should annotate locations of significant components & wiring)

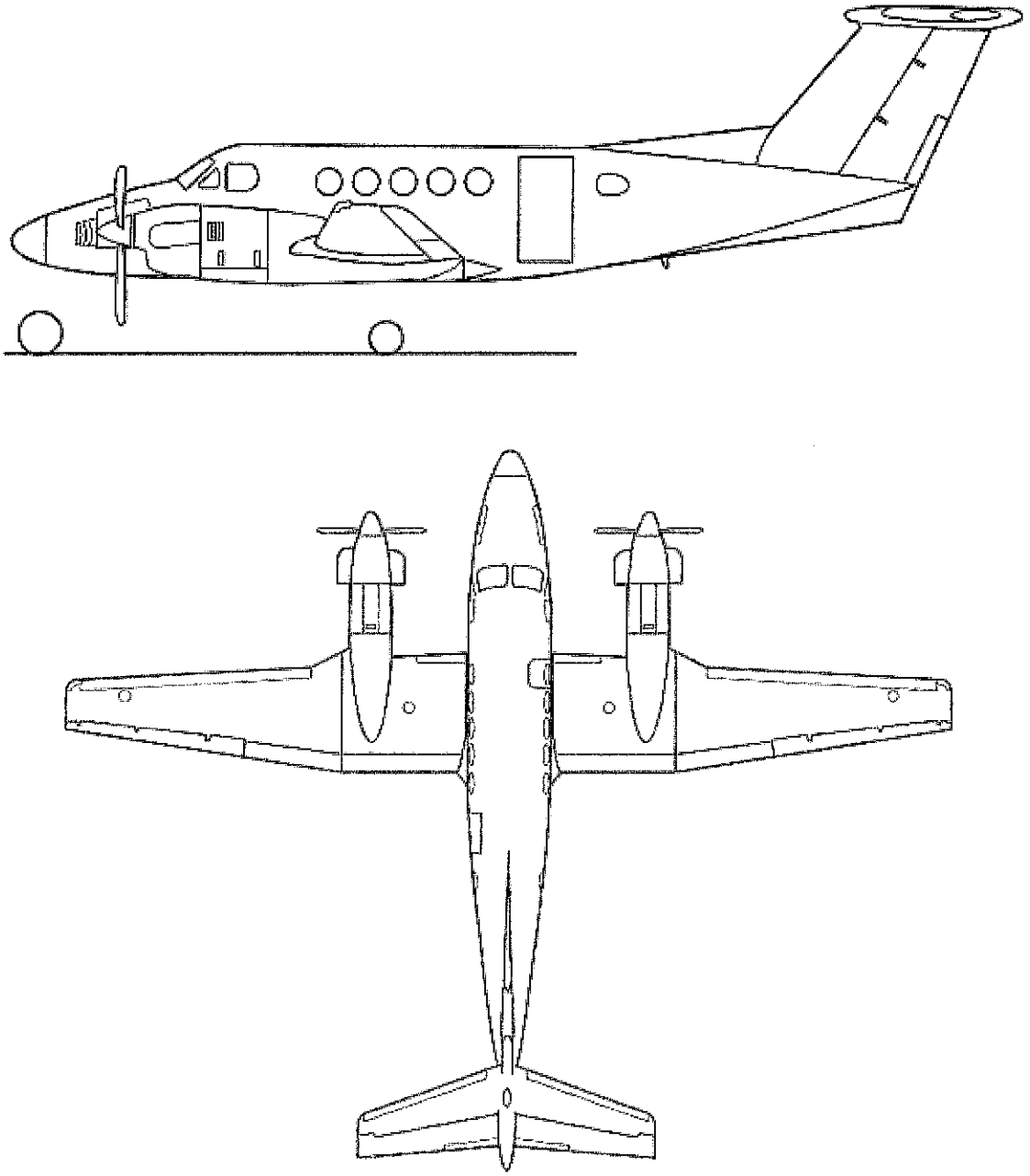

Figure A-2: Aircraft Installation Graphic (Multi Engine)

(Installer should annotate locations of significant components & wiring)

[Installer should attach a basic Interconnect Wiring Diagram of the System installation here]

Figure A-3: Aircraft Interconnect Wiring Diagram (Optional)