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FAA APPROVED

AIRPLANE FLIGHT MANUAL SUPPLEMENT

or

SUPPLEMENTAL FLIGHT MANUAL

For The

**L3 Aviation Products
Lynx Multilink Surveillance System
Model NGT-9000
L3 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: _____

Airplane Serial Number: _____

Airplane Registration Number: _____

FAA Approved:

For: 
Manager, Northwest Flight Test Section, AIR-715
Federal Aviation Administration
Seattle, WA

Date: 19 September, 2017

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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
2	3/27/2016	Incorporation of s/w Revision 2.0: ATAS and TAWS
3	2/24/2017	Updated for s/w Version 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 from other aircraft and ground stations providing immediate surveillance of air-to-air traffic.

In addition to ADS-B surveillance, the installed NGT-9000 includes an Active Traffic Awareness System (TAS/TCAS), ADS-B Traffic Advisory System (ATAS) and Terrain Awareness and Warning System (TAWS), as well as support for both top and bottom antenna diversity.

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

- 1030MHz/1090 MHz In – Receive ADS-R and TIS-B
- 1090ES OUT – Transmits 1090 MHz Extended Squitter ADS-B
- UAT IN – Receives 978 MHz ADS-B, ADS-R and TIS-B, FIS-B, NOTAMS, and TFR's



Figure 1-1: Lynx NGT-9000

1.2 NGT-9000 ADS-B Traffic Advisory System (ATAS) [Optional]

The ADS-B Traffic Advisory System (ATAS) is a passive system that monitors ADS-B, ADS-R and TIS-B ADS-B IN data and alerts the flight crew via on-screen alerts aural traffic calls and an optional Traffic Alert lamp to nearby aircraft and assists the pilot in the visual acquisition of aircraft that may represent a danger. Refer to the Pilot's Guide, L3 p/n 0040-17000-01 Revision H or later, for examples of on-screen symbology and aural alerts.

- The tracking of other aircraft is in a cylindrical volume centered on own aircraft with a maximum radius of 20 nmi and extending 10,000 ft above and 10,000 ft below ownship.
- ATAS will track up to 60 intruders simultaneously.
- A Traffic Advisory (TA) is displayed when other aircraft are a potential threat.
- When ownship is in the airport environment, a Traffic Advisory (TA) is displayed 12.5 to 35 seconds prior to the CPA with another aircraft when the CPA is within 750 ft horizontally and 300 ft vertically.
- A TA symbol remains on the screen for at least 8 seconds unless the respective track is terminated.
- When the aircraft is outside the airport environment, aircraft that are within a range of 6 nmi of ownship with a vertical distance of +/- 1200 ft (if altitude is reporting) are classified as a Proximate Advisory (PA). A PA is displayed only for aircraft that are in air.
- ATAS and TAS/TCAS may operate at the same time with traffic information being correlated by the unit

When ATAS is installed, an Audio Acknowledge button will cancel the current aural announcement.

1.3 NGT-9000 Terrain Awareness and Warning System (TAWS) [Optional]

The Terrain Awareness and Warning System (TAWS) is an optional function that is set up during installation. The TAWS function continuously monitors the aircraft's position, altitude, speed, track, and phase of flight and compares the information to the terrain database loaded during installation. Terrain and obstacle hazards are indicated by cautions and warnings using screen annunciators, aural terrain alerts, and Terrain Caution and Warning alert lamps. Refer to the Pilot's Guide, L3 p/n 0040-17000-01 Revision H, or later, for examples of on-screen symbology and aural alerts.

The TAWS function uses Forward Looking Terrain Avoidance (FLTA) and Ground Proximity Warning System (GPWS) functionality to determine when a terrain alert or altitude callout is triggered due based on the following conditions:

- Reduced required terrain or obstacle clearance (FLTA)
- Imminent terrain impact (FLTA)
- Premature descent
- Excessive descent rate (GPWS)
- Negative climb rate or altitude loss after takeoff (GPWS)
- Passing an altitude of 500 ft (GPWS)

There are four TAWS configurations available with the NGT-9000:

- Disabled
- TAWS B – Default Aural Phrases
- TAWS B – Alternate Aural Phrases
- Display Only – No Alerts

When a TAWS configuration is enabled with audio, an Audio Acknowledge button will cancel the current aural announcement.

1.4 NGT-9000+ Traffic Awareness Overview [Optional]

The NGT-9000+ (“9000 Plus”) supports optional active Traffic Awareness System (TAS) and Traffic Conflict Avoidance System (TCAS).

The TAS/TCAS options are active systems that operate as aircraft-to-aircraft interrogation devices. 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. Refer to the Pilot’s Guide, L3 p/n 0040-17000-01 Revision K or later, for examples of on-screen symbology and aural alerts for each system.

- 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 (with optional Extended Call-outs enabled).
- The TCAS option qualifies as a TCAS I system and as such, offers only Traffic Advisories (TA) (“Traffic, traffic. 12-O’clock, one mile”) but not Resolution Advisories (RA) such as “Climb, climb”.

1.5 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 or the optional Directional Antenna.

1.6 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 TAWS and peripheral ARINC-429 or RS-422 panel mounted traffic and weather displays.

1.7 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.

1.8 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

1.9 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

1.10 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 L3 approved avionics dealer or contact L3 Aviation Products for a current list of approved applications.

1.11 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.

1.12 Lightning Detection (Optional)

The WX-500 Stormscope is a Weather Mapping System that provides lightning discharge information. This information is shown on the right application screen of the NGT-9000 Panel Mount unit. This function is available beginning with Software 2.1.

1.13 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/TCAS) targets on the unit's built-in display and can repeat this traffic information on any approved ARINC-429 or RS-422 display. Figure 1-2 illustrates a typical traffic display on the NGT-9000 screen. Table 1-1 illustrates typical target symbology.

Refer to the Pilot's Guide, L3 p/n 0040-17000-01 Revision K, or later, for details on operation and a description of how the information is depicted. Check with an L3 approved avionics dealer or contact L3 Aviation Products for a current list of approved traffic displays.

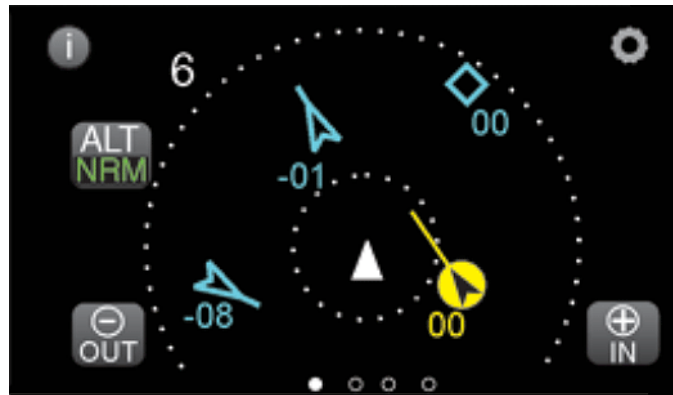


Figure 1-2: Typical NGT-9000 Traffic Screen

1.13.1 Traffic Priority













Traffic is displayed on the screen using the following priority scheme:

1. TAS/TCAS Traffic Advisories (TA's)
2. ATAS (ADS-B) Traffic Alerts
3. Selected Traffic
4. Proximate Advisories
5. Other Traffic

Traffic may also be prioritized according to phase of flight by using the ALT Mode toggle on the left of the screen with:

- Normal (NRM) displaying traffic $\pm 2,700$ ft relative to Ownship
- Above (ABV), or Takeoff Mode, displaying traffic +9,000 and -2,700 ft relative to Ownship
- Below (BLW), or Landing Mode, displaying traffic +2,700 and -9,000 ft relative to Ownship
- Unrestricted (UNR) or Enroute Mode, displaying traffic +9,900 and -9,900 ft relative to Ownship

Table 1-1: Typical Target Symbology

SYMBOL	DESCRIPTION - EXAMPLE
	Airborne Directional Traffic Advisory (TA) (TAS or ATAS option only)
	Airborne Directional Proximity Advisory (PA) *
	Airborne Directional Other Traffic (OT) * (Panel mount only)
	Airborne Non-directional (TA) (TAS or ATAS option only)
	Airborne Non-directional (PA) *
	Airborne Non-directional (OT) *
	On Ground Directional (OT)
	Ground Vehicle Directional
	On Ground Non-directional (OT)
	Ground Vehicle Non-directional
	Airborne Directional TA Traffic symbol with a data tag indicating a relative altitude of 100ft below with a horizontal velocity vector. (Panel mount only)
	Airborne Directional Other Traffic symbol with a data tag indicating a relative altitude of 800ft below own aircraft descending with a horizontal velocity vector. (Panel mount only)

* To promote cockpit commonality, installation configuration options are available to set the airborne PA & OT traffic color to either cyan or white.

1.14 Interaction of Major Components

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

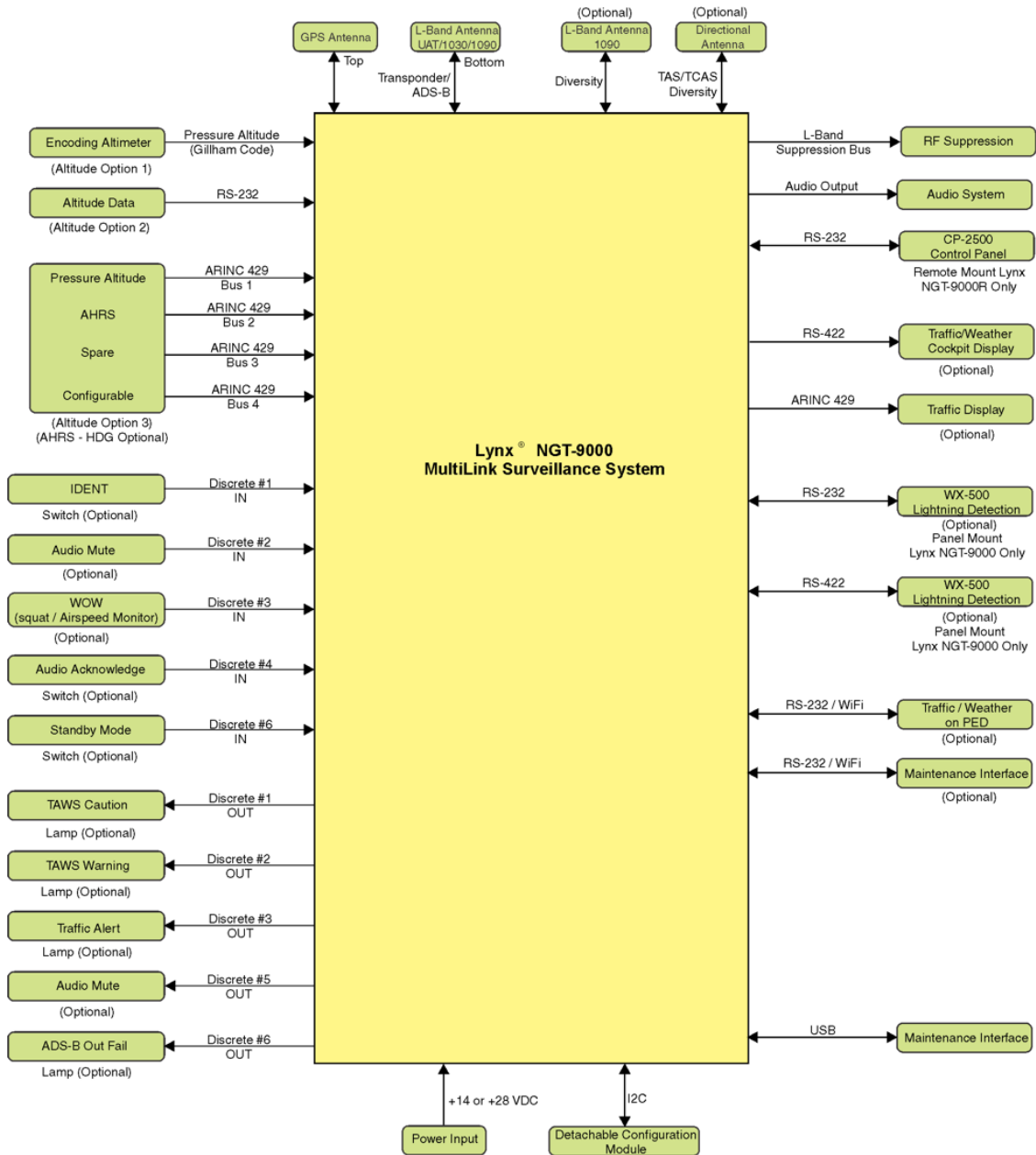


Figure 1-3: NGT-9000 Connections and Functions

1.15 Installation Configuration for This Aircraft

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

- Model NGT-9000: P/N 9029000-20000
- Model NGT-9000+: P/N 9029000-20000
- Model NGT-9000D: P/N 9029000-20000
- Model NGT-9000D+: P/N 9029000-20000

Aircraft Specific

Tail Number: N3114G

Mode S Identifier (Octal): 50646563

Transponder Diversity: Disabled Enabled

TAS Enable: Disabled Enabled TCAS Enable: Disabled Enabled

TAS/TCAS Ground Filtering Altitude: Disabled Enabled

TAS/TCAS or ATAS Extended Callout Enable: Disabled Enabled

FIS-B Enable: Disabled Enabled Auto

TIS-B/ADS-R Service Status Indication Enable: Disabled Enabled

Normal (Prox/Other) Traffic Color: Cyan White

ATAS: Disabled Enabled

Terrain Display Enable:

- Disabled
- TAWS B – Default Aural Phrases
- TAWS B – Alternate Aural Phrases
- Display Only – No Alerts

WX-500 Enabled (Stormscope)

- Disabled
- Enabled – Bottom Antenna
- Enabled – Top Antenna

Heading Source: Disabled Enabled

On Ground Discrete Installed: Not Installed Open – In Air Open – On Ground

In Air/On Ground

On Ground Discrete Installed: Not Installed Open – In Air Open – On Ground

Standby Input

Standby Discrete Installed: Not Installed Ground-Standby

Input/Output Configuration

RS-422 #1: External Display WX-500 L3 Protocol 1

RS-232 #1: WX-500 L3 Protocol 1 N/a

Wi-Fi: Disabled Enabled

Figure 1-4: Installation Configuration Data

SECTION 2. LIMITATIONS

2.1 Minimum Documentation

The L3 Pilot's Guide for the NGT-9000 Part Number 0040-17000-01 (Rev K, 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-9000+, NGT-9000D, or NGT-9000D+ With operable SBAS position source	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 IDENT Function

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

2.5 ALT Function

While operating within airspace requiring an ADS-B OUT compliant transmitter, Pressure Altitude Broadcast Inhibit (PABI), shall only be enabled when requested by Air Traffic Control.

2.6 Standby Function

The Standby Mode input is used to place the unit's transponder into Standby. It is intended for use when dual transponders are installed on the aircraft.

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 Terrain Awareness

- a. Navigation must not be predicated on the use of TAWS;
- b. To avoid giving unwanted alerts, the TAWS must be inhibited when landing at an airport that is not included in the airport database;
- c. The use of the TAWS terrain warning and Terrain Display functions is prohibited during QFE operations.
- d. TAWS must meet the requirements of TSO-151c for Class B.
- e. If unit is configured for *Terrain Display Only (no aural alerts)*, then unit is not considered a Class B TAWS.

2.9 Applicable System Software

This AFMS/SFM is applicable to the software versions shown in Table 2-2 or later FAA approved version.

Table 2-2: Software Version

Software	Part No.	Version
NGT-9000 Ops s/w	9020010-() where 9020010-004 is the first in the series	Rev 3.x where Rev 3.0 is the first in the series
68DC Navigational Database North America (68.bin)	8010-22310-0001	Most current cycle ^{1, 2}
72DC Cultural Features Database North American Extended (72.bin)	8010-12004-0001	Most current cycle ²
71DC World Terrain Database	8010-23010-0001	Most current cycle ²

¹ Available from Jeppesen on 28-day cycles

² There is no requirement to update this database because it is used only for informational purposes.

SECTION 3. EMERGENCY PROCEDURES

3.1 Emergency Procedures

3.1.1 Terrain Warning Alert (Display Alert, Audio Alert, or Terrain Warning (Red) Lamp)

TAWS Display **PULL UP**, Audio Alert of “**Terrain, Terrain; Pull Up, Pull UP**” or “**Obstacle, Obstacle; Pull Up, Pull Up**” and/or Red Terrain Warning Lamp.....

IMMEDIATELY STOP DESCENT AND BEGIN MAXIMUM PERFORMANCE RATE OF CLIMB CONSISTENT WITH PHASE OF FLIGHT.

CHECK TERRAIN CLEARANCE, OR ATTEMPT TO VISUALLY ACQUIRE OBSTACLE.

CONTINUE CLIMB UNTIL CLEAR OF TERRAIN OR OBSTACLE

3.1.2 Terrain Caution Alert (Display Alert, Audio Alert, and/or Terrain Caution (Amber) Lamp)

TAWS Display **TERRAIN**, Audio Alert of “**Caution Terrain, Caution Terrain**” or “**Caution Obstacle, Caution Obstacle**” and/or Amber Terrain Warning Lamp.....

IMMEDIATELY STOP DESCENT AND BEGIN A SAFE RATE OF CLIMB CONSISTENT WITH PHASE OF FLIGHT.

CHECK TERRAIN CLEARANCE, OR ATTEMPT TO VISUALLY ACQUIRE OBSTACLE.

CONTINUE CLIMB UNTIL CLEAR OF TERRAIN OR OBSTACLE

3.1.3 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

3.1.4 Loss of GPS/SBAS Position Data

Loss of GPS/SBAS indicated by a GPS failure message on the NGT-9000/CP-2500 and a SLOW blinking ADS-B FAIL light (if installed) PULL NGT CIRCUIT BREAKER. WAIT 5 SECONDS AND RESET. IF SLOW 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.

3.1.5 Visual/Aural Traffic Alert From ATAS, TAS or TCAS

Traffic Alert VISUALLY ACQUIRE TRAFFIC

3.2 Abnormal Procedures

3.2.1 Abnormal Indications

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

Symptom	Screen	Cause/Corrective Actions
<ul style="list-style-type: none"> Blank display. ADS-B Fail lamp is OFF 	All	Loss of power or damaged unit. <ol style="list-style-type: none"> 1. Check power connections, breakers, and main avionics switch. 2. Verify Battery (BAT) Master switch is on. 3. Check the Lynx MAT fault log. Contact L3 Field Service before removal of unit.
The unit has manual brightness adjustment only.	All	Loss of light sensor data. <ol style="list-style-type: none"> 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. Contact L3 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. <ol style="list-style-type: none"> 1. Perform the Screen Calibration has described in the Installation Manual (L3-76AK-IM1). Contact L3 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". <ol style="list-style-type: none"> 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. Contact L3 Field Service before removal of unit.

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

Symptom	Screen	Cause/Corrective Actions
<p>Message page contains messages that do not indicate a functional failure on the system status page.</p>	<p>N/A</p>	<p>The following internal tests do not create a fail message in the system status page.</p> <ul style="list-style-type: none"> • Configuration Module Test • Configuration Module Configuration Validity • Mutual Suppression Bus Self-Test • Over-Temperature Monitor (in air) • Power Fail Monitor <p>Although no immediate loss of function is occurring, an undesired condition is taking place. At the earliest convenience, perform the following action:</p> <ol style="list-style-type: none"> 1. Try clearing the failure by restarting the unit by tapping the Restart button (or cycling power). <p>Contact L3 Field Service before removal of unit.</p>
<p>Unit does not operate in normal mode and starts in Bootloader or maintenance mode. MSG button on screen.</p>	<p>N/A</p>	<p>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.</p> <ul style="list-style-type: none"> • 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 <ol style="list-style-type: none"> 1. Cycle power to the unit. <p>Contact L3 Field Service before removal of unit.</p>
<p>Display indicator GROUND TEST</p>	<p>Traffic</p>	<p>This indication is shown in the upper right hand corner of 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.</p>
<p>Display indicator TRK (Track)</p>	<p>Traffic</p>	<p>Indicates that the traffic display orientation is true track.</p> <ol style="list-style-type: none"> 1. This is a normal condition used for pilot information.

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

Symptom	Screen	Cause/Corrective Actions
<ul style="list-style-type: none"> • Display indicator ADS ONLY (Models with TAS/TCAS only) showing on traffic screen. • MSG button on screen. 	Traffic	<p>A traffic mode indicator that is shown when TAS/TCAS is failed (or not available) and ADS-B is operating.</p> <ol style="list-style-type: none"> 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. <p>Contact L3 Field Service before removal of unit.</p>
<ul style="list-style-type: none"> • Display indicator TAS/TCAS ONLY (Models with TAS/TCAS) showing on traffic screen. • MSG button on screen. 	Traffic	<p>A traffic mode indicator that is shown when TAS/TCAS is in operation but ADS-B traffic information is not available</p> <ol style="list-style-type: none"> 1. The TAS/TCAS 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. <p>Contact L3 Field Service before removal of unit.</p>
<p>Display indicator TAS/TCAS STBY (Models with TAS/TCAS) showing on traffic screen.</p>	Traffic	<p>A traffic mode indicator that is shown when the Traffic Awareness (TAS/TCAS) system is in standby.</p> <ol style="list-style-type: none"> 1. This is a normal condition when the aircraft is on ground. 2. If the indication is seen during flight. Contact L3 Field Service before removal of unit.
<ul style="list-style-type: none"> • Display indicator TRAFFIC FAILED (Amber text) showing on traffic screen. • MSG button on screen. 	Traffic	<p>Displayed if both ADS-B and TAS/TCAS (optional) have failed.</p> <ol style="list-style-type: none"> 1. Cycle power to the unit. 2. Check the secondary equipment (antenna) for problems. 3. Check System Status Messages. 4. Check the Lynx MAT fault log. <p>Contact L3 Field Service before removal of unit.</p>

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

Symptom	Screen	Cause/Corrective Actions
<p>Display indicator TRAFFIC UNAVAILABLE (Amber text) showing on traffic screen.</p> <ul style="list-style-type: none"> Indicates both TAS/TCAS 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/TCAS in standby). 	<p>Traffic</p>	<p>ADS-B is operational but heading and track are invalid or GPS is failed. TAS/TCAS is in Standby. Transponder Mode Control is "ON" which inhibits the display of relative altitude so traffic is unavailable.</p> <ol style="list-style-type: none"> 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. Cycle power to the unit. Check the GPS antenna for problems. Check System Status Messages. Check the Lynx MAT fault log. <p>Contact L3 Field Service before removal of unit.</p>
<ul style="list-style-type: none"> 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. 	<p>Traffic</p>	<p>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.</p> <ol style="list-style-type: none"> The symptoms are normal if the target or ground station is not transmitting TIS-B data. The target or ground station needs to be within line-of-site range. <p>Contact L3 Field Service before removal of unit.</p>
<ul style="list-style-type: none"> 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. 	<p>Traffic</p>	<p>Possible hardware problem with the unit.</p> <ol style="list-style-type: none"> Cycle power to the unit. Check System Status Messages. Check the Lynx MAT fault log. <p>Contact L3 Field Service before removal of unit.</p>
<ul style="list-style-type: none"> Ownship is shown, but no traffic is being displayed. ADS-B Out Fail lamp (if installed) is OFF. 	<p>Traffic</p>	<p>Possible problem with the UAT/1090 antenna or RF cables.</p> <ol style="list-style-type: none"> Cycle power to the unit. Check cable connections. Check System Status Messages. Check the Lynx MAT fault log. <p>Contact L3 Field Service before removal of unit.</p>

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

Symptom	Screen	Cause/Corrective Actions
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: <ol style="list-style-type: none"> 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/TCAS traffic is not displayed as directional. A TAS/TCAS or 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.
Traffic display is working correctly, but some aircraft are not showing up on the display.	Traffic	Lack of data as described below: <ol style="list-style-type: none"> 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's guide for more information regarding what traffic can be displayed.
Traffic display is working correctly, but TAS/TCAS targets are not showing up on the display.	Traffic	Lack of data as described below: <ol style="list-style-type: none"> 1. Aircraft is out of the selected TAS/TCAS altitude range (Above/Below/Unrestricted) 2. The installed Lynx NGT-9000 does not have TAS/TCAS functionality. 3. The TAS/TCAS Configuration option was not enabled during installation. 4. The TAS/TCAS requires other aircraft to be equipped with equipped with an active ATCRABS transponder.

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


Symptom	Screen	Cause/Corrective Actions
<p>No TIS-B Coverage Indicator</p>  <p>It is located on the traffic screen next to the Zoom Out button.</p> <p>NOTE: The indicator is suppressed when TAS/TCAS is operational (i.e. installed, not failed, not in standby).</p>	<p>Traffic</p>	<p>The No Coverage Indicator is shown on the traffic display for the following reasons:</p> <ol style="list-style-type: none"> 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 failed (indicator seen after 60 seconds of test failure) 4. 1090 Receiver failed <ul style="list-style-type: none"> • 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. <p>Contact L3 Field Service before removal.</p>
<p>Display indicator ON-GND showing on transponder screen.</p>	<p>Transponder</p>	<p>Transponder is operating in the on-ground mode.</p> <ol style="list-style-type: none"> 1. This is a normal condition when the aircraft is on ground. 2. If the indication is seen during flight. Contact L3 Field Service.
<ul style="list-style-type: none"> • Display indicator XPDR FAIL (Amber text) showing on transponder screen. • MSG button on screen. 	<p>Transponder</p>	<p>Transponder data is invalid. This indication is shown on the transponder screen and alternate traffic screen.</p> <ol style="list-style-type: none"> 1. Possible problem with internal hardware. 2. Cycle power to the unit. 3. Check System Status Messages. 4. Check the Lynx MAT fault log. <p>Contact L3 Field Service before removal of unit.</p>
<p>Pressure Altitude digits replaced with amber dashes.</p>	<p>Transponder</p>	<p>Invalid Pressure Altitude.</p> <p>Note: Some altitude encoders may not provide pressure altitude until after 1-3 minutes of operation.</p> <ol style="list-style-type: none"> 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. <p>Contact L3 Field Service before removal of unit.</p>
<ul style="list-style-type: none"> • No data on the weather display. • ADS-B Out Fail lamp is OFF. 	<p>Weather</p>	<p>The FIS-B data is not being transmitted to the weather display.</p> <p>Note: NEXRAD data is only transmitted every 5 minutes. CONUS data is only transmitted every 15 minutes.</p> <ol style="list-style-type: none"> 1. No ground station is in range. 2. The ground station may not provide FIS-B service.

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


Symptom	Screen	Cause/Corrective Actions
<p>No FIS-B Coverage Indicator</p>  <p>It is located on the Weather screens at the bottom center.</p>	<p>Weather</p>	<p>The No Coverage Indicator is shown on the weather display for the following reasons:</p> <ol style="list-style-type: none"> 1. No FIS-B data available in the area <ul style="list-style-type: none"> • 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) <ul style="list-style-type: none"> • 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. <p>Contact L3 Field Service before removal.</p>
<ul style="list-style-type: none"> • 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 	<p>Weather</p>	<p>The indication is shown on the weather map indicating that GPS is Acquiring (On Ground – no previous position fix).</p> <ol style="list-style-type: none"> 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. <p>Contact L3 Field Service before removal of unit.</p>

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

Symptom	Screen	Cause/Corrective Actions
<ul style="list-style-type: none"> • 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). <ol style="list-style-type: none"> 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. Contact L3 Field Service before removal of unit.
<ul style="list-style-type: none"> • 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. <ol style="list-style-type: none"> 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. Contact L3 Field Service before removal of unit.
<ul style="list-style-type: none"> • Display indicator TAWS UNAVAILABLE (White text) showing on TAWS screen. • MSG button on screen. 	TAWS	Displayed when TAWS is not available. <ol style="list-style-type: none"> 1. Cycle power to the unit. 2. Check System Status Messages. 3. Check the Lynx MAT fault log. Contact L3 Field Service before removal of unit.
<ul style="list-style-type: none"> • Display indicator TAWS FAILED (Amber text) showing on TAWS screen. • MSG button on screen. 	TAWS	Displayed when TAWS is Failed. <ol style="list-style-type: none"> 1. Cycle power to the unit. 2. Check System Status Messages. 3. Check the Lynx MAT fault log. Contact L3 Field Service before removal of unit.

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

Symptom	Screen	Cause/Corrective Actions
<ul style="list-style-type: none"> • Display indicator TERRAIN DISPLAY FAILED (Amber text) showing on TAWS screen. • MSG button on screen. 	TAWS	Displayed when an alert fault causing loss of terrain display. Alerting is still operational. <ol style="list-style-type: none"> 1. Cycle power to the unit. 2. Check System Status Messages. 3. Check the Lynx MAT fault log. Contact L3 Field Service before removal of unit.
<ul style="list-style-type: none"> • Display indicator Lightning Failed (amber text) showing on Lightning screen. 	Lightning	Displayed when Lightning detection is not available. <ol style="list-style-type: none"> 1. Cycle power to the unit. 2. Cycle power to the WX-500. 3. Check System Status Messages. 4. Check the MPC (MAT) fault log. Contact L3 Field Service before removal of unit.
<ul style="list-style-type: none"> • Heading shows “- - -” on Lightning screen. 	Lightning	Heading input is missing. <p>Cycle power to the unit.</p> <ol style="list-style-type: none"> 1. Verify “STAB” is set to “ON” (See lightning setting page) 2. Cycle power to the WX-500. 3. Check System Status Messages. 4. Check heading source for failure. Contact L3 Field Service before removal of unit.

SECTION 4. NORMAL PROCEDURES

The procedures described below are specific only to the NGT-9000. Reference the Pilot's 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. An ADS-B OUT OF RANGE icon 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 L3 LYNX, Models NGT-9000, NGT-9000D and NGT-9000+ Pilot's Guide, Document Part Number 0040-17000-01, Revision K and later, 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 Lightning Detection Sources [Optional]

The WX-500 Stormscope is required for installation configured for lightning detection. The WX-500 detects electrical discharges from thunderstorms within a 200 nmi radius of the aircraft. This information plots the location of the thunderstorms and is shown on the right application screen of the NGT-9000.

7.5 Power

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

7.6 External Switches, Lights and Controls [Optional]

The following external lights listed in Table 7-1 are supported by the NGT-9000.

Table 7-1: Light and Switch Functions

Switch or Light	Function
ADS-B FAIL lamp [optional] (amber)	Out – Normal operation
	Steady – ADS-B Failure
	Slow Flashing – GPS aligning
TRAFFIC Caution lamp (amber) [optional]	Out – No traffic of concern detected
	Steady – Traffic detected
TERRAIN Caution lamp (amber) [TAWS installed] [optional]	Out – No terrain of concern
	Steady – Terrain hazard detected
TERRAIN Warning lamp (red) [TAWS installed] [optional]	Out – No immediate terrain avoidance required
	Steady – Immediate terrain avoidance required